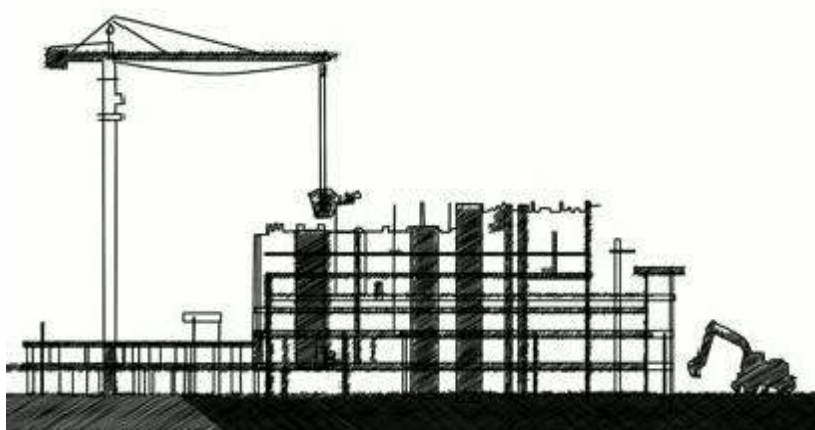




HEALTH, SAFETY and ENVIRONMENT PLAN

for

**SITE
OPERATIONS**

by

**SUB-
CONTRACTORS**

POWER SECTOR

HSE PLAN FOR SITE OPERATIONS BY BHEL'S SUBCONTRACTORS

AT A GLANCE

BEFORE START	SIGNING OF MOU	
	Agree to comply to HSE requirement- Statutory and BHEL’s	
PLAN	HSE ORGANISATION	
	Manpower 1 (one) safety officer for every 500 workers or part thereof 1(one) safety-steward/ supervisor for every 100 workers Qualification As per Cl. 7.1	HSE Roles and responsibilities - Site In-charge- As per clause 7.2.1 - Safety officer- As per clause 7.2.2
	HSE Planning for Man, Machinery/Equipment/Tools & Tackles	
PROVIDE	HSE INFRASTRUCTURE	
	- PPEs - Drinking Water - Washing Facilities - Latrines and Urinals - Provision of shelter for rest - Medical facilities	- Canteen facilities - Labour Colony - Emergency Vehicle - Pest Control - Scrapyard - Illumination
TRAIN	HSE TRAINING , AWARENESS & PROMOTION	
	Training - Induction training - Height work and other critical areas - Tool Box talk & Pep Talk	Awareness & Promotion - Signage - Poster - Banner - Competition - Awards
COMMUNICATE	HSE COMMUNICATION	
	Incident Reporting - Accident- Fatal & Major - Property damage - Near Miss	Event Reporting - Celebrations - Training - Medical camp

EXECUTE SAFELY

OPERATIONAL CONTROL PROCEDURES

PERMIT TO WORK

Height work (above 2 metres), Hot Work, Heavy Lifting, Confined Space, Radiography, excavation (More than 4 metres)

SAFETY DURING WORK EXECUTION

- | | |
|--|---|
| <ul style="list-style-type: none"> • Welding • Rigging • Cylinder- storage & Movement • Demolition work • T&Ps • Chemical Handling • Electrical works | <ul style="list-style-type: none"> • Fire • Scaffolding • Height work • Working Platform • Excavation • Ladder • Lifting • Hoisting appliance |
|--|---|

HOUSE KEEPING

WASTE MANGEMENT

TRAFFIC MANAGEMENT

ENVIRONMENTAL CONTROL

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

CHECKS

HSE AUDITS & INSPECTION

- | | |
|---|--|
| <ul style="list-style-type: none"> • Daily Checks • Inspection of PPEs • Inspection of T& Ps • Inspection of Cranes & Winches | <ul style="list-style-type: none"> • Inspection of Height work • Inspection of Welding and Gas cutting • Inspection of elevators etc. |
|---|--|

HSE PERFORMANCE EVALUATION PARAMETERS

NON CONFORMANCE

PENALTY for NON CONFORMANCE

Refer Clause 16

Incremental penalty

For repeated violation by the same person, the penalty would be double of the previous penalty

For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS		Doc no.: HSEP: 14
	POWER SECTOR		REV: 01
			Date: 20.01.2020

REVISION HISTORY SHEET

Date	Revision No.	Details of Changes	Reason	Prepared	Reviewed	Approved
12.08.2014	00	First Issue	First Issue	S. B. Jayant, Dy Manager- FQA & Safety	A. K. Sinha, GM-FQA & Safety	Anuj Bhatnagar, ED-FQA & Safety
20.01.2020	01	Formats added: HSEP:14-F30 – Monthly HSE Planning & Review (Page 11, Clause 8.0 - updated) HSEP:14-F13E-Excavation Inspection Format (part of F30)) HSEP:14-F32B – Job Safety Analysis Format (part of F30) HSEP:14-F31A – Daily HSE Reporting (Page 18, Clause 10.3 – added) HSEP:14-F33 – HSE Performance Evaluation (Page 31, Clause 13 – revised)	IOM No. PSHQHSE/M ONREP/02 Dated 08-Jan-2020	Rohit Kumar	Santosh Nair, GM (MSX & HSE)	



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 1 of 43

Sr. No.	Description	Page No.
1.0	PURPOSE	4
2.0	SCOPE	4
3.0	OBJECTIVES AND TARGETS	4
4.0	HEALTH, SAFETY & ENVIRONMENT POLICY	5
5.0	MEMORANDUM OF UNDERSTANDING	6
6.0	TERMS & DEFINITIONS	7
7.0	HSE ORGANIZATION	8
7.1	QUALIFICATION FOR HSE PERSONNEL	8
7.2	RESPONSIBILITIES	9
8.0	PLANNING BY SUBCONTRACTOR	11
8.1	MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS	11
8.2	MOBILISATION OF MANPOWER BY SUBCONTRACTOR	11
8.3	PROVISION OF PPEs	12
8.4	ARRANGEMENT OF INFRASTRUCTURE	13
9.0	HSE TRAINING & AWARENESS	16
9.1	HSE INDUCTION TRAINING	16
9.2	HSE TOOLBOX TALK	17
9.3	TRAINING ON HEIGHT WORK	17
9.4	HSE TRAINING DURING PROJECT EXECUTION	17



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 2 of 43

9.5	HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC	18
10.0	HSE COMMUNICATION	18
10.1	INCIDENT REPORTING	18
10.2	HSE EVENT REPORTING	18
11.0	OPERATIONAL CONTROL	19
11.1	HSE ACTIVITIES	19
11.2	WORK PERMIT SYSTEM	20
11.3	SAFETY DURING WORK EXECUTION	20
11.4	ENVIRONMENTAL CONTROL	24
11.5	HOUSEKEEPING	24
11.6	WASTE MANAGEMENT	25
11.7	TRAFFIC MANAGEMENT SYSTEM	26
11.8	EMERGENCY PREPAREDNESS AND RESPONSE	28
12.0	HSE INSPECTION	29
12.1	DAILY HSE CHECKS	29
12.2	INSPECTION OF PPE	29
12.3	INSPECTION OF T&Ps	30
12.4	INSPECTION OF CRANES AND WINCHES	30
12.5	INSPECTION ON HEIGHT WORKING	30
12.6	INSPECTION ON WELDING AND GAS CUTTING OPERATION	30



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: **3 of 43**

12.7	INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES	31
12.8	INSPECTION OF ELEVATOR	31
12.9	INSPECTION OF EXCAVATION ACTIVITIES	31
13.0	HSE PERFORMANCE	31
14.0	HSE PENALTIES	32
15.0	OTHER REQUIREMENTS	32
16.0	NON COMPLIANCE	33
17.0	HSE AUDIT/INSPECTION	34
18.0	MONTHLY HSE REVIEW MEETING	34
19.0	FORMATS USED	34
20.0	Annexures	36

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 4 of 43

1.0 PURPOSE

- 1.1 The purpose of this HSE Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during installation and servicing of industrial projects and power plants.
- 1.2 This document shall be followed by BHEL's subcontractors at all installation and servicing sites. In case customer specific documents are to be implemented, this document will be followed in conjunction with customer specific documents.
- 1.3 Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.
- 1.4 In case the customer has any specific requirement, the same is to be fulfilled.

2.0 SCOPE

The document is applicable for BHEL's Subcontractors at all installation / servicing activities of BHEL Power Sector as per the relevant contractual obligations.

3.0 OBJECTIVES AND TARGETS

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces.

- Ensure the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment of the work site.
- Comply at all times with the relevant statutory and contractual HSE requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their work.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including subcontractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps/Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent person.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.
- Ensure continual improvements in HSE performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 5 of 43

HSE TARGETS

EXPLOSION	ZERO
FATALITY	ZERO
LOST TIME INJURY	ZERO
FIRE	ZERO
VEHICLE INCIDENTS	ZERO
ENVIRONMENTAL INCIDENTS	ZERO

4.0 BHEL POWER SECTOR HEALTH, SAFETY & ENVIRONMENT POLICY

Health, Safety & Environment Policy of BHEL

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

sd/-

CMD, BHEL

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 6 of 43

5.0 MEMORANDUM OF UNDERSTANDING:

After award of work, subcontractors are required to enter into a memorandum of understanding as given below:

Memorandum of Understanding

BHEL, Power Sector _____ Region is committed to Health, Safety and Environment Policy (HSE Policy).

M/s _____ do hereby also commit to comply with the same HSE Policy while executing the Contract Number _____

M/s _____ shall ensure that safe work practices as per the HSE plan. Spirit and content therein shall be reached to all workers and supervisors for compliance.

In addition to this, M/S _____ shall comply to all applicable statutory and regulatory requirements which are in force in the place of project and any special requirement specified in the contract document of the principal customer.

M/s _____ shall co-operate in HSE audits/inspections conducted by BHEL /customer/ third party and ensure to close any non-conformity observed/reported within prescribed time limit.

Signed by authorized representative of M/s -----

Name :

Place & Date:



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 7 of 43

6.0 TERMS AND DEFINITIONS

6.1 DEFINITIONS

6.1.1 INCIDENT

Work- related or natural event(s) in which an injury, or ill health (regardless of severity), damage to property or fatality occurred, or could have occurred.

6.1.2 NEAR MISS

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as "Near-Miss".

6.1.3 MAN-HOURS WORKED

The total number of man hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labours. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workdays for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

6.1.4 FIRST AID CASES

First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time.

6.1.5 LOST TIME INJURY

Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred.

6.1.6 MEDICAL CASES

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.

6.1.7 TYPE OF INCIDENTS & THEIR REPORTING:

The three categories of Incident are as follows:

Non-Reportable Cases:

An incident, where the injured person is given medical help and discharged for work without counting any lost time.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 8 of 43

Reportable Cases:

In this case the injured person is disable for 48 hours or more and is not able to perform his duty.

Injury Cases:

These are covered under the heading of non-reportable cases. In these cases the incident caused injury to the person, but he still continues his duty.

6.1.8 TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI} \times 1,000,000}{\text{Total Man Hours Worked}}$$

6.1.9 SEVERITY RATE

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

$$\frac{\text{Days lost due to LTI} \times 1,000,000}{\text{Total Man Hours Worked}}$$

6.1.10 INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:

$$\frac{\text{Number of LTI} \times 1000}{\text{Average number of manpower deployed}}$$

7.0 HSE ORGANISATION

Number of safety officers:

The subcontractor must deploy one safety officer for every 500 workers or part thereof in each package. In addition, there must be one safety-steward/safety-supervisor for every 100 workers.

Deployment: The subcontractor should deploy sufficient safety officers and safety-steward/Safety-supervisor, as per requirement given above, since initial stage and add more in proportion to the added strength in work force. Any delay in deployment will attract a penalty of Rs.30,000/- per man month for the delayed period.

7.1 QUALIFICATION FOR HSE PERSONNEL

Sl.no	Designation	Qualification	Experience
1	Safety officer (Construction Agency)	Degree or Diploma in Engineering with full time diploma in Industrial Safety with construction safety as one of the subjects	Minimum two years for degree holder and five years for diploma holder in the field of Construction of power plant/ major industries



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 9 of 43

POWER SECTOR

2	Safety-Steward/ Supervisor	Safety- Supervisor	Degree or diploma in any discipline with full time diploma in Industrial Safety with construction safety as one of the subjects	Minimum two years
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7.2 RESPONSIBILITIES

7.2.1 SITE IN -CHARGE OF SUBCONTRACTOR

- ☐ Shall sign Memorandum of Understanding (MoU) for compliance to BHEL's HSE Plan for Site Operations as per clause 5.0
- Shall engage qualified safety officer(s) and steward (s) as per clause 7.0
- Shall adhere to the rules and regulations mentioned in this code, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like safety helmets, belts, full body harness, shoes, face shield, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in Factory Rule Regulation R57.
- Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent person.
- Shall ensure that provisions stipulated in contract Labour Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs) available with the site management.
- Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
- Shall ensure that Horseplay is strictly forbidden.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of HSE audit, mockdrill, medical camps, induction training and training on HSE at site.
- Shall ensure full co-operation during HQ/External /Customer HSE audits.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 10 of 43

- ☐ Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the worksite.
- Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labour colony.
- Shall ensure adequate emergency preparedness.
- Shall be member of site HSE committee and attend all meetings of the committee
- Power source for hand lamps shall be maximum of 24 v.
- ☐ Temporary fencing should be done for open edges if Hand – railings and Toe-guards are not available.

7.2.2 HEALTH, SAFETY AND ENVIRONMENT OFFICER OF SUBCONTRACTOR

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Help concerned HOS to prepare Job Specific instructions for critical jobs.
- Conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
- Convene HSE meeting & minute the proceeding for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Report to PS Region/HQ on all matters pertaining to status of safety and promotional program at site level.
- Facilitate administration of First Aid
- Facilitate screening of workmen and safety induction.
- Conduct fire Drill and facilitate emergency preparedness
- Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- ☐ Apprise PS– Region on safety related problems.
- Notify site personnel non-conformance to safety norms observed during site visits / site inspections.
- Recommend to Site In charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
- Shall work as interface between various agencies such customer, package-in-charges, subcontractors on HSE matters

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 11 of 43

8.0 PLANNING BY SUBCONTRACTOR

Monthly planning and review of HSE activities shall be carried out by subcontractor as per format No. HSEP:14-F30 jointly along with BHEL.

8.1 MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS BY SUBCONTRACTOR

- As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and complies with legislative and owner requirement, inspection shall be arranged by in-house competent authority for acceptance as applicable.
- The machinery and equipment to be embraced for this purpose shall include but not limited to the following:
 - o Mobile cranes.
 - o Side Booms.
 - o Forklifts.
 - o Grinding machine.
 - o Drilling machine.
 - o Air compressors.
 - o Welding machine.
 - o Generator sets.
 - o Dump Trucks.
 - o Excavators.
 - o Dozers
 - o Grit Blasting Equipment.
 - o Hand tools.
- Subcontractor shall notify the engineer, of his intention to bring on to site any equipment or any container, with liquid or gaseous fuel or other substance which may create a hazard. The Engineer shall have the right to prescribe the condition under which such equipment or container may be handled and used during the performance of the works and the subcontractor shall strictly adhere to such instructions. The Engineer shall have the right to inspect any construction tool and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition will be entertained.

8.2 MOBILISATION OF MANPOWER BY SUBCONTRACTOR

- The subcontractor shall arrange induction and regular health check of their employees as per schedule VII of BOCW rules by a registered medical practitioner.
- The subcontractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.
- Ensure that the regulatory requirements of excessive weight limit (to carry/lift/ move weights beyond prescribed limits) for male and female workers are complied with.
- Appropriate accommodation to be arranged for all workmen in hygienic condition.



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 12 of 43

8.3 PROVISION OF PPEs

- Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured
- The following matrix recommends usage of minimum PPEs against the respective job.

Sl. No	Type of work	PPEs
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/ Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders
3	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Respiratory mask, Hand gloves, safety goggles
6	Work at height	Double lanyard full body harness, Fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves
8	Painting	Plastic gloves, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines

- The PPEs shall conform to the relevant standards as below and bear ISI mark.

Relevant is-codes for personal protection

IS: 2925 – 1984	Industrial Safety Helmets.
IS: 4770 – 1968	Rubber gloves for electrical purposes.
IS: 6994 – 1973 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves).
IS: 1989 – 1986 (Part-I-II)	Leather safety boots and shoes.
IS: 5557 – 1969	Industrial and Safety rubber knee boots.
IS: 6519 – 1971	Code of practice for selections care and repair of Safety footwear.
IS: 11226 – 1985	Leather Safety footwear having direct molding sole.
IS: 5983 – 1978	Eye protectors.
IS: 9167 – 1979	Ear protectors.
IS: 1179-1967	Eye & Face protection during welding
IS: 3521 – 1983	Industrial Safety Belts and Harness
IS: 8519 -1977	Guide for selection of industrial Safety equipment for body protection
IS: 9473-2002, 14166-1994, 14746-1999	Respiratory Protective Devices

The list is not exhaustive. The safety officer may demand additional PPEs based on specific requirement.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 13 of 43

- Where workers are employed in sewers and manholes, which are in use, the subcontractor shall ensure that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into manhole, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent incident to the public
- Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work.

Colour scheme for Helmets:

1. Workmen: Yellow
 2. Safety staff: Green or white with green band
 3. Electrician: Red
 4. Others including visitors: White
- All the PPEs shall be checked for its quality before issue and the same shall be periodically checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced.
 - The issuing agency shall maintain register for issue and receipt of PPEs.
 - The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front.
 - The body harnesses shall be serial numbered.

8.4 ARRANGEMENT OF INFRASTRUCTURE

8.4.1 DRINKING WATER

- Drinking water shall be provided and maintained at suitable places at different elevations.
- Container should be labeled as "Drinking Water"
- Cleaning of the storage tank shall be ensured atleast once in 3 months indicating date of cleaning and next due date.
- Potability of water should be tested as per IS10500 at least once in a year.

8.4.2 WASHING FACILITIES

- In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
- Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition and dully illuminated for night use.
- Overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work.

8.4.3 LATRINES AND URINALS

- Latrines and urinals shall be provided in every work place.
- Urinals shall also be provided at different elevations.
- They shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person.
- Separate facilities shall be provided for the use of male and female worker if any.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 14 of 43

8.4.4 PROVISION OF SHELTER DURING REST

Proper Shed & Shelter shall be provided for rest during break

8.4.5 MEDICAL FACILITIES

8.4.5.1 MEDICAL CENTRE (As per Schedule V, X and XI of BOCW central Rules, 1998)

- A medical centre shall be ensured/identified at site with basic facilities for handling medical emergencies. The medical center can be jointly developed on proportionate sharing basis with permission from BHEL
- A qualified medical professional, not less than MBBS, shall be deployed at the medical centre
- The medical centre shall be equipped with one ambulance, with trained driver and oxygen cylinder.
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste –Management and Handling Rules, 1998)

8.4.5.2 FIRST AIDER

- Ensure availability of Qualified First-aider throughout the working hours.
- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.
- List of Qualified first aiders and their contact numbers should be displayed at conspicuous places.

8.4.5.3 FIRST AID BOX (as per schedule III of BOCW)

- The subcontractor shall provide necessary first aid facilities as per schedule III of BOCW. At every work place first aid facilities shall be provided and maintained.
- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact no to be displayed on the box.
- The first aid boxes should be placed at various elevations so as to make them available within the reach and at the quickest possible time.
- The first aid box shall be distinctly marked with a Green Cross on white background.
- Details of contents of first aid box is given in Annexure No. 01
- Monthly inspection of First Aid Box shall be carried out by the owner as per format no. HSEP:14-F01
- The subcontractor should conduct periodical first –aid classes to keep his supervisor and Engineers properly trained for attending to any emergency.

8.4.5.4 HEALTH CHECK UP (As per schedule VII and Form XI)

The persons engaged at the site shall undergo health checkup as per the format no. HSEP:14-F02 before induction. The persons engaged in the following works shall undergo health checkup at least once in a year:

- a. Height workers
- b. Drivers/crane operators/riggers



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 15 of 43

- c. Confined space workers
- d. Shot/sand blaster
- e. Welding and NDE personnel

8.4.6 PROVISION OF CANTEEN FACILITY

- Canteen facilities shall be provided for the workmen of the project inside the project site.
- Proper cleaning and hygienic condition shall be maintained.
- Proper care should be taken to prevent biological contamination.
- Adequate drinking water should be available at canteen.
- Fire extinguisher shall be provided inside canteen.
- Regular health check-up and medication to the canteen workers shall be ensured.

8.4.7 PROVISION OF ACCOMODATION/LABOUR COLONY

- ☐ The subcontractor shall arrange for the accommodation of workmen at nearby localities or by making a labour colony.
- ☐ Regular housekeeping of the labour colony shall be ensured.
- ☐ Proper sanitation and hygienic conditions to be maintained.
- ☐ Drinking water and electricity to be provided at the labour colony.
- ☐ Bathing/ washing bay
- ☐ Room ventilation and electrification.

8.4.8 PROVISION OF EMERGENCY VEHICLE

- Dedicated emergency vehicle shall be made available at workplace by each subcontractor to handle any emergency

8.4.9 PEST CONTROL

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labour colony and stores.

8.4.10 SCRAPYARD

- In consultation with customer, scrapyard shall be developed to store metal scrap, wooden scrap, waste, hazardous waste.
- Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.

8.4.11 ILLUMINATION

- The subcontractor shall arrange at his cost adequate lighting facilities e.g. flood lighting, hand lamps, area lighting etc. at various levels for safe and proper working operations at dark places and during night hours at the work spot as well as at the pre-assembly area.
- Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II). Some recommended values are given below:



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 16 of 43

POWER SECTOR

S. No.	Location	Illumination (Lux)
A. Construction Area		
1.	Outdoor areas like store yards, entrance and exit roads	20
2.	Platforms	50
3.	Entrances, corridors and stairs	100
4.	General illumination of work area	150
5.	Rough work like fabrication, assembly of major items	150
6.	Medium work like assembly of small machined parts	300
	rough measurements etc.	
7.	Fine work like precision assembly, precision	700
	measurements etc.	
8.	Sheet metal works	200
9.	Electrical and instrument labs	450
B. Office		
1.	Outdoor area like entrance and exit roads	20
2.	Entrance halls	150
3.	Corridors and lift cars	70
4.	Lift landing	150
5.	Stairs	100
6.	Office rooms, conference rooms, library reading tables	300
7.	Drawing table	450
8.	Manual telephone exchange	200

- Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.
- Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp.
- Emergency lighting provision for night work shall be made to minimise danger in case of main supply failure.

If the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor

9.0 HSE TRAINING& AWARENESS

9.1 HSE INDUCTION TRAINING

All persons entering into project site shall be given HSE induction training by the HSE officer of BHEL /subcontractor before being assigned to work.

In-house induction training subjects shall include but not limited to:

- Briefing of the Project details.
- Safety objectives and targets.
- Site HSE rules.
- Site HSE hazards and aspects.
- First aid facility.
- Emergency Contact No.
- Incident reporting.
- Fire prevention and emergency response.
- Rules to be followed in the labour colony (if applicable)



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 17 of 43

- Proper safety wear & gear must be issued to all the workers being registered for the induction (i.e., Shoes/Helmets/Goggles/Leg guard/Apron etc.)
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
- On completing attending subcontractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP:14-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. They may only then be qualified to be issued with a personal I.D. card, for access to the work site.

9.2 HSE TOOLBOX TALK

- HSE tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups prior to the start of work. The agenda shall consist of the followings:
 - o Details of the job being intended for immediate execution.
 - o The relevant hazards and risks involved in executing the job and their control and mitigating measures.
 - o Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
 - o Recent non-compliances observed.
 - o Appreciation of good work done by any person.
 - o Any doubt clearing session at the end.
- Record of Tool box talk shall be maintained as per format no. HSEP:14-F04
- Tool box talk to be conducted at least once a week for the specific work.

9.3 TRAINING ON HEIGHT WORK

Training on height work shall be imparted to all workers working at height by in-house/external faculty at least twice in a year. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, retractable fall arrester, life line, safety nets etc.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.
- Dos & Don'ts during height work.

9.4 HSE TRAINING DURING PROJECT EXECUTION

- Other HSE training shall be arranged by BHEL/ subcontractor as per the need of the project execution and recommendation of HSE committee of site.
- The topics of the HSE training shall be as follows but not limited to:
 - o Hazards identification and risk analysis (HIRA)
 - o Work Permit System
 - o Incident investigation and reporting
 - o Fire fighting
 - o First aid
 - o Fire-warden training
 - o EMS and OHSMS
 - o T & Ps fitness and operation



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 18 of 43

- o Electrical safety
- o Welding, NDE & Radiological safety
- o Storage, preservation & material handling.
- A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out.

9.5 HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

9.5.1 Display of HSE posters and banners

- Site shall arrange appropriate posters, banners, slogans in local/Hindi/English languages at work place

9.5.2 Display of HSE signage

- Appropriate HSE signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed

9.5.3 Competition on HSE and award

- Site will arrange different competition (slogan, poster, essay etc.) on HSE time to time (Safety day, BHEL day, World Environment Day etc.) and winners will be suitably awarded.

9.5.4 HSE awareness programme

- Subcontractor shall arrange HSE awareness programme periodically on different topics including medical awareness for all personnel working at site

10.0 HSE COMMUNICATION

10.1 INCIDENT REPORTING

- The subcontractor shall submit report of all incidents, fires and property damage etc to the Engineer immediately after such occurrence, but in any case not later than 24 hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. (Refer HSE procedure for incident investigation, analysis and reporting for details)
- In addition, periodic reports on safety shall also be submitted by the subcontractor to BHEL from time to time as prescribed by the Engineer. Compiled monthly reports of all kinds of incidents, fire and property damage to be submitted to BHEL safety officer as per prescribed formats.
- HSE incidents of site shall be reported to BHEL site Management as per Procedure for Incident Investigation and Reporting in format no. HSEP:14-F15. Corrective action shall be immediately implemented at the work place and compliance shall be verified by BHEL HSE officer and until then, work shall be put on hold by Construction Manager.

10.2 HSE EVENT REPORTING

- Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to BHEL site management in detail with photographs for publication in different in-house magazines
- Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above.

10.3 DAILY HSE ACTIVITY REPORTING

Daily HSE activities shall be reported by subcontractor to BHEL as per Format No. HSEP:14-F31A



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 19 of 43

11.0 OPERATIONAL CONTROL

All applicable OCPs (Operational control procedures) will be followed by subcontractor as per BHEL instructions. This will be done as part of normal scope of work. List of such OCPs is given below. In case any other OCP is found to be applicable during the execution of work at site, then subcontractor will follow this as well, within quoted rate. These OCPs (applicable ones) will be made available to subcontractor during work execution at site. However for reference purpose, these are kept with Safety Officer of BHEL at the Power Sector Regional HQ, or available in downloadable format in the website, which may be refereed by subcontractor, if they so desire.

LIST OF OCPs

Safe handling of chemicals	Safety in use of cranes	Hydraulic test
Electrical safety	Storage and handling of gas cylinders	Spray insulation
Energy conservation	Manual arc welding	Trial run of rotary equipment
Safe welding and gas cutting operation	Safe use of helmets	Stress relieving
Fire safety	Good house keeping	Material preservation
Safety in use of hand tools	Working at height	Cable laying/tray work
First aid	Safe excavation	Transformer charging
Food safety at canteen	Safe filling of hydrogen in cylinder	Electrical maintenance
Illumination	Vehicle maintenance	Safe handling of battery system
Handling and erection of heavy metals	Safe radiography	Computer operation
Safe acid cleaning	Waste disposal	Storage in open yard
Safe alkali boil out	Working at night	For sanitary maintenance
Safe oil flushing	Blasting	Batching
Steam blowing	DG set	Piling rig operation
Safe working in confined area	Handling & storage of mineral wool	Gas distribution test
Safe operation of passenger lift, material hoists & cages	Drilling, reaming and grinding(machining)	Cleaning of hotwell / deaerator
Electro-resistance heating	Compressor operation	O&M of control of AC plant & system
Air compressor	Passivation	Safe Loading of Unit
Safe EDTA Cleaning	Safe Chemical cleaning of Pre boiler system	Safe Boiler Light up
Safe Rolling and Synchronization		

11.1 HSE ACTIVITIES

HSE activities shall be conducted at site based on the HSEMSM developed by Power Sector and issued to site by Regions.

While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures:

- 1) HSE Procedure for Register of OHS Hazards and Risks
- 2) HSE Procedure for Register of Environmental Aspects and Impacts
- 3) HSE Procedure for Register of Regulations



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 20 of 43

- 4) Operational Control Procedures
- 5) HSE Procedure for Emergency Preparedness and Response Plan
- 6) Contract documents

11.2 WORK PERMIT SYSTEM

- ☐ The following activities shall come under Work Permit System
 - a. Height working above 2 metres
 - b. Hot working at height
 - c. Confined space
 - d. Radiography
 - e. Excavation more than 4 meter depth
 - f. Heavy lifting above 50 tonRefer Annexure 05 for Work permit formats.
- "HSE Procedure for Work Permit System" shall be followed while implementing permit system. Where customer is having separate Work Permit System the same shall be followed.
- ☐ Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work with Job Hazard Analysis.
- ☐ Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- ☐ Permit holder shall implement and maintain all control measures during the period of permit .He will close the permit after completion of the work. The closed permit shall be archived in HSE Department of site.

11.3 SAFETY DURING WORK EXECUTION

Respective OCPS are to be followed and adherence to the same would be contractually binding

11.3.1 WELDING SAFETY

All safety precautions shall be taken for welding and cutting operations as per IS-818. All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.

11.3.2 RIGGING

Rigging equipment shall not be loaded in excess of its recommended safe working load. Rigging equipment, when not in use, shall be removed from the original work area so as not to present a hazard to employees.

11.3.3 CYLINDERS STORAGE AND MOVEMENT

All gas cylinders shall be stored in upright position. Suitable trolley shall be used. There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. Damaged tube and regulators must be immediately replaced. No of cylinders shall not exceed the specified quantity as per OCP

Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dragged, struck or permitted to strike each other violently.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 21 of 43

When cylinders are transported by powered vehicle they shall be secured in a vertical position.

11.3.4 DEMOLITION WORK

Before any demolition work is commenced and also during the process of the work the following shall be ensured:

- All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- No electric cable or apparatus which is liable to be a source of danger nor a cable or an apparatus used by the operator shall remain electrically charged.
- All practical steps shall be taken to prevent danger to persons employed from the risks of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render them unsafe.

11.3.5 T&Ps

All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test/calibration certificates bearing endorsement from competent authority of BHEL..Subcontractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.

11.3.6 CHEMICAL HANDLING

Displaying safe handling procedures for all chemicals such as lube oil, acid, alkali, sealing compounds etc , at work place.Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the subcontractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The subcontractor shall be responsible for obtaining the same.

11.3.7 ELECTRICAL SAFETY

- Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts.
- Fulfilling safety requirements at all power tapping points.
- High/ Low pressure welders to be identified with separate colour clothings. No welders will be deployed without passing appropriate tests and holding valid welding certificates. Approved welding procedure should be displayed at work place.
- The subcontractor shall not use any hand lamp energized by Electric power with supply voltage of more than 24 volts in confined spaces like inside water boxes, turbine casings, condensers etc.
- All portable electric tools used by the subcontractor shall have safe plugging system to source of power and be appropriately earthed. Only electricians licensed by appropriate statutory authority shall be employed by the subcontractor to carry out all types of electrical works. Details of earth resource and their test date to be given to BHEL safety officer as per the prescribed formats of BHEL
- The subcontractor shall use only properly insulated and armored cables which conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 22 of 43

- BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the cost of the subcontractor.
- All electrical appliances used in the work shall be in good working condition and shall be properly earthed.
- No maintenance work shall be carried out on live equipment.
- The subcontractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations.
- Area wise Electrical safety inspection is to be carried out on monthly basis as per "Electrical Safety Inspection checklist" and the report is to be submitted to BHEL safety officer
- Adequate precautions shall be taken to prevent danger for electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public
- The subcontractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.

11.3.8 FIRE SAFETY

- Providing appropriate fire fighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
- Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labor colony etc. Such fire protection equipment shall be easy and kept open at all times.
- The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders.
- All other fire safety measures as laid down in the "codes for fire safety at construction site" issued by safety coordinator of BHEL shall be followed.
- Non-compliance of the above requirement under fire protection shall in no way relieve the subcontractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others.
- Emergency contacts nos must be displayed at prominent locations
- Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site.

11.3.9 SCAFFOLDING

- Suitable scaffolds shall be provided for workman for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration of work which can be done safely from ladders.
- When a ladder is used, it shall be of rigid construction made of steel. The steps shall have a minimum width of 45 cm and a maximum rise of 30 cm. Suitable handholds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than $\frac{1}{4}$ horizontal and 1 vertical.
- Scaffolding or staging more than 3.6 m above the ground floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly bolted, braced or otherwise secured, at least 90 cm above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from savor, from swaying, from the building or structure.

11.3.10 WORK AT HEIGHT:

- Guardrails and toe-board/barricades and sound platform conforming to IS:4912-1978 should be provided.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 23 of 43

- Wherever necessary, life-line (pp or metallic) and fall arrestor along with Polyamide rope or Retractable lifeline should be provided.
- Safety Net as per IS:11057:1984 should be used extensively for prevention/ arrest of men and materials falling from height. The safety nets shall be fire resistant, duly tested and shall be of ISI marked and the nets shall be located as per site requirements to arrest or to reduce the consequences of a possible fall of persons working at different heights.
- Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.
- Use of Rebar steel for making Jhoola and monkey-ladder (Rods welded to vertical or inclined structural members), temporary platform etc. must be avoided.
- Monkey Ladder should be properly made and fitted with cages.
- Jhoola should be made with angles and flats and tested like any lifting tools before use.
- Lanyard must be anchored always and in case of double lanyard, each should be anchored separately.
- In case of pipe-rack, persons should not walk on pipes and walk on platforms only.
- In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.
- Empty drums must not be used.
- For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor. Rope ladder should be discouraged.

11.3.11 WORKING PLATFORM

Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform gangways provided is more than 3.6 m above ground level or floor level, they shall be closely boarded and shall have adequate width which shall not be less than 750 mm and be suitably fenced as described above. Every opening in the floor or a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 90 cm.

11.3.12 EXCAVATION

Wherever there are open excavation in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

11.3.13 LADDER SAFETY

Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m in the length while the width between side rails in rung ladder shall in no case be less than app. 29.2 cm for ladder upto and including 3 m in length. For longer ladders this width shall be increased at least ¼" for each additional foot of length.

A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to Construction.

11.3.14 LIFTING SAFETY

- It will be the responsibility of the subcontractor to ensure safe lifting of the equipment, taking due precaution to avoid any incident and damage to other equipment and personnel.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 24 of 43

- All requisite tests and inspection of handling equipment, tools & tackle shall be periodically done by the subcontractor by engaging only the Competent Persons as per law.
- Defective equipment or uncertified shall be removed from service.
- Any equipment shall not be loaded in excess of its recommended safe working load.

11.3.15 HOISTING APPLIANCE

- Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safe guards.
- Hoisting appliance should be provided with such means as will reduce to the minimum the risk of any part of a suspended load becoming incidentally displaced.
- When workers employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided.
- The worker should not wear any rings, watches and carry keys or other materials which are good conductor of electricity.

11.4 ENVIRONMENTAL CONTROL

Environment protection has always been given prime importance by BHEL. Environmental damage is a major concern of the principal subcontractor and every effort shall be made, to have effective control measures in place to avoid pollution of Air, Water and Land and associated life. Chlorofluorocarbons such as carbon tetrachloride and trichloroethylene shall not be used. Waste disposal shall be done in accordance with the guidelines laid down in the project specification.

Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per Material Safety Data Sheet (MSDS).

In the event of any spillage, the principle is to recover as much material as possible before it enters drainage system and to take all possible action to prevent spilled materials from running off the site. The subcontractor shall use appropriate MSDS for clean-up technique

All subcontractors shall be responsible for the cleanliness of their own areas.

The subcontractors shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the subcontractor anticipates the generation of excessive noise levels from his operations the subcontractor shall inform to Construction Manager of BHEL accordingly so that reasonable & practicable precautions can be taken to protect other persons who may be affected.

It is imperative on the part of the subcontractor to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social upliftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.

The subcontractor shall carry out periodic air and water quality check and illumination level checking in his area of work place and take suitable control measure.

11.5 HOUSEKEEPING

- Keeping the work area clean/ free from debris, removed scaffoldings, scraps, insulation/sheeting wastage /cut pieces, temporary structures, packing woods etc. will be in the scope of the subcontractor. Such cleanings has to be done by



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 25 of 43

subcontractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by subcontractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the subcontractor

- Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.
- All surplus earth and debris are removed/disposed off from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. Sufficient waste bins shall be provided at
- Different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Labour camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc. shall not be allowed in the camp to obstruct free movement of men and machineries.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power line.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas

11.6 WASTE MANAGEMENT

Take suitable measures for waste management and environment related laws/legislation as a part of normal construction activities. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained.

11.6.1 BINS AT WORK PLACE

- Sufficient rubbish bins shall be provided close to workplaces.
- Bins should be painted yellow and numbered.
- Sufficient nos. of drip trays shall be provided to collect oil and grease.
- Sufficient qty. of broomsticks with handle shall be provided.
- Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management.

11.6.2 STORAGE AND COLLECTION

- Different types of rubbish/waste should be collected and stored separately.
- Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
- Rubbish should not be left or allowed to accumulate on construction and other work places.
- Do not burn construction rubbish near working site.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 26 of 43

11.6.3 SEGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.
- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

11.6.4 DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.
- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Make schedule for collection and disposal of waste.

11.6.5 WARNING AND SIGNS

- Appropriate sign to be displayed at scrap storage area
- No toxic, corrosive or flammable substance to be discarded into public sewage system.
- Waste disposal shall be in accordance with best practice.
- Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste.

11.7 TRAFFIC MANAGEMENT SYSTEM

11.7.1 SAFE WORKPLACE TRANSPORT SYSTEM

- Traffic routes in a work place shall be suitable for the persons or vehicles using them. This shall be sufficient in number and of sufficient size. This shall reflect the suitability of traffic routes for vehicles and pedestrians.
- Where vehicles and pedestrians use the same traffic routes there shall be sufficient space between them. Where necessary all traffic routes must be suitably indicated. Pedestrians or vehicles must be able to use traffic routes without endangering those at work. There must be sufficient separation of traffic routes from doors, gates and pedestrian traffic routes.
- For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
- Temporary obstacles shall be brought to the attention of drivers by warning signs or hazard cones.
- Speed limits shall be clearly displayed. Speed ramps preceded by a warning signs or marker are necessary.
- The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions.
- Safest route shall be provided between places where vehicles have to call or deliver.
- Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 27 of 43

- Safe areas shall be provided for loading and unloading.
- Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
- Ensure road crossings are minimum and clearly signed.
- Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
- Set sensible speed limits which are clearly sign posted.
- Where necessary ramps should be used to retard speed. This shall be preceded by a warning sign or mark on the road.
- Forklift trucks shall not pass over road hump unless of a type capable of doing so.
- Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
- Road traffic signs shall be provided on prominent locations for prevention of incidents and hazards and for quick guidance and warning to employees and public. Safety signs shall be displayed as per the project working requirement and guideline of the state in which project is done. Vehicles hired or used shall not be parked within the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be approved by the person in-charge of the site.

11.7.2 TRAFFIC ROUTE FOR PEDESTRIANS

- Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.
- Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners or buildings.
- Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
- Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
- Provide high visibility clothing for people permitted in delivery area.

11.7.3 WORK VEHICLE

Work vehicle shall be as safe stable efficient and roadworthy as private vehicles on public roads. Site management shall ensure that drivers are suitably trained. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following:

- o A high level of stability.
- o A safe means of access/egress.
- o Suitable and effective service and parking brakes.
- o Windscreens with wipers and external mirrors giving optimum all round visibility.
- o Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms.
- o Provision of seat belts.
- o Guards on dangerous parts.
- o Driver protection - to prevent injury from overturning and from falling objects/materials.
- o Driver protection from adverse weather.
- o No vehicle shall be parked below HT/LT power lines.
- o Valid Pollution Under Control certification for all vehicles

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 28 of 43

11.7.4 DAILY CHECK BY DRIVER

- There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used.
 - o Brakes.
 - o Tires.
 - o Steering.
 - o Mirrors.
 - o Windscreen waters.
 - o Wipers.
 - o Warning signals.
 - o Specific safety system i.e. control interlocks
- Management should ensure that drivers carry out these checks.

11.7.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES

- All drivers shall hold a valid driving License for the class of vehicle to be driven and be registered as an authorized BHEL driver with the Administration Department.
 - Securing of the load shall be by established and approved methods, i.e. chains with patented tightening equipment for steel/heavy loads. Sharp corners on loads shall be avoided when employing ropes for securing.
 - All overhangs shall be made clearly visible and restricted to acceptable limits
 - Load shall be checked before moving off and after traveling a suitable distance.
 - On no account is construction site to be blocked by parked vehicles Drivers of vehicles shall only stop or park in the areas designate by the stringing foreman.
 - Warning signs shall be displayed during transportation of material.
- All vehicles used by BHEL shall be in worthy condition and in conformance to the Land Transport requirement.

11.7.6 MAINTENANCE

All Vehicles used for transportation of man and material shall undergo scheduled inspections on frequent intervals to secure safe operation. Such inspections shall be conducted in particular for steering, brakes, lights, horn, doors etc. Site management shall ensure that work equipment is maintained in an efficient, working order and in good repair. Inspections and services carried out at regular intervals of time and or mileage. No maintenance shall be carried below HT/LT power lines.

11.8 EMERGENCY PREPAREDNESS AND RESPONSE

- Emergency preparedness and response capability of site shall be developed as per Emergency Preparedness and Response plan issued by Regional HQ
- Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its subcontractors
- All the subcontractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Subcontractor should nominate his supervisor to coordinate and implement the safety measures.
- Assembly point shall be earmarked and access to the same from different location shall be shown
- Fire exit shall be identified and pathway shall be clear for emergency escape.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 29 of 43

- Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection
- Adequate number of first aid boxes shall be strategically placed at different work places to cater emergency need. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same.
- First aid center shall be developed at site with trained medical personnel and ambulance
- Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations.
- Tie up with fire brigade shall be done in case customer is not having fire station.
- Tie up with hospital shall be done in case customer is not having hospital.
- Disaster Management group shall be formed at site
- Mock drill shall be arranged at regular intervals. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats
- Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action

12.0 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements. The subcontractor shall maintain and ensure necessary safety measures as required for inspection and tests HV test, Pneumatic test, Hydraulic test, Spring test, Bend test etc. as applicable, to enable inspection agency for performing Inspection. If any test equipment is found not complying with proper safety requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.

12.1 DAILY HSE CHECKS

Both the Site Supervisors and safety officer of Subcontractor are to conduct daily site Safety inspection around work activities and premises to ensure that work methods and the sites are maintained to an acceptable standard. The following are to form the common subjects of a daily safety inspection:

- Personal Safety wears & gear compliance.
- Complying with site safety rules and permit-to-work (PTW).
- Positions and postures of workers.
- Use of tools and equipment etc. by the workers.

The inspection should be carried out just when work starts in beginning of the day, during peak activities period of the day and just before the day's work ends.

12.2 INSPECTION OF PPE

- PPEs shall be inspected by HSE officer at random once in a week as per format no. HSEP:14-F06 for its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register.
- The applicable PPEs for carrying out particular activities are listed below.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 30 of 43

12.3 INSPECTION OF T&Ps

- A master list of T&Ps shall be maintained by each subcontractor.
- All T&Ps being used at site shall be inspected by HSE officer once in a month as per format no. HSEP:14-F07 for its healthiness and maintenance.
- The T&Ps which require third party inspection shall be checked for its validity during inspection. The third party test certificate should be accompanied with a copy of the concerned competent person's valid qualification record.
- The validity of T&P shall be monitored as per "Status of T&Ps" format no. HSEP:14-F08

12.4 INSPECTION OF CRANES AND WINCHES

- Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
- Cranes and Winches shall be inspected by HSE officer once in a month as per format no. HSEP:14-F09 for healthiness, maintenance and validity of third party inspection.
- The date of third party inspection and next due date shall be painted on cranes and winches.
- The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card.
- The operator should be above 18 years of age and should be in possession of driving license of HMV man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list.

12.5 INSPECTION ON HEIGHT WORKING

- Inspection on height working shall be conducted daily by supervisors before start of work to ensure safe working condition including provision of
 - o Fall arrestor
 - o Lifelines
 - o Safety nets
 - o Fencing and barricading
 - o Warning signage
 - o Covering of opening
 - o Proper scaffolding with access and egress.
 - o Illumination
- Inspection on height working shall be conducted once in a week by HSE officer as per format no. HSEP:14-F10.
- Medical fitness of height worker shall be ensured.
- Height working shall not be allowed during adverse weather.

12.6 INSPECTION ON WELDING AND GAS CUTTING OPERATION

- Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
- Gas cylinders shall be kept upright.
- Use of Flash back arrestor shall be ensured at both ends.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 31 of 43

- Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per format no. HSEP:14-F11.
- Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
- Availability of fire extinguisher at vicinity shall be ensured.

12.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

- Ensure proper earthing in electrical installation
- Use ELCB at electrical booth
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out as per format no. HSEP:14-F12.

12.8 INSPECTION OF ELEVATOR

- Elevators shall be inspected by concerned supervisors once in a week as per format no. HSEP:14-F13.
- All elevators shall be inspected by competent person and validity shall be ensured.
- The date of third party inspection and next due date shall be painted on elevator.

12.9 INSPECTION OF EXCAVATION

Excavation activities shall be inspected as per Format HSEP:14-F13A

13.0 HSE PERFORMANCE

- Contractor shall be assessed on monthly basis for HSE Compliance by BHEL Safety In-charge at site. The HSE compliance shall be based on Online HSE Evaluation System of BHEL as per Format No. HSEP:14-F33.
- BHEL shall reserve the right to use this assessment for evaluating bidder's capacity for future tenders
- Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen by the subcontractor.
To decide HSE reward, performance towards HSE shall be evaluated for workmen and it shall be awarded regularly in public gathering.
- If safety record of the subcontractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the subcontractor may be considered by BHEL after completion of the job.

	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS	Doc no.: HSEP: 14
		REV: 01
	POWER SECTOR	Date: 20.01.2020
		Page: 32 of 43

14.0 HSE PENALTIES

- As per contractual provision HSE penalties shall be imposed on subcontractors for non-compliance on HSE requirement as per format no. HSEP:14-F14. The list in the format is only indicative. For any other violation, not listed in the format, the minimum penalty amount is to be decided as per BOCW act.
- If principal customer/statutory and regulatory bodies impose some penalty on HSE due to the non-compliance of the subcontractor the same shall be passed on to them.
- The penalty amount shall be recovered by Site Finance department from subcontractors from the RA/Final bill.

15.0 OTHER REQUIREMENTS

- In case of any delay in completion of a job due to mishaps attributable to lapses by the subcontractor, BHEL shall have the right to recover cost of such delay from the payments due to the subcontractor, after notifying the subcontractor suitably.
- If the subcontractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instruction regarding safety issued by BHEL, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL.
- If the subcontractor succeeds in carrying out its job in time without any fatal or disabling injury incident and without any damage to property BHEL may, at its sole discretion, favorably consider to reward the subcontractor suitably for the performance.
- In case of any damage to property due to lapses by the subcontractor, BHEL shall have the right to recover the cost of such damages from the subcontractor after holding an appropriate enquiry.
- The subcontractor shall take all measures at the sites of the work to protect all persons from incidents and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any persons for injury sustained or death owing to neglect of the above precautions and to pay any such persons such compensation or which may with the consent of the subcontractor be paid to compromise any claim by any such person, should such claim proceeding be filed against BHEL, the subcontractor hereby agrees to indemnify BHEL against the same.
- The subcontractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.
- The subcontractor shall notify BHEL of his intention to bring to site any equipment or material which may create hazard.
- BHEL shall have the right to prescribe the conditions under which such equipment or materials may be handled and the subcontractor shall adhere to such instructions.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 33 of 43

- BHEL may prohibit the use of any construction machinery, which according to the organization is unsafe. No claim for compensation due to such prohibition will be entertained by BHEL.

16. NON COMPLIANCE

NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND BHEL HAS RIGHT TO IMPOSE FINES ON THE SUBCONTRACTOR AS UNDER FOR EVERY INSTANCE OF VIOLATION NOTICED:

SN	Violation of Safety Norms	Fine (in Rs)
01	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03	Not wearing safety shoe	200/-*
04	Not keeping gas cylinders vertically	200/-
05	Not using flash back arrestors	100/-
06	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slings properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

• Legend:-

*: per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the subcontractor. The amount collected above will be utilized for giving award to the employees who could avoid incident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: **34 of 43**

17.0 HSE AUDIT/INSPECTION

- Regular HSE Audit/inspection shall be carried out by Subcontractor as per Site HSE audit calendar.
- HSE checklist (**Annexure 02**) shall be used for carrying out audit/inspection and report shall be submitted to BHEL site management
- All non-conformities and observations on HSE identified during internal or external HSE audit shall be disposed off by site in a time bound manner and reported back the implementation status
- Corrective action and Preventive action on HSE issues raised by certification body issued by Regional HQs shall be implemented by site and reported to Site management.

18.0 MONTHLY HSE REVIEW MEETING

- ☐ Site shall hold HSE review meeting every month to discuss and resolve HSE issues of site and improve HSE performance. It will also discuss the incidents occurred since previous meeting, its root cause and Corrective action and Preventive action. The agenda is given below:
 - o Implementation of earlier MOM
 - o HSE performance
 - o HSE inspection
 - o HSE audit and CAPA
 - o HSE training
 - o Health check-up camp
 - o HSE planning for the erection and commissioning and installation activities in the coming month
 - o HSE reward and promotional activities
- ☐ The meeting shall be chaired by Construction Manager, convened by HSE coordinator and attended by all HOS, Site Incharge of Subcontractors and HSE officer of Subcontractors.
- ☐ MOM on the discussion will be circulated to the concerned for implementation.

19.0 FORMATS USED (Details available in Annexure-04)

SL. No.	Format Name	Format No.	Rev No.
01	Inspection of First Aid Box	HSEP:14-F01	00
02	Health Check Up	HSEP:14-F02	00
03	HSE Induction Training	HSEP:14-F03	00
04	Tool Box Talk	HSEP:14-F04	00
05	Monthly Site HSE Report	As specified by BHEL	00
06	Inspection of PPE	HSEP:14-F06	00



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 35 of 43

POWER SECTOR

07	Inspection of T&Ps	HSEP:14-F07	00
08	Status of T&Ps	HSEP:14-F08	00
09	Inspection of Cranes and Winches	HSEP:14-F09	00
10	Inspection on Height Working	HSEP:14-F10	00
11	Inspection on Welding & Gas Cutting	HSEP:14-F11	00
12	Inspection on Electrical Installation	HSEP:14-F12	00
13	Inspection on Elevator	HSEP:14-F13	00
14	HSE Penalty	HSEP:14-F14	00
15	Accident /incident / property damage /fire incident report	HSEP:14-F15	00



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 36 of 43

20.0 ANNEXURES

ANNEXURE 01

As per Contract Labour (Regulation & Abolition Act), Central Rules, 1971,

- (1) The first-aid box shall be distinctively marked with a Red Cross on a white background and shall contain the following items, namely:

(a) For establishments in which the number of contract labour employed does not exceed fifty, each first aid box shall contain the following equipment:

(i)	6 small sterilized dressings
(ii)	3 medium size sterilized dressings
(iii)	3 large size sterilized dressings
(iv)	6 pieces of sterilized eye pads in separate sealed packets.
(v)	6 roller bandages 10 cm wide.
(vi)	6 roller bandages 5 cm wide.
(vii)	One tourniquet
(viii)	A supply of suitable splints
(ix)	Three packets of safety pins.
(x)	Kidney tray.
(xi)	3 large sterilized burn dressings.
(xii)	1 (30ml) bottle containing a two percent alcoholic solution of iodine
(xiii)	1 (30 ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label
(xiv)	1 snake bite lancet
(xv)	1 (30gms) bottle of potassium permanganate crystals.
(xvi)	1 pair scissors
(xvii)	1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
(xviii)	A bottle containing 100 tablets (each of 5 grains) of aspirin
(xix)	Ointment for burns
(xx)	A bottle of suitable surgical anti-septic solution

(b) For establishment in which the number of contract labour exceeds fifty each first-aid box shall contain the following equipment:

(i)	12 small sterilized dressings
(ii)	6 medium size sterilized dressings
(iii)	6 large size sterilized dressings.
(iv)	6 large size sterilized burn dressings
(v)	6 (15 grams) packets sterilized cotton wool
(vi)	12 pieces of sterilized eye pads in separate sealed packets.



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 37 of 43

(vii)	12 roller bandages 10 cm wide.
(viii)	12 roller bandages 5 cm wide.
(ix)	One tourniquet.
(x)	A supply of suitable splints.
(xi)	Three packets of safety pins.
(xii)	Kidney tray.
(xiii)	Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.
(xiv)	4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.
(xv)	1 (60ml) bottle containing a two percent alcoholic solution of iodine
(xvi)	One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water.
(xvii)	1 (120ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label.
(xviii)	1 roll of adhesive plaster (6 cmX1 meter)
(xix)	2 rolls of adhesive plaster (2 cmX1 meter)
(xx)	A snake bite lancet.
(xxi)	1 (30 grams) bottle of potassium permanganate crystals.
(xxii)	1 pair scissors
(xxiii)	1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India.
(xxiv)	a bottle containing 100 tablets (each of 5 grains) of aspirin
(xxv)	Ointment for burns
(xxvi)	A bottle of a suitable surgical anti septic solution.

(2) Adequate arrangement shall be made for immediate recoupment of the equipment when necessary.



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 38 of 43

ANNEXURE 02

HSE AUDIT/INSPECTION CHECKLIST CUM COMPLIANCE REPORT

PROJECT: _____

SUBCONTRACTOR: _____

DATE : _____

OWNER : _____

INSPECTION BY: _____

Note : write 'NA' wherever the items is not applicable

Item	Y e s	N o	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNEL PROTECTIVE EQUIPMENTS				
Goggles; shields				
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 39 of 43

POWER SECTOR

Angle + 70° from horizontal				
Other				
HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaf OK				
Condition of slings, chains, hooks OK				
Inspection & maintenance log maintained				
Outriggers used				
Signals observed and understood				
Qualified operators				
Others				
MACHINERY, TOOLS & EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
General neatness				
Others				
FIRE PREVENTION				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas.				
Hydrants				
Clearance				
Others				
ELECTRICAL				
Proper wiring				
ELCB's provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Other				
HANDLING & STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: **40 of 43**

Other				
WORKING AT HEIGHT				
Safety nets				
Safety belts				
Safety helmets				
Anchoring of safety belt to the life line rope				
ENVIRONMENT				
Lubricant waste/engine oils properly dispose.				
Waste from Canteen, offices, sanitation etc. disposed properly.				
Disposal of surplus earth, stripping materials, expired batteries, oily rags and combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.				
Availability of first-aid facilities				
Proper sanitation at site, office & labor camps.				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				
Provision of crèches for children.				



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATION by SUBCONTRACTORS

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: 41 of 43

ANNEXURE 03

REFERENCES

- Contract documents
- Relevant legislations
- HSEMSM
- Relevant Indian standards as listed below (illustrative only):

SL NO	CODE NAME	TITLE
(1)	IS : 818-1888 (Reaffirmed 2003)	Code of Practice for safety and health requirements in Electric and Gas Welding and Cutting operations.
(2)	IS: 1179-1967 (Reaffirmed 2003)	Specification for Equipment for Eye & Face protection during welding.
(3)	IS : 1989 (Part 2):1986 (Reaffirmed 1997)	Specification for Leather Safety Boots & Shoes
(4)	IS:2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
(5)	IS:3521 : 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
(6)	IS:3646(Part II) – 1966 (Reaffirmed 2003)	Code of Practice for Interior Illumination
(7)	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders
(8)	IS: 3696(Part 2) : 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
(9)	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Incidents
(10)	IS:4770 : 1991 (Reaffirmed 2006)	Rubber Gloves – Electricals purposes-Specification
(11)	IS:4912 : 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
(12)	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
(13)	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
(14)	IS:9167:1979	Specification for Ear-Protectors
(15)	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
(16)	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
(17)	IS 11006 : 2011	Flash Back(Flame Arrestor) Specification



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

POWER SECTOR

Page: **42 of 43**

(18)	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
(19)	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect against Particles-Specification.
(20)	IS:9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings-Recommendations on Safe working loads.
(21)	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
(22)	IS:12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots-Specification
(23)	IS:13367(Part 1):1992 (Reaffirmed 2003)	Safe Use of Cranes-Code of Practice
(24)	IS:14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
(25)	IS:14746 : 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
(26)	IS : 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type(Stored Pressure)-Specification
(27)	IS: 19011:2002	Guidelines for Quality and/or Environmental Management Systems Auditing



**HEALTH, SAFETY AND ENVIRONMENT
PLAN FOR
SITE OPERATION by SUBCONTRACTORS**

POWER SECTOR

Doc no.: HSEP: 14

REV: 01

Date: 20.01.2020

Page: **43 of 43**

**ANNEXURE 04 : SAFETY FORMATS
&
ANNEXURE 05 : WORK PERMIT FORMATS**

**POWER SECTOR****INSPECTION OF FIRST AID BOX**

FORMAT NO: HSEP:14-F01

REV NO.: 00

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Number of employees on the site: - _____

Sl.No.	Item	No. Available	Remarks
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of large sized sterilized burn dressings		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of Suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available.		
14	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
15	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
16	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		

**POWER SECTOR****INSPECTION OF FIRST AID BOX**

FORMAT NO: HSEP:14-F01

REV NO.: 00

PAGE NO. 02 OF 02

Sl.No.	Item	No. Available	Remarks
17	Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label, available.		
18	Whether roll of adhesive plaster (6 cmX1 meter) available		
19	No of rolls of adhesive plaster (2 cmX1 meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium permanganate crystals available.		
22	Whether a pair scissors available		
23	Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India available.		
24	Whether bottle containing 100 tablets (each of 5 grains) of aspirin available		
25	Whether Ointment for burns available		
26	Whether bottle of a suitable surgical anti-septic solution available		

Signature of Subcontractor's Site I/C:

**POWER SECTOR****HEALTH CHECK UP**

FORMAT NO: HSEP:14-F02

REV NO.: 00

PAGE NO. 1 OF 02

Name of Site :	
Name of Sub-Contractor :	
Name of Employee :	

NAME:

History Of Past Illness	H/O Epilepsy
	H/O Drug Allergy
	H/O Diabetics/ Hypertension
	H/O Unconsciousness
Personal History	
EXAMINATION	
OBSERVATION	
<u>General Physical Examination</u>	
Height	:
Weight	:
BMI	:
Built And nourishment	:
Pallor	:
Temperature	:
Chest Expansion	: Inspiration Expansion
Lymph Node Enlargement	:
<u>Ear, Nose, Throat</u>	:
Ear	:
Nose	:
Throat	:

**POWER SECTOR****HEALTH CHECK UP**

FORMAT NO: HSEP:14-F02

REV NO.: 00

PAGE NO. 2 OF 02

EXAMINATION	OBSERVATION
<u>Cardiovascular System Examination :</u>	
Inspection :	
Palpation :	Pulse BP
Auscultation (Heart Sounds) :	
<u>Respiratory System :</u>	
Inspection :	Respiratory Rate
Palpation:	
Percussion :	
Auscultation (Breath Sounds) :	
<u>Examination of Abdomen :</u>	
Inspection :	
Palpation :	
Auscultation (Bowel Sounds) :	
Any Other :	
Clinical Impression	

Signature of the examining doctor

**POWER SECTOR****HSE INDUCTION TRAINING**

FORMAT NO: HSEP:14-F03

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Date :	
Name of Training Co-ordinator	

Sl No.	Name	Designation	Organisation	Signature

Signature of Training co-ordinator :

	POWER SECTOR	FORMAT NO: HSEP:14-F04 REV NO.: 00 PAGE NO. 01 OF 01
	TOOL-BOX TALK	

Name of Site :	
Sub-Contractors Name :	
Date :	

Topic	Name of person delivered Tool Box Talk	No. of Participants attended	Remarks

Signature of Site I/C of Subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F06 REV NO.: 00 PAGE NO. 01 OF 01
	PERSONAL PROTECTIVE EQUIPMENTS	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at site
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Other PPEs.			

Signature of Site I/C of Subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F07 REV NO.: 00 PAGE NO. 01 OF 01
	INSPECTION OF T&Ps	

Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Sl.No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs / overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	

Signature-Site Safety Officer (BHEL)	Signature-Subcontractor/ Subcontractor's Safety Officer
--	--

	POWER SECTOR	FORMAT NO: HSEP:14-F08 REV NO.: 00 PAGE NO. 01 OF 01
	STATUS OF T&Ps	

Name of Site	
Name of Sub-Contractor	
Date of Inspection	

Item	Nos. Deployed	Identification No.	Nos. Tested by competent person	Validity of Test Certificate
Winches				
Chain Blocks				
Wire Rope Slings				
Man Cages				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of Site I/C of subcontractor:

**POWER SECTOR****INSPECTION OF CRANES AND WINCHES**

FORMAT NO: HSEP:14-F09

REV NO.: 00

PAGE NO. 01 OF 03

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Crane Reg. No (Make/Model) _____

Name of Driver/Operator _____

Sl.no.	Description	Observation	Measures
1	Valid Driving license		
2	Hook & Hook Latch		
3	Over Hoist limit switch		
4	Boom limit switch		
5	Boom Angle Indicator		
6	Boom limit cutoff switch		
7	Condition of Boom		
8	Condition of ropes		
9	Number of load lines		
10	Size and condition of the slings		
11	Stability of the cranes		
12	Soil Condition		
13	Swing Break And Lock		
14	Proper Break And Lock		
15	Hoist Break And Lock		
16	Boom Break And Lock		
17	Main Clutch		
18	Leakage in Hydraulic Cylinders		
19	Out riggers fully extendable		
20	Tyre pressure		
21	Condition of Battery And Lamps		

**POWER SECTOR****INSPECTION OF CRANES AND WINCHES**

FORMAT NO: HSEP:14-F09

REV NO.: 00

PAGE NO. 2 OF 03

Sl.no.	Description	Observation	Measures
22	Guards of moving and rotating parts		
23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

WINCH

Sl. No.	Description	YES	NO	NA	Remarks
1	Has the copy of Third Party Inspection certificate been provided in winch machine shed?				
2	Is winch machine operator experienced enough to operate the winch machine?				
3	Is the winch machine operated by someone other than the winch machine operator?				
4	Is there guard provided in all moving parts like wheel and motor's shaft?				
5	Will it protect against unforeseen operational contingencies?				
6	Are brakes, clutch and locking arrangement working properly?				
7	Has it been ensured that the guard does not constitute a hazard by itself?				
8	Are the cranks and the connecting rods protected by guardrails?				
9	Is there provision for fully covered shed with wooden plank roof?				

**POWER SECTOR****INSPECTION OF CRANES AND WINCHES**

FORMAT NO: HSEP:14-F09
REV NO.: 00
PAGE NO. 3 OF 03

Sl. No.	Description	YES	NO	NA	Remarks
10	Is wire rope free from any kind of damage or wear and tear?				
11	Is split pin provided for the protection of clutch and brake locking arrangement?				
12	Is pulley inspected by competent person and certified before use?				
13	Is pulley free from any wear and tear visually?				
14	Is winch rope barricaded with clipsheet for the protection of rope and person?				
15	Is the wire rope lubricated by cardium oil?				
16	Is there any friction in wire rope which may damage the wire rope rather than the rolling parts?				
17	Is there any oil leakage in the hydraulic system of the winch machine?				
18	Has it been ensured that the guard will not cause discomfort or inconvenience to operator?				
	Total Number of NO:				
	Total Number of NA:				
	% Compliance :				

Signature of Site I/C of subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F10 REV NO.: 00 PAGE NO. 01 OF 02
	INSPECTION OF HEIGHT WORKING	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
1	All the workers have been explained safe work method?		
2	An established communication system has been established and explained to the workers.		
3	Adequate illumination has been ensured.		
4	Work area inspected prior to the start of the work.		
5	Area below the work place barricaded, particularly below hot work.		
6	Workers provided with bags /box to carry bolts, nuts and hand tools		
7	Arrangement for fastening hand tools made.		
8	All work platforms ensured to be of adequate strength and ergonomically suitable.		
9	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.		
10.	Work at more than one elevation at the same segment is restricted.		
	ACCESS/EGRESS		
1	Walkways provided with handrail, mid-rail and toe guard?		
2	All checkered plates, gratings properly welded/ bolted?		
3	Are ladders inspected and they are in good condition?		
4	Are ladders spliced?		
5	Are ladders properly secured to prevent slipping, sliding or falling?		
6	Do side rails extend 36" above top landing?		
7	Are built up ladders constructed of sound materials?		

**POWER SECTOR****INSPECTION OF HEIGHT WORKING**

FORMAT NO: HSEP:14-F10

REV NO.: 00

PAGE NO. 02 OF 02

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
8	Are rugs and cleats not over 12" on center?		
9	Metal ladders not used around electrical hazards.		
10	Proper maintenance and storage.		
11	Ladders placed at right slope.		
12	Ladders / staircases welded/ bolted properly.		
13	Any obstruction in the stairs.		
14	Are landing provided with handrails, knee rails, toe boards etc.?		
15	Whether ramp is provided with proper slope.		
16	Proper hand rails / guards provided in ramps.		
	Housekeeping		
1	Walkways, aisles & all overhead workplaces cleared of loose material.		
2	Flammable materials, if any, are cleared.		
3	All the de shuttering materials are removed after de shuttering is done.		
4	Platforms and walkways free from oil/grease or other slippery material.		
5	Collected scrap are brought down or lowered down and not dropped from height.		
	PPE And Safety Devices		
1	Use of safety helmet, safety belts ensured for all workers		
2	Anchoring points provided at all places of work.		
3	Common lifeline provided wherever linear movement at height is required.		
4	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical workplaces.		
6	Crawler boards/Safety system or works on fragile roof are used.		

Signature of Site I/C of subcontractor :

**POWER SECTOR****INSPECTION OF WELDING AND GAS
CUTTING**

FORMAT NO: HSEP:14-F11
REV NO.: 00
PAGE NO. 1 OF 02

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection	

Welding				
Sl.no.	Description	Y e s	N o	Remarks
1	Is electric connection given through 30 mA ELCB/RCCB to welding m/c?			
2	Is electric cable fitted properly in junction box on m/c?			
3	Is electrical cable free from joints?			
4	Are the joints attached firmly & insulated with tape?			
5	Is double earthing given to body of m/c?			
6	Is the physical condition of the m/c good?			
7	Is ON/OFF switch connected to the m/c is working and in good condition?			
8	Are indication lamps on m/c working?			
9	Is the electrode holder in good condition?			
10	Are the cables of the welding m/c lugged & tight properly?			
11	Are return lead connected properly (Rod, Angle, Channels shall not be used)			
	Total No of NO			
	Total No of YES			

**POWER SECTOR****INSPECTION OF WELDING AND GAS
CUTTING**

FORMAT NO: HSEP:14-F11
REV NO.: 00
PAGE NO. 2 OF 02

Gas Cutting				
Sl. no	Description	Yes	No	Remarks
1	Are Cylinders kept on trolleys?			
2	Physical condition of Gas cylinders Good?			
3	Is there Oil/Grease on valve of the cylinder?			
4	Are pressure regulators in good condition?			
5	Condition of hose pipe OK?			
6	Are hose pipe clamped with hose clip?			
7	Is flash back arrestor & NRV fitted on torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of subcontractor :

	POWER SECTOR	FORMAT NO: HSEP:14-F12 REV NO.: 00 PAGE NO. 01 OF 02
	INSPECTION OF ELECTRICAL INSTALLATION	

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection:	

Sr. No.	Contents	Yes/No	Remarks
A	Cable		
1.	Whether the condition of cable is checked?		
2.	Are cables received from other sites checked for insulation resistance before putting them into use?		
3.	Are all main cables taken either underground / overhead?		
4.	Are welding cables routed properly above the ground?		
5.	Are welding and electrical cables overlapping?		
6.	Is any improper joining of cables/wires prevailing at site?		
B	DBs/SDBs		
1.	Is earth conductor continued up to DB / SDB?		
2.	Whether DBs and extension boards are protected from rain / water?		
3.	Is there any overloading of DBs / SDBs?		
4.	Are correct / proper fuses & CBs provided at main boards and sub-boards?		
5.	Is energized wiring in junction boxes, CB panels & similar places covered all times?		
C	ELCB		
1.	Whether the connections are routed through ELCB?		
2.	Is ELCB sensitivity maintained at 30 mA?		

**POWER SECTOR****INSPECTION OF ELECTRICAL INSTALLATION**

FORMAT NO: HSEP:14-F12

REV NO.: 00

PAGE NO. 02 OF 02

Sr. No.	Contents	Yes/No	Remarks
3.	Are the ELCB numbered and tested periodically & test results recorded in a logbook countersigned by a competent person?		
D	Grounding		
1.	Is natural earthing ensured at the source of power (main DB at Generator or Transformer)?		
2.	Whether the continuity and tightness of the earth conductor are checked?		
3.	Mention the gauge of the earth conductor used at the site.		
4.	Mention the value of Earth Resistance.		
E	Electrically operated Machines or Accessories.		
1.	Whether the plug top is provided everywhere.		
2.	Are all metal parts of electrical equipment and light fittings / accessories grounded?		
3.	Is there any shed or cover for welding machines?		
4.	Are halogen lamps fixed at proper places?		
5.	Are portable power tools maintained as per norms?		
6.	Any other information:		

Signature of Site I/C of subcontractor :

**POWER SECTOR****INSPECTION OF ELEVATOR**

FORMAT NO: HSEP:14-F13

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site	
Name of Sub-Contractor	
Inspected by	
Date of Inspection	

Sr. No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs/overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	

Signature-Subcontractor/ Subcontractor's
Safety Officer

Signature-Site Safety Officer (BHEL)



POWER SECTOR

Inspection of Excavation

FORMAT NO: HSEP:14-F13E

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sl.no.	Description	Yes	No	Remarks
1	Precautions taken for Underground Electrical Cable			
2	Precautions taken for Under / Above ground sewer/ Drinking Water Line			
3	Precautions taken for Underground Telecommunication Line			
4	Precautions taken for Underground Product/Utility Line			
5	Precautions taken for Underground Fire Water Line			
6	Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times			
7	Slope Cutting / Angle Maintained			
8	Hard Barricading & Edge Protection provided			
9	Separate Safe Access for Man and Vehicle			
10	Lighting arrangement			
11	Banksman Provided			
12	Required basic PPEs provided			
13	Excavated soil / Construction Material / equipment kept away from the edge.			
14	First aid in attendance.			
15	Other:			
	Total No of YES			

Signature-Subcontractor/ Subcontractor's Safety Officer

Signature-Site Safety Officer (BHEL)

**POWER SECTOR****HSE PENALTY**

FORMAT NO: HSEP:14-F14

REV NO.: 00

PAGE NO. 1 OF 02

Sub: MEMO for Penalty for non-compliances in Safety

Following lapse (tick marked) was observed and penalty is imposed as stated at the bottom of this memo. It is requested that such occurrences be please avoided in future.

Safety Area

SN	Violation of Safety Norms	Fine (in Rs)
01.	Not Wearing Safety Helmet	200/- *
02.	Not wearing Safety Belt or not anchoring life line	500/-*
03.	Not wearing safety shoe	200/-*
04.	Not keeping gas cylinders vertically	200/-
05.	Not using flash back arrestors	100/-
06.	Not wearing gloves	50/- *
07.	Grinding Without Goggles	50/- *
08.	Not using 24 V Supply For Internal Work	500/-
09.	Electrical Plugs Not used for hand Machine	100/-
10.	Not Slings properly	200/-
11.	Using Damaged Sling	200/-
12.	Lifting Cylinders Without Cage	500/-
13.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
14.	Not Removing Small Scrap From Platforms	500/-
15.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	500/-
16.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
17.	Improper Earthing Of Electrical T&P	500/-
18.	No or improper barricading	500/-
19.	Activity carried out without Safety work permit (Height work, Lifting activity, Hot work-each person/case)	1000/-
20.	Incident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
21.	Fatal Incident Resulting in total loss in Earning Capacity	1,00,000/- per victim for first instance #

Legend: -

*: per head. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.

#: or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

1 Copy to Site Construction Manager (BHEL)

	POWER SECTOR- HQ	FORMAT NO: HSEP:14-F15 REV NO.: 00 PAGE NO. 01 OF 01
	Incident Report (To be submitted within 24 hours of time of incident)	

Type of incident: Fatal/Major/ Minor/Fire/Property Damage/Near-miss

1	NAME OF SITE		3	ACTIVITY AREA	
2	SCOPE OF WORK		4	NAME OF CONTRACTOR	
			5	NAME & DESIGNATION OF BHEL ACTIVITY I/C	
6	DATE & TIME OF ACCIDENT		7	DATE RESUMED	
8	NO. OF WORK-DAYS LOST BY VICTIM (If duty not resumed, give estimated figure)				
9	NO. OF MANHOURS LOST BY OTHERS				
10	PERSONAL DETAILS OF INJURED AND / OR DETAILS OF MATERIALS / EQUIPMENT / PROPERTY DAMAGED				
NAME			NAME OF MATERIAL / EQUIPMENT / PROPERTY		
PERIOD OF EMPLOYMENT					
AGE	YRS	SEX	MALE/ FEMALE	ESTIMATED COST	ACTUAL COST
MARITAL STATUS		SINGLE / MARRIED			
OCCUPATION		NATURE OF DAMAGE			
PART OF BODY INJURED					
NATURE OF INJURY					
AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) MOST RESPONSIBLE FOR CAUSING ACCIDENT / INJURY / DAMAGE					
12	PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE) CAUSING ACCIDENT INJURY / DAMAGE				
13	DESCRIBE CLEARLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET, IF REQUIRED)				
ANALYSIS					
14	WHAT ACTS AND / OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS ACCIDENT				
15	WHAT ARE THE BASIC REASON FOR THE EXISTENCE OF THESE ACTS AND / OR CONDITION ?				
16	WHAT CORRECTIVE ACTIONS HAVE BEEN TAKEN TO PREVENT ACCIDENT RECURRENCE ?				
	DATE :		SIGNATURE OF SITE HSE COORDINATOR		
17	COMMENTS OF HEAD / SOX				
	DATE:		SIGNATURE OF HEAD/SOX		



POWER SECTOR

Format for Monthly HSE Planning & Review

FORMAT NO: HSEP:14-F30

REV NO.: 00

PAGE NO. 01 OF 3

Note: This is a template and can be modified in consultation with BHEL

Name of the Site		Name of the Subcontractor	
Scope of Work		Date	
PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF.....		PART-B: REVIEW ON	
SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
1	Availability of First Aid Box at Required Places and Inspection thereof as per Format: Fo1	Areas 1.	
2	Health check-up as per Format: Fo2	Health check-up for Nos 1. New inductees 2. Drivers & Operators 3. Workers in following high risk areas: a. ...	
3	Induction training of newly joined workers as per Format: Fo3	Minimum No. of workers:	
4	Toolbox talks (TBT) conducted before start of work as per Format: Fo4	Locations of TBTs & No. of workers 1. ...	
5	PPE usage and issue as per Format: Fo6		
6	Inspection of T&Ps as per Format: Fo7	List of T&Ps to be inspected 1.	
7	Identification & Inspection Status of T&Ps as per Format: Fo8		
8	Inspection of Cranes & Winches as per Format: Fo9	List of Cranes & Winches & Nos. 1. ...	
9	Inspection of Height Working as per Format: F10	Areas: 1. ...	
10	Inspection of Welding & Gas Cutting operations as per Format: F11	Areas: 1. ...	
11	Inspection of Electrical Installations as per Format: F12	Locations: 1. ...	
12	Inspection of Elevators (as applicable) as per Format: F13	Locations: 1. ...	
13	Inspection of Excavation as per Format: F13E	Locations: 1. ...	



POWER SECTOR

Format for Monthly HSE Planning & Review

FORMAT NO: HSEP:14-F30

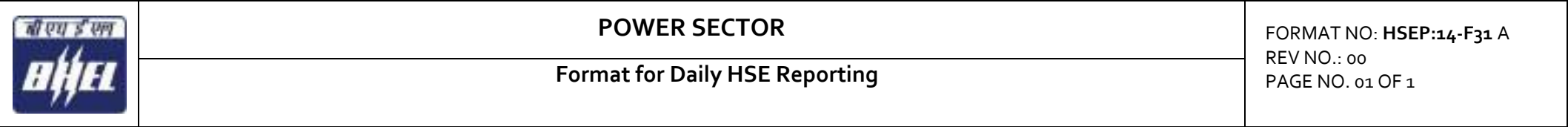
REV NO.: 00

PAGE NO. 02 OF 3

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
14	Job Safety Analysis as per Format F32B	Activities: 1. ...	
15	Regular Job Specific Training (Re-training) for workers involved in hazardous activities	Topics/ Hazards & No. of workers 1. ...	
16	Mass housekeeping (HK) drive in work areas	Areas 1. ...	
17	Vertigo Test of Height workers	Minimum No. of workers:	
18	Deployment of qualified HSE Officers as per contract	Location(s) & Nos. 1. ...	
19	Deployment of qualified HSE Stewards as per contract	Location(s) & Nos. 1. ...	
20	Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.)	Tool/ Equipment & Location 1. ...	
21	Safety Walks by site in charge of agency (4 -Weekly once)	Dates:	
22	Safety walks by departmental head (8-Weekly twice)	Dates:	
23	Availability/ deployment of Safety posters/ placards/ signage at strategic locations	Locations: Nos. 1. ...	
24	Provision of clean drinking water sources for workers	Locations: Nos. 1. ...	
25	Provision of toilets for workers (separate for male & female workers)	Locations: Nos. 1. ...	
26	Rest sheds for workers during lunchtime, rain, dust storm etc.	Locations: Nos. 1. ...	
27	Availability of following in Labor colony	1. Clean drinking water 2. Toilets 3. Cleanliness & Hygiene 4. Grass cutting, 5. Fogging 6. Electrical Inspection ...	

	POWER SECTOR		FORMAT NO: HSEP:14-F30 REV NO.: 00 PAGE NO. 03 OF 3
	Format for Monthly HSE Planning & Review		
SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
28	Availability of dust/ waste bins at various locations	Locations: 1. ...	
29	Availability of Ambulance (individual/ joint) in each shift	Ambulance No.	
30	Availability of emergency vehicle in each shift	Emergency vehicle	
31	Deployment/ Availability of tested Fire Extinguishers	Locations & Nos. 1. ...	
32	Tree plantation	Locations & Nos. 1. ...	
33	Waste disposal & Scrap Bins	Locations 1. ...	
34	Illumination checks	Locations 1. ...	
35	Safety award function: 1. Display of good practices Award presentation	Minimum 1 per month	
36	Submission of Daily Reports as per Format No.F31A	Daily Reports (Night & Day Shifts)	

PLAN		REVIEW	
<u>Agency</u> Name:	<u>BHEL</u> Name:	<u>Agency</u> Name:	<u>BHEL</u> Name:
Sign:	Sign:	Sign:	Sign:
Date:	Date:	Date:	Date:



	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

	POWER SECTOR	FORMAT NO: HSEP:14-F31 A REV NO.: 00 PAGE NO. 01 OF 1
	Format for Daily HSE Reporting	

Night		Day	SHIFT	Year	Site
			Submitted By		
			Work Area(s)		
			Staff		
			Man-Power		
			Safety Officers		
			Safety Stewards		
			Tool Box (Topics and No. of Participants)		
			Induction Training (No. of Participants)		
			Vertigo Test (Numbers Tested)		
			On-the-Job Training (Topic & participants)		
			Work Permits		
			Job Safety Analyses conducted		
			Height Work Inspection		
			Other Hazardous Activities Inspection		
NA			T&P Inspection (Names & Nos. Inspected)		
			Safety Walk (Designation, Areas)		
NA			HSE Meeting		
NA			Safety Reward (Details)		
NA			Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/Details)		
			Lost time Accident		
			Restricted Work Case		
			Medical Treatment Case		
			First Aid Case		
			Near miss		
			Property Damage/ Fire		
			Non-Compliances Submitted by BHEL		
			Complied by Agency		
			Any other Remarks/ Inputs		



POWER SECTOR

Job Safety Analysis Format

FORMAT NO: HSEP:14-F32B

REV NO.: 00

PAGE NO. 01 OF 1

Name of the Site	
Name of the Subcontractor	
Activity, Area	

HAZARDS				PRECAUTIONS	

(Name)	Submitted By (Agency HSE)		Reviewed By (BHEL Execution)		Approved By (BHEL HSE)	
(Sign)						
(Date)						

**POWER SECTOR- HQ**

FORMAT NO: HSEP:14-F33

REV NO.: 00

PAGE NO. 01 OF 3

Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	M	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	M	1	Toolbox Talk Records
1c	Contractor in charge and safety in charge attended safety meetings?	M	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	M	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	M	1	Report submission date
1f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	M	1	Incident/ Near Miss Records
1g	Carrying out Inspections and submission of Inspection reports within stipulated time	M	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	M	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	M	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	M	2	Safety Officer qualification & experience records
2c	Availability of Qualified safety supervisor (1 for every 100 labour)	M	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	M	2	PPE Issue Records, Inspection/ non-conformity records
2e	Housekeeping done on regular basis and scrap removal at site	M	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2l	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
2l.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
2l.3	Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks		1	Master T&P List with internal & external test details
2l.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators. Mixers etc.		1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details
2l.6	Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.		1	Master T&P List with internal & external test details
2l.7	Availability of Tags & Inspection Certificates for Batching plants		1	Master T&P List with internal & external test details

**POWER SECTOR- HQ**

FORMAT NO: HSEP:14-F33

REV NO.: 00

PAGE NO. 02 OF 3

Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
2m.1	Use of Lifting Permit as per requirement		1	Permit Records
2m.2	Use of Height Permit as per requirement		1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		1	Permit Records
2m.4	Use of Excavation permit as per requirement		1	Permit Records
2m.5	Use of Confined space work permit as per requirement		1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		1	Permit Records
2m.7	Use of Lockout-Tag out permit as per requirement		1	Permit Records
2m.8	Use of Radiography permit as per requirement		1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		1	Inspection/ non-conformity records
3b	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	M	1	
3d	Availability of rest rooms for workers at site	M	1	
3e	Availability of Drinking water facility at work spot		1	
3f	Hygienic Labour colony is provided for workers.		1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		1	Work Permit records
4b	Whether area below lifting activities barricaded		1	Inspection/ non-conformity records
4c	Availability of experienced rigging foreman		1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		1	
5a	Whether all deep excavation has been protected by barrier		1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		1	-do-
5c	Proper access and egress provided for excavations?		1	-do-
5d	Blasting is done in controlled manner?		2	-do-
6a	Whether Electrical booth is equipped with Co ₂ fire extinguishers and fire buckets filled with sand?		2	Inspection/ non-conformity records
6b	Availability of Illumination lamp in electric booth?		1	-do-
6c	whether Caution Boards have been displayed?		1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		1	-do-
6e	Usage of Insulated welding cables.		1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		1	-do-
6g	Availability of functional & individual 30mA ELCB / RCCB and MCB for protection and conducting periodical check-up?		1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		1	-do-
6i	Whether Electrician is qualified and experienced		1	Qualification & Experience records of electrician
6j	Availability and usage of Rubber hand gloves by electrician?		1	Inspection/ non-conformity records

	POWER SECTOR- HQ	FORMAT NO: HSEP:14-F33
	Checklist for Evaluation of HSE Performance	REV NO.: 00 PAGE NO. 03 OF 3

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
7a	Whether Scaffolding pipes made with steel or aluminum, are being used and checked periodically by experienced/ certified scaffolder?		2	Inspection/ non-conformity records
7b	8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work?		2	-do-
7c	Availability of emergency lighting in case of power failure		1	-do-
7d	Whether all the openings are covered with Safety Nets made of fire proof Nylon?		1	-do-
7e	Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard ?		1	-do-
7f	Whether Ladder with vertical life line /Fall arrestor is available to climb?		1	-do-
7g	Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test?		1	Height Pass records
7h	Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt?		1	PPE Issue records, inspection/ non-conformity reports
7i	Is all hand tools/Small material used by height workers is tied firmly to prevent fall?		1	-do-
8a	Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side		1	Inspection/ non-conformity records
8b	Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately?		1	-do-
8c	Availability of Face screen, Hand gloves, and Apron, for welders		1	-do-
8d	Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas		1	-do-
9a	Pre-employment medical check-up done for all workers and submitted?		1	Medical check records
9b	Availability of first aid center, with MBBS doctor(Own or Sharing basis)	M	2	Attendance records
9c	Availability of Ambulance facility 24 hours (Own or sharing basis)	M	2	-do-
9d	Is First aid trained personnel's are available and their names are displayed at site?	M	1	-do-
9e	Availability of Emergency vehicle at site		1	
9f	Periodical medical check-up is conducted for all the workers and submitted?		1	Medical check records
9g	Availability of sufficient number of first aid box as per standard list and maintaining record		1	Inspection records
10a	Availability of Fire extinguishers, buckets at all vulnerable points		2	Fire extinguisher records
10b	Periodic fire mock drill conducted?		1	Fire, Mock drill records
10c	Are all flammable materials are stored separately?		1	
10d	Periodic grass cutting is done in material storage area?		1	
10e	Availability of 24V DC lighting in confined space work area		1	
10f	Availability of exhaust fan in confined space work area		1	

Note:

- **M: Mandatory; O: Optional.** Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL
- Additionally: 30 Marks for each Fatal Accident and 10 mark for each major accident shall be deducted.



SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

Subcontractor: _____

BURNING/WELDING /HOT WORK PERMIT

Area : _____ Date: _____ Time: _____

Name of Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Work Performing Contractor: _____

Name of Package In charge: _____ Sign: _____ Date: _____

Description of Work: _____

Work Execution Date: _____ Time Valid from: _____ to _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	Proper Access/Exit available		
2.	Proper ventilation and /or lighting provided.		
3.	Proper and safe scaffolding, platform, ladder provided.		
4.	Welding machine located in a clean and dry area.		
5.	Welding machine grounded at the equipment and proper leakage current protection device (ELCB) provided for welding machine.		
6.	Emergency STOP buttons are in working condition. Welder /Helper knows how to operate it.		
7.	Welding machine input/output cables, welding holder and weld return clamp (Holder) are insulated and in good condition.		
8.	Welder & Fitter trained to connect ground/work return clamps (Holder) to work place prior to energization of welding machine.		
9.	Gas cylinders are stacked vertically and not below the welding / cutting area. Regulator key is available with cylinder.		
10.	Pressure gauges/Flash back arrestor provided and in working condition.		
11.	Personal Protective equipment Minimum applicable: safety helmet, safety goggles, welding helmet, safety shoes, leather gloves, long sleeve and nose mask -provided		
12.	In case of pits, water removed from the pit and wood/rubber insulation provided.		
13.	Safety signboards are in place.		
14.	Adequate and Suitable nos. of fire fighting extinguisher provided.		
15.	Nearby combustible material removed. Housekeeping done.		
16.	Other		

Name of Contractor Safety Officer: _____ Sign: _____ Date: _____ Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name: _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Safety Representative: _____ Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority: _____ **Sign:** _____ **Date:** _____ **Time:** _____**Permit Cancellation:**

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

Name of Work performing Authority: _____ Sign: _____ Date: _____ Time: _____

Name of Site Engr. (Permit Requesting Authority): _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Site Engr. (Permit Issuing Authority): _____ Sign: _____ Date: _____ Time: _____

(This permit is valid only for the date it is issued)

Original at BHEL site

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Third Copy : Contractor



SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

Subcontractor: _____

LIFTING ACTIVITY PERMIT

Area : _____ Date: _____ Time: _____

Name of Site Engineer (Permit Requesting Authority): _____ Sign: _____ Name of Work

Performing Contractor: _____

Name of Package In charge: _____ Sign: _____ Date: _____

Description of Work: _____

Work Execution Date: _____ Time Valid from: _____ to _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	Crane used for lifting activity tested, certified and approved for rated lifting		
2.	All lifting tackles, gears/appliances are tested and certified for lifting works.		
3.	Crane operator is trained and competent for lifting operation.		
4.	Lifting sling/ belt is protected against sharp edge of the jobs to be lifted.		
5.	Access and exit marked and without obstruction.		
6.	Lifting arrangement adequate.		
7.	Unwanted rubbish material removed from work platform.		
8.	Minimum 2 guidelines have been provided for balancing and guiding jobs to be lifted.		
9.	Periphery area of crane booms as well as lifting job is barricaded and unauthorized/no-entry sign board posted.		
10.	Rigger and signal man is trained and competent for lifting work.		
11.	No lifting activity to be carried out during lightening, heavy wind/rain.		
12.	If scaffolding to be used during lift, scaffolding with valid tag available for use.		
13.	Double lanyards safety harness/belt checked and in working condition.		
14.	Safety shoes (non-slip), helmet with chin strap available with employees.		
15.	Others.		

Name of Contractor Safety Officer: _____ Sign: _____ Date: _____ Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name: _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Safety Representative: _____ Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority: _____ **Sign:** _____ **Date:** _____ **Time:** _____**Permit Cancellation:**

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

Name of Work performing Authority: _____ Sign: _____ Date: _____ Time: _____

Name of Site Engr. (Permit Requesting Authority): _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Site Engr. (Permit Issuing Authority): _____ Sign: _____ Date: _____ Time: _____

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SAFETY WORK CLEARANCE

Permit no. _____

Project: _____

Emergency Contact Nos: _____

Subcontractor: _____

WORKING AT HEIGHT PERMIT

Area : _____ Date: _____ Time: _____

Name of Site Engineer (Permit Requesting Authority): _____ Sign: _____ Name of Work

Performing Contractor: _____

Name of Package In charge: _____ Sign: _____ Date: _____

Description of Work: _____

Work Execution Date: _____ Time Valid from: _____ to _____

The above signing person(s) will be responsible to ensure that the above described work will be done under all the safety precautions mentioned on the permit to work.

The following precautions are to be taken:

No.	Item	Yes	Not required
1.	All workers on job are medically fit for working at height (Person should not have vertigo)		
2.	Scaffolding with valid tag available for use		
3.	Safety harness with life line support/ fall arrester are checked and in working condition		
4.	Safety shoes (non-slip), Helmet with chin strip available with employees		
5.	Safety nets are provided as per design and provided 25 ft. below working area & extending 8 ft beyond.		
6.	Horizontal life lines are provided to cater to design specification of 2300kg per person.		
7.	Ladders have been inspected and provided as per BHEL standard/contract.		
8.	All lifting / tightening tools, hand tools/equipment checked and in good condition		
9.	Access and exit marked and without obstruction.		
10.	Lighting arrangement adequate.		
11.	Unwanted and rubbish material removed from working platform.		
12.	Electrical cable, welding Hose/Compressed air hose properly secured and lay down without obstruction.		
13.	Signboards provided on working platforms		
14.	Hazards in the vicinity are identified and communicated to the worker.		
15.	Other		

Name of Contractor Safety Officer: _____ Sign: _____ Date: _____ Time: _____

Reviewed and approved by BHEL Site Engineer (Permit Issuing Authority):

Name: _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Safety Representative: _____ Sign: _____

I understand the precaution to be taken as described above and as per project requirement and hereby confirm that work will be executed under my supervision by following all precaution and Safety Rules.

Name of Work Performing Authority: _____ **Sign:** _____ **Date:** _____ **Time:** _____**Permit Cancellation:**

I hereby declare that the work is complete, all workers under my control have been withdrawn and the site restored to safe tidy condition.

Name of Work performing Authority: _____ Sign: _____ Date: _____ Time: _____

Name of Site Engr. (Permit Requesting Authority): _____ Sign: _____ Date: _____ Time: _____

Name of BHEL Site Engr. (Permit Issuing Authority): _____ Sign: _____ Date: _____ Time: _____

(This permit is valid only for the date it is issued)

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Project		Vendor			Package/Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents`
#1.01	Cumulative number of days in the month, the nominated Quality Officer or his authorised nominee was not available	QUALITY	1.5		Quality Officer or his authorised nominee should be available for all the days of working at site	Daily Log Book entry/Incident Registers/letter references
#1.02	Number of instances of non- compliance wrt FQP, Standard Drawings, Specifications, E&C Manuals etc.	QUALITY	1.5		No deviation from FQP, Standard Drawings, Specifications, E&C Manuals etc. is allowed without BHEL Engineer's approval.	Daily Log Book entry/Incident Registers/letter references
#1.03	Percentage submission of test certificates for batches of welding electrodes, cement, sand, aggregate, consumable, Paints etc. as applicable for this month OR In case of MM & MH package, monthly checks for Storage/Preservation of material.	QUALITY	1		Submission of 100% Test certificates for materials as per FQP is mandatory. MM & MH package: Storage/Preservation as per manual/procedure.	Daily Log Book entry/Incident Registers/letter references
#1.04	Number of incidences of improper storage & preservation (not in accordance to the guidelines of BHEL MUs or approved FQP) of materials, consumables (viz. gases, welding electrodes & fluxes, fuel etc.) & bought-out items (paints, fasteners etc.) under the custody of the contractor	QUALITY	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#1.05	Rework/ Rejection instances in a month necessitated due to deviation from Standard Drawings /Specifications /Manuals /E&C procedures /FQPs or due to Poor Workmanship by contractor	QUALITY	2		Reworks/ Rejection should be as minimum as possible. Total number of reworks/ rejections due to reasons attributable to contractor.	Daily Log Book entry/Incident Registers/letter references
#1.06	Delay in preparation & submission of signed protocols / log sheets / site register / NDT test reports as per approved FQP/ Qualified Welder List along with photocopies of Welder ID cards / Welder Performance Evaluation records etc. in the month OR in case of MM / MH package reconciliation statement / verification report.	QUALITY	1		Within 2 days of measurements taken or within first 3 working days of next month, as advised by BHEL Engineer	Daily Log Book entry/Incident Registers/letter references
#1.07	Number of instances for Major equipment/product failure due to negligence/improper work/poor workmanship by contractor	QUALITY	1		No such event should happen	Daily Log Book entry/Incident Registers/letter references
#1.08	Total number of complaints received in the month on the quality of finish / aesthetics	QUALITY	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents`
#2.01	Cumulative number of days of delay in submission of Plan FOR THE MONTH supported by deployment plan of Major T&Ps and Manpower (as per Form F-14) and relevant construction/layout drawings - like A4 plan / elevation views of plan status for structures / pressure parts/Civil Works, Piping isometrics for piping, Layout / PID / System reference sketch, Unloading / storage plans etc.as applicable.	PERFORMANCE	5		Number of days delayed from second working day of the month	Daily Log Book entry/Incident Registers/letter references
#2.02	Percentage of timely submission of Daily Reports for Progress of work, Resources, Consumables etc.	PERFORMANCE	1.5		Percentage of timely submission of daily reports/ Scheduled date is successive next day for each day	Daily Log Book entry/Incident Registers/letter references
#2.03	Number of days delayed for submission of FQP log sheets / protocols / Monthly Progress Reports for the work executed during the month under measurement	PERFORMANCE	1.5		Number of days delayed/Scheduled date is first 2 working days of next month	Daily Log Book entry/Incident Registers/letter references
#2.04	Shortfall attributable to contractor w.r.t. Plan as per Form-14 for the subject month	PERFORMANCE	35		Percentage of shortfall to be calculated w.r.t. Total planned target for the month as per part-A of F-14. If more than one work has been planned in a month then Weightages of works shall be assigned at the time of plan to arrive at plan vs achievement calculation.	Progress review formats
#2.05	Number of days delayed in submission of Running bills with complete supporting documents (including updated reconciliation statement of BHEL issued material) for the month	PERFORMANCE	2		Number of days delayed / Scheduled date is 7th day of next month	Daily Log Book entry/Incident Registers/letter references
#2.06	Number of times the Top Management of contractor did not respond to critical issues of site, for the month	PERFORMANCE	1		Total number of instances	Daily Log Book entry/Incident Registers/letter references
#2.07	Cumulative number of days in the month the works were stopped / refused on interpretation of contract clauses/scope due to tendency of taking undue advantage by interpreting contract clauses in their favour	PERFORMANCE	2		Cumulative number of days lost	Daily Log Book entry/Incident Registers/letter references
#2.08	Number of times rework was refused by contractor	PERFORMANCE	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents`
#2.09	Cumulative number of days in the month recording / logging was not done in daily log / history register / hindrance register / soft form in a PC maintained at BHEL Site Office	PERFORMANCE	1		Cumulative number of days recording or logging was not done / all days of the month	Daily Log Book entry/Incident Registers/letter references
#3.01	Number of days of non-availability of required Manpower including supporting staff as per plan submitted in F-14 for the month.	RESOURCES	7		Cumulative number of days Sufficient Manpower was not available as per Plan in F-14	Daily Log Book entry/Incident Registers/letter references
#3.02	Number of days of non-availability of required T&P as per plan submitted in F-14 for the month.	RESOURCES	7		Cumulative number of days Sufficient T&P was not available as per Plan in F-14	Daily Log Book entry/Incident Registers/letter references
#3.03	Cumulative number of major instances in the month hampering / affecting progress of work due to breakdown or non-availability of major T&P and MME for the work, under the scope of Contractor	RESOURCES	3		Cumulative number of instances	Daily Log Book entry/Incident Registers/letter references
#3.04	Cumulative number of major instances in the month hampering / affecting progress of work due to non-availability of Consumables/ use of improper consumables under the scope of contractor	RESOURCES	3		Cumulative number of instances	Daily Log Book entry/Incident Registers/letter references
#4.01	Number of non-compliances during the month for Statutory requirements like validity of Labour Licence, Insurance Policy, Labour Insurance, PF, BOCW Compliance etc. and any other applicable laws/ Regulation, Electrical Licence, T&P fitness certificate, Contractors' All Risk Policy etc. as applicable	SITE INFRASTRUCTURE & SERVICE	1		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#4.02	Cumulative number of days in a month poor illumination is reported at storage area, erection area, pre-assembly area and other designated areas by BHEL site.	SITE INFRASTRUCTURE & SERVICE	0.5		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.03	Cumulative number of days of non-availability of well-maintained toilets facilities for workers (separate for men and women) and non-availability of potable drinking water stations for workers in specified areas.	SITE INFRASTRUCTURE & SERVICE	1		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents`
#4.04	Total number of instances in the month, Housekeeping NOT attended to in spite of instructions by BHEL -i.e. removal / disposal of surplus earth / debris / scrap / unused / surplus cable drums / other electrical items / surplus steel items / packing materials, thrown out scrap like weld butts, cotton waste etc. from the working area to identified locations	SITE INFRASTRUCTURE & SERVICE	2		Total number of non-compliances/random checks	Daily Log Book entry/Incident Registers/letter references
#4.05	Total number of instances in a month, Site Office with reasonably good facilities including enough nos. of computers and printers etc. for use by office and supporting staff was not made available/maintained.	SITE INFRASTRUCTURE & SERVICE	0.5		No discrepancy during regular or surprise visits	Photograph and report of the Engineer
#5.01	Number of days delayed in making labour payments for the last month	SITE FINANCE	2		Number of days delayed / Scheduled date is 7th day of next month	Daily Log Book entry/Incident Registers/letter references
#5.02	Number of complaints from labour/ sub supplier/ sub-contractor for non-receipt of payments from contractor	SITE FINANCE	1.5		Total number of complaints or reporting	Daily Log Book entry/Incident Registers/letter references
#5.03	Number of times the site operations were hampered for want of funds at the disposal of site-in-charge.	SITE FINANCE	1.5		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#6.01	Cumulative number of days in a month the nominated Safety Officer was not available	HSE & SA	1		Safety Officer should be available for all the days	Daily Log Book entry/Incident Registers/letter references
#6.02	Shortfall in number of weekly safety meetings in the month conducted or attended by the Safety Officer	HSE & SA	0.5		Safety meetings to be held every week	Copy of Minutes of meeting
#6.03	Level of compliance w.r.t decisions taken in previous Safety meetings	HSE & SA	0.5		Number of consolidated issues discussed in Safety meetings	Copy of Minutes of meeting, Non-compliance intimation documents from BHEL site
#6.04	Delay in submission of monthly report on safety (including electrical safety for equipment & personnel etc.) in the prescribed form	HSE & SA	1		Number of days delayed/Scheduled date is third working day of next month	Daily Log Book entry/Incident Registers/letter references
#6.05	Number of days taken for lodging FIRs from date of occurrence/notice of incident of theft / accident etc.	HSE & SA	0.5		Number of days delayed/Scheduled date is within 24 Hrs of occurrence/notice of incidence	Copy of FIR lodged by Contractor

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

Project		Vendor			Package/Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents`
#6.06	Number of times written(email, letters etc.) warning issued for non-availability/ use of improper Fall protection and rescue arrangement as lifeline, fall arrestors, safety net, hand-railings, covered floors, man-basket, rescue basket & kit etc. by the contractor	HSE & SA	2		Total number of non-compliances	Daily Log Book entry/Incident Registers/letter references
#6.07	Number of times punitive fines imposed for unsafe practices as per contract like non-availability/use of PPEs as safety shoes, helmets, goggles, gloves, lifeline, safety belts etc.	HSE & SA	1		Total number of non-compliances	Non-compliance intimation documents from BHEL site
#6.08	Percentage compliance to Emergency preparedness and response plan: Portable Fire-extinguishers, Buckets, Fire-wardens, display of emergency numbers, mock-drills, Hazard Identification and Risk Assessment(HIRA) etc.	HSE & SA	1		Compliance should be 100% as per HSE Plan or as finalized in Safety Meetings	Non-compliance intimation documents from BHEL site
#6.09	Number of times the agency has defaulted on display of safety posters / safety slogans / safety barriers/emergency numbers etc. in identified areas	HSE & SA	0.5		Total number of instances	Non-compliance intimation documents from BHEL site
#6.10	Non compliances observed during HSE and Safety Audit	HSE & SA	0.5		Total number of non-compliances	Non-compliance intimation documents from BHEL site, Audit Reports
#6.11	Cumulative number of days in the month, non-availability of First Aid Kit, First Aider & Emergency Vehicles/Ambulance.	HSE & SA	0.5		Cumulative number of days	Non-compliance intimation documents from BHEL site
#6.12	Number of days taken for submission of Root Cause analysis (RCA) for the accident from the cut-off date intimated by BHEL for submission of RCA	HSE & SA	0.5		Number of days delayed/Scheduled date is cut-off date intimated by BHEL	Daily Log Book entry/Incident Registers/letter references
#6.13	Non conductance of training (induction, job specific, height work etc.), tool box meeting and health check-up as per Contract requirements	HSE & SA	0.5		Number of incidences of non-conductance during the month	Daily Log Book entry/Incident Registers/letter references
Total			100			

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

MONTHLY PERFORMANCE EVALUATION OF CONTRACTOR

Form No.: F-15 (Rev 02)

Page 6 of 6

Project		Vendor			Package/Unit	
SL	Parameter for Measurement	Classification	Max Score	Score Obtained	Measurement Key/Scheduled date	Supporting Documents`
	Less Deduction in Score Due to Major Accidents (Fatal, Permanent Disability or bodily injury by which person injured is prevented to resume to work within 48 hours or more after accident,, Major Damage to Equipment etc.) @ 3 points/ accident					
	Less Deduction in Score Due to Minor Accidents(All Others) @ 1 point/ accident					
	Less Deduction in Score Due to not Maintaining of Labour Colony (if applicable) as per BHEL HSE policy @2 points in a month on verification any day					
	Final Score					

Performance Score Summary for the Month	Total Score	Score Obtained
QUALITY	10	
PERFORMANCE	50	
RESOURCES	20	
SITE INFRASTRUCTURE & SERVICE	5	
SITE FINANCE	5	
HSE & SA	10	
OTHERS (deductions if any)	0	
TOTAL	100	

Name and Signature of BHEL Package In-charge

Name and Signature of Contractor

 PSSR	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page 2 of 6
Name of Project	Contract No.	
Name of Work	Name of Contractor	

PART- A: Contd.....

Note 1: In addition to the work planned as per Col. 'A', Contractor shall also make full efforts to minimize the 'Cumulative shortfall attributable to contractor upto the month' as mentioned in Col. 'B' by enhancing its resources, so as to achieve the completion of activities as per agreed schedule. In case contractor is not able to execute the entire shortfall, then BHEL 'Engineer in-charge', shall decide the priority of work to be executed and it shall be binding on the contractor.

Note 2: Percentage Shortfall attributable to contractor w.r.t. "Plan - Shortfall attributable to BHEL" for the month = $[(\Sigma E - \Sigma B) / (\Sigma A - \Sigma D)] \times 100$
 In case, $(\Sigma E - \Sigma B)$ is negative, then it shall be treated as zero percent."

Note 3: Form 14 should include all items being planned in the current month, and all items against which shortfall was attributable to contractor till previous month. However, for practical reason, if it is not possible to mention some of the items in Form-14 being planned to be executed in this month, then also value of such items shall necessarily be included in calculation of Total Value.

Note 4: In case reason for shortfall attributable to contractor is w.r.t. T&P and Manpower, it should be in conformity with Part B1 and B2.

BHEL
 (Sign with name, designation and date)

CONTRACTOR
 (Sign with name, designation and date)

Name of Project		Contract No.
Name of Work		Name of Contractor

PART – B-1: PLAN/REVIEW OF DEPLOYMENT OF MAJOR T&Ps FOR THE MONTH OF CONTRACTOR'S SCOPE:-

Date of Plan/ Review.....

[illegible]

Note: In case, $E > B$, it shall be considered as $E = B$. Similarly, in case $D > A$, it shall be considered as $D = A$.
Percentage of T&P Deployed = $\Sigma F / 100$

BHIEL SCOPE: -

SN.	PLAN			DEPLOYMENT STATUS		
	Major T&P to be deployed as per work planned for the month	QTY	Deployment Period (in days)	Actual Deployed Quantity	Actual Deployment Period (in days)	REMARKS (Works affected due to non-deployment of T&Ps)

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

 PSSR	MONTHLY PLAN & REVIEW WITH CONTRACTOR	Page 4 of 6
Name of Project	Contract No.	
Name of Work	Name of Contractor	

PART – B-2: PLAN/ REVIEW OF DEPLOYMENT OF MANPOWER FOR THE MONTH OF

Date of Plan/ Review

CONTRACTOR'S SCOPE: -

SN.	Area of Work	Category of Labour	No. of Labour required as per category	Deployment Period (in days)	No. of Labour actually deployed	Actual Deployment Period (in days)	REMARKS (Works affected due to non-availability of labour)
			A	B	C	D	

 Percentage of Manpower Deployed = $100 \times \Sigma(CxD) / \Sigma(AxB)$

BHEL

(Sign with name, designation and date)

CONTRACTOR

(Sign with name, designation and date)

Name of Project		Contract No.
Name of Work		Name of Contractor

PART – C: PLAN(PHYSICAL) FOR THE NEXT MONTH i.e.

[illegible]

Note 1: Planned quantity should be based on available/ expected fronts/ inputs in the next month

Note 2: “Original Planned Quantity” shall be as per latest jointly agreed programme between BHEL and Contractor before commencement of work or at the time of latest Time Extension, as the case may be.

BHEL
(Sign with name, designation and date)

CONTRACTOR
(Sign with name, designation and date)

 PSSR	MONTHLY PLAN & REVIEW WITH CONTRACTOR		Page 6 of 6

Name of Project		Contract No.	
Name of Work		Name of Contractor	

PART – D: REASONS FOR SHORTEALL ATTRIBUTABLE TO BHEL IN RESPECT OF PLAN FOR THE MONTH.....

SN.	Description of Work (from Part-A)	Quantities Affected		Reasons for Shortfall attributable to BHEL	Agency responsible for reasons for Shortfall	Remarks (Supporting Documents in respect of agency responsible)
		(Physical Quantity)	Unit of Measu- rement			
1	2	3	4	5	6	7

Note1: Reasons for shortfall shall include non-availability of fronts/ drawings/ materials/ T&P (BHEL Scope)/ clearances etc. and other hindrances for which contractor is not responsible.

Note2: Agency responsible may be BHEL Site/ MUs/ Design Centre/ BHEL Customer/ other Contractors etc.

BHEL
(Sign with name, designation and date)

PROFORMA OF BANK GUARANTEE (in lieu of EARNEST MONEY)
(On non-Judicial paper of appropriate value)
(Para 4.7.6 of Works Accounts Manual)

Bank Guarantee No.....

Date.....

To
(Employer's Name and Address)

.....

Dear Sirs,

In accordance with the terms and conditions of Invitation for Bids/Notice Inviting Tender No.....¹ (Tender Conditions), M/s. ² having its registered office at ³ (hereinafter referred to as the 'Tenderer'), is submitting its bid for the work of.....⁴ invited by Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at *BHEL House, Siri Fort, Asiad, New Delhi – 110049* through its unit at *Bharat Heavy Electricals Limited, Power Sector Southern Region, 690, Anna Salai, Nandanam, Chennai 600035*

The Tender Conditions provide that the Tenderer shall pay a sum of Rs ⁵ as Earnest Money Deposit in the form therein mentioned. The form of payment of Earnest Money Deposit includes Bank Guarantee executed by a Scheduled Bank.

In lieu of the stipulations contained in the aforesaid Tender Conditions that an irrevocable and unconditional Bank Guarantee against Earnest Money Deposit for an amount of ⁶ is required to be submitted by the Tenderer as a condition precedent for participation in the said Tender and the Tenderer having approached us for giving the said Guarantee,

we, the(Name & address of the Bank)
..... having our Head Office at
.....(hereinafter referred to as the Bank) being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of Rs.....⁶ (in words Rupees.....) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ⁶

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Tenderer in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

We Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Tender or to extend the time of submission of from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said

Tenderer and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Tenderer or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Tenderer or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Tenderer and notwithstanding any security or other guarantee that the Employer may have in relation to the Tenderer's liabilities.

This Guarantee shall be irrevocable and shall remain in force upto and including.....⁷ and shall be extended from time to time for such period as may be desired by the Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Tenderer but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the ⁸ we shall be discharged from all liabilities under this Guarantee.

We, ... Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁶
- b) This Guarantee shall be valid up to ⁷
- c) Unless the Bank is served a written claim or demand on or before ⁸ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank

We, ... Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

(Signature of Authorised signatory)

Date.....

Place of Issue.....

¹ Details of the Invitation to Bid/Notice Inviting Tender (Tender Ref. No. Eg. - BHEL PSSR SCT XXXX)

² Name of Tenderer

³ REGISTERED Office Address of the Tenderer

⁴ Details of the Work i.e Tender Description

⁵ EMD Amount as mentioned in Notice Inviting Tender

⁶ BG Amount in words and Figures (BG Amount shall be Minimum of EMD amount less Rs. 2 Lakhs)

⁷ Validity Date

⁸ Date of Expiry of Claim Period (Claim Period shall be minimum of 3 Months after the validity date of Bank Guarantee)

Note:

- 1. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.
- 2. In Case of Bank Guarantees submitted by Foreign Vendors-

- a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
- b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor Country's Bank)
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

(On non-Judicial paper of appropriate value)

(Para 4.7.6 of Works Accounts Manual)

Bank Guarantee No.....

Date.....

To

(Employer's Name and Address)

.....

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at *BHEL House, Siri Fort, Asiad, New Delhi – 110049* through its unit at *Bharat Heavy Electricals Limited, Power Sector Southern Region, 690, Anna Salai, Nandanam, Chennai 600035* having agreed to exempt

_____ ¹ (Name of the Vendor / Contractor / Supplier) with its registered office at _____ ² (hereinafter called the said "Contractor" which term includes supplier), from demand under the terms and conditions of the Contract arising vide Letter of Intent (LOI) reference No. _____ dated _____ ³ valued at Rs. _____ ⁴ (Rupees _____ only) ⁴ (hereinafter called the said Contract), of Security Deposit for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs. _____ ⁵ (Rupees _____ only),

We, the (Name & address of the Bank) having our Head Office at (hereinafter referred to as the Bank), at the request of _____ [Contractor(s)], being the Guarantor under this Guarantee, do hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer, an amount not exceeding Rs. _____ without any demur, immediately on demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand

Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ ⁵.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment.

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) or acceptance of the final bill or discharge of this guarantee by the Employer, whichever is earlier. This guarantee shall initially remain in force upto and including _____ ⁶ and shall be extended from time to time for such period as may

be desired by the Employer. Unless a demand or claim under this guarantee is made on us in writing on or before the _____⁷, we shall be discharged from all the liability under this guarantee thereafter.

We, _____ (indicate the name of the Bank) further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

We, ... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁵
- b) This Guarantee shall be valid up to ⁶
- c) Unless the Bank is served a written claim or demand on or before _____⁷ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

Date _____ Day of _____ for _____ (indicate the name of the Bank)

(Signature of Authorised signatory)

¹ NAME OF VENDOR /CONTRACTOR / SUPPLIER

² REGISTERED OFFICE ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ LETTER OF INTENT(LOI) REFERENCE NO. WITH DATE

⁴ CONTRACT VALUE (AS MENTIONED IN LOI)

⁵ BG AMOUNT IN FIGURES AND WORDS

⁶ VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD (CLAIM PERIOD SHALL BE MINIMUM OF 3 MONTHS AFTER VALIDITY DATE)

Note:

1. The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.
2. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor Country's Bank)
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:
2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings. If BHEL is to initiate Conciliation, then, the invitation to Conciliate shall be extended to the concerned Stakeholder in **Format 7** hereto. Where the stakeholder is to initiate the Conciliation, the notice for initiation of Conciliation shall be sent in **Format-8** hereto.
3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.
4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL. The appointment of Conciliator(s) shall be completed and communicated by the concerned Department/Group of BHEL Unit/Division/Region/Business Group to the other party and the Conciliator(s) within 30 days from the date of acceptance of the invitation to conciliate by the concerned party in the **Format-9**. The details of the Claim, and counter-claim, if any, shall be intimated to the Conciliator(s) simultaneously in **Format-5**.
5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.
6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

- 7.** The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within 15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.
- 8.** Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
- 9.** In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
- 10.** Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
- 11.** When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
- 12.** In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
- 13.** Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.
- 14.** In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after

seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.

- 15.** The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
- 16.** Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
- 17.** In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
- 18.** A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
- 19.** The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.
- 20.** Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.
- 21.** Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged

absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

22. The proceedings of Conciliation under this Scheme may be terminated as follows:

- a.** On the date of signing of the Settlement agreement by the Parties; or,
- b.** By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
- c.** By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
- d.** By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
- e.** On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.

23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	Particulars	Amount
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator) In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator)

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on the, Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL. Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region /

Sl No	Particulars	Amount
		Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

- 24.** The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.
- 25.** If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
- 26.** The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
- 27.** Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.
- 28.** The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 4 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
- 29.** The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement,

except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.

- 30.** The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
- a.** Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - b.** admissions made by the other party in the course of the Conciliator proceedings;
 - c.** proposals made by the Conciliator;
 - d.** The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
- 31.** The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
- 32.** None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
- 33.** The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.
- 34.** The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

**STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE
IEC BY BOTH THE PARTIES**

1. Chronology of the Disputes
2. Brief of the Contract/MoU/Agreement/LOI/LOA
3. Brief history of the Disputes:
4. Issues:
5. Details of Claim(s)/Counter Claim(s):

SI. No.	Description of claim(s)/Counter Claim	Amount (in INR)Or currency applicable in the contract	Relevant contract clause

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/ Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/ Counter Claims. The statement of Claims/ Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY BHEL FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

M/s. (Stakeholder's name)

Subject: **NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE CONTRACT BY BHEL**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Dear Sir/Madam,

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which arise out of the above- referred Contract/MoU/Agreement/LOI/LOA are reproduced hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring disputes to conciliation.

In terms of Clause -----of Procedure i.e., Annexure ----- to the Contract/MoU /Agreement / LOI / LOA, we hereby seek your consent to refer the matter to Conciliation by Independent Experts Committee to be appointed by BHEL. You are invited to provide your consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which you might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA.

Please note that upon receipt of your consent in writing within 30 days of the date of receipt of this letter by you, BHEL shall appoint suitable person(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you
Yours faithfully

Representative of BHEL

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

**FORMAT FOR NOTICE INVOKING CONCILIATION CLAUSE BY A
STAKEHOLDER FOR REFERRING THE DISPUTES TO CONCILIATION
THROUGH IEC**

To,

BHEL (Head of the Unit/Division/Region/Business Group)

Subject: **NOTICE FOR INVOCATION OF THE CONCILIATION CLAUSE OF THE
CONTRACT BY A STAKEHOLDER**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Dear Sir/Madam,

As you are aware, with reference to above referred Contract/MoU/Agreement/LOI/LOA, certain disputes have arisen, which, in spite of several rounds of mutual discussions and various correspondences have remained unresolved. The brief particulars of our claims which have arisen out of the above-referred Contract/MoU/Agreement/LOI/LOA are enumerated hereunder:

Sl. No.	Claim description	Amount involved

As you are aware, there is a provision in the captioned Contract/MoU/Agreement/LOI/ LOA for referring inter-se disputes of the Parties to conciliation.

We wish to refer the above-said disputes to Conciliation as per the said Clause of the captioned Contract/MoU/Agreement/LOI/ LOA. In terms of Clause -----of Procedure i.e., Annexure ----- to the Contract/MoU /Agreement / LOI / LOA, we hereby invite BHEL to provide its consent in writing to proceed with conciliation into the above mentioned disputes within a period of 30 days from the date of this letter along with details of counter-claims, if any, which it might have with regard to the subject Contract/ MoU/ Agreement/ LOI/ LOA and to appoint suitable person(s) as Conciliator(s) from the BHEL Panel of Conciliators.

This letter is being issued without prejudice to our rights and contentions available under the contract and law.

Thanking you
Yours faithfully

Representative of the Stakeholder

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.

FORMAT FOR INTIMATION TO THE STAKEHOLDER ABOUT APPOINTMENT OF CONCILIATOR/IEC

To,

M/s. (Stakeholder's name)

Subject: **INTIMATION BY BHEL TO THE STAKEHOLDER AND CONCILIATOR(S) ABOUT APPOINTMENT OF CONCILIATOR/IEC**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

This is with reference to letter dated ----- regarding reference of the disputes arising in connection with the subject Contract No /MoU/Agreement/LOI/LOA to conciliation and appointment of Conciliator(s).

In pursuance of the said letter, the said disputes are assigned to conciliation and the following persons are nominated as Conciliator(s) for conciliating and assisting the Parties to amicably resolve the disputes in terms of the Arbitration & Conciliation Act, 1996 and the Procedure ---- to the subject Contract/MoU/Agreement/LOI/LOA, if possible.

Name and contact details of Conciliator(s)

a)

b)

c)

You are requested to submit the Statement of Claims or Counter-Claims (strike off whichever is inapplicable) before the Conciliator(s) in Format 5 (enclosed herewith) as per the time limit as prescribed by the Conciliator(s).

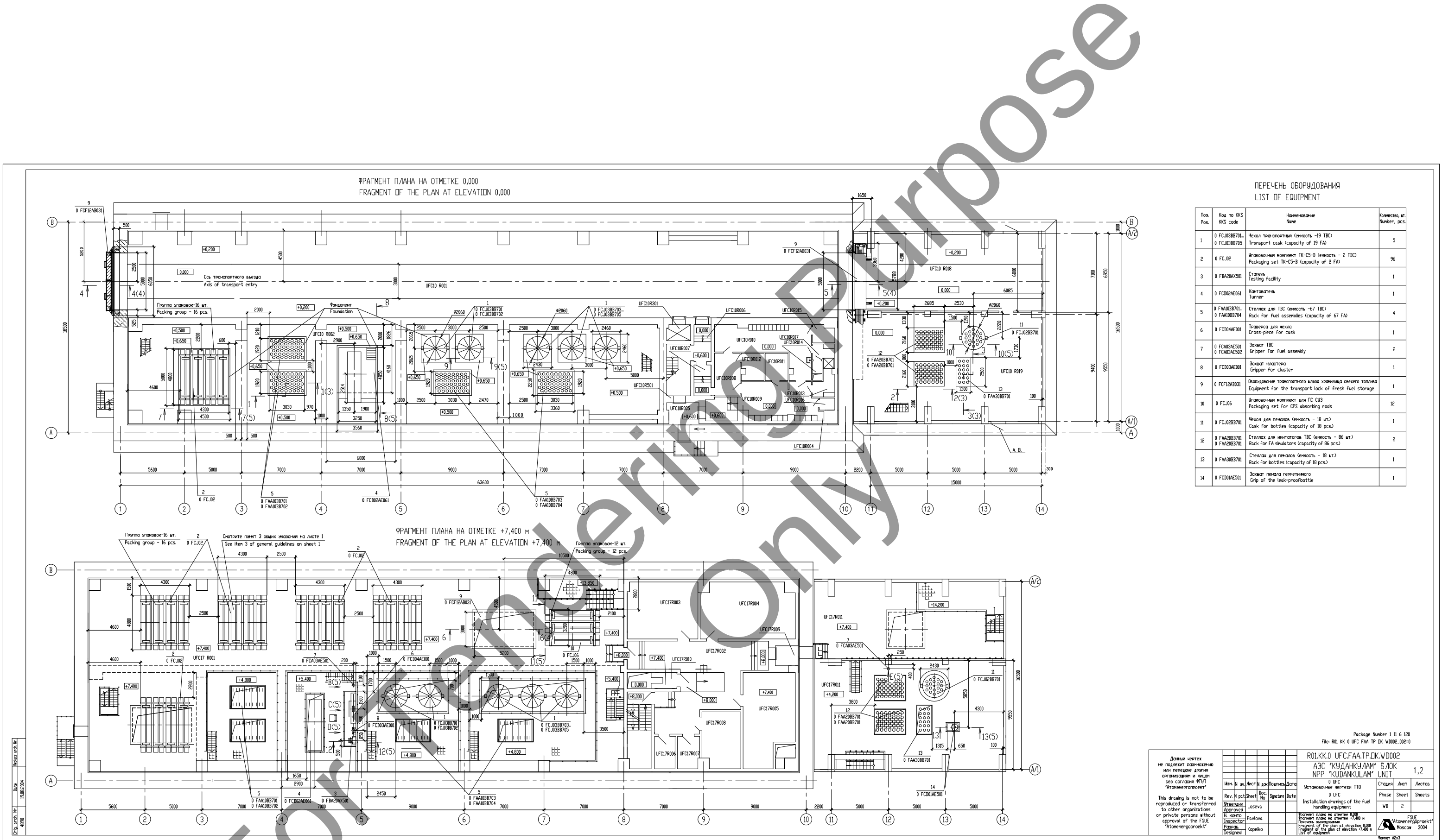
Yours faithfully,

Representative of BHEL

CC: To Conciliator(s)... for Kind Information please.

Encl: As above

Note: The Format may be suitably modified, as required, based on facts and circumstances of the case.



ПЕРЕЧЕНЬ ОБОРУДОВАНИЯ
LIST OF EQUIPMENT

Pos. Pos.	Код по KKS KKS code	Наименование Name	Количество, шт. Number, pcs
1	0 FCJ0388701... 0 FCJ0388705	Чехол транспортный (емкость -19 ТБС) Transport cask (capacity of 19 FA)	5
2	0 FCJ02	Упаковочный комплект ТК-С5-В (емкость - 2 ТБС) Packaging set TK-CS-B (capacity of 2 FA)	96
3	0 FBA20AK501	Станция Testing facility	1
4	0 FCD02AE061	Конвертер Turner	1
5	0 FAA108B701... 0 FAA108B704	Стеллаж для ТБС (емкость -67 ТБС) Rack for fuel assemblies (capacity of 67 FA)	4
6	0 FCD04AE001	Таврица для чехла Cross-piece for cask	1
7	0 FCA03AE501 0 FCA03AE502	Захват ТБС Gripper for fuel assembly	2
8	0 FCD03AE001	Захват кластера Gripper for cluster	1
9	0 FCF12AB031	Оборудование транспортного входа хранения свежего топлива Equipment for the transport lock of fresh fuel storage	1
10	0 FCJ06	Упаковочный комплект для ПС С13 Packaging set for CPS absorbing rods	12
11	0 FCJ02B8701	Чехол для пеналов (емкость - 18 шт.) Cask for bottles (capacity of 18 pcs)	1
12	0 FAA208B701 0 FAA208B701	Стеллаж для имитаторов ТБС (емкость - 86 шт.) Rack for FA simulators (capacity of 86 pcs)	2
13	0 FAA308B701	Стеллаж для пеналов (емкость - 18 шт.) Rack for bottles (capacity of 18 pcs)	1
14	0 FCD01AE501	Захват пенала герметичного Grip of the leak-proof bottle	1

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Изм. N	И	Лист N	до	Подпись	Дата
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Утвержден	Л	И	И	И	И
Approved	Inspector	Pavlova	Inspector	Kopeiko	Designed

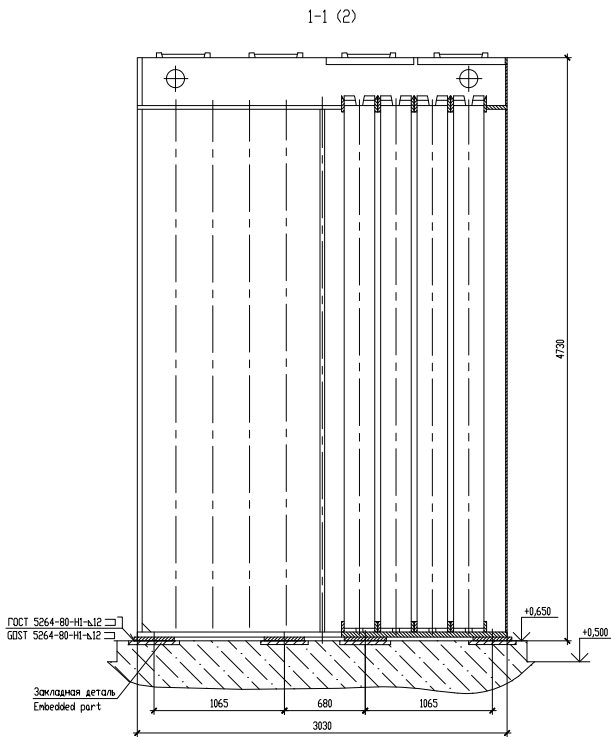
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АЭС "КУДАНКУЛАМ" БЛОК
NPP "KUDANKULAM" UNIT

0 UFC
Установка чертежи ТТО
0 UFC
Installation drawings of the fuel
handling equipment

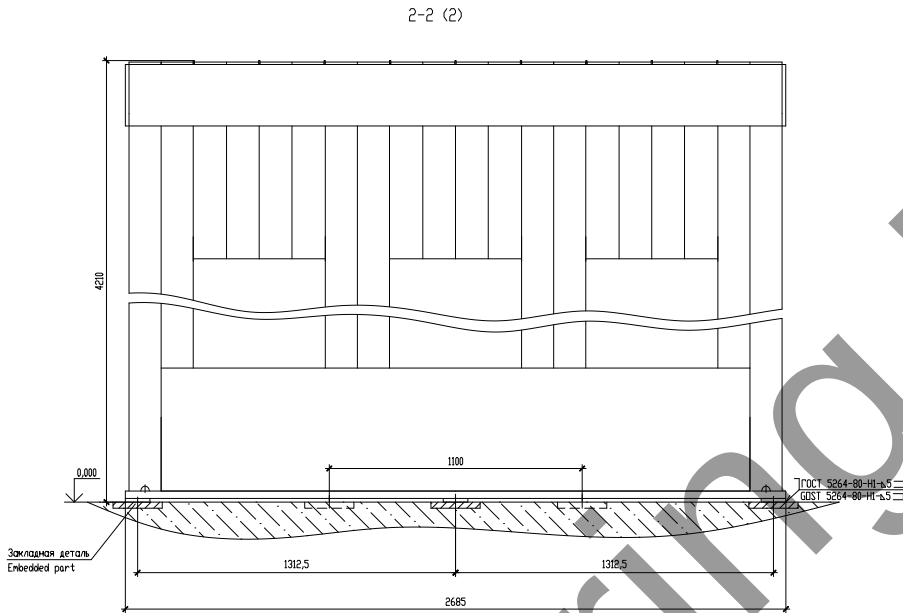
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Формат А3



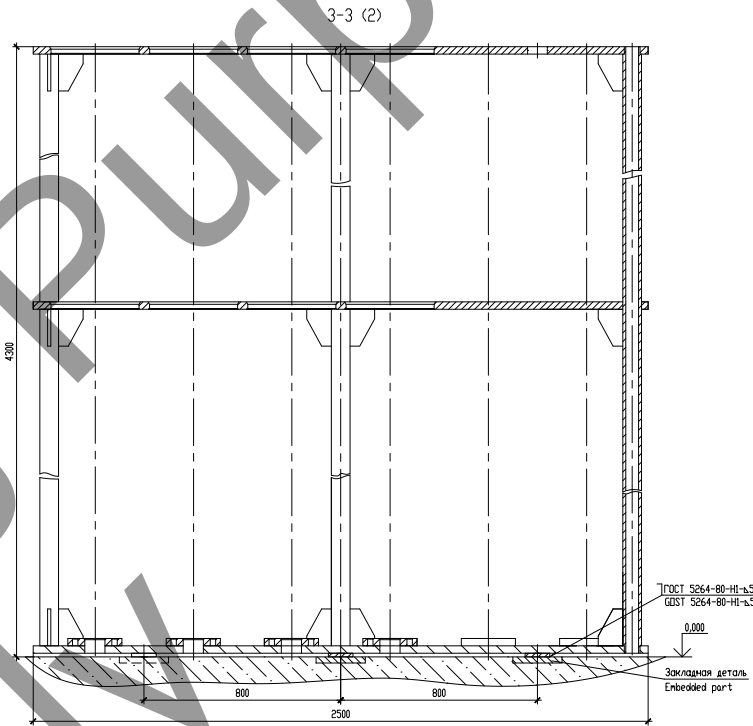
ТЕХНИЧЕСКАЯ ХАРАКТЕРИСТИКА
TECHNICAL CHARACTERISTIC

Наименование Name	Величина Value	Примечание Note
Чехол транспортный Transport cask		
Шаг размещения труб (ячеек) по вершинам равнобедренного треугольника, мм Location pitch of tubes (cells) by the vertices of an equal-sided triangle, mm	400	
Количество ячеек, шт. Number of cells, pcs.	19	
Упаковочный комплект ТК-С5-В Packaging set TK-CS-B		
Количество ТКБ, шт. Number of FA, pcs.	2	
Грузоподъемность, кг Load-lifting capacity, kg	2000	
Станция Testing facility		
Размер "под ключ", мм Dimension "for wrench", mm	235,5	
Кантователь Turner		
Грузоподъемность, кг Load-lifting capacity, kg	4000	
Угол поворота поворотной рамы Turning angle of rotatory frame	90°	
Время полного хода при повороте рамы на 90°, с Time of operating stroke (turn 90°) of frame, s	30	



Наименование Name	Величина Value	Примечание Note
Стеллаж для ТКБ Rack for fuel assemblies		
Количество труб (ячеек) в стеллаже, шт. Number of tubes (cells) in the rack, pcs.	67	
Наружный размер "под ключ" шестигранной трубы (ячейки), мм Outer dimension "for wrench" of hexagonal tube (cell), mm	257	
Толщина стенки шестигранной трубы (ячейки), мм Wall thickness of hexagonal tube (cell), mm	6	
Шаг размещения труб (ячеек) по вершинам равнобедренного треугольника, мм Location pitch of tubes (cells) by the vertices of an equal-sided triangle, mm	300	
Платформа для чехла Cross-piece for cask		
Грузоподъемность, кг Load-lifting capacity, kg	30000	
Захват ТКБ Gripper for fuel assembly		
Грузоподъемность, кг Load-lifting capacity, kg	1200	
Захват кластера Gripper for cluster		
Грузоподъемность, кг Load-lifting capacity, kg	22	

Наименование Name	Величина Value	Примечание Note
Оборудование транспортного шлюза хранения свежего топлива Equipment for the equipment lock of fresh fuel storage		
Ворота распорные Sling gate		
Механизм герметизации, шт. Sealing mechanism, pcs.	8	
Мощность электродвигателя, кВт Motor capacity, kW	0,25	
Механизм перемещения, шт. Displacement mechanism, pcs.	2	
Мощность электродвигателя, кВт Motor capacity, kW	0,75	
Масса металлоконструкции, кг Mass of metal structure, kg	43000	
Ворота откатные Sliding gate		
Скорость передвижения ворот, м/с (м/мин) Gate traveling speed, m/s (m/min)	0,027 (1,64)	
Время передвижения ворот, с (мин) Gate traveling time, s (min)	204 (3,4)	
Масса ворот, кг Mass of gate, kg	56000	
Люк Hatch		
Механизм герметизации, шт. Sealing mechanism, pcs.	4	
Мощность электродвигателя, кВт Motor capacity, kW	0,25	
Масса люка, кг Mass of hatch, kg	26000	



ТЕХНИЧЕСКИЕ ТРЕБОВАНИЯ

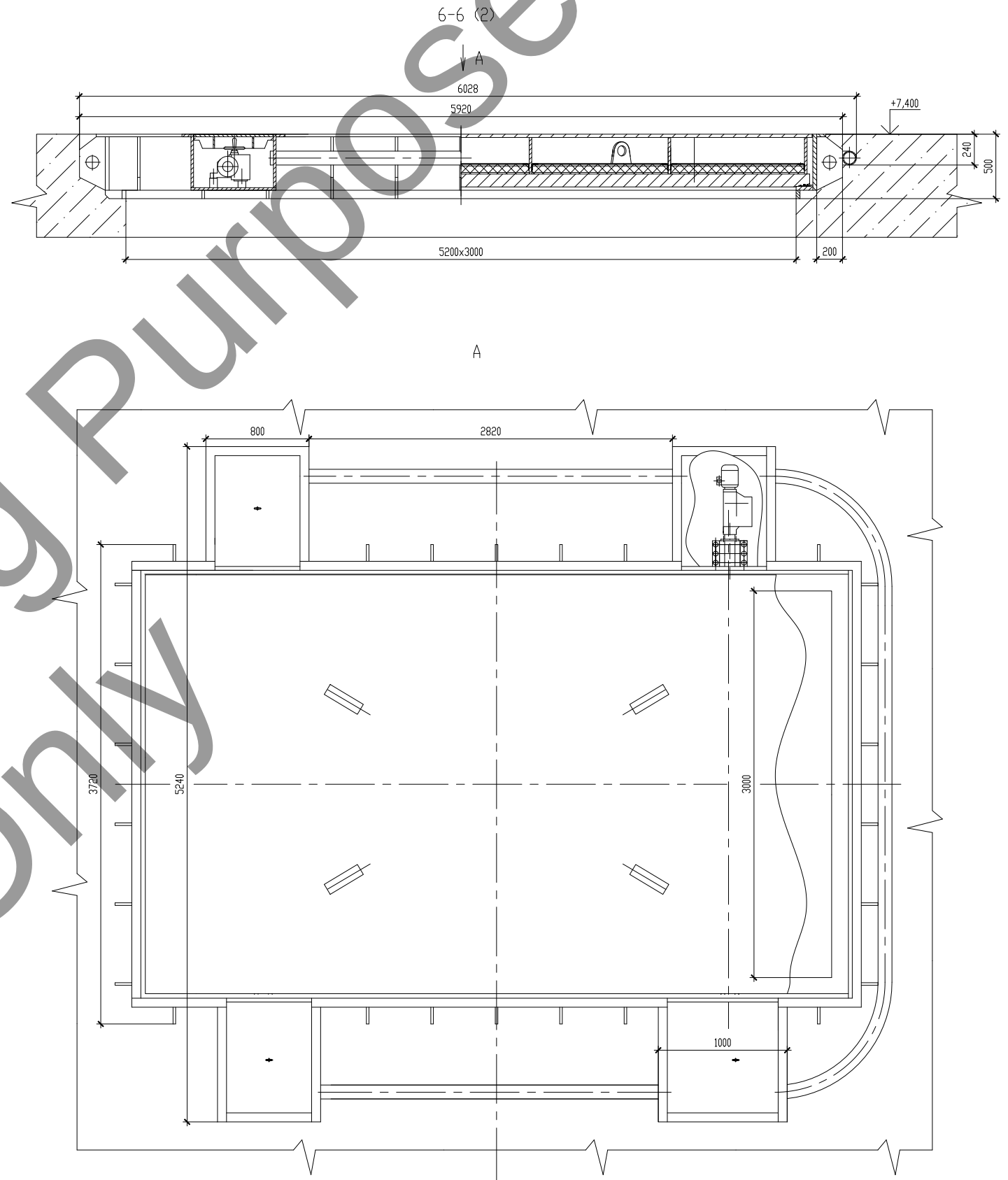
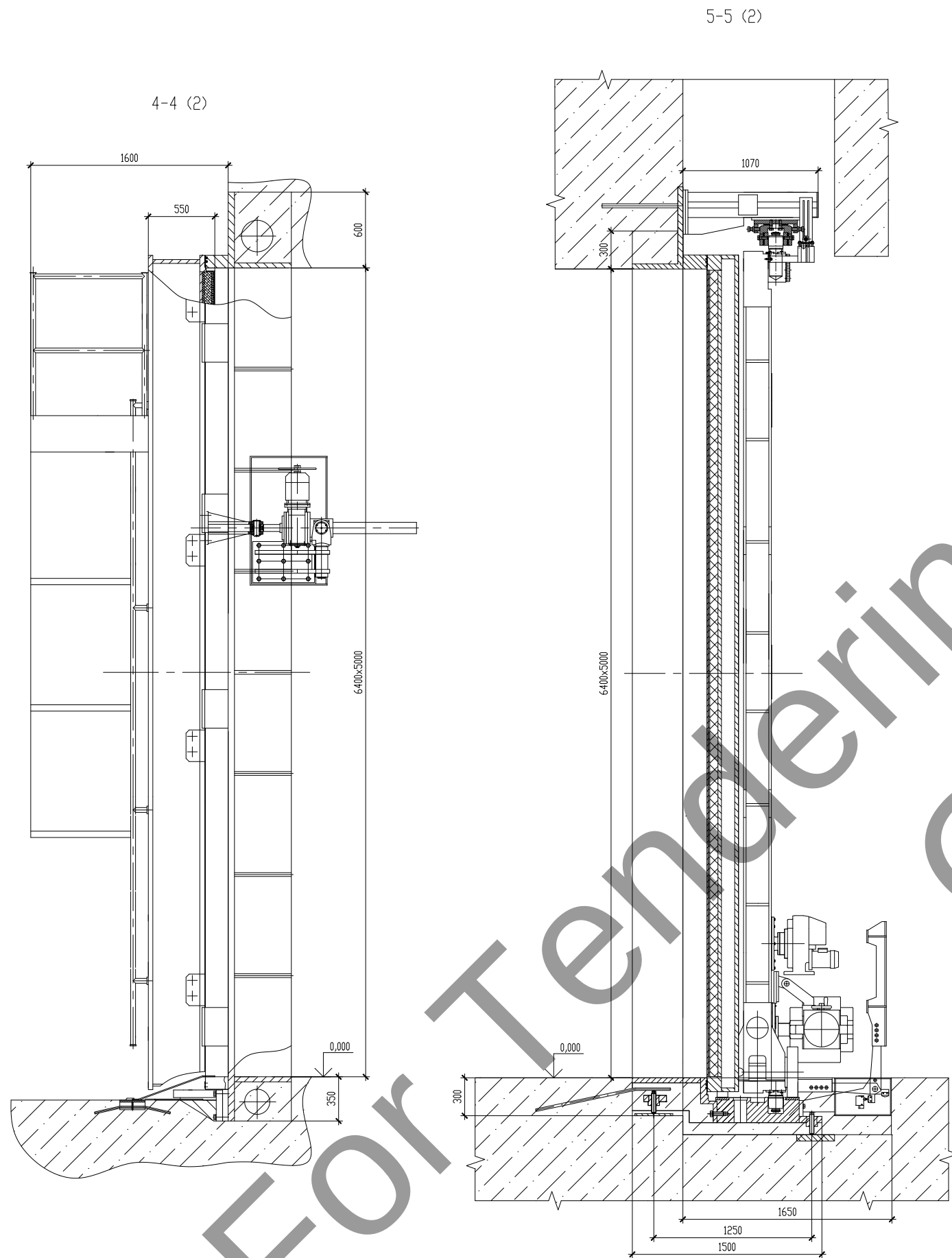
- Способ установки (крепления) оборудования:
 - позиции 5, 9, 12, 13 крепятся к закладным деталям при помощи сварки;
 - позиции 1, 2, 6, 7, 8, 10, 11, 14 не крепятся к строительной части (свободное опирание на перекрытия, фундаменты или металлоконструкции);
 - позиции 3, 4 крепятся к закладным деталям; способ установки будет уточнен после получения технической документации на оборудование.
- Места хранения групп упаковок отметить краской.
- Технические требования по установке оборудования см. в комплекте заводской документации: АМЕ 257.00.00.000 "Оборудование транспортного шлюза хранения свежего топлива", СТ 0401.01.00.000 "Станция", 1204.33.10.000 "Стеллаж для ТКБ".
- Крепежные изделия и электроды поставляются комплектом с оборудованием.
- Данный чертеж рассматривать совместно со строительными чертежами:
 - пакет 1 6 2 20, чертеж R25KK.0.UFC.AKZDK.W005 "0 UFC. Полы на отметке 0,000 в осях 1-10. Геометрические размеры", чертеж R25KK.0.UFC.AKZDK.W003 "0 UFC. Стены и перекрытия в осях 1-10 до отметки +7,400. Геометрические размеры";
 - пакет 1 7 2 39, чертеж R25KK.0.UFC.AKZDK.W001 "0 UFC. Стены, перекрытия и покрытие в осях 1-10 выше отметки +7,400. Геометрические размеры";
 - пакет 1 11 2 35 "Металлоконструкции";
 - пакет 1 11 2 36 "Полы и фундаменты под оборудование".
- Подача питания к кантователю, оборудование транспортного шлюза хранения свежего топлива и подающие механизмы см. в пакете 1 11 3 14 "0 UFC. Электротехническая документация", пакет "0 UFC. Кабельные каналы", пакет "0 UFC. Расстановка кабельных металлоконструкций".

TECHNICAL REQUIREMENTS

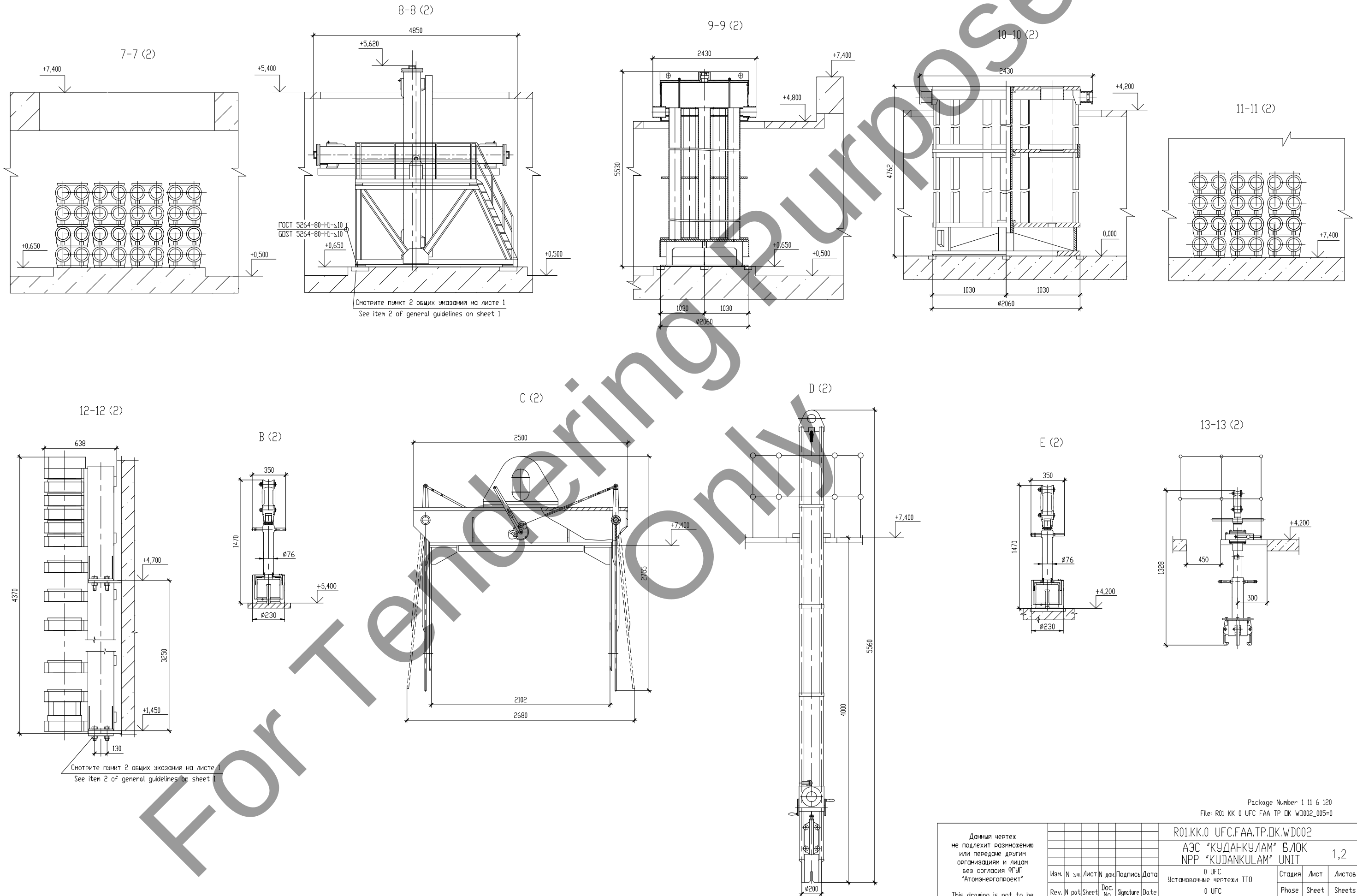
- Installation of equipment:
 - positions 5, 9, 12, 13 shall be fixed to the embedded parts by welding;
 - positions 1, 2, 6, 7, 8, 10, 11, 14 shall not be fixed to the civil part (close support on the slab, foundations or metal structures);
 - positions 3, 4 are secured to embedded parts; the installation method will be refined after receiving technical documents for the equipment.
- The places of packing groups storage shall be painted.
- Technical requirements for equipment installation see sets of factory documentation: АМЕ 257.00.00.000 "Equipment for the transport lock of fresh fuel storage", ST 0401.01.00.000 "Testing facility", 1204.33.10.000 "Rack for FA".
- Fastenings and electrodes supplied in complete with equipment.
- The present drawing is to be used in combination with the construction drawings:
 - Package Number 1 6 2 20, drawing R25KK.0.UFC.AKZDK.W005 "0 UFC. Floors at elevation 0,000 in axes 1-10. Geometrical dimensions", drawing R25KK.0.UFC.AKZDK.W003 "0 UFC. Walls and ceilings in axes 1-10 to elevation +7,400. Geometrical dimensions";
 - Package Number 1 7 2 39, drawing R25KK.0.UFC.AKZDK.W001 "0 UFC. Walls, ceilings and coating in axes 1-10 above elevation +7,400. Geometrical dimensions";
 - Package Number 1 11 2 35 "Metal structures";
 - Package Number 1 11 2 36 "Floors and equipment foundation".
- For power input to the turner, equipment for the transport lock of fresh fuel storage and cable routing see Package Number 1 11 3 14 "0 UFC. Electrical documentation", Package "0 UFC. Cable logs", Package "0 UFC. Cable metal structures layout".

Package Number 1 11 6 120
File: R01.KK.0.UFC.FAA.TP.DK.W002_003-0

Данный чертеж не подлежит размножению или передаче другим организациям и лицам без согласия ВУП "Атомэнергопроект"				R01.KK.0.UFC.FAA.TP.DK.W002				АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT				1,2			
				0 UFC				0 UFC				0 UFC			
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				Л. Павлова				Л. Павлова				Л. Павлова			
FSUE "Atonenergoproekt" Moscow 2004				Инженер				Инженер				Инженер			
				Копелко				Копелко				Копелко			



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						АЗС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1,2				
						0 UFC				
	Изм. N уч.	Лист N	док.	Подпись	Дата	Установочные чертежи ТТО		Стадия	Лист	Листов
	Rev. N pat.	Sheet	Doc. No	Signature	Date	0 UFC		Phase	Sheet	Sheets
	Утвердил	Loseva				Installation drawings of the fuel handling equipment		WD	4	
	Н. контр.	Pavlova				Разрезы 4-4, 5-5, 6-6 Вид А		FSUE "Atomenergoproekt" Moscow 2004		
	Inspector	Kopelko				Sections 4-4, 5-5, 6-6 View А				
	Разработ.									
	Designed									



Package Number 1 11 6 120
File: R01.KK.0 UFC.FAA.TP.OK.WD002_005=0

R01.KK.0 UFC.FAA.TP.OK.WD002			
АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT			
1,2			
Изм. N	уч.	Лист N	документа
Rev. N	pat.	Sheet	Doc. No.
Утвердил	Approved	Лист	Sheet
Н. контр.	Inspector	Phase	Sheet
Разработчик	Designed	WD	5
FSUE "Atomenergoproekt" Moscow 2004			

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0 UFC
Установочные чертежи ТТО
0 UFC
Installation drawings of the fuel handling equipment

Разрезы 7-7, 8-8, 9-9, 10-10, 11-11, 12-12, 13-13. Виды B, C, D, E
Sections 7-7, 8-8, 9-9, 10-10, 11-11, 12-12, 13-13. Views B, C, D, E

Формат А1

48	Оборудование. Стяжное кольцо. Спецификация. Разрез 1-1 Equipment. Clamping ring. Specification. Section 1-1	
49	Оборудование. Элемент стяжного кольца. Спецификация Equipment. Element of clamping ring. Specification	
50	Скоба навесная Suspended clamp	
51	Оборудование. Кохух лака. Спецификация. Разрезы 1-1...5-5 Equipment. Hatch casing. Specification. Sections 1-1...5-5	
52	Технические требования к сборке мелких металлоконструкции Technical requirements to small metal structures welding	
53	Воздуховоды прямоугольного сечения. Изоляция матами. Спецификация. Разрезы 1-1...8-8 Rectangular cross-section air ducts. Insulation by mats. Specification. Sections 1-1...8-8	
54	Воздуховоды прямоугольного сечения. Изоляция матами. Разрезы 9-9...15-15 Rectangular cross-section air ducts. Insulation by mats. Sections 9-9...15-15	
55	Воздуховоды круглого сечения. Изоляция матами. Спецификация. Разрезы 1-1...9-9 Round cross-section air ducts. Insulation by mats. Specification. Sections 1-1...9-9	
56	Воздуховоды круглого сечения. Изоляция матами. Разрезы 10-10...13-13 Round cross-section air ducts. Insulation by mats. Sections 10-10...13-13	
57	Воздуховоды. Изоляция с пароизоляционным слоем матами. Спецификация. Разрезы 1-1...8-8 Air ducts. Insulation with steam-insulation layer by mats. Specification. Sections 1-1...8-8	
58	Воздуховоды. Изоляция с пароизоляционным слоем матами. Разрезы 9-9...18-18 Air ducts. Insulation with steam-insulation layer by mats. Sections 9-9...18-18	
59	Оборудование вертикальное диаметром менее 1200 мм. Изоляция матами. Спецификация. Разрезы 1-1...7-7 Vertical equipment of less than 1200 mm in dia Insulation by mats. Specification. Sections 1-1...7-7	
60	Оборудование вертикальное диаметром 1200 мм и более. Изоляция матами. Спецификация. Разрезы 1-1...9-9 Vertical equipment 1200 mm in dia and more Insulation by mats. Specification. Sections 1-1...9-9	
61	Оборудование вертикальное диаметром 1200 мм и более. Изоляция матами. Разрезы 10-10...16-16 Vertical equipment 1200 mm in dia and more Insulation by mats. Sections 10-10...16-16	
62	Оборудование горизонтальное диаметром менее 1200 мм. Изоляция матами. Спецификация. Разрезы 1-1...8-8 Horizontal equipment of less than 1200 mm in dia Insulation by mats. Specification. Sections 1-1...8-8	
63	Оборудование горизонтальное диаметром 1200 мм и более. Изоляция матами. Спецификация. Разрезы 1-1...7-7 Horizontal equipment 1200 mm in dia and more Insulation by mats. Specification. Sections 1-1...7-7	
64	Оборудование горизонтальное диаметром 1200 мм и более. Изоляция матами. Разрезы 8-8...13-13 Horizontal equipment 1200 mm in dia and more Insulation by mats. Sections 8-8...13-13	
65	Подогреватель пластинчатый. Изоляция матами. Спецификация. Разрезы 1-1...6-6 Plate-type heater. Insulation by mats. Specification. Sections 1-1...6-6	
66	Подогреватель пластинчатый. Изоляция матами. Разрезы 7-7...12-12 Plate-type heater. Insulation by mats. Sections 7-7...12-12	
67	Бак. Изоляция матами. Спецификация. Разрезы 1-1...8-8 Tank. Insulation by mats. Specification. Sections 1-1...8-8	
68	Бак. Изоляция матами. Разрезы 9-9...16-16 Tank. Insulation by mats. Sections 9-9...16-16	
69	Насос. Изоляция матами. Спецификация. Разрезы 1-1...2-2 Pump. Insulation by mats. Specification. Sections 1-1...2-2	
70	Насос. Кохух теплового изоляции. Спецификация. Разрезы 1-1...5-5 Pump. Heat insulation casing. Specification. Sections 1-1...5-5	

21	Трубопроводы. Сварной шов. Спецификация. Разрезы 1-1, 2-2 Pipelines. Welded joint. Specification. Sections 1-1, 2-2	
22	Трубопроводы. Переход. Спецификация. Разрезы 1-1...3-3 Pipelines. Reducing. Specification. Sections 1-1...3-3	
23	Трубопроводы. Тройник. Спецификация. Разрезы 1-1...5-5 Pipelines. T-joint. Specification. Sections 1-1...5-5	
24	Трубопроводы. Заглушка. Спецификация. Разрезы 1-1, 2-2 Pipelines. Plug. Specification. Sections 1-1, 2-2	
25	Трубопроводы. Фланцевое соединение. Спецификация. Разрезы 1-1, 2-2 Pipelines. Flange connection. Specification. Sections 1-1, 2-2	
26	Трубопроводы. Проходка. Спецификация. Разрезы 1-1...4-4 Pipelines. Penetration. Specification. Sections 1-1...4-4	
27	Трубопроводы. Опорная полка. Спецификация. Разрез 1-1 Pipelines. Support rack. Specification. Section 1-1	
28	Трубопроводы. Опорное кольцо. Спецификация Pipelines. Support ring. Specification	
29	Трубопроводы. Элемент опорной полки, опорного кольца, диафрагмы. Спецификация. Разрез 1-1 Pipelines. Element of support rack, support ring, diaphragm. Specification. Section 1-1	
30	Трубопроводы. Скоба опорная. Спецификация. Разрезы 1-1, 2-2 Pipelines. Support clamp. Specification. Sections 1-1, 2-2	
31	Арматура Ду10...25 мм. Спецификация. Разрезы 1-1, 2-2 Valves NB10...25 mm. Specification. Sections 1-1, 2-2	
32	Арматура. Спецификация. Разрезы 1-1...3-3 Valves. Specification. Sections 1-1...3-3	
33	Арматура. Разрезы 4-4...9-9 Valves. Sections 4-4...9-9	
34	Арматура. Разрезы 10-10...15-15 Valves. Sections 10-10...15-15	
35	Арматура. Разрез 16-16 Valves. Section 16-16	
36	Арматура. Разрез 17-17 Valves. Section 17-17	
37	Арматура. Разрез 18-18 Valves. Section 18-18	
38	Штырь Pin	
39	Штырь Pin	
40	Бандаж с пряжкой. Спецификация Bandage with buckle. Specification	
41	Бандаж с замком. Спецификация. Разрезы 1-1, 2-2 Bandage with lock. Specification. Sections 1-1, 2-2	
42	Оборудование. Штырь одинарный Ш1 Equipment. Single pin Sh1	
43	Оборудование. Штырь одинарный Ш1.1 Equipment. Single pin Sh1.1	
44	Оборудование. Штырь двойной Ш2 Equipment. Double pin Sh2	
45	Оборудование. Штырь двойной Ш2.1 Equipment. Double pin Sh2.1	
46	Оборудование. Опорная полка. Опорное кольцо. Спецификация. Разрез 1-1 Equipment. Support rack. Support ring. Specification. Section 1-1	
47	Оборудование. Элемент опорной полки, опорного кольца, элемент диафрагмы. Спецификация. Разрезы 1-1...2-2 Equipment. Element of support rack, support ring, element of diaphragm. Specification. Sections 1-1...2-2	

ВЕДОМОСТЬ РАБОЧИХ ЧЕРТЕЖЕЙ ОСНОВНОГО КОМПЛЕКТА
LIST OF THE WORKING DRAWINGS OF THE MAIN SET

Лист Sheet	Наименование Name	Примечание Note
1	Общие данные General data	
2	Трубопроводы Ø10...630 мм. Изоляция матами МТП-АС. Спецификация. Разрезы 1-1...9-9 Pipelines Ø10...630 mm. Insulation by MTP-AS mats. Specification. Sections 1-1...9-9	
3	Арматура. Изоляция матами МТП-АС. Спецификация. Разрезы 1-1...2-2 Valves. Insulation by MTP-AS mats. Specification. Sections 1-1...2-2	
4	Арматура. Изоляция матами МТП-АС. Разрезы 3-3...7-7 Valves. Insulation by MTP-AS mats. Sections 3-3...7-7	
5	Арматура. Изоляция матами МТП-АС Valves. Insulation by MTP-AS mats	
6	Трубопроводы Ø10...57 мм. Изоляция шнуром. Спецификация. Разрезы 1-1...6-6 Pipelines Ø10...57 mm. Insulation by cord. Specification. Sections 1-1...6-6	
7	Трубопроводы Ø10...57 мм. Изоляция с пароизоляционным слоем шнуром. Спецификация. Разрезы 1-1...10-10 Pipelines Ø10...57 mm. Insulation with steam-insulation layer by cord. Specification. Sections 1-1...10-10	
8	Трубопроводы Ø10...820 мм. Изоляция матами. Спецификация. Разрезы 1-1...10-10 Pipelines Ø10...820 mm. Insulation by mats. Specification. Sections 1-1...10-10	
9	Трубопроводы Ø10...820 мм. Изоляция с пароизоляционным слоем матами. Спецификация. Разрезы 1-1...12-12 Pipelines Ø10...820 mm. Insulation with steam-insulation layer by mats. Specification. Sections 1-1...12-12	
10	Трубопроводы Ø920...1620 мм. Изоляция матами. Спецификация. Разрезы 1-1...12-12 Pipelines Ø920...1620 mm. Insulation by mats. Specification. Sections 1-1...12-12	
11	Трубопроводы Ø920...1620 мм. Изоляция с пароизоляционным слоем матами. Спецификация. Разрезы 1-1...9-9 Pipelines Ø920...1620 mm. Insulation with steam-insulation layer by mats. Specification. Sections 1-1...9-9	
12	Трубопроводы Ø920...1620 мм. Изоляция с пароизоляционным слоем матами. Разрезы 10-10...13-13 Pipelines Ø920...1620 mm. Insulation with steam-insulation layer by mats. Sections 10-10...13-13	
13	Трубопроводы. Изоляция в местах установки опор матами. Спецификация. Разрезы 1-1...5-5 Pipelines. Insulation with mats in places where supports are installed. Specification. Sections 1-1...5-5	
14	Трубопроводы. Изоляция в местах установки опор матами. Pipelines. Insulation with mats in places where supports are installed.	
15	Трубопроводы. Изоляция в местах установки опор матами. Разрезы 6-6 и 7-7 Pipelines. Insulation with mats in places where supports are installed. Sections 6-6 and 7-7	
16	Трубопроводы. Изоляция в местах установки опор матами. Разрез 8-8 Pipelines. Insulation with mats in places where supports are installed. Section 8-8	
17	Трубопроводы. Изоляция в местах установки опор матами. Разрез 9-9 Pipelines. Insulation with mats in places where supports are installed. Section 9-9	
18	Трубопроводы. Изоляция в местах установки опор матами. Разрез 10-10 Pipelines. Insulation with mats in places where supports are installed. Section 10-10	
19	Трубопроводы. Изоляция в местах установки опор матами. Pipelines. Insulation with mats in places where supports are installed.	
20	Трубопроводы. Изоляция в местах установки опор матами. Разрезы 11-11...14-14 Pipelines. Insulation with mats in places where supports are installed. Sections 11-11...14-14	

УСЛОВНЫЕ ОБОЗНАЧЕНИЯ
LEGEND



Маты теплоизоляционные прошивные
Heat-insulation stitched mats

ОБЩИЕ УКАЗАНИЯ

- 1 Рабочие чертежи разработаны в соответствии с нормами, правилами и стандартами РФ.
2 Данный комплект разработан в соответствии с "Исходными техническими требованиями к теплоизоляционным материалам, изделиям и конструкциям" Р01.КК.0.0.Т1.ТТ.ВД001.

GENERAL GUIDELINES

- 1 The working drawings have been developed in compliance with codes, regulations and standards of RF.
2 This set has been developed in accordance with "Initial technical requirements for thermal insulation materials, articles and structures" R01.KK.0.0.T1.TT.WD001.

Package Number 1 11 6 124

File: R01.KK.1 0.0.T1.0K.WD001_001

При переписке в ссылке на документ (лист документа) следует указывать его обозначение, приведенное в основной надписи

In correspondence referring to the document (sheet of the document) it is necessary to specify its designation, given in the basic inscription

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Изм. N уч. лист N док. Подпись Дата

Rev. N pat. Sheet Doc. No. Signature Date

Буканов

Sinit syn

Inspected

Designed Kazachkova

Р01.КК.1 0.0.Т1.0К.ВД001

АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1

Тепловая изоляция трубопроводов и оборудования. Чертежи теплоизоляционных конструкций из трубопроводов и оборудования. Drawings of heat-insulation structures of pipelines and equipment.

Общие данные General data

Студия Лист Листов Phase Sheet Sheets 1 70

FSUE "Atomenergoproekt" Moscow 2004

формат А1

ИЗОЛЯЦИЯ В ОДИН СЛОЙ
ONE-LAYER INSULATION

ИЗОЛЯЦИЯ В ДВА СЛОЯ
TWO-LAYERS INSULATION

СПЕЦИФИКАЦИЯ
SPECIFICATION

Поз.	Обозначение	Наименование	Кол.	Масса	Примечание
Pos.	Designation	Name	Q-ty	Mass, kg	Note
			Единицы	Общая	
			Unit	Total	
1	ТУ 5953-159-05786904-00 ТУ 5953-159-05786904-00	Маты МТП-АС MTP-AS mats	-	-	Смотри пункт 2 See item 2
2	ГОСТ 3826-82 ГОСТ 3826-82	Сетка 2-1-0,25 проволочная тканая с квадратными ячейками из нержавеющей стали марки 12Х18Н10Т Wire gauze net 2-1-0,25 with square meshes from stainless steel, mark 12Kh18Ni10T	-	-	
3	ГОСТ 19904-90 ГОСТ 19904-90	Лист холоднокатаный БТ-ПН-0 из стали марки 12Х18Н10Т ГОСТ 5582-75, М2а толщиной 0,7 мм Cold-rolled sheet BT-PN-0 from steel, mark 12Kh18Ni10T GOST 5582-75, M2a 0,7 mm thick	-	-	
4	R01.KK.1 0.0. TI. ОК. WD001, лист 27 sheet	Опорная полка Support rack	-	-	
5	R01.KK.1 0.0. TI. ОК. WD001, лист 28 sheet	Диафрагма (лист холоднокатаный БТ-ПН-0 ГОСТ 19904-90 из стали марки 12Х18Н10Т ГОСТ 5582-75, М2а толщиной 0,7 мм) Diaphragm (cold-rolled sheet BT-PN-0 GOST 19904-90 from steel, mark 12Kh18Ni10T GOST 5582-75, M2a 0,7 mm thick)	-	-	
6	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick TU 21-5328981-08-93)	-	-	
7	-	Манжета (лист холоднокатаный БТ-ПН-0 ГОСТ 19904-90 из стали марки 12Х18Н10Т ГОСТ 5582-75, М2а толщиной 0,7 мм) Collar (cold-rolled sheet BT-PN-0 GOST 19904-90 from steel, mark 12Kh18Ni10T GOST 5582-75, M2a 0,7 mm thick)	-	-	
8	R01.KK.1 0.0. TI. ОК. WD001, лист 30 sheet	Скоба опорная Support clamp	-	-	
9	-	Кольцо (проволока 2,0-ТС ГОСТ 18143-72) Ring (wire 2,0-TS GOST 18143-72)	-	-	
10	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4х12 из легированной стали Self-tapping screw 4x12 of alloyed steel	-	-	

1 Сиз., S1 - толщины теплоизоляционных слоев;
Диз. - диаметр изолированного трубопровода.
2 Толщина теплоизоляционного слоя (поз. 1) указана в техномонтажных ведомостях.
3 Установку опорных полок, колец и скоб смотри на листах 27, 28 и 30.
4 Разгружающие устройства (поз. 4, 8) изготовленные из углеродистой стали подлежат антикоррозионной защите.
5 В качестве шивки для матов МТП-АС (поз. 1) применить стеланить марки ЕС-6-14х1х3х4(400)-А (ТУ 6-48-5786902-61-90).
6 В качестве шивки для сетки 2-1-0,25 (поз. 2) применить проволоку 1,0-ТС (ГОСТ 18143-72).

1 Сиз., S1- thicknesses of heat-insulating layers;
Диз. - insulated pipeline diameter.
2 The thickness of heat-insulating layer (pos. 1) is indicated in the technological and mounting sheets.
3 For arrangement of support racks, rings and clamps see sheets 27, 28 and 30.
4 Unloading devices (pos. 4, 8) made of carbon steel are subject to anticorrosive protection.
5 As stitching for MTP-AS mats (pos. 1), ES-6-14x1x3x4(400)-A glass thread (TU 6-48-5786902-61-90) shall be used.
6 As stitching for net 2-1-0,25 (pos. 2), wire 1,0-TS (GOST 18143-72) shall be used.

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI ОК WD001_02=0

R01.KK.1 0.0. TI. ОК. WD001

АЭС "КУДАНКУЛАМ" БЛОК
NPP "KUDANKULAM" UNIT 1

Тепловая изоляция
трубопроводов и оборудования.
Heat insulation
of pipelines and equipment.
Drawings of heat-insulation structures

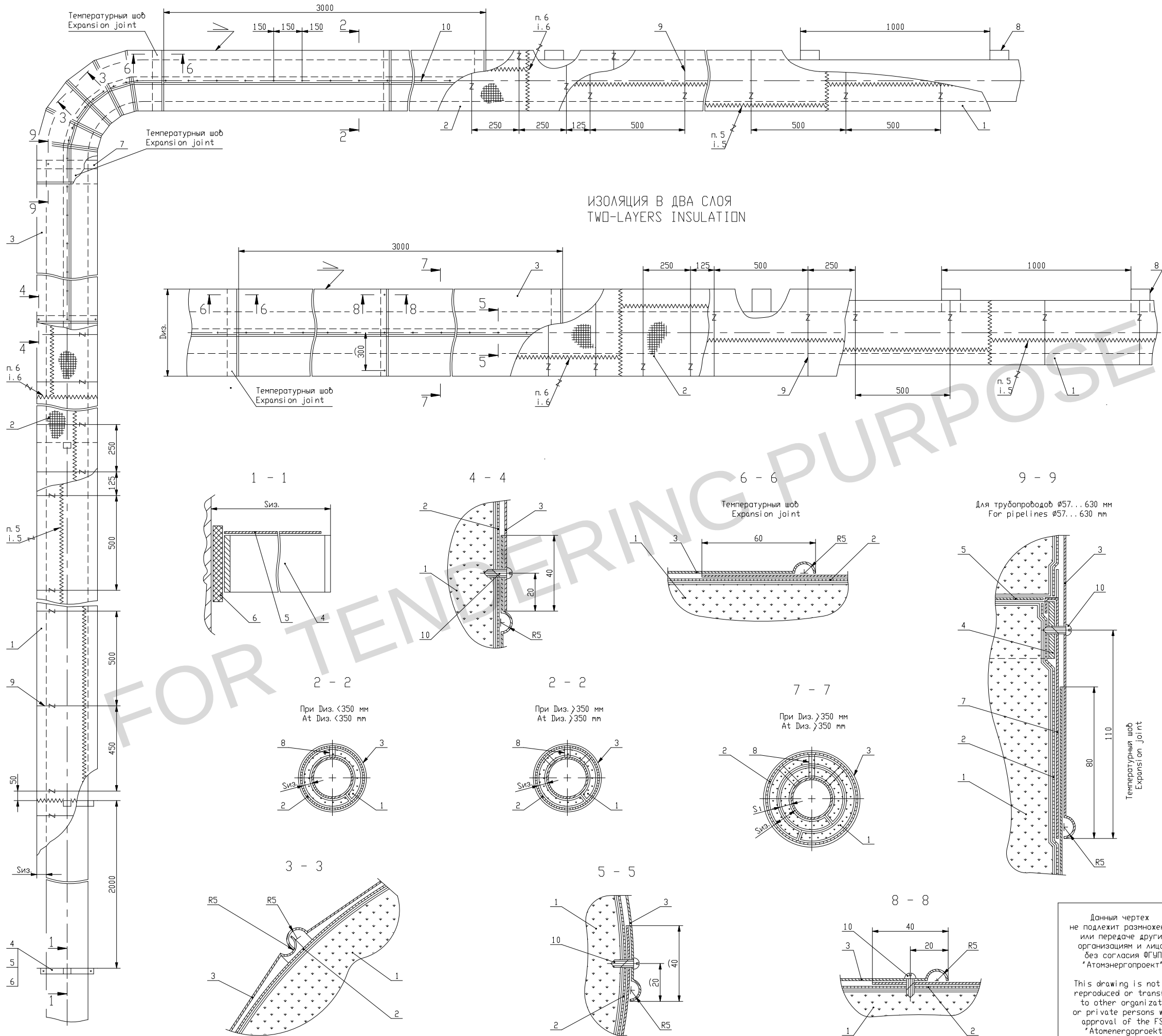
Изм. N уч.Лист N док.ПодписьДата
Rev. N pat. Sheet No. Signature Date

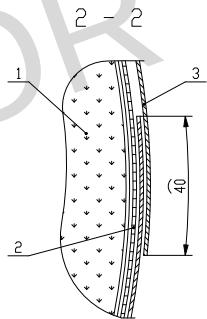
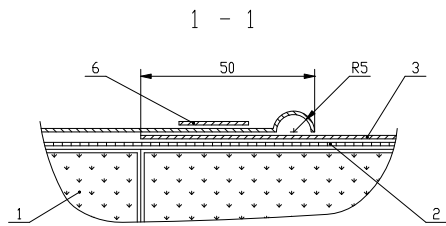
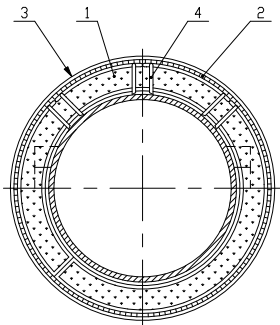
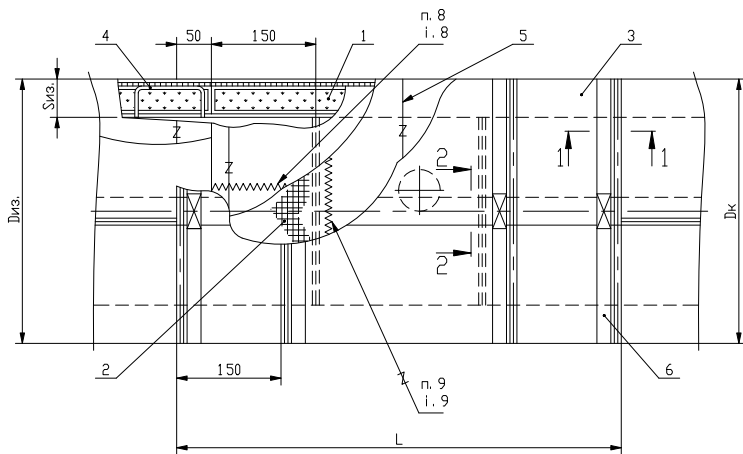
Исполнитель: Niki ti ra
Designed: Niki ti ra

Трубопроводы Ø10...630 мм. Изоляция
матов МТП-АС. Спецификация. Разрезы
1-1...9-9
Pipelines Ø10...630 mm. Insulation by
MTP-AS mats. Specification. Sections
1-1...9-9

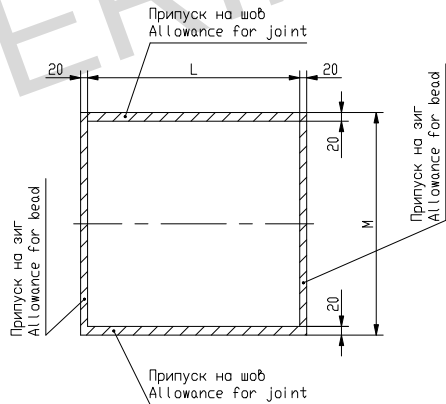
FSUE
"Atomenergoproekt"
Moscow 2004

формат А1





РАСКРОЙ ЭЛЕМЕНТА КОЖУХИ
LAYING-OUT OF CASING ELEMENT

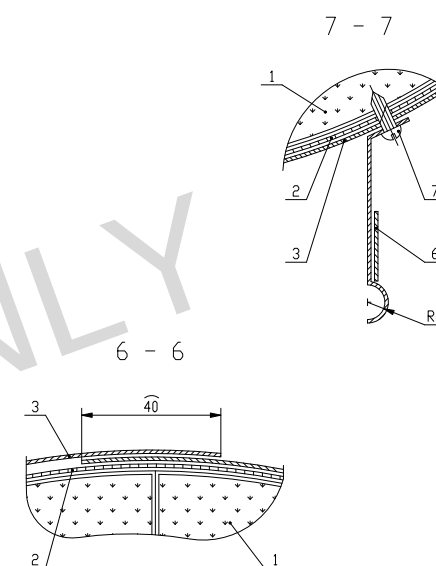
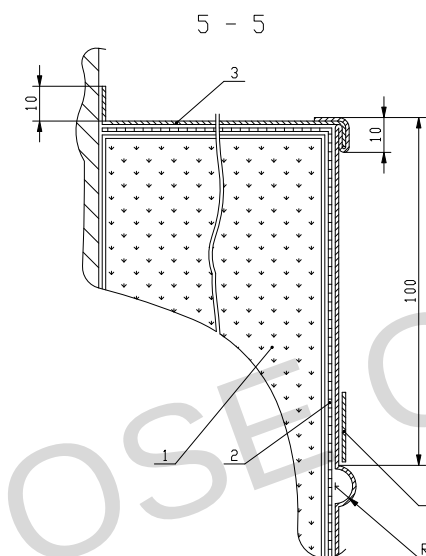
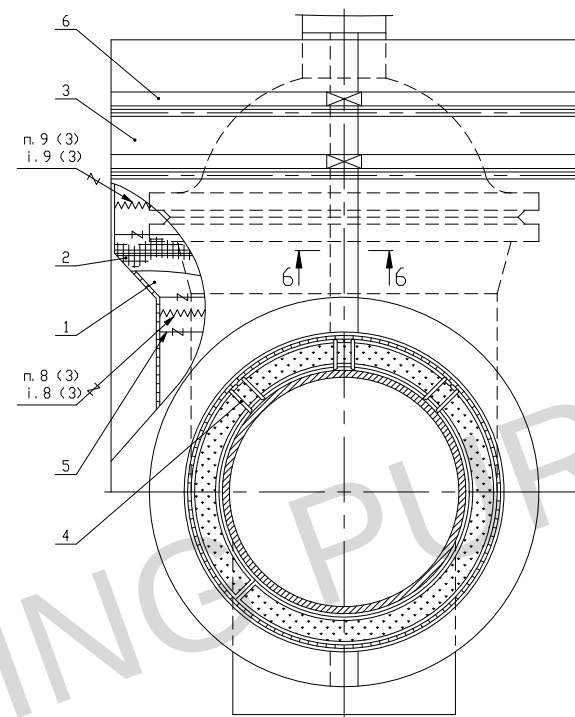


СПЕЦИФИКАЦИЯ SPECIFICATION					
Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, kg	Примечание Note
1	TU 5953-159-05786904-00 TU 5953-159-05786904-00	Маты МТП-АС MTP-AS mats	-	-	Смотри пункт 2 See item 2
2	ГОСТ 3826-82 ГОСТ 3826-82	Сетка 2-1-0,25 проволочная тканая с квадратными ячейками из нержавеющей стали марки 12Х18Н10Т Wire gauze net 2-1-0,25 with square meshes from stainless steel, mark 12Kh18Ni10T	-	-	
3	-	Элемент кожуха (лист холоднокатаный БТ-ПН-0 ГОСТ 19904-90 из стали марки 12Х18Н10Т ГОСТ 5582-75, М2а толщиной 0,7 мм) Element of casing (cold-rolled sheet BT-PN-0 GOST 19904-90 from steel, mark 12Kh18Ni10T GOST 5582-75, M2a 0,7 mm thick)	2	-	
4	R01.KK.1 0.0.0 OK.WD001, лист 30 sheet	Скоба опорная Support clamp	-	-	
5	-	Кольцо (проволока 2,0-ТС ГОСТ 18143-72) Ring (wire 2,0-TS GOST 18143-72)	-	-	
6	R01.KK.1 0.0.0 OK.WD001, лист 41 sheet	Бандаж с замком Bandage with lock	-	-	
7	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4x12 из легированной стали Self-tapping screw 4x12 of alloyed steel	-	-	

- 1 Siz. - толщина теплоизоляционного слоя;
Диз. - диаметр изолированного трубопровода;
L - длина кожуха;
Dk - диаметр кожуха;
 $M = \frac{3,14 Dk + 40}{2}$ мм.
- 2 Толщина теплоизоляционного слоя (поз. 1) указана в техномонтажных ведомостях.
- 3 При Диз. <200 мм применить бандаж с пряжкой (лист 40) взамен бандажа с замком (поз. 6).
- 4 Вырезы в матах и кожухе для штуцеров и других выступающих из изоляции частей произвести по месту. Вырезы в матах заделывать тканью.
- 5 При диаметре изолируемого трубопровода > 630 мм вместо скобы опорной (поз. 4) установить опорные кольца (лист 28).
- 6 Установку опорных колец и скоб смотри на листах 28 и 30.
- 7 Скобы опорные (поз. 4) изготовленные из углеродистой стали подлежат антикоррозионной защите.
- 8 В качестве шовки для матов МТП-АС (поз. 1) применить стелонить марки ЕС-6-14x1x3x4(400)-А (ТУ 6-48-5786902-61-90).
- 9 В качестве шовки для сетки 2-1-0,25 (поз. 2) применить проволоку 1,0-ТС (ГОСТ 18143-72).
- 10 Данный чертёж читать совместно с листами 4 и 5.

- 1 Siz. - thickness of heat-insulating layer;
Диз. - pipeline diameter with insulation;
L - length of casing;
Dk - diameter of casing;
 $M = \frac{3,14 Dk + 40}{2}$ mm.
- 2 The thickness of heat-insulating layer (pos. 1) is indicated in the technological and mounting sheets.
- 3 At Диз. <200 mm bandage with a buckle (sheet 40) should be used instead of bandage with a lock (pos. 6).
- 4 Cuts in mats and in casing for unions and other parts protruding from insulation should be done in-situ. Cuts in mats shall be closed with fabric.
- 5 When the diameter of the pipeline with insulation is > 630 mm, the support ring (sheet 28) shall be installed instead of the support clamp (pos. 4).
- 6 For arrangement of support rings and clamps see sheets 28 and 30.
- 7 Support clamps (pos. 4) made of carbon steel are subject to anticorrosive protection.
- 8 As stitching for MTP-AS mats (pos. 1) ES-6-14x1x3x4(400)-A glass fiber (TU 6-48-5786902-61-90) shall be used.
- 9 As stitching for net 2-1-0,25 (pos. 2) 1,0-TS wire (GOST 18143-72) shall be used.
- 10 The given drawing should be read together with sheets 4 and 5.

Данный чертёж не подлежит размножению или передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"						R01. KK. 1 0. 0. TI. OK. WD001		
This drawing is not to be reproduced or transferred to other organizations or private persons without approval of the FSUE "Atomenergoproekt"						АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1		
						Тепловая изоляция трубопроводов и оборудования.	Стадия	Лист
						Чертежи теплоизоляционных конструкций трубопроводов и оборудования.	Phase	Sheet
						Drawings of heat-insulation structures of pipelines and equipment.	3	
						Арматура. Изоляция натами МТП-АС. Спецификация. Разрезы 1-1...2-2	FSUE "Atomenergoproekt" Moscow 2004	
						Valves. Insulation by MTP-AS mats. Specification. Sections 1-1...2-2	формат А3х3	

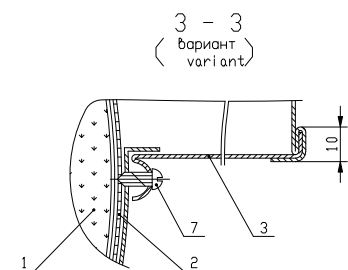
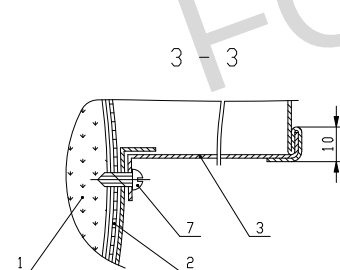
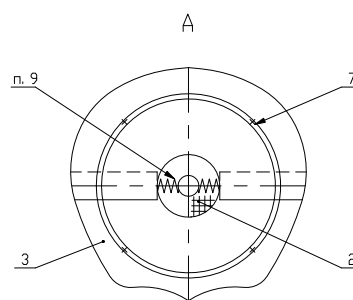
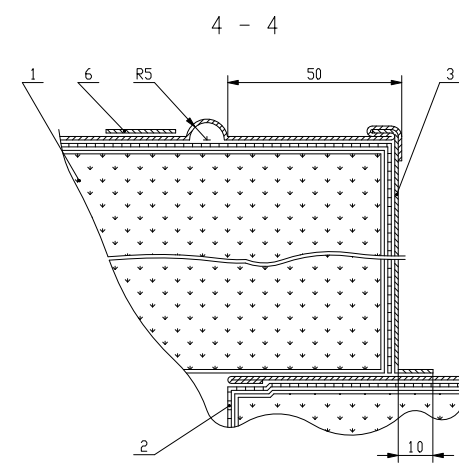


1 Сиз. – толщина теплоизоляционного слоя;
 Диз. – диаметр изолированного трубопровода;
 Дк – длина кожуха;
 Дк – диаметр кожуха;
 Дн – диаметр верхнего патрубка кожуха;
 дн – диаметр нижнего патрубка кожуха;
 h – высота верхнего патрубка кожуха;
 d, d1 – диаметры выступающих из изоляции частей арматуры.

2. Данный чертеж читать совместно с листами 3 и 5.

1 Sws. - thickness of heat-insulating layer;
Dns. - pipeline diameter with insulation;
L - length of casing;
Dk - diameter of casing;
Dn - diameter of casing top branch pipe;
dn - diameter of casing bottom branch pipe;
h - height of casing top branch pipe;
d, d1 - diameter of valves protruding from insulation.

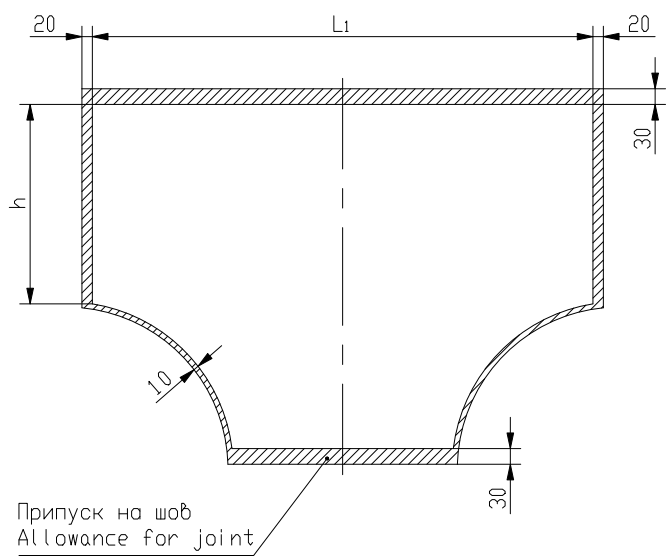
2 The given drawing should be read together with sheets 3 and 5.



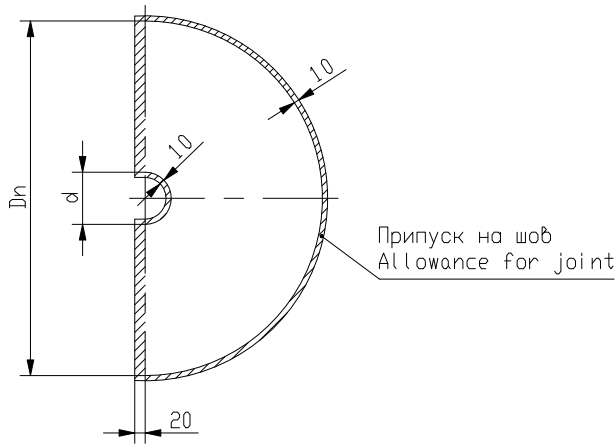
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				АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1									
				Тепловая изоляция трубопроводов и оборудования.									
				Чертеж теплоизоляционных конструкций									
This drawing is not to be reproduced or transferred to other organizations without approval of the FSUE "Atomenergoproekt"				Изм. N учИст N докПодписано				Стация		Лист		Листов	
				Rev. N patSheet Doc. No SignatureDate				Phase Sheet		Sheets			
				Approved Kazachkova				4					
				Inspector Sinitsina									
Паздоб. Nikitina				Desig ned				Арматура. Изоляция матомы МТП-АС. Разрезы 3-3...7-7 Разрезы. Insulation by MTP-AS mats. Sections 3-3...7-7					
FSUE "Atomenergoproekt" Moscow 2004								ФОРМАТ А3х3					

РАСКРОЙ ЭЛЕМЕНТОВ КОЖУХА (4)
LAYING-OUT OF CASING ELEMENTS (4)

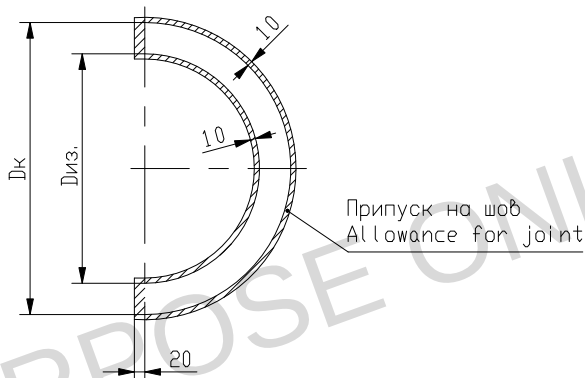
ПАТРУБОК ВЕРХНИЙ
TOP BRANCH PIPE



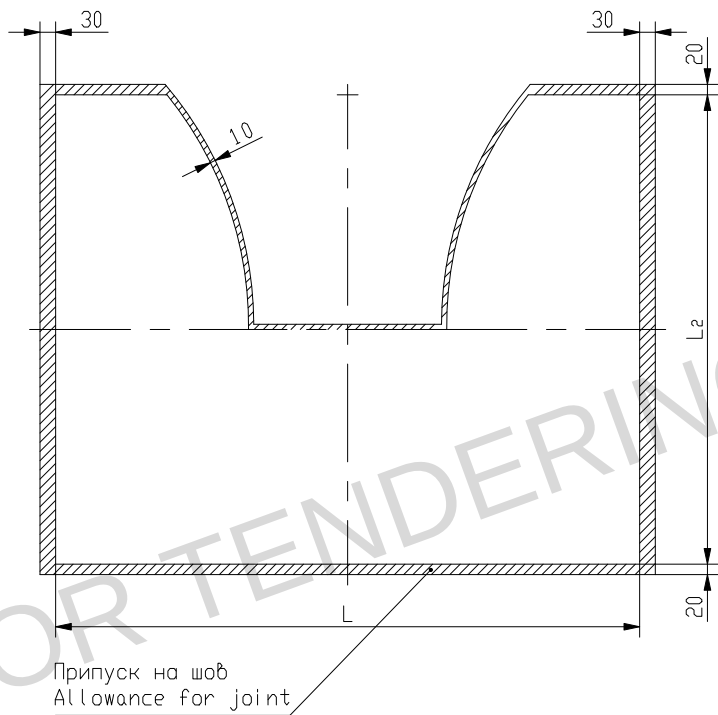
ВЕРХНИЙ ТОРЕЦ
TOP END FACE



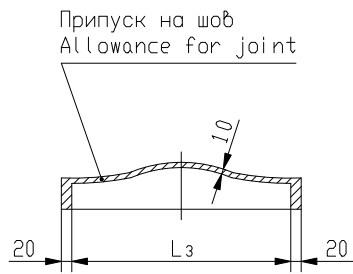
БОКОВОЙ ТОРЕЦ
SIDE END FACE



КОРПУС
BODY



ПАТРУБОК НИЖНИЙ
BOTTOM BRANCH PIPE



- 1 Диз. - диаметр изолированного трубопровода;
L - длина кожуха;
Dк - диаметр кожуха;
Dн - диаметр верхнего патрубка кожуха;
h - высота верхнего патрубка кожуха;
d - диаметр выступающей из изоляции части арматуры;
 $L_1 = \frac{3,14 D_n}{2}$;
 $L_2 = \frac{3,14 D_k}{2}$;
 $L_3 = \frac{3,14 d_n}{2}$;

2 Данный чертеж читать совместно с листами 3 и 4.

- 1 Диз. - pipeline diameter with insulation;
L - length of casing;
Dк - diameter of casing;
Dн - diameter of casing top branch pipe;
h - height of casing top branch pipeline;
d - diameter of valves part protruding from insulation;
 $L_1 = \frac{3,14 D_n}{2}$;
 $L_2 = \frac{3,14 D_k}{2}$;
 $L_3 = \frac{3,14 d_n}{2}$;

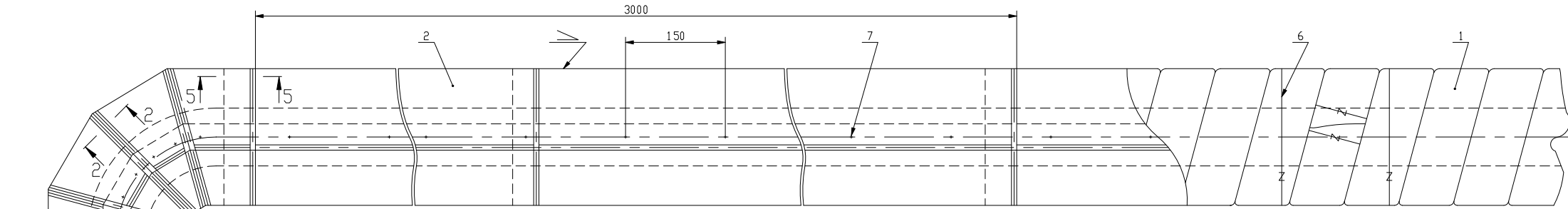
2 The given drawing should be read together with sheets 3 and 4.

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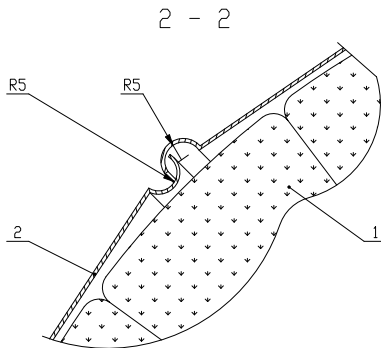
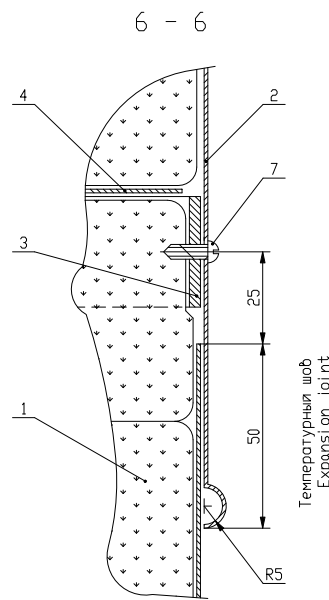
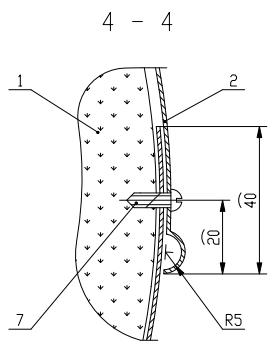
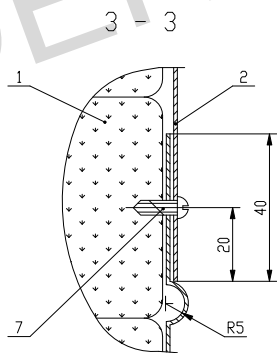
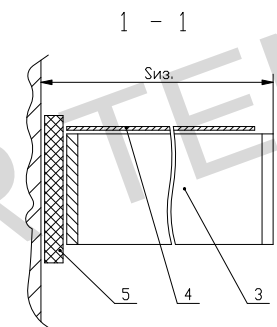
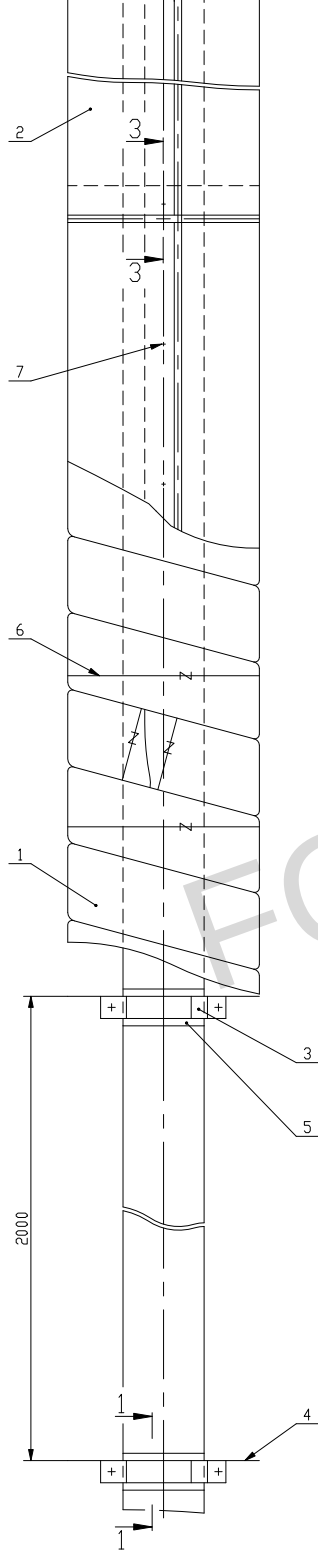
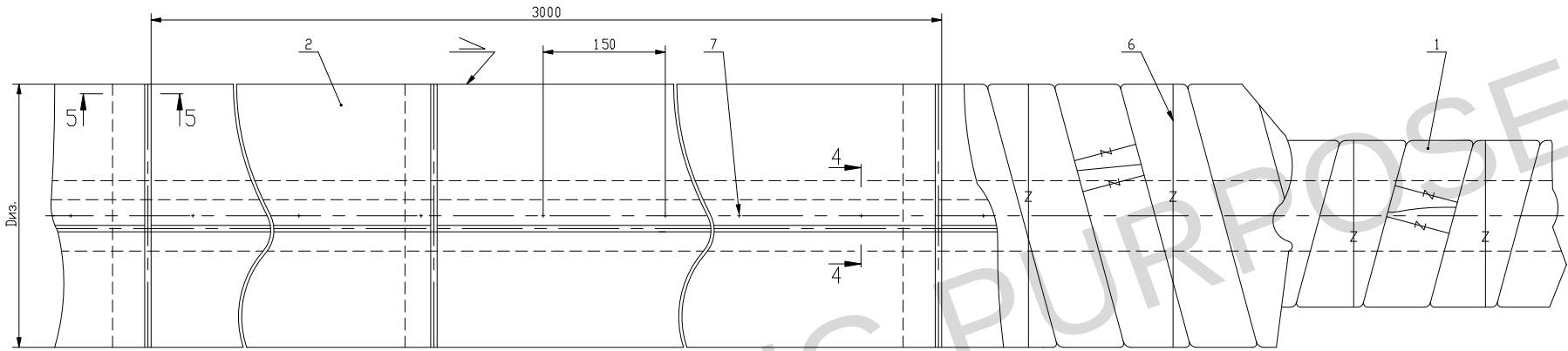
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						АЭС "КУДАНКУЛАМ" БЛОК 1 NPP "KUDANKULAM" UNIT 1			
	Изм. N уч.	Лист N док.	Подпись	Дата	Тепловая изоляция трубопроводов и оборудования.		Стадия	Лист	Листов
	Rev. N pat.	Sheet	Doc. No	Signature	Date	Чертежи теплоизоляционных конструкций.	Phase	Sheet	Sheets
	Heat insulation of pipelines and equipment. Drawings of heat-insulation structures								
This drawing is not to be reproduced or transferred to other organizations or private persons without approval of the FSUE "Atomenergoproekt"	Утвердил	Kazachkova				Арматура. Изоляция матами МТП-АС. Valves. Insulation by MTP-AS mats		FSUE "Atomenergoproekt" Moscow 2004	
	Инспектор	Sinitzin							
	Разраб.	Nikitina							
	Designed								

формат A2

ИЗОЛЯЦИЯ В ОДИН СЛОЙ
ONE-LAYER INSULATION

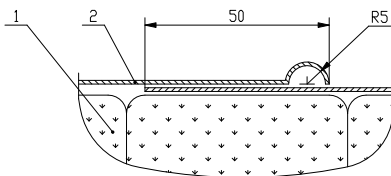


ИЗОЛЯЦИЯ В ДВА СЛОЯ
TWO-LAYERS INSULATION



5 - 5

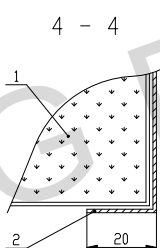
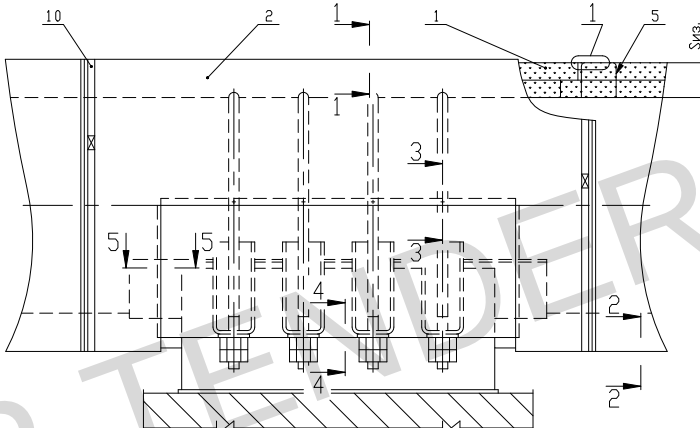
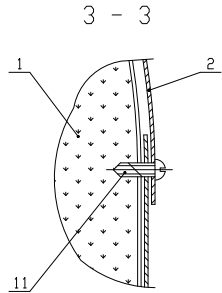
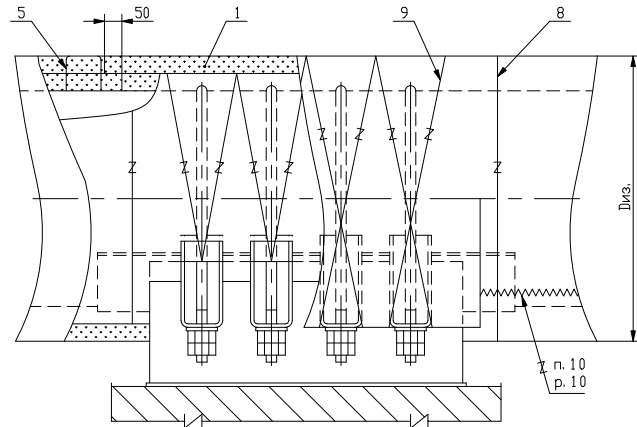
Температурный шов
Expansion joint



СПЕЦИФИКАЦИЯ SPECIFICATION					
Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, kg	Примечание Note
			Единицы Unit	Общая Total	
1	-	Шнур теплоизоляционный Heat-insulation cord	-	-	Смотри пункт 2 See item 2
2	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 2 See item 2
3	R01. KK. 1 0. 0. TI. ПК. WD001, лист 27 sheet	Опорная полка Support rack	-	-	
4	R01. KK. 1 0. 0. TI. ПК. WD001, лист 29 sheet	Диафрагма (лист толщиной 0,8 мм) Diaphragm (sheet 0,8 mm thick)	-	-	
5	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick ТУ 21-5328981-08-93)	-	-	
6	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	Смотри пункты 3,4 See items 3,4
7	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4x12, 01. 029 Self-tapping screw 4x12. 01. 029	-	-	

- 1 Сиз. - толщина теплоизоляционного слоя;
Диз. - диаметр изолированного трубопровода.
- 2 Материал и толщина теплоизоляционного слоя (поз. 1) и металлопокрытия (поз. 2) указаны в "Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям" R01. KK. 0. 0. TI. TT. WD001 и технологических ведомостях.
- 3 При выполнении тепловой изоляции трубопроводов изготовленных из нержавеющей стали применить кольца (поз. 6) из проволоки 2,0-ТС ГОСТ 18143-72.
- 4 При выполнении тепловой изоляции трубопроводов изготовленных из углеродистой стали применить кольца (поз. 6) из проволоки 2,0-0-4 ГОСТ 3282-74.
- 5 Допускается применение бандожа с пряжкой (лист 40) взамен кольца (поз. 6).
- 1 Сиз. - thickness of heat-insulation layer;
Диз. - pipeline diameter with insulation.
- 2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01. KK. 0. 0. TI. TT. WD001 and in technological and mounting sheets.
- 3 When performing heat insulation of pipelines made of stainless steel, 2,0-TS wire rings (pos. 6), GOST 18143-72, shall be used.
- 4 When performing heat insulation of pipelines made of carbon steel, 2,0-0-Ch wire rings (pos. 6), GOST 3282-74, shall be used.
- 5 It is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 6).

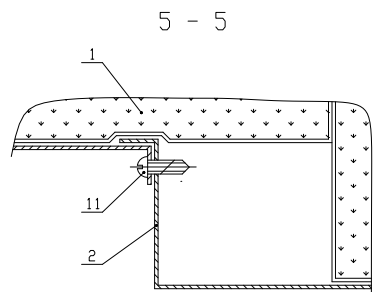
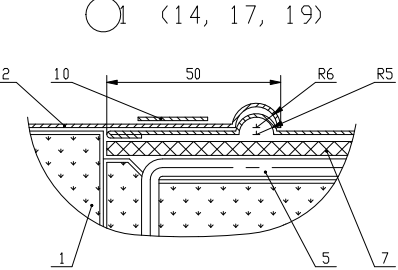
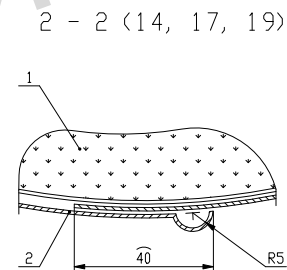
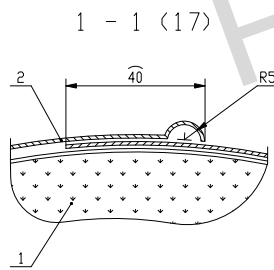
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Поз.	Обозначение	Наименование	Кол.	Масса	Примечание
Pos.	Designation	Name	Q-ty	Mass, kg Единица Unit	Note
1	-	Маты в стеклотканки Mats in glass fabric	-	-	Смотри пункт 6 See item 2
2	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 6 See item 2
3	R01. KK. 1 0 0 OK. WD001, лист 27 sheet	ТТ. Опорная полка Support rack	-	-	
4	R01. KK. 1 0 0 OK. WD001, лист 28 sheet	ТТ. Опорное кольцо Support ring	-	-	
5	R01. KK. 1 0 0 OK. WD001, лист 30 sheet	ТТ. Скоба опорная Support clamp	-	-	
6	R01. KK. 1 0 0 OK. WD001, лист 29 sheet	ТТ. Диафрагма (лист толщиной 0,8 мм) Diaphragm (sheet 0,8 mm thick)	-	-	
7	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick ТУ 21-5328981-08-93)	-	-	
8	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	Смотри пункты 6 See items 6
9	-	Стяжка (проволока Ø1,2 мм) Tie-rod (wire Ø1,2 mm)	-	-	Смотри пункты 6 See items 6
10	R01. KK. 1 0 0 OK. WD001, лист 41 sheet	ТТ. Бандаж с замком Bandage with lock	-	-	
11	ГОСТ 10621-80 GOST 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	

- 1 Шиз. - толщина теплоизоляционного слоя;
Шиз.1 - толщина теплоизоляционного слоя принята конструктивно, по месту;
Шиз. - диаметр изолированного трубопровода.
- 2 Материал и толщина теплоизоляционного слоя (поз. 1) и металлопокрытие (поз. 2) указаны в "Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям" Р01.КК.0.0.Т1.ТТ.УД001 и техномактахных безаомства.
- 3 Перед установкой в проектное положение, опора должна быть забита тепло- изоляционным материалом.
- 4 Установку опорных полок, опорных колец и скоб опорных смотри на листах 27, 28 и 30.
- 5 Разгрузочные устройства (поз. 3...5) изготовленные из углеродистой стали подлежат антикоррозийной защите
- 6 При выполнении тепловой изоляции, трубопроводов изготовленных из нержавеющей стали применить кольца (поз. 8) и стяжки (поз. 9) из прболоки 2,0-1С ГОСТ 8143-72.
- 7 При выполнении тепловой изоляции, трубопроводов изготовленных из углер- одистой стали применить кольца (поз. 8) и стяжки (поз. 9) из прболоки 2,0-0-4 ГОСТ 3282-74.
- 8 При Шиз. < 200 мм применить бандажа с пржкой (лист 40) взамен бандажа с замком (поз. 10).
- 9 Вырезы в матах (поз. 1) и металлопокрытие (поз. 2) для выступающих из изоляции частей произвести по месту. Вырезы в матах заделать тьяном.
- 10 В качестве шифки для матов:
 - в обкладке из кремнезенойной кати КТ-11 применить нить кремнезеноую К1С6-180 (ТУ 6-48-52-90);
 - в обкладке из стеклокати Т-23 применить нить стеклянную крученую ком- плексную ЕС6-28х1х2(100) (ГОСТ 8325-78).
- 11 Данный чертх читать совместно с листами 18...20.

- 1 Sws. - thickness of heat-insulation layer;
- Sw31 - thickness of heat-insulation layer 15 structurally accepted, in-situ.
- Dws. - insulated pipeline diameter.
- 2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2) is indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01.KK.0.0.TI.TT.WD001 and technological and mounting sheets.
- 3 Prior to installation in the design position, the support should be packed with heat-insulating material.
- 4 For arrangement of support racks, support rings and support clamp see sheets 27, 28 and 30.
- 5 Unloading devices (pos. 3...5) made of carbon steel are subject to anticorrosive protection.
- 6 When performing heat insulation of pipelines made of stainless steel, 2,0-TS wire rings (pos. 8) and tie-rods (pos. 9), GDST 18143-72, shall be used.
- 7 When performing heat insulation of pipelines made of carbon steel, 2,0-0-Ch wire rings (pos. 8) and tie-rods (pos. 9), GDST 3282-74, shall be used.
- 8 At Dws. < 200 mm the bandage with buckle (sheet 40) should be used instead of bandage with lock (pos. 10).
- 9 Cuts in mats (pos. 1) and in metal covering (pos. 2) should be done in-situ far parts protruding from insulation. Cuts in mats shall be closed with fabric.
- 10 As stitching for mats:
 - in jacket made of KT-11 silica fiber, silica thread K11S6-180 (ТУ 6-48-52-90) shall be used;
 - in jacket made of glass fabric T-23, glass twisted complex thread ES6-28x1x2(100) (GDST 8325-78) shall be used.
- 11 The given drawing should be read together with sheets 14...20.



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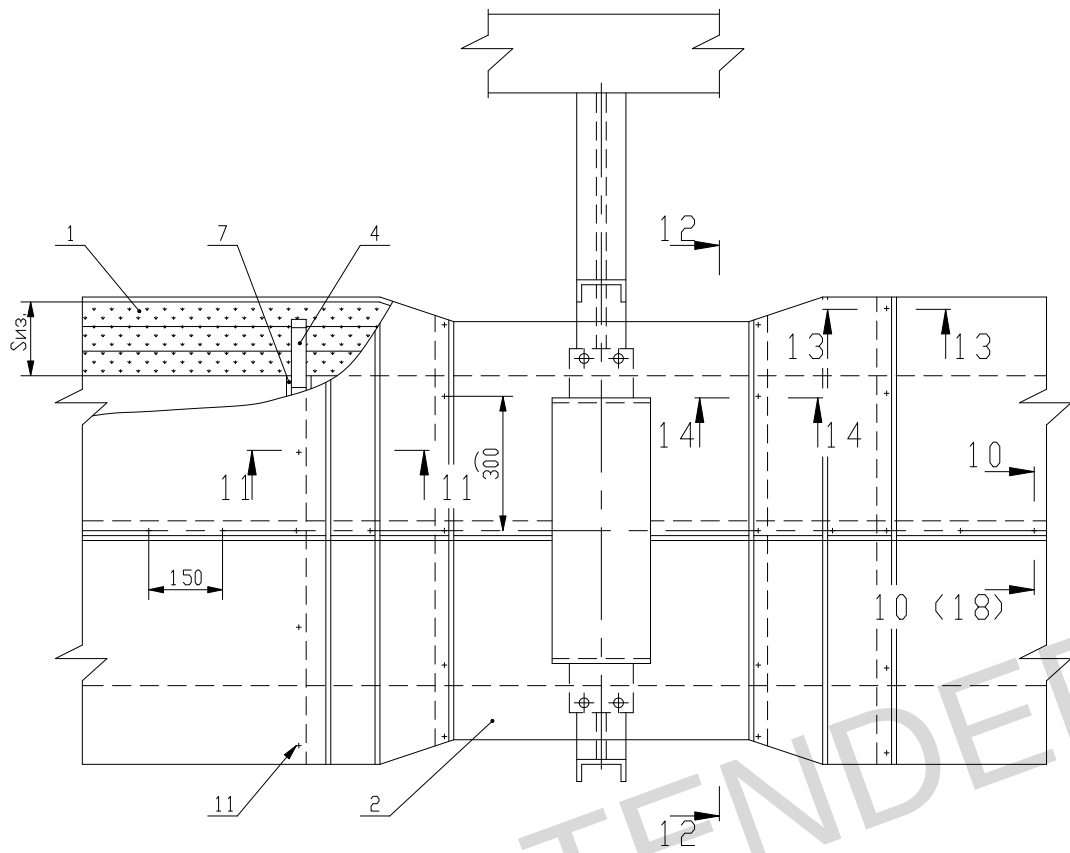
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				Тепловая изоляция трубопроводов и оборудования. Чертеж теплоизоляционных конструкций Heat insulation of pipelines and equipment. Drawings of heat-insulation structures	Страница	Лист
					Phase	Sheet
					13	
				Трубопроводы. Изоляция в местах опор настен. Спецификация. Размер 1-1, 5-5 Pipelines. Insulation with mats in supports places. Specification.	 FSUE 'Atomenergopromsk' Moscow 2004	

Package Number 1 11 6 124
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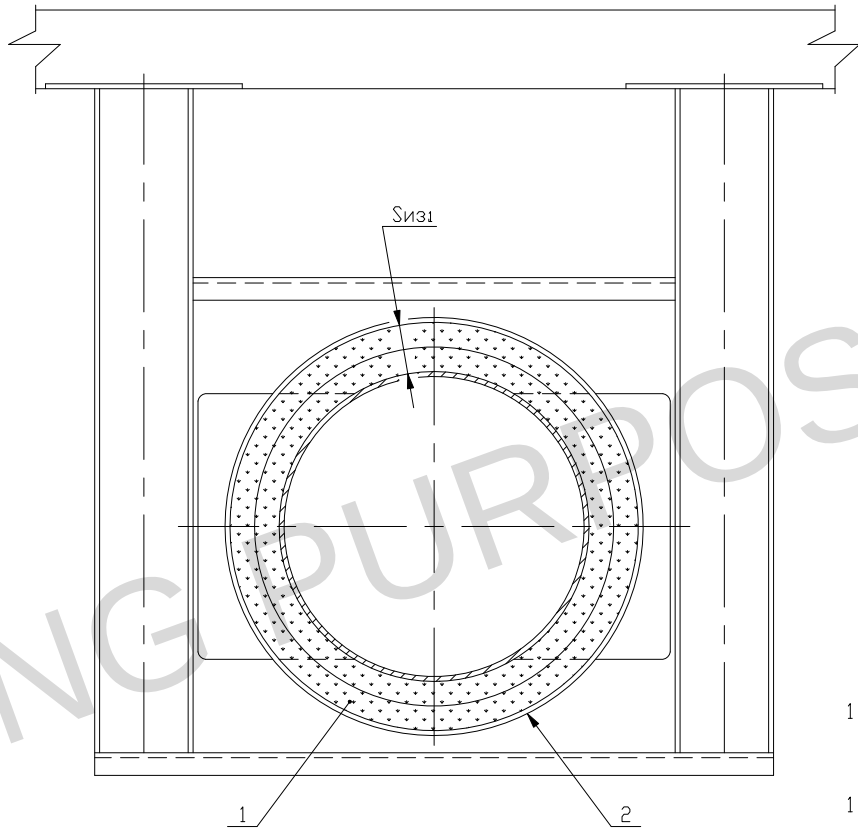
FSUE
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Moscow 2004

формат А3х3

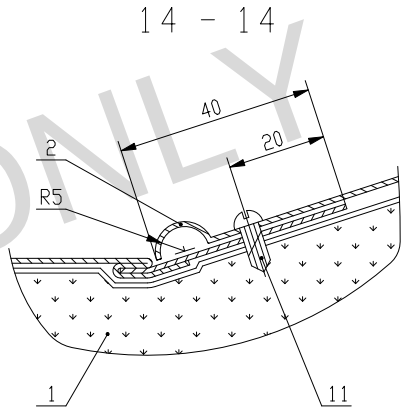
ОПОРА НАПРАВЛЯЮЩАЯ
GUIDE SUPPORT



12 - 12



14 - 14



1 Данный чертёж читать совместно с листами 13 и 18.

1 The given drawing should be read together with sheets 13 and 18.

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI OK WD001_020=0

R01. KK. 1 0. 0. TI. OK. WD001

АЭС "КУДАНКУЛАМ" БЛОК 1
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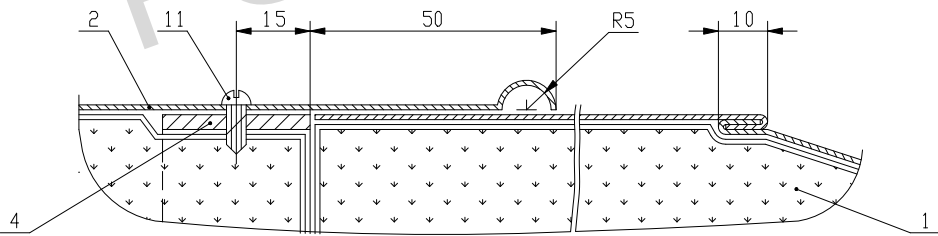
Тепловая изоляция трубопроводов и оборудования. Чертежи теплоизоляционных конструкций Heat insulation of pipelines and equipment. Drawings of heat-insulation structures	Стадия	Лист	Листов
	Phase	Sheet	Sheets
	WD	20	

Трубопроводы. Изоляция в местах опор
матями. Разрезы 11-11...14-14
Pipelines. Insulation with mats in
supports places. Sections 11-11...14-14

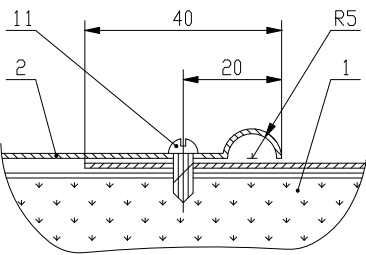
FSUE
"Atomenergoproekt"
Moscow 2004

формат A4x3

11 - 11



13 - 13

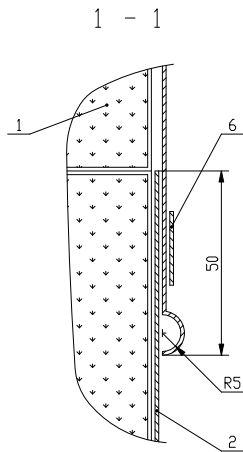
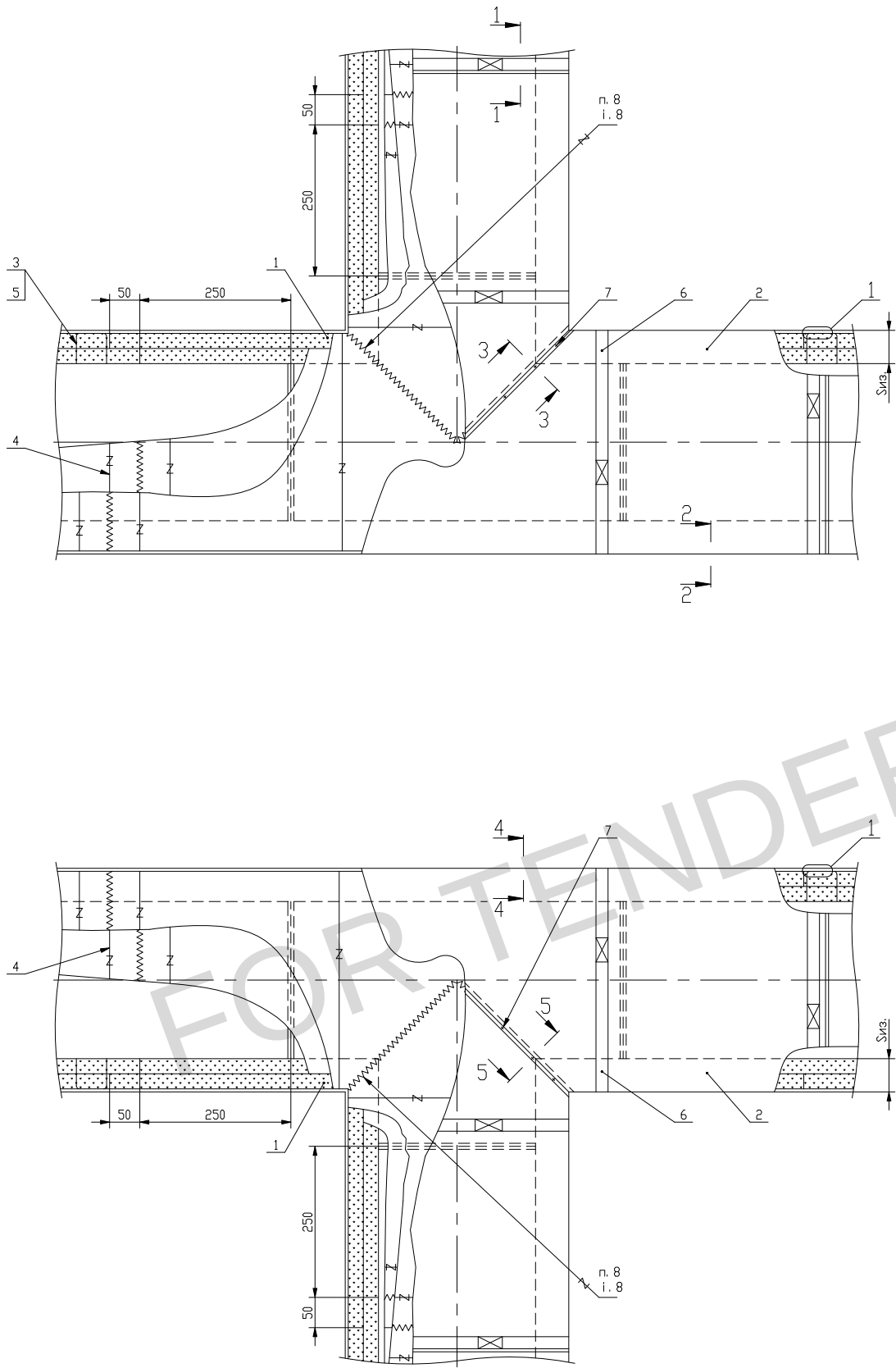


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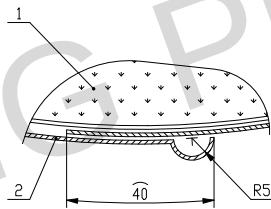
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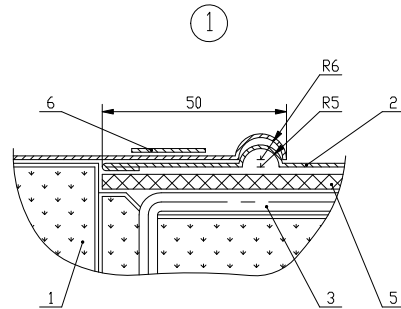
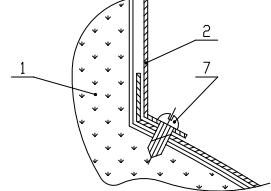
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Inspector
Разработ.
Designed



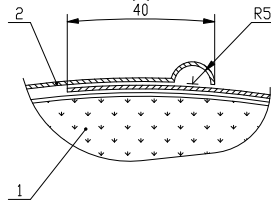
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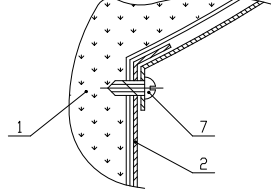
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4 - 4



5 - 5



СПЕЦИФИКАЦИЯ
SPECIFICATION

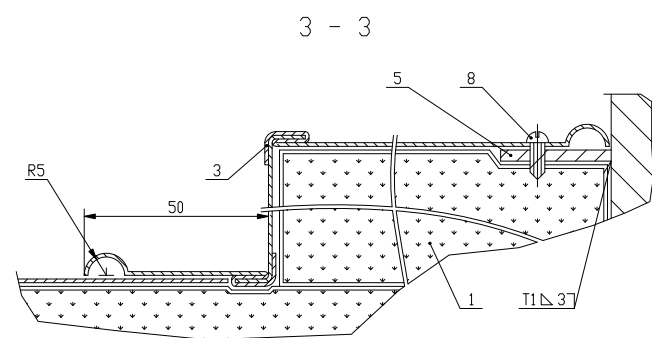
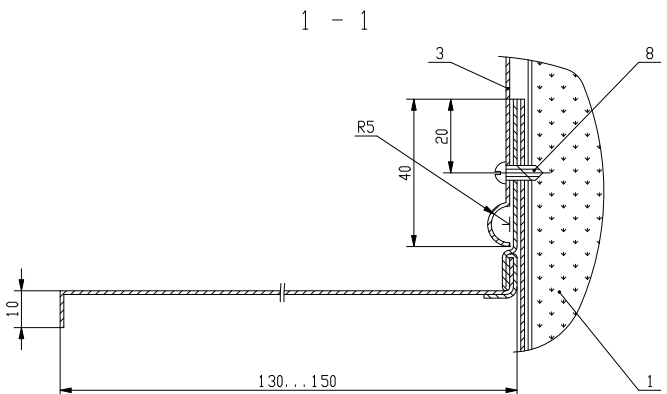
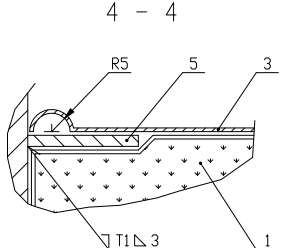
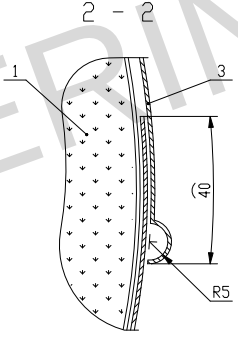
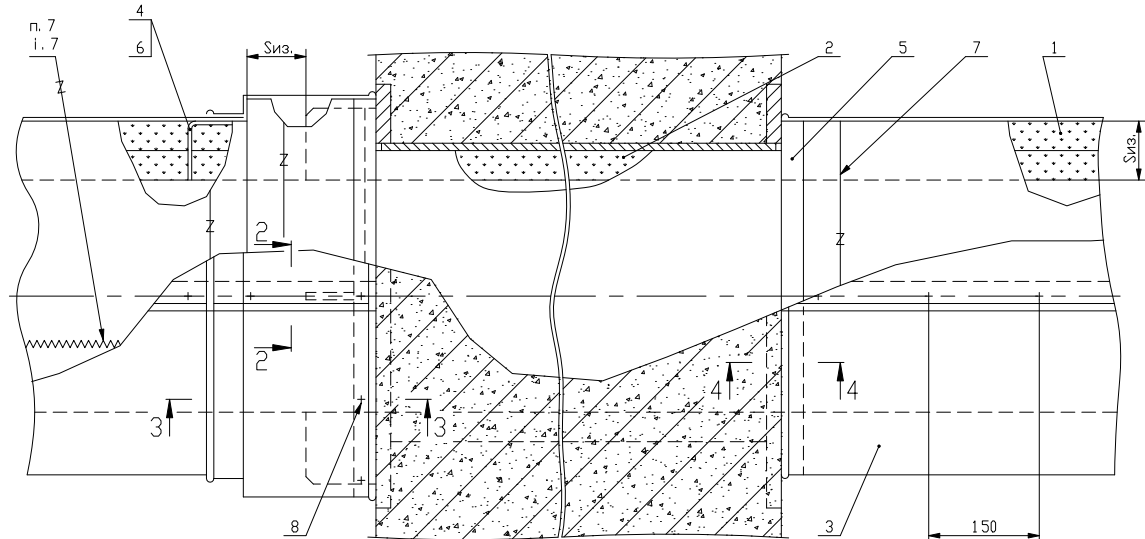
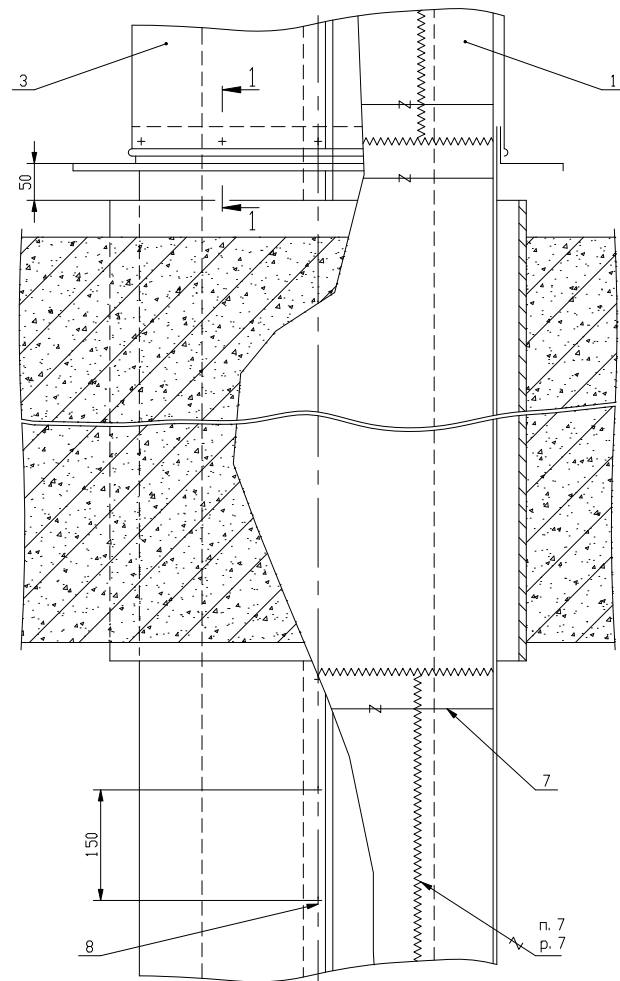
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Единицы Unit	Общая Total				
1	-	Маты в стеклоткани Mats in glass fabric	-	-	Смотри пункт 2 See item 2
2	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 2 See item 2
3	R01. KK. 1 0. 0. TI. OK. WD001, лист 30 sheet	Скоба опорная Support clamp	-	-	
4	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	Смотри пункты 5,6 See items 5,6
5	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick TU 21-5328981-08-93)	-	-	
6	R01. KK. 1 0. 0. TI. OK. WD001, лист 41 sheet	Бандаж с замком Bandage with lock	-	-	
7	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	

1 Сиз. - толщина теплоизоляционного слоя.
2 Материал и толщина теплоизоляционного слоя (поз. 1) и металлопокрытия (поз. 2) указаны в "Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям" R01. KK. 0. 0. TI. TT. WD001 и технологических ведомостях.
3 При Диз. <200 мм использовать бандаж с пряжкой (лист 40) взамен бандажа с замком (поз. 6).
4 Допускается применение винта самонарезающего 4x12.01.029 ГОСТ 10621-80 взамен бандажа (поз. 6).
5 При выполнении тепловой изоляции трубопроводов изготовленных из нержавеющей стали применять кольца (поз. 4) из проволоки 2,0-ТС ГОСТ 18143-72.
6 При выполнении тепловой изоляции трубопроводов изготовленных из углеродистой стали применять кольца (поз. 4) из проволоки 2,0-0-4 ГОСТ 3282-74.
7 Допускается применение бандажа с пряжкой (лист 40) взамен кольца (поз. 4).
8 В качестве шивки для матов:
- в обкладке из кремнеземной ткани КТ-11 применять нить кремнеземную К11С6-180 (ТУ 6-48-52-90);
- в обкладке из стеклоткани Т-23 применять нить стеклянную крученную комплексную ЕС6-28x1x2(100) (ГОСТ 8325-78).

1 Сиз. - толщина теплоизоляционного слоя.
2 The material and thickness of heat-insulating layer (pos. 1), metal covering (pos. 2) is indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01. KK. 0. 0. TI. TT. WD001 and technological sheets.
3 At Dns. <200 mm bandage with buckle (sheet 40) should be used instead of bandage with lock (pos. 6).
4 It is allowed to use self-tapping screw 4x12.01.029 GOST 10621-80 instead of bandage (pos. 6).
5 When performing heat insulation of pipelines made of stainless steel, 2,0-TS wire rings (pos. 4), GOST 18143-72, shall be used.
6 When performing heat insulation of pipelines made of carbon steel, 2,0-0-Ch wire rings (pos. 4), GOST 3282-74, shall be used.
7 It is allowed to use bandage with buckle (sheet 40) instead of wire ring (pos. 4).
8 As stitching for mats:
- in jacket made of KT-11 silica fiber, silica thread K11S6-180 (TU 6-48-52-90) shall be used;
- in jacket made of glass fabric T-23, glass twisted complex thread ES6-28x1x2(100) (GOST 8325-78) shall be used.

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI OK WD001_023=0

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This drawing is not to be reproduced or transferred to other organizations or private persons without approval of the FSUE "Atomenergoproekt"		Тепловая изоляция трубопроводов и оборудования. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures		Студия Лист Листов Phase Sheet Sheets	
Изм. N уч.Лист N док.ПодписьДата Rev. N pat. Sheet No. Signature Date		Трубопроводы. Тренинги. Спецификация. Разрезы 1-1... 5-5 Pipelines. T-joint. Specification. Sections 1-1... 5-5		FSUE "Atomenergoproekt" Moscow 2004	
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СПЕЦИФИКАЦИЯ
SPECIFICATION

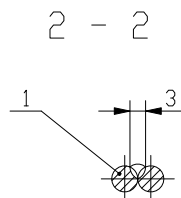
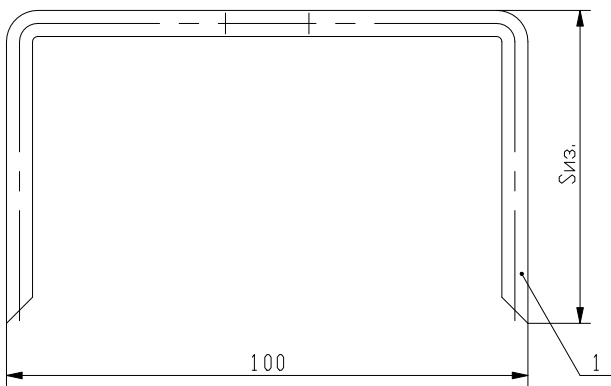
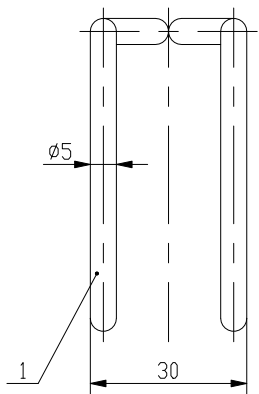
Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, kg	Примечание Note
			Единицы Unit	Общая Total	
1	-	Маты в стеклоткани Mats in glass fabric	-	-	Смотри пункт 2 See item 2
2	-	Теплоизоляционный материал в набивку Packed heat-insulating material	-	-	Смотри пункт 2 See item 2
3	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 2 See item 2
4	R01. KK. 1 0. 0. TI. ОК. WD001, лист 30 sheet	Скоба опорная Support clamp	-	-	
5	-	Кольцо (лента 3x30 мм ГОСТ 6009-74) Ring (tape 3x30 mm GOST 6009-74)	-	-	
6	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick TU 21-5328981-08-93)	-	-	
7	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	Смотри пункты 4,5 See items 4,5
8	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	
	ГОСТ 9467-75 ГОСТ 9467-75	Электроды Э-46А Ø3 мм Electrodes E-46A Ø3 mm	-	-	

1 Сиз. - толщина теплоизоляционного слоя.
2 Материал и толщина теплоизоляционного слоя (поз. 1 и 2) и металлопокрытия (поз. 3) указаны в 'Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям' R01. KK. 0. 0. TI. TT. WD001 и техномонтажных ведомостях.
3 Детали (поз. 4 и 5) изготовленные из углеродистой стали подлежат антикоррозионной защите.
4 При выполнении теплоизоляции трубопроводов изготовленных из нержавеющей стали применить кольца (поз. 7) из проволоки 2,0-ТС ГОСТ 18143-72.
5 При выполнении теплоизоляции трубопроводов изготовленных из углеродистой стали применить кольца (поз. 7) из проволоки 2,0-0-Ч ГОСТ 3282-74.
6 Допускается применение бондажа с прямой (лист 40) взамен кольца (поз. 7).
7 В качестве сшивки для матов:
- в обкладке из кремнеземной ткани КТ-11 применить нить кремнеземную К11С6-180 (ТУ 6-48-52-90);
- в обкладке из стеклоткани Т-23 применить нить стеклянную крученную комплексную ЕС6-28х1х2(100) (ГОСТ 8325-78).
8 Технические требования к сборке мелких металлоконструкций смотри лист 52.

1 Сиз. - thickness of heat-insulating layer.
2 The material and thickness of heat-insulating layer (pos. 1 and 2) and metal covering (pos. 3) are indicated in the 'Initial technical requirements for thermal insulation materials, articles and structures' R01. KK. 0. 0. TI. TT. WD001 and technological and mounting sheets.
3 Parts (pos. 4 and 5) made of carbon steel are subject to anticorrosive protection.
4 When performing heat insulation of pipelines made of stainless steel, 2,0-TS wire rings (pos. 7), GOST 18143-72, shall be used.
5 When performing heat insulation of pipelines made of carbon steel, 2,0-0-Ch wire rings (pos. 7), GOST 3282-74, shall be used.
6 It is allowed to use bandage with buckle (sheet 40) instead of wire ring (pos. 7).
7 As stitching for mats:
- in jacket made of KT-11 silica fiber, silica thread K11S6-180 (TU 6-48-52-90) shall be used;
- in jacket made of glass fabric T-23, glass twisted complex thread ES6-28x1x2(100) (GOST 8325-78) shall be used.
8 For the technical requirements to small metal structures welding see sheet 52.

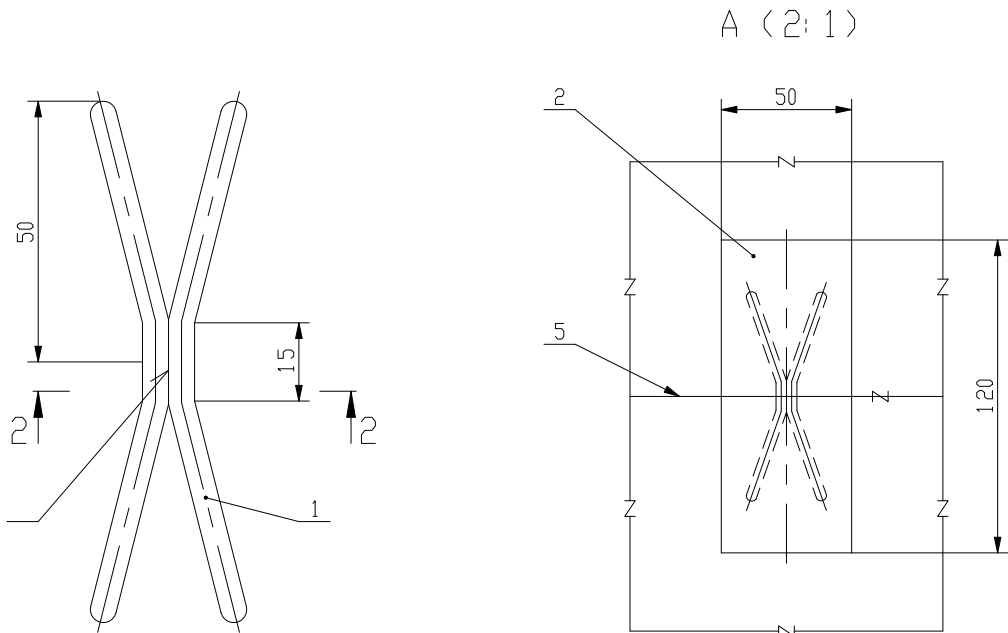
Package Number 1 11 6 124
File: R01 KK 1 0 0 TI ОК WD001_026=0

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This drawing is not to be reproduced or transferred to other organizations without approval of the FSUE "Atomenergoproekt"		Тепловая изоляция трубопроводов и оборудования. Чертежи теплоизоляционных конструкций трубопроводов и оборудования. Drawings of heat-insulation structures of pipelines and equipment.		Студия Лист Листов Phase Sheet Sheets	
Изм. N уч.Лист N док.ПодписьДата Rev. N pat. Sheet No Signature Date		Трубопроводы. Проходка. Спецификация. Разрезы 1-1...4-4 Pipelines. Penetration. Specification. Sections 1-1...4-4		26	
Инспектор Inspector Designed		Niki ti na		FSUE "Atomenergoproekt" Moscow 2004	

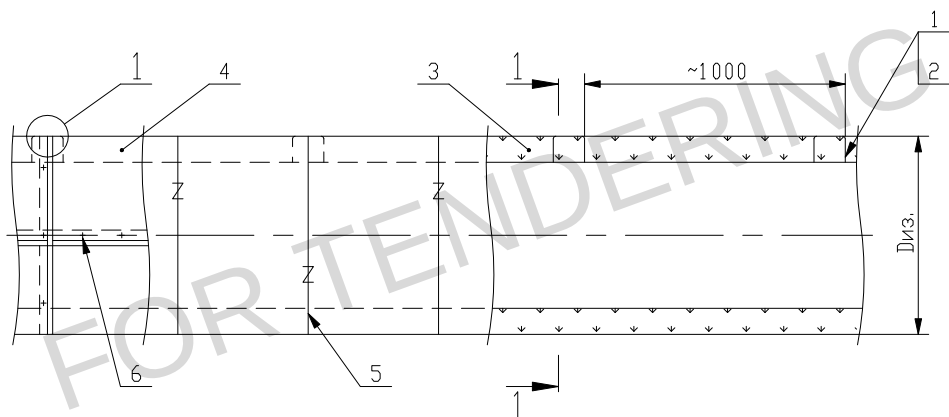


СПЕЦИФИКАЦИЯ
SPECIFICATION

Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, kg	Примечание Note
			Единицы Unit	Общая Total	
1	-	Скоба опорная (проволока Ø5 мм) Support clamp (wire Ø5 mm)	-	-	Смотри пункты 5,6 See item 5,6
2	-	Прокладка 120x50 мм (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket 120x50 mm (cardboard 4 mm thick TU 21-5328981-08-93)	-	-	
3	-	Теплоизоляционный слой из волокнистых материалов Heat-insulating layer of fibre materials	-	-	Смотри пункт 2 See item 2
4	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 2 See item 2
5	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	Смотри пункты 8,9 See items 8,9
6	ГОСТ 10621-80 GOST 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	



УСТАНОВКА СКОБЫ ОПОРНОЙ. СХЕМА
SUPPORT CLAMP INSTALLATION. DIAGRAM



- 1 Сиз. - толщина теплоизоляционного слоя;
Диз. - диаметр изолированного трубопровода.
2 Материал и толщина теплоизоляционного слоя (поз. 3) и металлопокрытия (поз. 4) указаны в техномонтажных ведомостях.
3 На горизонтальных участках трубопроводов Ø108 мм и более установить скобы опорные с шагом 1000 мм.
4 В местах установки опорных колец опорные скобы не устанавливать.
5 Для трубопроводов из углеродистой стали изготовить опорные скобы из проволоки 5,0-0-Ч ГОСТ 3282-74 из углеродистой стали.
6 Для трубопроводов из нержавеющей стали изготовить опорные скобы из проволоки 5,0-ТС ГОСТ 18143-72 из нержавеющей стали.
7 Опорные скобы изготовленные из проволоки из углеродистой стали подлежат антикоррозионной защите.
8 При выполнении тепловой изоляции трубопроводов изготовленных из нержавеющей стали применить кольца (поз. 5) из проволоки 2,0-ТС ГОСТ 18143-72.
9 При выполнении тепловой изоляции трубопроводов изготовленных из углеродистой стали применить кольца (поз. 5) из проволоки 2,0-0-Ч ГОСТ 3282-74.
10 При сварке опорной скобы применить:
- для углеродистой стали электроды Э-46А (ГОСТ 9467-75) Ø3 мм;
- для нержавеющей стали электроды ЭА-400/10У (ОСТ 5Р. 9370-81) Ø3 мм.
11 Технические требования к сварке мелких металлоконструкций смотри лист 52.

- 1 Сиз. - толщина теплоизоляционного слоя;
Диз. - pipeline diameter with insulation.
2 The material and thickness of heat-insulating layer (pos. 3) and metal covering (pos. 4) are indicated in the technological and mounting sheets.
3 On horizontal sections of pipelines Ø108 mm and more, support clamps with 1000 mm space shall be installed.
4 Support clamps shall not be installed in installation points of support rings.
5 For pipelines made of carbon steel, the support clamps from carbon steel wire of 5.0-0-Ch grade, GOST 3282-74, shall be made.
6 For pipelines made of stainless steel, the support clamps from stainless steel wire of 5.0-TS grade, GOST 18143-72, shall be made.
7 Support clamps made of carbon steel wire are subject to anticorrosive protection.
8 When performing heat insulation of pipelines made of stainless steel, 2.0-TS wire rings (pos. 5), GOST 18143-72, shall be used.
9 When performing heat insulation of pipelines made of carbon steel, 2.0-0-Ch wire rings (pos. 5), GOST 3282-74, shall be used.
10 When welding the support clamp use:
- for carbon steel electrodes E-46A (GOST 9467-75) Ø3 mm;
- for stainless steel electrodes EA-400/10U (OST 5R. 9370-81) Ø3 mm.
11 For the technical requirements to small metal structures welding see sheet 52.

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI OK WD001_030=0

R01. KK. 1 0. 0. TI. OK. WD001

АЭС "КУДАНКУЛАМ" БЛОК 1
NPP "KUDANKULAM" UNIT 1

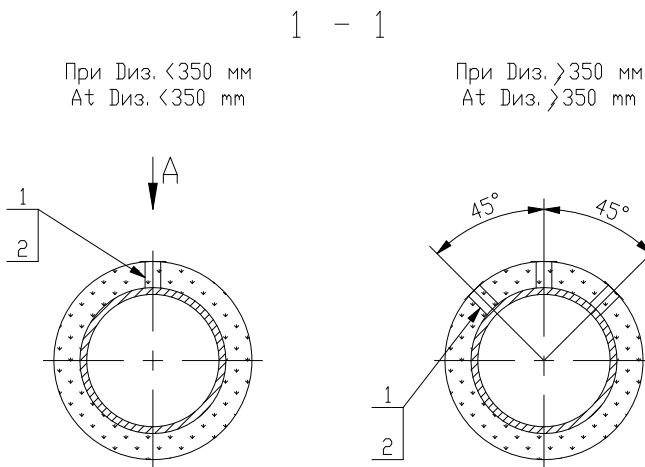
Тепловая изоляция трубопроводов и оборудования. Чертежи теплоизоляционных конструкций. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures	Стадия Phase	Лист Sheet	Листов Sheets
	WD	30	

Трубопроводы. Скоба опорная.
Спецификация. Разрез 1-1
Pipelines. Support clamp.
Specification. Section 1-1

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Moscow 2004

формат A2

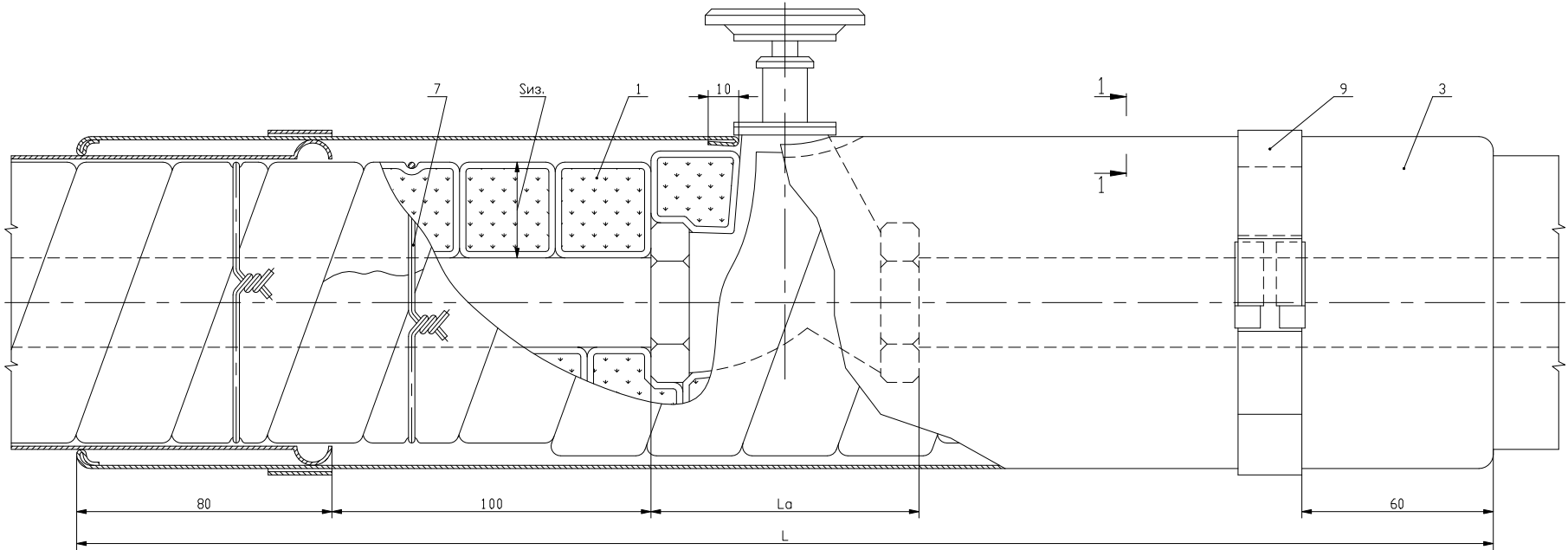
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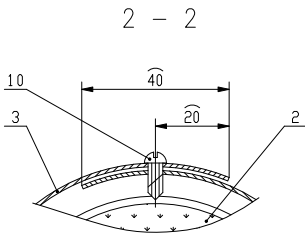
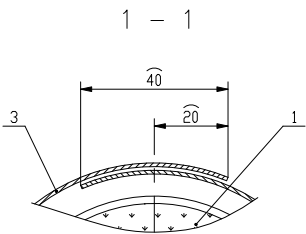
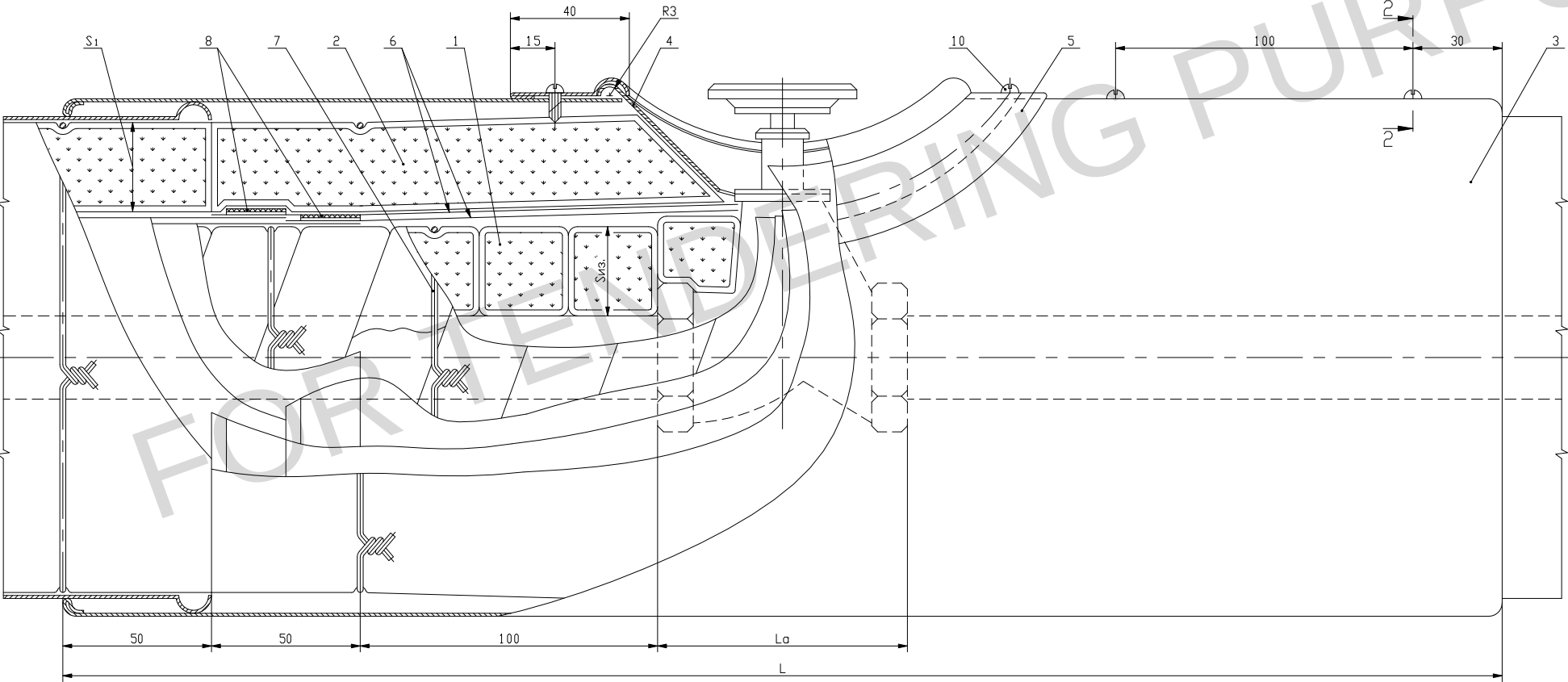
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Изм.	N	участ	N	док	Подпись	Дата
Rev.	N	pat	Sheet	Doc. No	Signature	Date
Апроб.	1	1	1	1	Kazachkova	
Инсп.	1	1	1	1	Sinityn	
Разраб.	1	1	1	1	Nikitina	
Designed						



АРМАТУРА, ИЗОЛЯЦИЯ ШНУРОМ С ПАРОИЗОЛЯЦИОННЫМ СЛОЕМ
VALVES, INSULATION BY CORD WITH STEAM-INSULATION LAYER



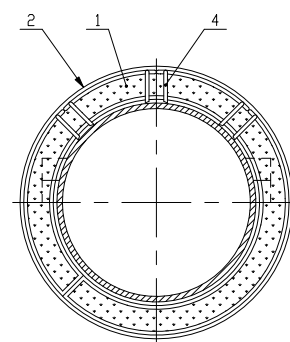
СПЕЦИФИКАЦИЯ SPECIFICATION					
Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, kg	Примечание Note
			Единицы Unit	Общая Total	
1	-	Шнур теплоизоляционный Heat-insulation cord	-	-	См. пункт 2 See item 2
2	-	Маты в стеклоткани Mats in glass fabric	-	-	См. пункт 2 See item 2
3	-	Кожух (лист толщиной 0,5 мм) Casing (sheet 0,5 mm thick)	-	-	См. пункт 2 See item 2
4	-	Воронка (лист толщиной 0,5 мм) Cone (sheet 0,5 mm thick)	-	-	См. пункт 2 See item 2
5	-	Накладка (лист толщиной 0,5 мм) Cover plate (sheet 0,5 mm thick)	-	-	См. пункт 2 See item 2
6	ГОСТ 618-73 GOST 618-73	Фольга алюминиевая толщиной 0,06 мм Aluminum foil 0,06 mm thick	-	-	
7	-	Кольцо (проволока Ø 2 мм) Ring (wire Ø 2 mm)	-	-	См. пункты 6, 7 See items 6, 7
8	ГОСТ 4514-78 GOST 4514-78	Лента для электропромышленности Tape for electric industry LE-20-30 (surgical)	-	-	
9	R01. KK. 1 0. 0. TI. ОК. WD001, лист 40 sheet	Бандаж с пряжкой Bandage with buckle	-	-	
10	ГОСТ 10621-80 GOST 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	

1 Сиз. - толщина теплоизоляционного слоя;
S1 - толщина защитного слоя;
La - длина арматуры, определить по месту;
L - длина кожуха, определить по месту.
2 Материал и толщина теплоизоляционного слоя (поз. 1), защитного слоя (поз. 2), кожуха (поз. 3), воронки (поз. 4) и накладки (поз. 5) указаны в "Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям" R01. KK. 0. 0. TI. TT. WD001 и технологических ведомостях.
3 Размеры воронки (поз. 4) и накладки (поз. 5) определить по месту.
4 Взамен бандажей (поз. 9) допускается установка винтов самонарезающих (поз. 10).
5 При креплении металлокрытия (поз. 3) бандажами (поз. 9), защитный слой (поз. 2) не устанавливать.
6 При выполнении тепловой изоляции трубопроводов изготовленных из нержавеющей стали применить кольца (поз. 7) из проволоки 2,0-ТС ГОСТ 18143-72.
7 При выполнении тепловой изоляции трубопроводов изготовленных из углеродистой стали применить кольца (поз. 7) из проволоки 2,0-0-4 ГОСТ 3282-74.
8 Допускается применение бандажа с пряжкой (лист 39) взамен кольца (поз. 7).

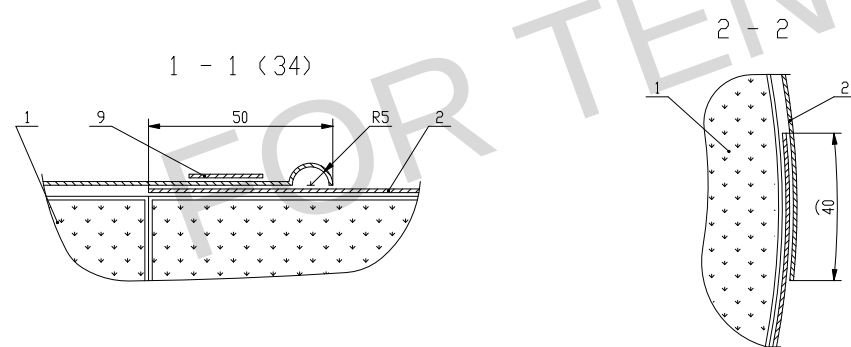
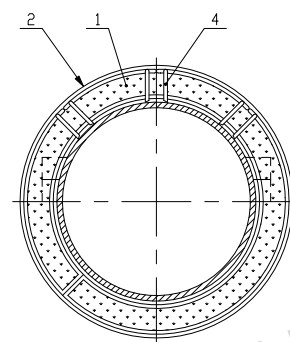
1 Сиз. - thickness of heat-insulating layer;
S1 - thickness of the protective layer;
La - length of valves should be determined in-situ;
L - length of casing should be determined in-situ.
2 The material and thickness of heat-insulating layer (pos. 1), protective layer (pos. 2), casing (pos. 3), cone (pos. 4) and cover plate (pos. 5) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01. KK. 0. 0. TI. TT. WD001 and in technological and mounting sheets.
3 Dimensions of the cone (pos. 4) and of the cover plate (pos. 5) shall be specified in-situ.
4 It is allowed to install self-tapping screws (pos. 10) instead of bandages (pos. 9).
5 When fastening the metal covering (pos. 3) by means of bandages (pos. 9), protective layer (pos. 2) is not installed.
6 When performing heat insulation of pipelines made of stainless steel, 2,0-TS wire rings (pos. 7), GOST 18143-72, shall be used.
7 When performing heat insulation of pipelines made of carbon steel, 2,0-0-Ch wire rings (pos. 7), GOST 3282-74, shall be used.
8 It is allowed to use bandage with a buckle (sheet 39) instead of wire ring (pos. 7).

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI ОК WD001_031=0

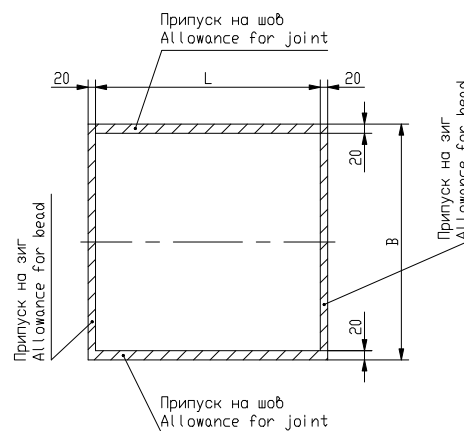
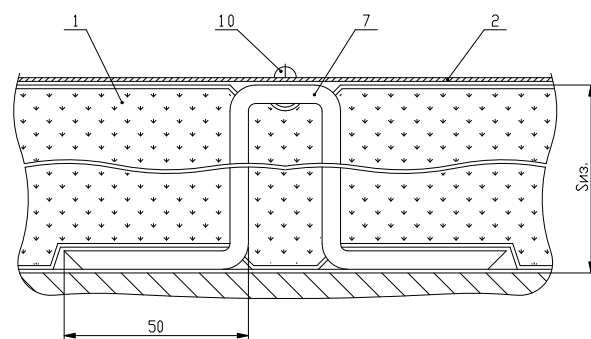
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This drawing is not to be reproduced or transferred to other organizations without approval of the FSUE "Atomenergoproekt"		Тепловая изоляция трубопроводов и оборудования. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures		Студия Лист Листов Phase Sheet Sheets	
Изм. N уч.Лист N док.ПодписьДата		Арматура Dy 10...25 мм. Specifications. Разрезы 1-1, 2-2 Valves NB 10...25 mm. Specification. Sections 1-1, 2-2		31	
Rev. N pat. Sheet No. Doc. Signature Date		Инспектор Nini syn		FSUE "Atomenergoproekt" Moscow 2004	
Разработчик Niki ti na				формат А1	



Technical drawing of a mechanical assembly, showing a cross-section of a component with a central cavity and a flange. The drawing includes dimensions: 50, 150, 150, and L. It also shows a detail view of a hole with diameter 12 and a section line n-n. The component is labeled with numbers 1, 2, 4, 8, and 9.



3 - 3 (36)



Поз.	Обозначение	Наименование	Кол.	Масса	Примечание
Pos.	Designation	Name	Q-ty	Mass, kg Единицы Unit Total	
1	-	Маты в стеклоткани Mats in glass fabric	-	-	См. пункт 2 See item 2
2	-	Кожух (лист) Casing (sheet)	2	-	См. пункт 2 See item 2
3	R01. KK. 1 0. 0. OK. WD001, лист 27 sheet	ТИ. Опорная полка Support rack	-	-	
4	R01. KK. 1 0. 0. OK. WD001, лист 30 sheet	ТИ. Скоба опорная Support clamp	-	-	
5	R01. KK. 1 0. 0. OK. WD001, лист 29 sheet	ТИ. Диафрагма Diaphragm	-	-	
6	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick ТУ 21-5328981-08-93)	-	-	
7	R01. KK. 1 0. 0. OK. WD001, лист 38 sheet	ТИ. Штырь (лист толщиной 1,0 мм) Pin (sheet 1,0 mm thick)	-	-	
8	-	Кольцо (проволока Ø 2 мм) Ring (wire Ø2 mm)	-	-	См. пункты 9, See items 9,
9	R01. KK. 1 0. 0. OK. WD001, лист 41 sheet	ТИ. Бандаж с замком Bondage with a lock	-	-	
10	ОСТ 34 13. 017- 88 ОСТ 34 13. 017- 88	Заклепка комбинированная 3-4, 8+PC1 Combined rivet Z-4, 8+RS1	-	-	
11	ГОСТ 10621-80 GOST 10621-80	Винт самонарезающий 4x12. 01. 029 Self-tapping screw 4x12. 01. 029	-	-	
12	ГОСТ 618-73 GOST 618-73	Фольга алюминиевая толщиной 0,06 мм Aluminum foil 0,06 mm thick	-	-	См. лист 36 See sheet 36
13	ГОСТ 4514-78 АЗ-20-30 (киперная) GOST 4514-78	Лента для электропромышленности Tape for electric industry LE-20-30 (surpical)	-	-	См. лист 36 See sheet 36

1 Сиз. - толщина теплоизоляционного слоя;
Диз. - диаметр изолированного трубопровода;
L - длина кожуха;
Дк - диаметр кожуха;
 $B = \frac{3,14 \cdot D_k}{2} + 40$ мм.

2. Материал и толщина теплоизоляционного слоя (поз. 1) и кожуха (поз. 2) указаны в 'Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям' R01. KK. 0. 0. TI. TT. WD001 и техномонтажных ведомостях.

3 Крепление мата теплоизоляционного к кохуу рекомендуется применять для арматуры с условным диаметром до 300 мм. Крепление мата теплоизоляционного к арматуре рекомендуется применять для арматуры с условным диаметром 300 мм и более.

4 При Диз. <200 мм применить бандаж с пряжкой (лист 40) взамен бандажа с замком (поз. 9).

5 Вырезы в матах и кожухе для штуцеров и других выступающих частей произвести по месту. Вырезы в матах заделать тканью.

6 При диаметре изолируемого трубопровода ≥ 630 мм вместо скобы опорной (поз. 4) установить опорное кольцо (лист 28).

8 Разгружающие устройства (поз. 3, 4) изготовленные из углеродистой стали

подлежат антикоррозионной защите.

9 При выполнении тепловой изоляции трубопроводов изготовленных из нержавеющей стали применить кольца (поз. 8) из проволоки 2,0-ТС ГОСТ 18143-72.

10 При выполнении тепловой изоляции трубопроводов изготовленных из углеродистой стали применить кольца (поз. 8) из проволоки 2,0-0-4 ГОСТ 3282-74.

11 Допускается применение бандажа с пряжкой (лист 40) взамен кольца (поз. 8).

12 В качестве сшивки для матов:
- в обкладке из кремнеземной ткани КТ-11 применить нить кремнеземную

- в обложке из стеклоткани Т-23 применить нить стеклянную крученную ком-

13 Данный чертеж читать совместно с листами 33...37.

1 $\delta_{\text{из.}}$ - thickness of heat-insulating layer;
 $D_{\text{из.}}$ - pipeline diameter with insulation;

Dk - diameter of casing;

$$B = \frac{3,14 D_K}{2} + 40 \text{ mm.}$$

2 The material and thickness of heat-insulating layer (pos. 1) and casing (pos. 2) are indicated in the "Initial technical requirements for thermal

insulation materials, articles and structures" R01.KK.0.0.TI.TT.WD001 and in technological and mounting sheets.

3 It is recommended to attach heat-insulation mat to the casing for valves with the nominal bore up to 300 mm. It is recommended to attach heat-in-

4 At Dn. < 200 mm the bandage with a buckle (sheet 40) should be used

5 Cuts in mats and in casing for unions and other parts protruding from

6 If the diameter of the pipeline with insulation is > 630 mm, the support rings (about 28) shall be installed instead of the support clamps (see 4).

ring (sheet 28) shall be installed instead of the support clamp (pos. 4).

8 Unloading devices (pos. 3, 4) made of carbon steel are subject to anticorrosive protection.

9 When performing heat insulation of pipelines made of stainless steel, 20-IS wire rings (pos. 8) ГОСТ 18143-72 shall be used.

10 When performing heat insulation of pipelines made of carbon steel, 2 0-13 wire rings (pos. 8) GOST 18143-72, shall be used.

11 It is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 8).

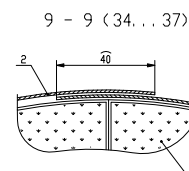
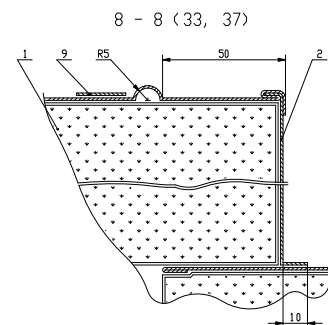
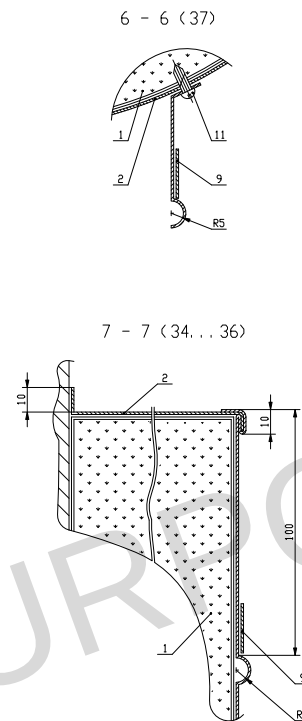
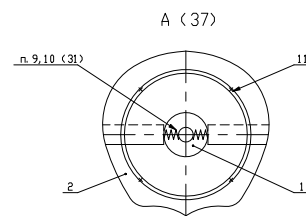
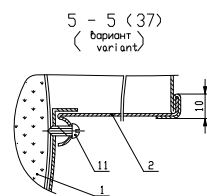
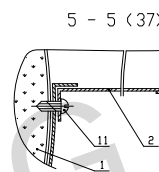
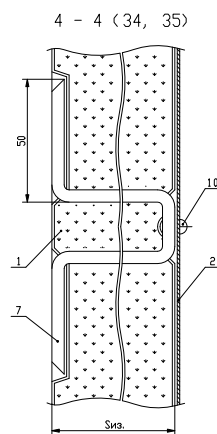
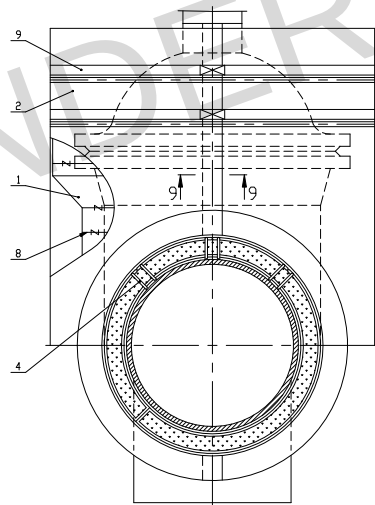
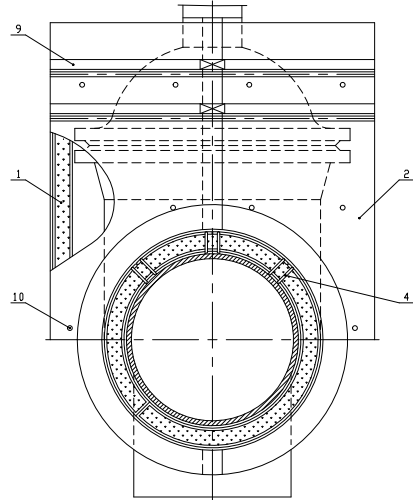
- in jacket made of silica fabric, mark KT-11, silica thread of K11S6-180

- in jacket made of glass fabric, mark T-23, glass twisted complex thread

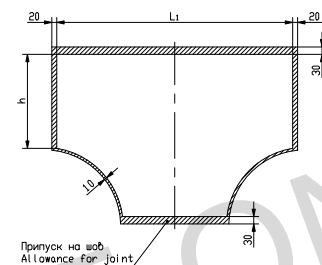
13 The given drawing should be read together with sheets 33.. 37.

16 The given drawing should be read together with the sheets mentioned.

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						AЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1			
						Тепловая изоляция трубопроводов и оборудования.	Стадия	Лист	Листов
						Чертежи теплоизоляционных конструкций Heat insulation of pipelines and equipment.	Phase	Sheet	Sheets
						Drawings of heat-insulation structures	WD	32	
						Арматура. Спецификация. Разрезы 1-1...3-3 Valves. Specification. Sections 1-1...3-3			
	Изм. N	участ.	N док.	Подпись	Дата				
	Rev.	N pat.	Doc.	Signature	Date				
						FSUE "Atomenergoproekt" Moscow 2004			



ПАТРУБОК ВЕРХНИЙ
TOP BRANCH PIPE



Technical drawing of a semi-circular joint. The drawing shows a cross-section of a semi-circular component with a central hole. The dimensions are labeled as follows:

- B_n : Total height of the component.
- d : Diameter of the central hole.
- 10 : Radius of the semi-circular component.
- 20 : Distance from the bottom edge to the center of the hole.

The text "Припуск на шов" (Allowance for joint) is written next to the semi-circular arc.

Technical drawing of a semi-circular part. Dimensions shown: R_1 (outer radius), $R_{\text{вн.}}$ (inner radius), and 20 (width). A note indicates: "Припуск на шов Allowance for joint".

1 Swa. - thickness of heat-insulating layer;
D_{wa} - pipeline diameter with insulation;
L - length of casing;
D_k - diameter of casing;
D_n - diameter of casing top branch pipe;
d_n - diameter of casing bottom branch pipe;
h - height of casing top branch pipe;
d, d_i - diameters of valves parts protruding from insulation;
 $L_1 = \frac{3,14 D_n}{2}$
 $L_2 = \frac{3,14 D_k}{2}$
 $L_3 = \frac{3,14 d_n}{2}$

2 The given drawing should be read together with sheet 32.

Припуск на шов
Allowance for joint

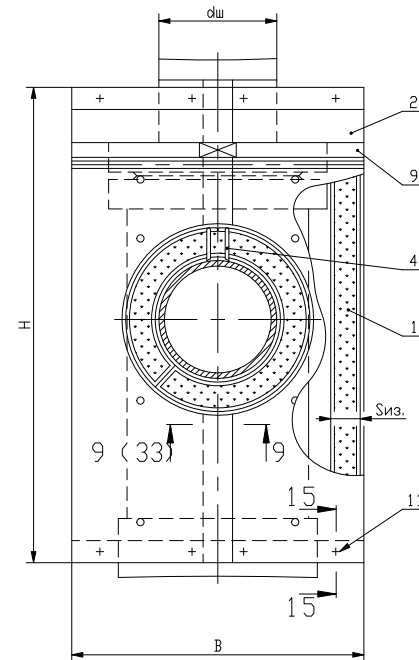
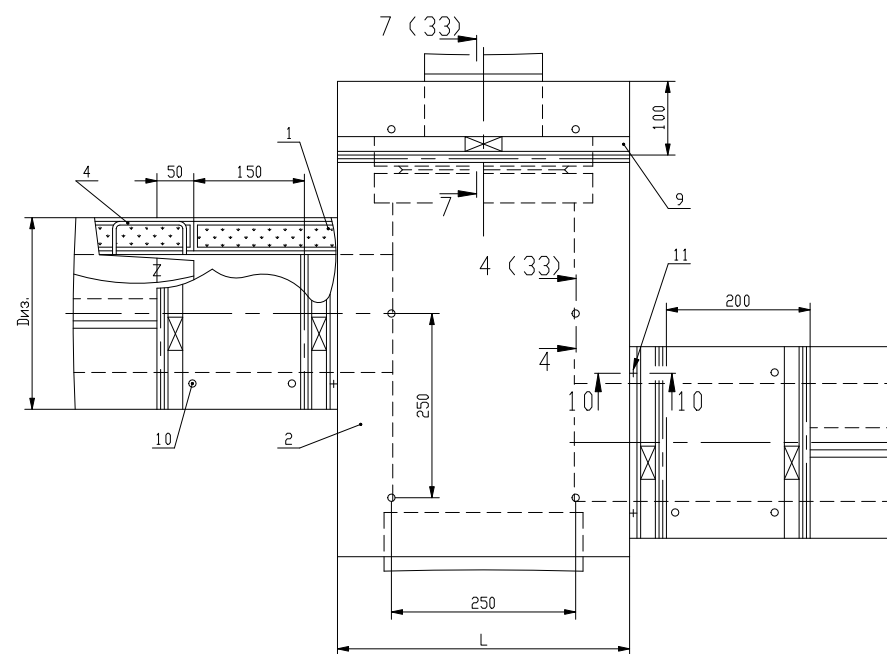
20

L_3

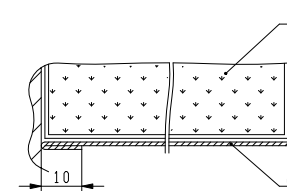
1.0

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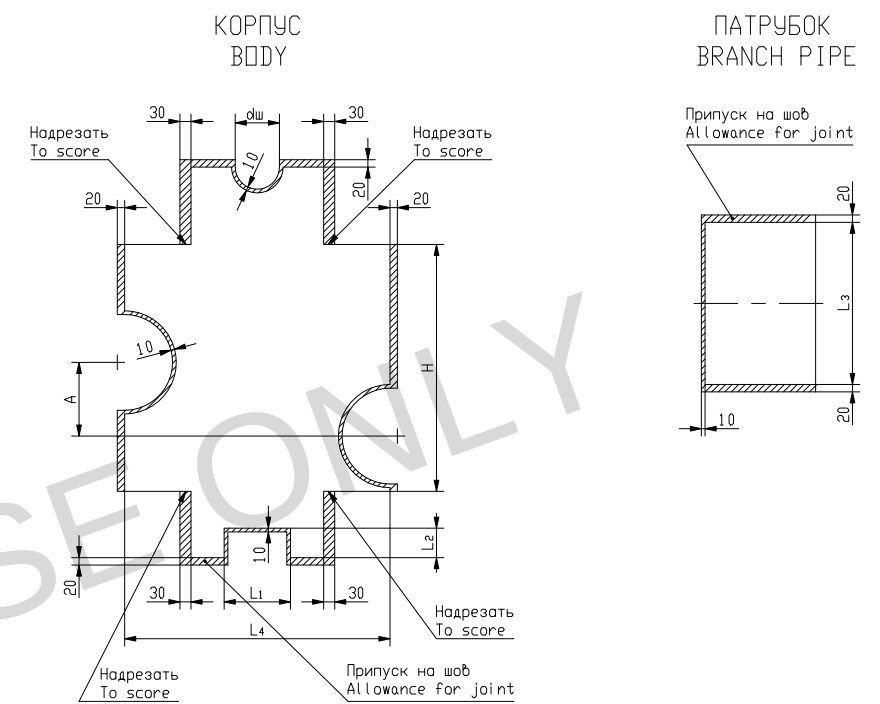
КРЕПЛЕНИЕ МАТА ТЕПЛОИЗОЛЯЦИОННОГО К КОЖУХУ ATTACHMENT OF HEAT-INSULATION MAT TO CASING



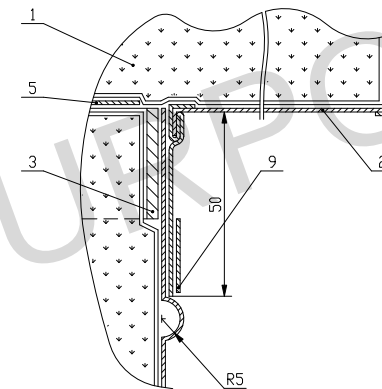
12 - 12



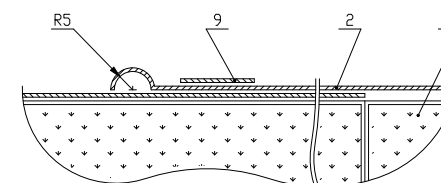
РАСКРОЙ ЭЛЕМЕНТОВ КОЖУХА
LAYING-OUT OF CASING ELEMENTS



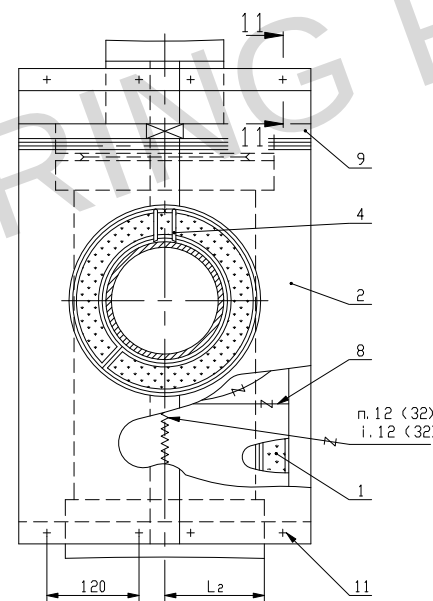
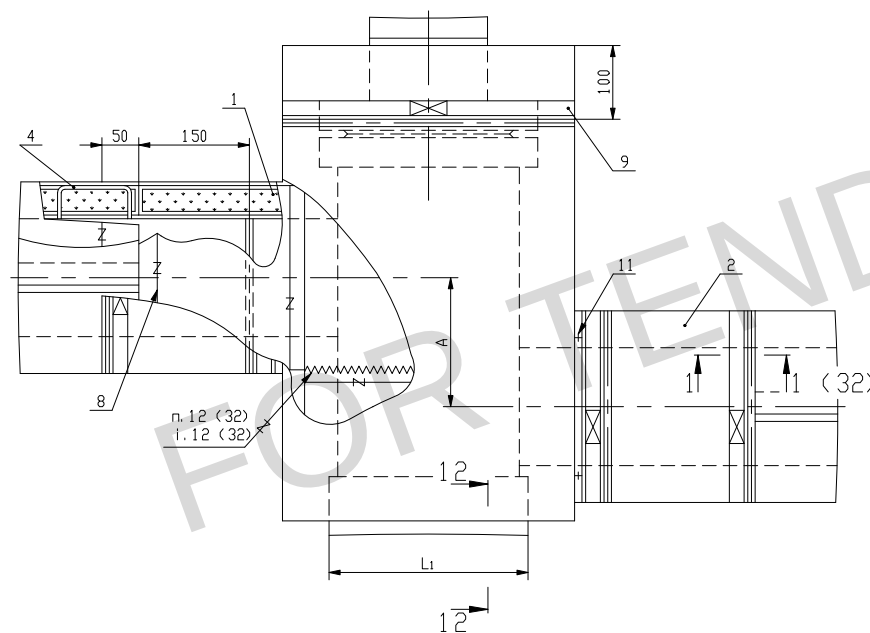
13 - 13 (35)



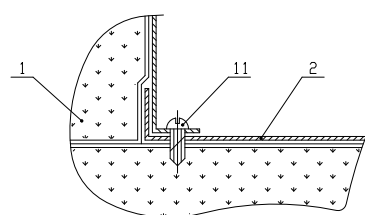
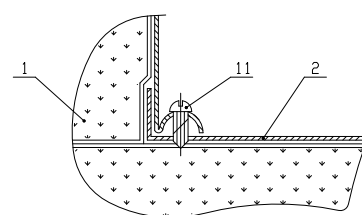
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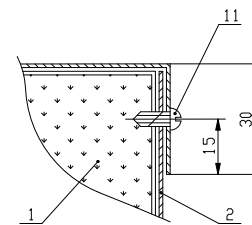
КРЕПЛЕНИЕ МАТА ТЕПЛОИЗОЛЯЦИОННОГО К АРМАТУРЕ
ATTACHMENT OF HEAT-INSULATION MAT TO VALVES



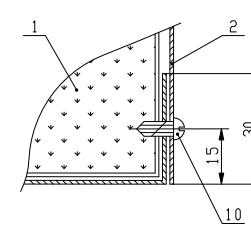
10 - 10


$$\left(\begin{array}{c} 10 - 10 \\ \text{вариант} \\ \text{variant} \end{array} \right)$$


11 - 11



15 - 15



1 Сиз. – толщина теплоизоляционного слоя;
Диз. – диаметр изолированного трубопровода;
Н – высота кожуха;
дш – диаметр штока;
А – расстояние между осями патрубков;
L₁, L₂ – размеры выступающих из изоляции частей арматуры;
В, L – размеры сторон кожуха;
L₃ = 3,14Диз. ;
L₄ = $\frac{B+L}{2}$.

2 Данный чертеж читать совместно с листами 32, 33 и 35.

δ_3 - thickness of heat-insulating layer;
 $D_{\text{и3}}$ - pipeline diameter with insulation;
 H - height of casing;
 d_w - rod diameter;
 A - distance between branch pipe axes;
 l_1, l_2 - sizes of valves ports protruding from insulation;
 B, L - sizes of casing sides;
 $L_3 = 3,14 D_{\text{и3}}$;
 $L_4 = \frac{B+L}{2}$.

2 The given drawing should be read together with sheets 32, 33 and 35.

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI DK WD001_034=0

R01, KK, 1 0, 0, TI, PK, WD001
АЭС "КУДАНКУЛАМ" БЛОК 1
NPP "KUDANKULAM" UNIT 1

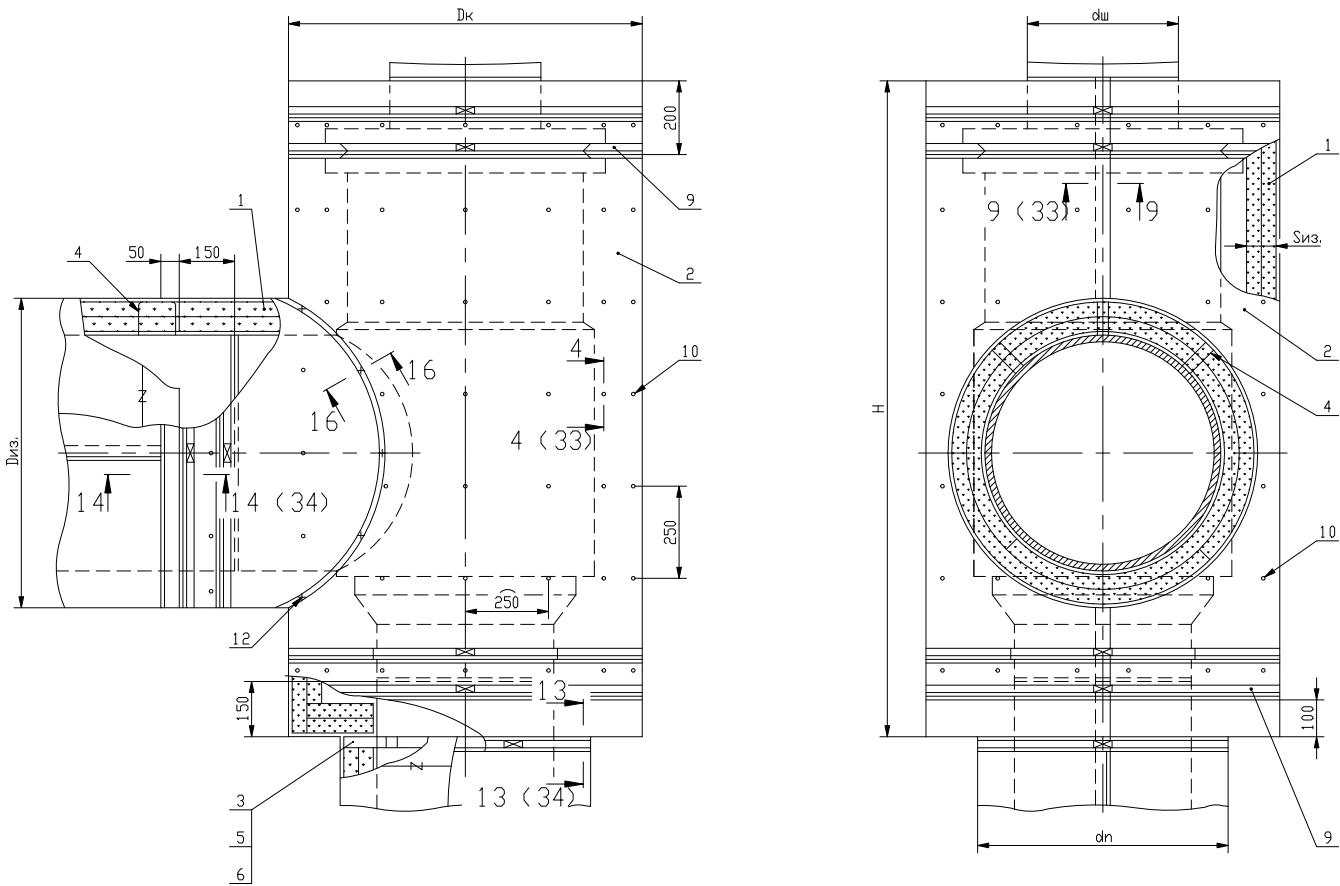
а	Тепловая изоляция трубопроводов и оборудования.	Стадия	Лист	Листов
те	Чертежи теплоизоляционных конструкций.	Phase	Sheet	Sheets
	Heat insulation of pipelines and equipment.			
	Drawings of heat-insulation structures	34		

Арматура. Разрезы 10-10...15-15
Valves. Sections 10-10...15-15

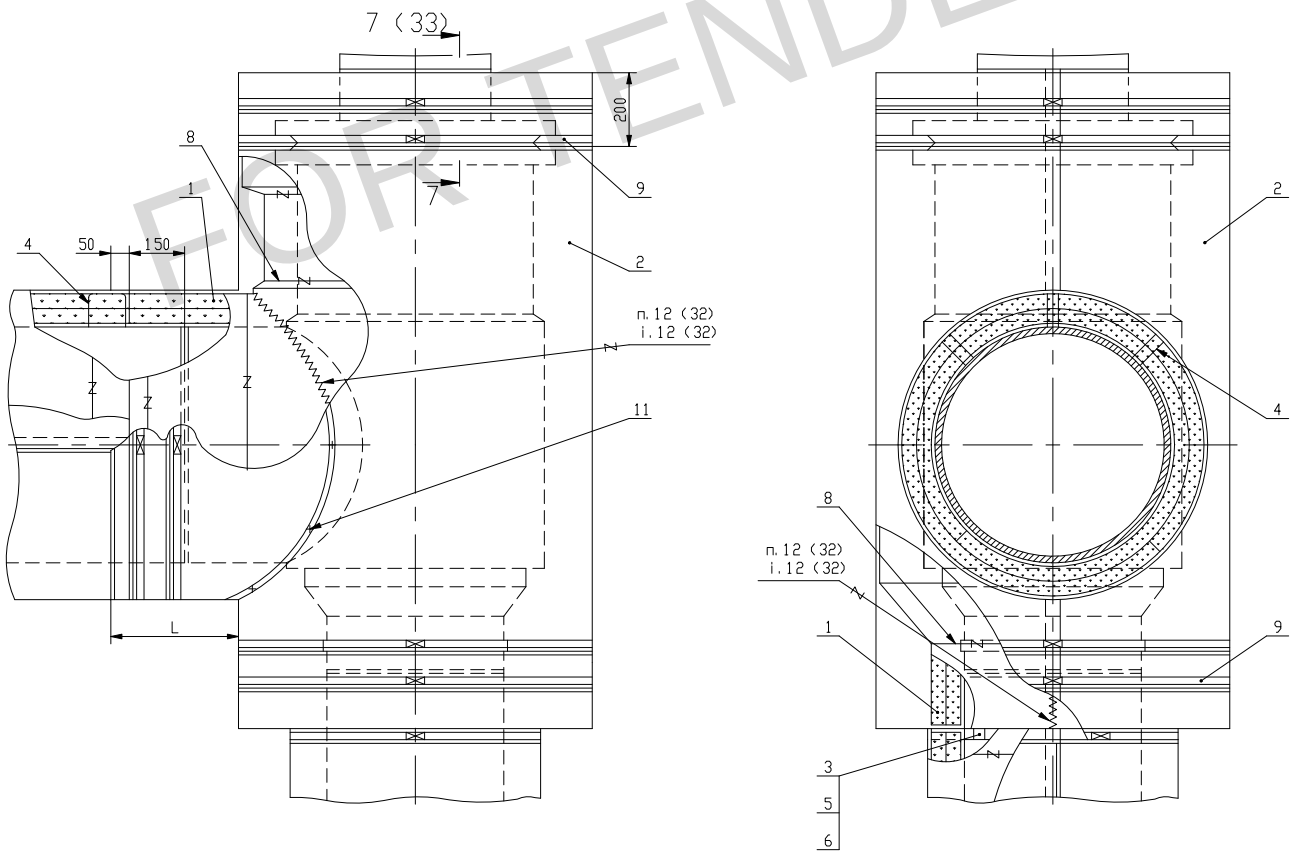
FSUE
"Atomenergoproekt"
Moscow 2004

PMGT A1

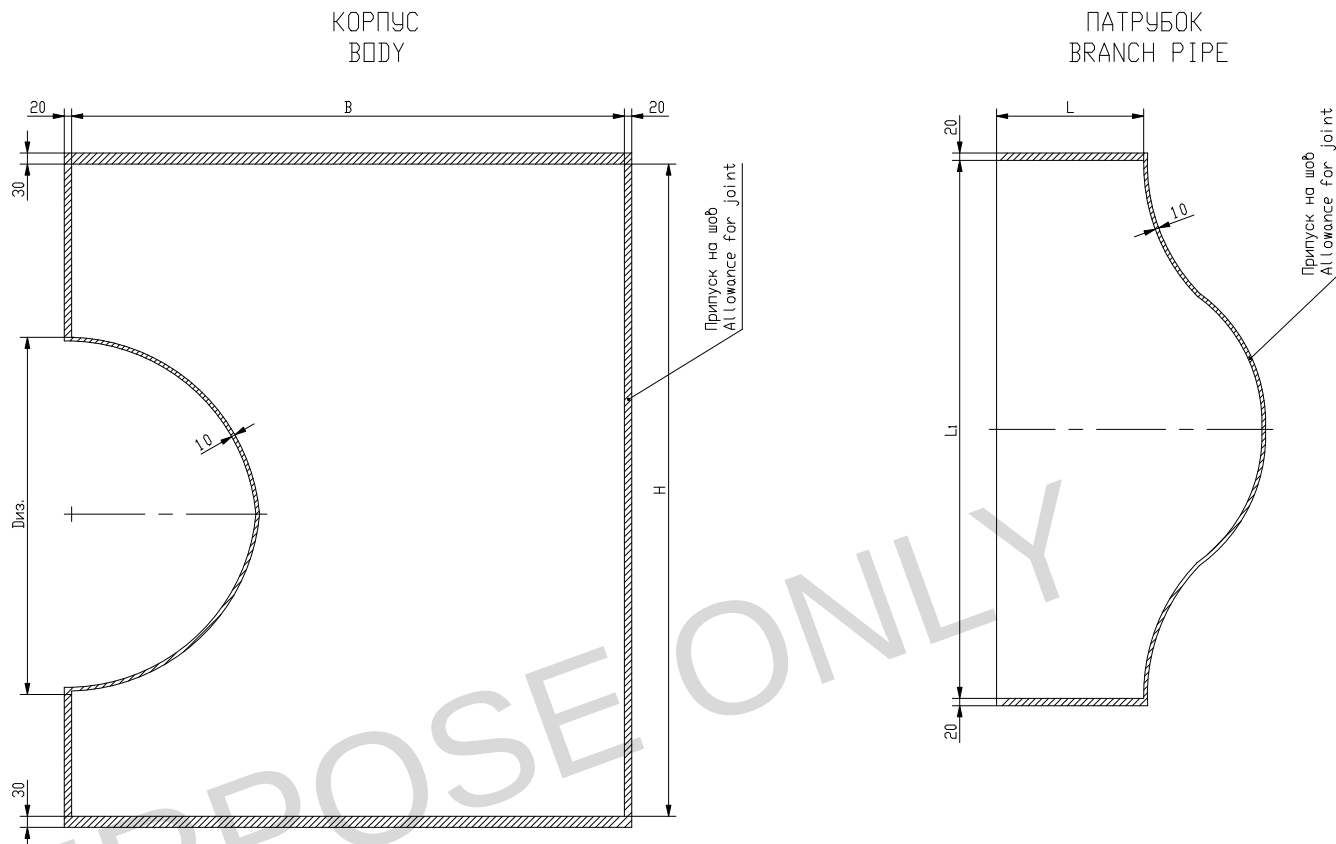
КРЕПЛЕНИЕ МАТА ТЕПЛОИЗОЛЯЦИОННОГО К КОЖУХУ
ATTACHMENT OF HEAT-INSULATION MAT TO CASING



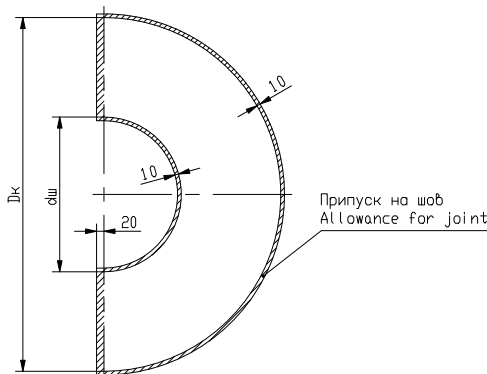
КРЕПЛЕНИЕ МАТА ТЕПЛОИЗОЛЯЦИОННОГО К АРМАТУРЕ
ATTACHMENT OF HEAT-INSULATION MAT TO VALVES



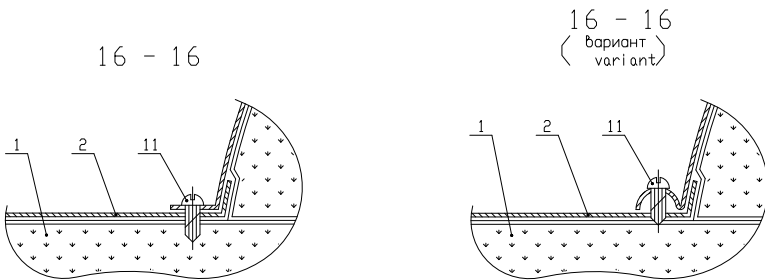
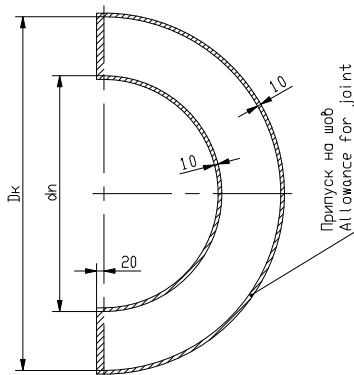
РАСКРОЙ ЭЛЕМЕНТОВ КОЖУХА
LAYING-OUT OF CASING ELEMENTS



ВЕРХНИЙ ТОРЕЦ
TOP END FACE



НИЖНИЙ ТОРЕЦ
BOTTOM AND FACE

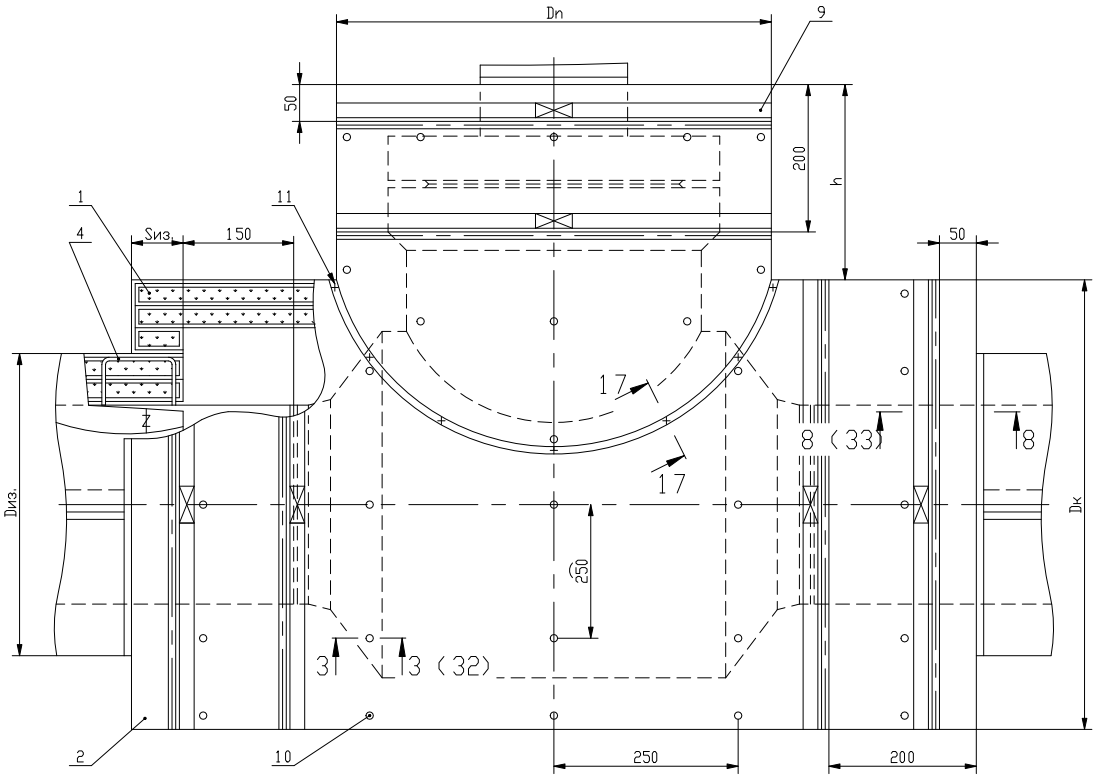


- 1 Сиз. - толщина теплоизоляционного слоя;
Диз. - диаметр изолированного трубопровода;
H - высота кожуха;
Dк - диаметр кожуха;
L - длина патрубков кожуха;
dн - диаметр нижнего патрубка кожуха;
dш - диаметр штока;
 $B = 3,14D_k$;
 $L = 3,14D_{из}$;
2 Данный чертеж читать совместно с листами 32...34.
- 1 Сиз. - thickness of heat-insulating layer;
Диз. - pipeline diameter with insulation;
H - height of casing;
Dк - diameter of casing;
L - length of casing branch pipes;
dн - diameter of casing bottom branch pipe;
dш - rod diameter;
 $B = 3,14D_k$;
 $L = 3,14D_{из}$;
2 The given drawing should be read together with sheets 32...34.

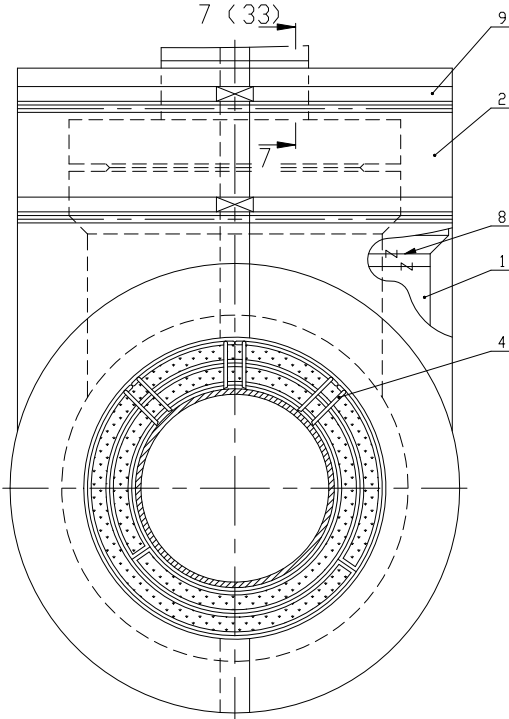
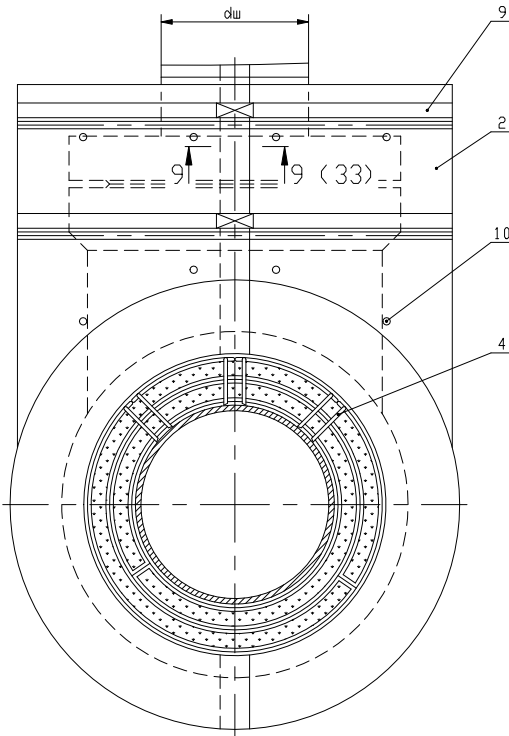
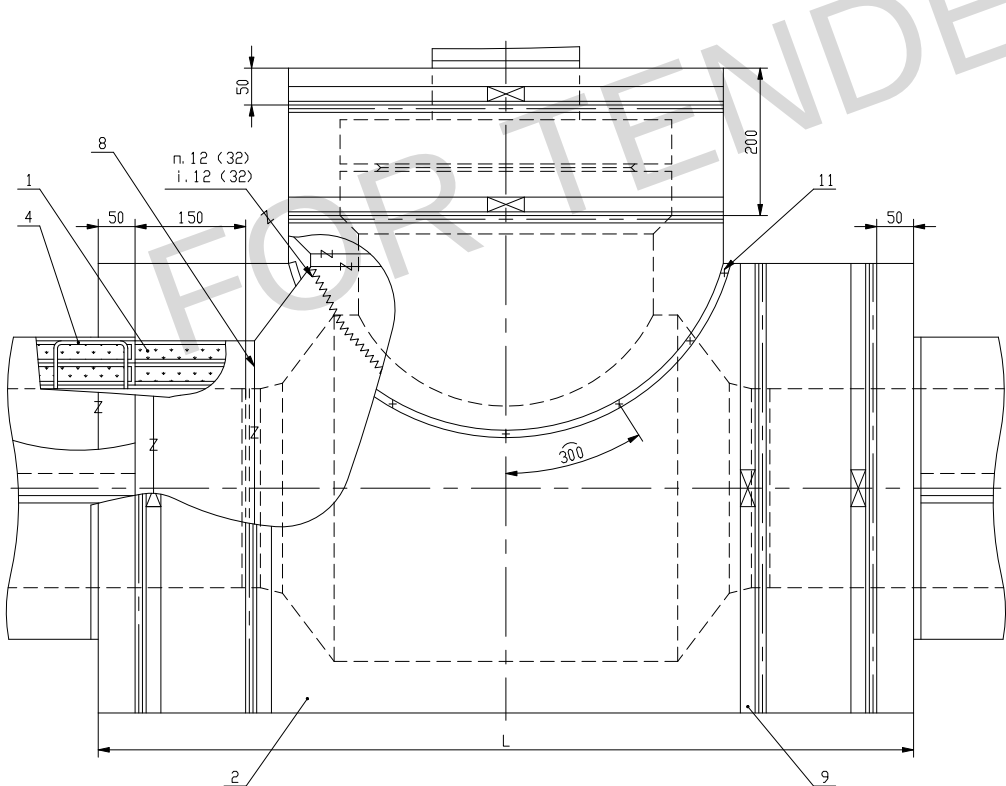
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R01. KK. 1 0. 0. TI. DK. WD001				АЭС "КУДАНКУЛАМ" БЛОК 1 NPP "KUDANKULAM" UNIT 1			
Тепловая изоляция трубопроводов и оборудования. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures.				Студия	Лист	Листов	
Phase				Sheet	35	Sheets	
Арматура. Разрез 16-16 Valves. Section 16-16				FSUE "Atomenergoproekt" Moscow 2004			
формат A1							

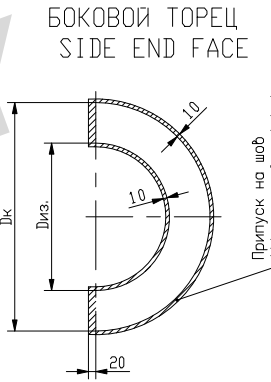
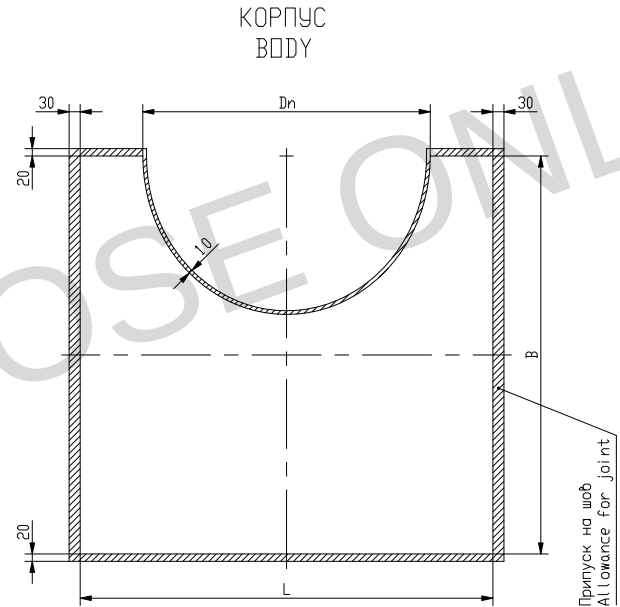
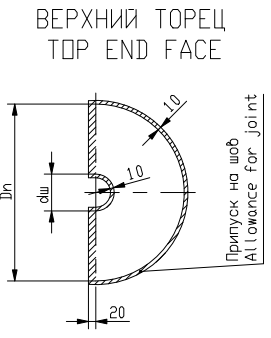
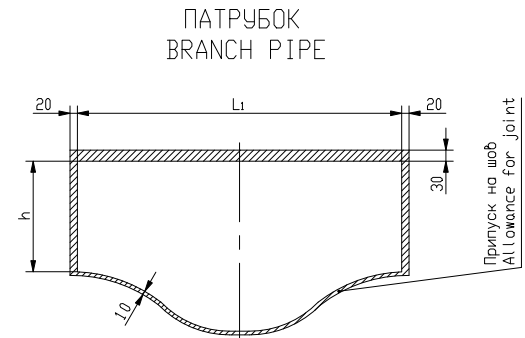
КРЕПЛЕНИЕ МАТА ТЕПЛОИЗОЛЯЦИОННОГО К КОЖУХУ
ATTACHMENT OF HEAT-INSULATION MAT TO CASING



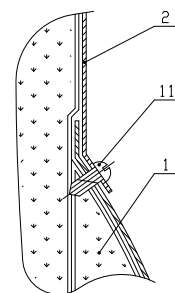
КРЕПЛЕНИЕ МАТА ТЕПЛОИЗОЛЯЦИОННОГО К АРМАТУРЕ
ATTACHMENT OF HEAT-INSULATION MAT TO VALVES



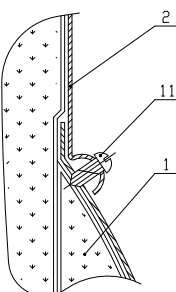
РАСКРОЙ ЭЛЕМЕНТОВ КОЖУХИ
LAYING-OUT OF CASING ELEMENTS



17 - 17



17 - 17
(вариант)



1 Sиз - толщина теплоизоляционного слоя;
Диз - диаметр изолированного трубопровода;
L - длина кожуха;
Dк - диаметр кожуха;
Dн - диаметр верхнего патрубка кожуха;
dш - диаметр штока;
h - высота верхнего патрубка кожуха;
 $B = \frac{3,14 D_k}{2}$;
 $L_1 = \frac{3,14 D_n}{2}$;
2 Данный чертеж читать совместно с листами 32 и 33.

1 Sиз - thickness of heat-insulating layer;
Диз - pipeline diameter with insulation;
L - length of casing;
Dк - diameter of casing;
Dн - diameter of casing top branch pipe;
dш - rod diameter;
h - height of casing top branch pipe;
 $B = \frac{3,14 D_k}{2}$;
 $L_1 = \frac{3,14 D_n}{2}$;
2 The given drawing should be read together with sheets 32 and 33.

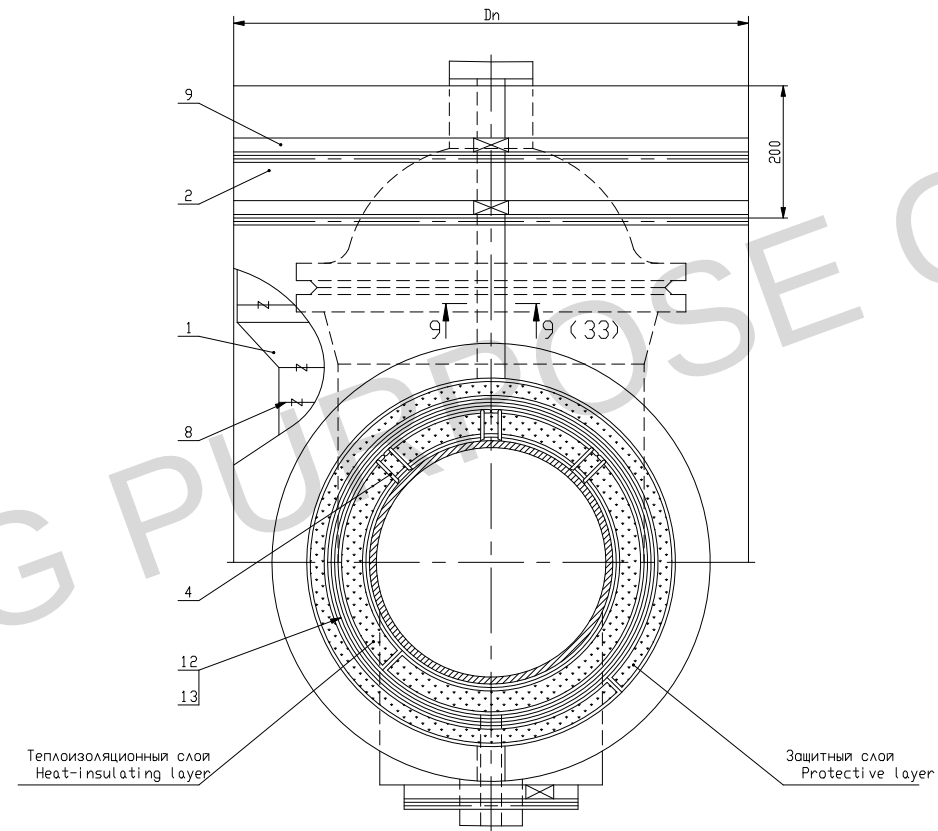
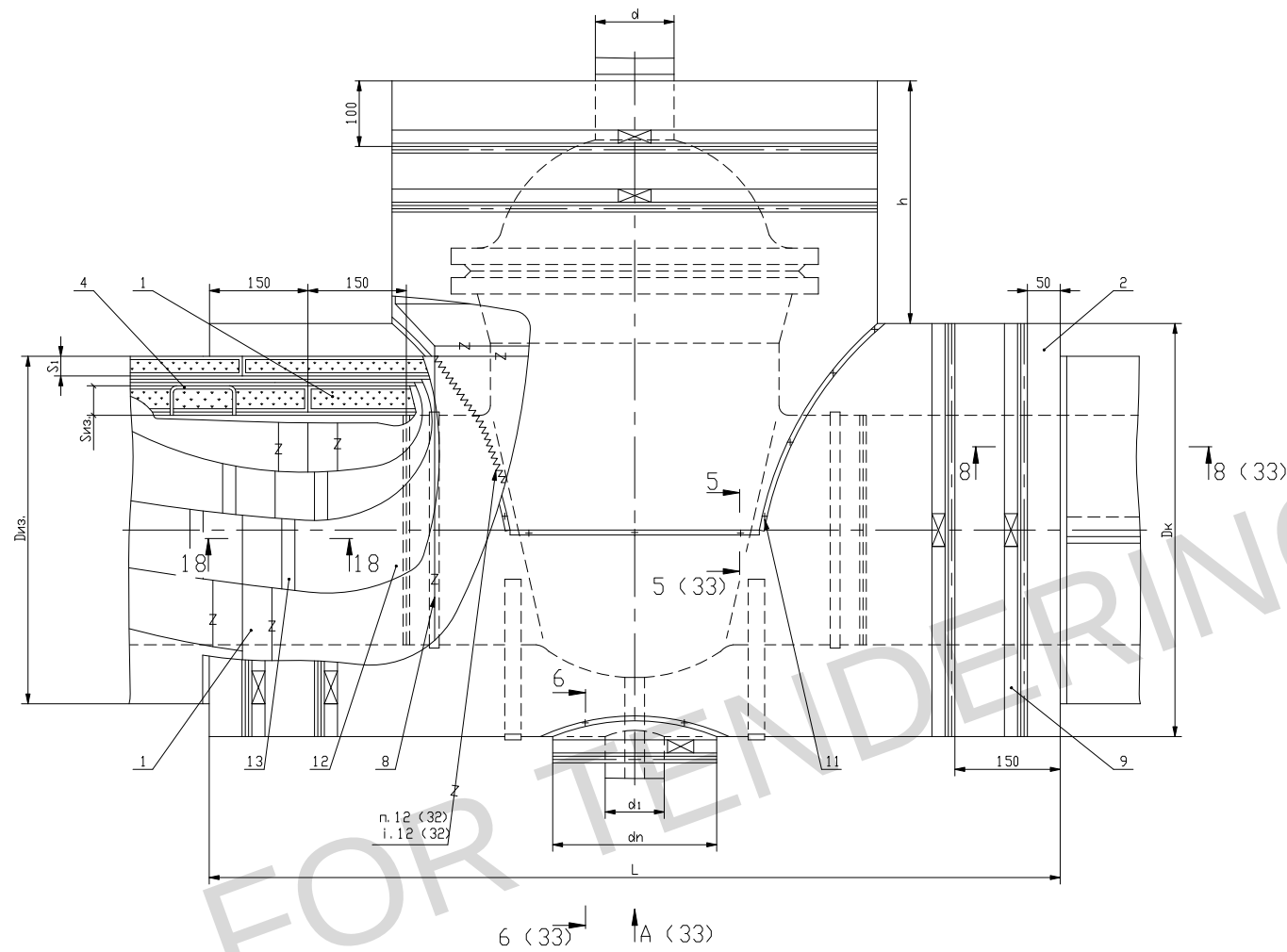
Package Number 1 11 6 124
File: R01 KK 1 0 0 TI DK WD001_036=0

R01. KK. 1 0. 0. TI. DK. WD001			АЭС "КУДАНКУЛАМ" БЛОК 1 NPP "KUDANKULAM" UNIT 1		
Тепловая изоляция трубопроводов и оборудования. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures			Стадия Phase	Лист Sheet	Листов Sheets
Арматура. Разрез 17-17 Valves. Section 17-17			36		

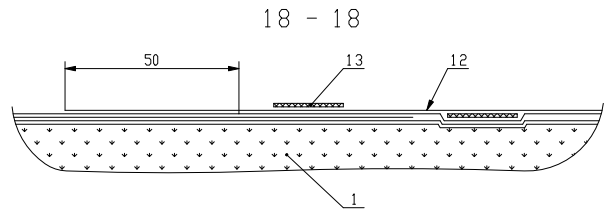
FSUE
"Atomenergoproekt"
Moscow 2004
формат А1

Drig. arch. Nr. 3009
Date 26.04.2004
Replace arch. Nr.

ИЗОЛЯЦИЯ С ПАРОИЗОЛЯЦИОННЫМ СЛОЕМ
INSULATION WITH STEAM-INSULATION LAYER



- 1 Сиз - толщина теплоизоляционного слоя;
S1 - толщина защитного слоя;
Диз - диаметр изолированного трубопровода;
L - длина кожуха;
Dк - диаметр кожуха;
Dн - диаметр верхнего патрубка кожуха;
dн - диаметр нижнего патрубка кожуха;
h - высота верхнего патрубка кожуха;
d, d1 - диаметры выступающих из изоляции частей арматуры.
2 Данный чертеж читать совместно с листами 32 и 33.
- 1 Сиз - thickness of heat-insulating layer;
S1 - thickness of protective layer;
Диз - pipeline diameter with insulation;
L - length of casing;
Dк - diameter of casing;
Dн - diameter of casing top branch pipe;
dн - diameter of casing bottom branch pipe;
h - height of casing top branch pipe;
d, d1 - diameters of valves parts protruding from insulation.
2 The given drawing should be read together with sheets 32 and 33.



Данный чертеж не подлежит размножению или передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"

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Изм.	№	уч.	Лист	№	док.	Подпись	Дата
Rev.	N	pat	Sheet	Doc.	No	Signature	Date
Approved						Kazachkova	
Inspector						Sini tsyn	
Разработ.						Niki ti na	
Designed							

R01. KK. 1 0. 0. TI. OK. WD001

АЭС "КУДАНКУЛАМ" БЛОК
NPP "KUDANKULAM" UNIT 1

Тепловая изоляция трубопроводов и оборудования.
Чертежи теплоизоляционных конструкций
Heat insulation of pipelines and equipment.
Drawings of heat-insulation structures

Стадия Лист Листов
Phase Sheet Sheets
WD 37

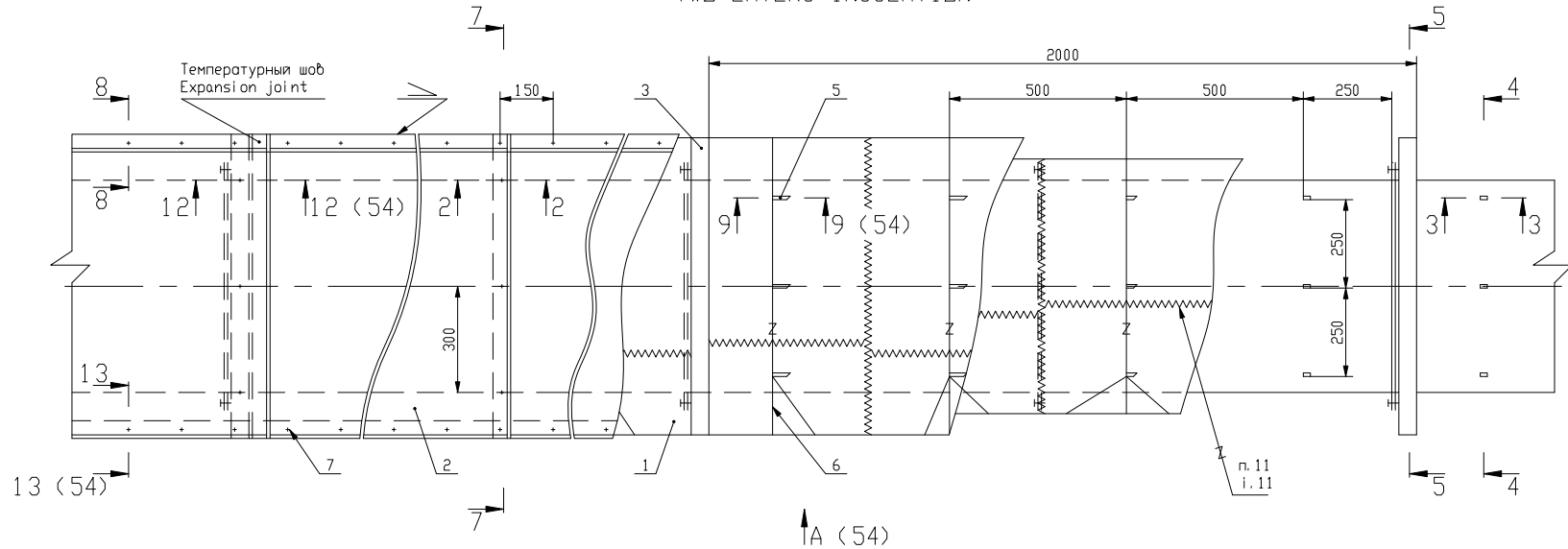
Арматура. Разрез 18-18
Valves. Section 18-18

FSUE
"Atomenergoproekt"
Moscow 2004

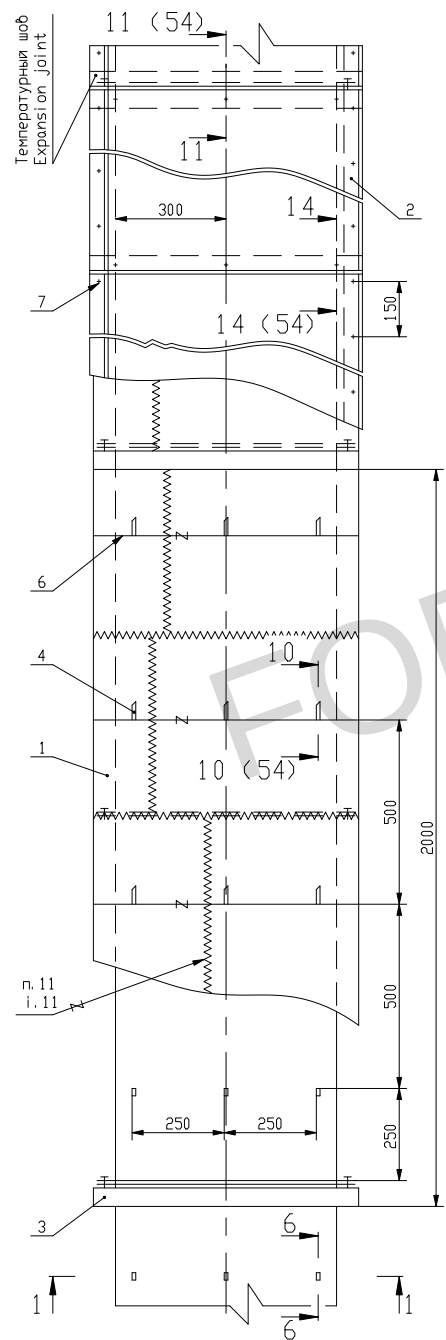
формат А3х3

Dr.ig. arCh. №. Date
3009 26.04.2004
Replace arch. №.

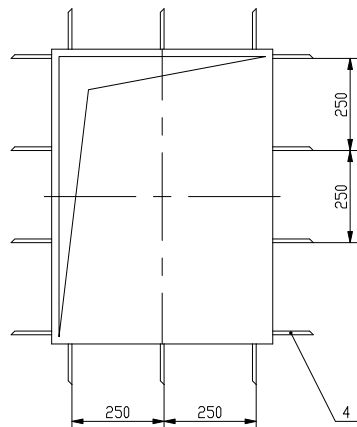
ИЗОЛЯЦИЯ В ДВА СЛОЯ
TWO-LAYERS INSULATION



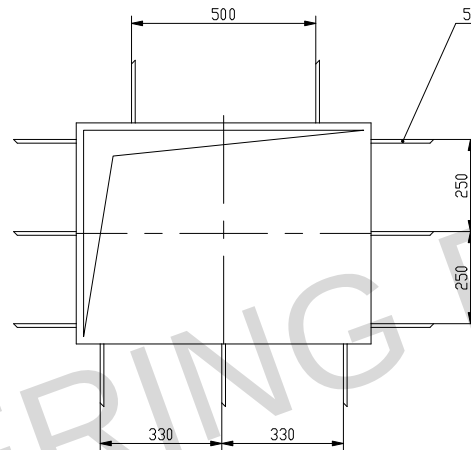
ИЗОЛЯЦИЯ В ОДИН СЛОЙ
ONE-LAYER INSULATION



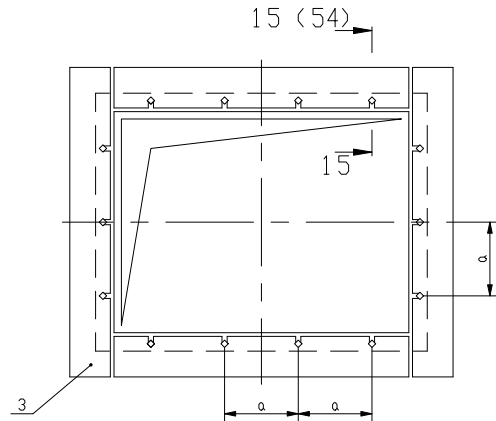
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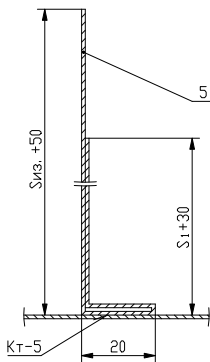
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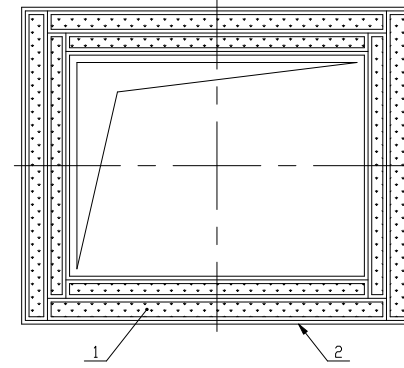
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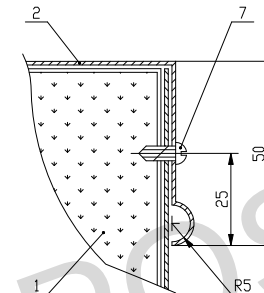
3 - 3



7 - 7



8 - 8



СПЕЦИФИКАЦИЯ
SPECIFICATION

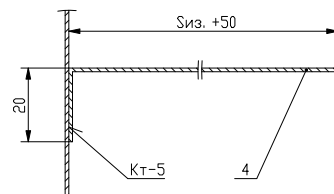
Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, кг Unit	Примечание Note
1	-	Маты в стеклоткани Mats in glass fabric	-	-	Смотри пункт 2 See item 2
2	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 2 See item 2
3	-	Разгружающее устройство (лист) Unloading device (sheet)	-	-	Смотри пункты 12,13 See items 12,13
4	R01. KK. 1 0. 0. TI. OK. WD001, лист 39 sheet	Штырь одинарный Single pin	-	-	-
5	R01. KK. 1 0. 0. TI. OK. WD001, лист 39 sheet	Штырь двойной Double pin	-	-	-
6	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	Смотри пункты 8,9 See items 8,9
7	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	-

УСЛОВНЫЕ ОБОЗНАЧЕНИЯ
LEGEND

Кт-5 - обозначение точечного контактного сварного соединения, где:
- Кт - сварка точечная контактная;
- 5 - диаметр точки, мм.

Кт-5 - designation of resistance spot welded joint, where:
- Кт - resistance spot welding;
- 5 - the spot diameter, mm.

6 - 6



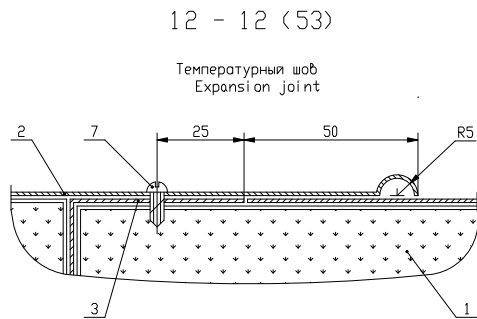
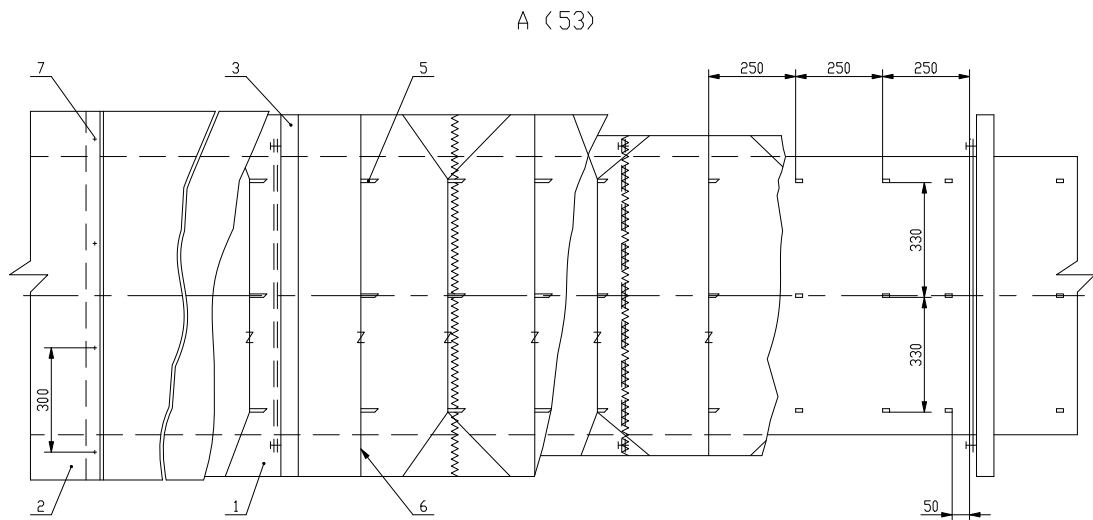
- 1 Сиз., S1 - толщины теплоизоляционных слоев;
- a - шаг болтов фланцевого соединения секции воздухопровода;
- L - длина заготовки элемента разгружающего устройства.
- 2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01. KK. 0. 0. TI. TT. WD001 and in technological and mounting sheets.
- 3 The pins (pos. 4 and 5) shall be welded prior to air duct sections fabrication to the sheets, using resistance spot welding.
- 4 If it is impossible to weld the pins directly to the air duct surface, the pins shall be welded to the clamping rings (sheet 49).
- The spacing of pins welding to the clamping rings and the spacing of clamping rings installation on the air duct shall correspond to the sizes between pins, specified on this drawings.
- 5 It is allowed to use pins (sheets 43 and 45) instead of pins (sheet 39).
- 6 The pins shall not be installed on the air ducts with a cross-section of 400x400 mm and less. Fastening of the heat-insulating layer shall be carried out by means of rings (pos. 6). In this case the distance between rings (pos. 6) shall not exceed 250 mm.
- 7 Unloading device (pos. 3) and pins (pos. 4 and 5) made of carbon steel are subject to anticorrosive protection.
- 8 When performing heat insulation of air ducts made of stainless steel, 2,0-TS wire rings (pos. 6), GOST 18143-72, shall be used.
- 9 When performing heat insulation of air ducts made of carbon steel, 2,0-P-Ch wire rings (pos. 6), GOST 3282-74, shall be used.
- 10 When performing heat insulation of air ducts it is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 6).
- 11 Fastening of fire heat insulation of the air ducts subject to fire protection shall be carried out by means of 2,0-TS wire rings (pos. 6), GOST 18143-72.
- 12 The unloading devices (pos. 3) 0.7 mm thick made of stainless steel shall be installed on the stainless steel air ducts.
- 13 The unloading devices (pos. 3) 1.0 mm thick made of carbon steel shall be installed on the carbon steel air ducts.
- 14 As stitching for mats:
 - in jacket made of silica fabric, mark KT-11, silica thread K11S6-180 (TU 6-48-52-90) shall be used;
 - in jacket made of glass fabric, mark T-23, glass twisted complex thread ES6-28x1x2(100) (GOST 8325-78) shall be used.
- 15 When welding use:
 - for carbon steel electrodes E-46A (GOST 9467-75) Ø3 mm;
 - for stainless steel electrodes EA-400/10U (DST SR. 9370-81) Ø3 mm.
- 16 * Dimensions shall be specified in-situ.
- 17 The given drawing should be read together with sheet 54.

- 1 Сиз., S1 - thicknesses of heat-insulation layers;
- a - space between flange connection bolts of the air duct;
- L - length of the blank for unloading device element.
- 2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01. KK. 0. 0. TI. TT. WD001 and in technological and mounting sheets.
- 3 The pins (pos. 4 and 5) shall be welded prior to air duct sections fabrication to the sheets, using resistance spot welding.
- 4 If it is impossible to weld the pins directly to the air duct surface, the pins shall be welded to the clamping rings (sheet 49).
- The spacing of pins welding to the clamping rings and the spacing of clamping rings installation on the air duct shall correspond to the sizes between pins, specified on this drawings.
- 5 It is allowed to use pins (sheets 43 and 45) instead of pins (sheet 39).
- 6 The pins shall not be installed on the air ducts with a cross-section of 400x400 mm and less. Fastening of the heat-insulating layer shall be carried out by means of rings (pos. 6). In this case the distance between rings (pos. 6) shall not exceed 250 mm.
- 7 Unloading device (pos. 3) and pins (pos. 4 and 5) made of carbon steel are subject to anticorrosive protection.
- 8 When performing heat insulation of air ducts made of stainless steel, 2,0-TS wire rings (pos. 6), GOST 18143-72, shall be used.
- 9 When performing heat insulation of air ducts made of carbon steel, 2,0-P-Ch wire rings (pos. 6), GOST 3282-74, shall be used.
- 10 When performing heat insulation of air ducts it is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 6).
- 11 Fastening of fire heat insulation of the air ducts subject to fire protection shall be carried out by means of 2,0-TS wire rings (pos. 6), GOST 18143-72.
- 12 The unloading devices (pos. 3) 0.7 mm thick made of stainless steel shall be installed on the stainless steel air ducts.
- 13 The unloading devices (pos. 3) 1.0 mm thick made of carbon steel shall be installed on the carbon steel air ducts.
- 14 As stitching for mats:
 - in jacket made of silica fabric, mark KT-11, silica thread K11S6-180 (TU 6-48-52-90) shall be used;
 - in jacket made of glass fabric, mark T-23, glass twisted complex thread ES6-28x1x2(100) (GOST 8325-78) shall be used.
- 15 When welding use:
 - for carbon steel electrodes E-46A (GOST 9467-75) Ø3 mm;
 - for stainless steel electrodes EA-400/10U (DST SR. 9370-81) Ø3 mm.
- 16 * Dimensions shall be specified in-situ.
- 17 The given drawing should be read together with sheet 54.

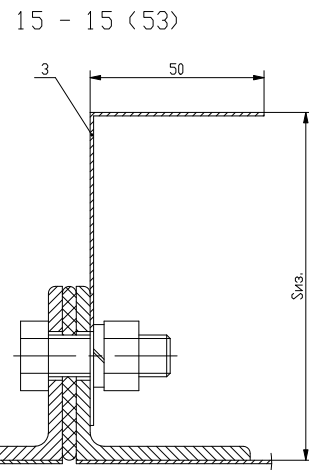
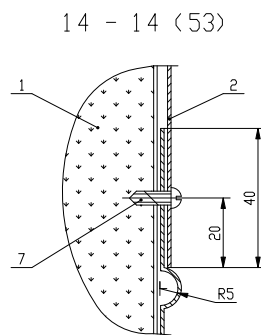
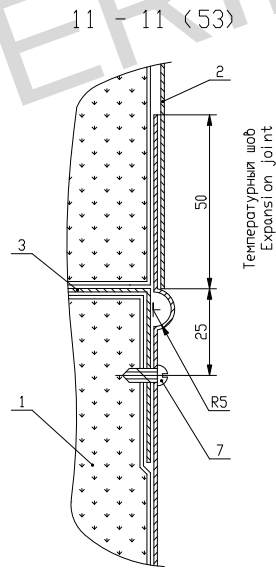
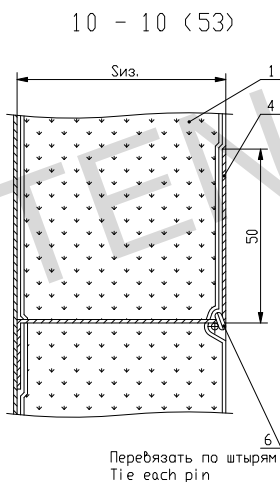
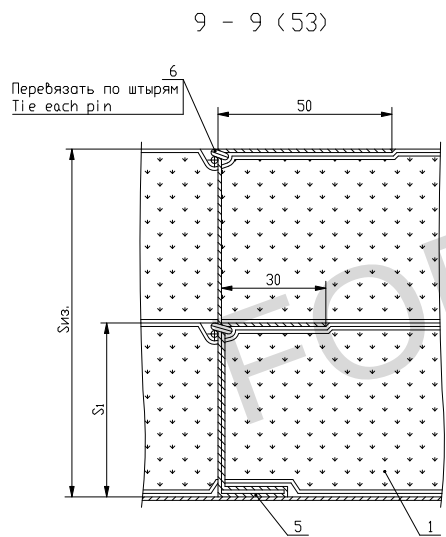
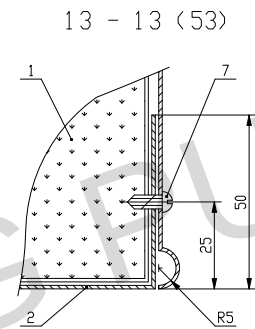
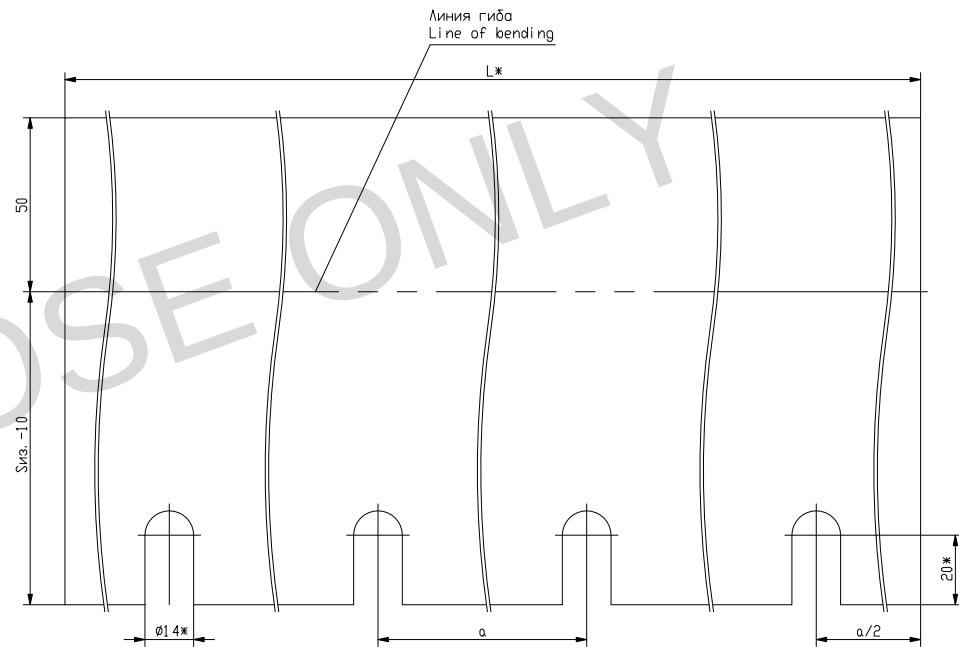
Package Number 1 11 6 124
File: R01 KK 1 0 0 TI OK WD001_053=0

Данный чертёж не подлежит размножению или передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"		This drawing is not to be reproduced or transferred to other organizations without approval of the FSUE "Atomenergoproekt"		R01. KK. 1 0. 0. TI. OK. WD001	
Изм. N уч.Ист. N док.ПодписьДата		Rev. N pat. Sheet No. Signature Date		АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1	
Тепловая изоляция трубопроводов и оборудования.		Heat insulation of pipelines and equipment.		Студия Лист Листов	
Чертежи теплоизоляционных конструкций трубопроводов и оборудования.		Drawings of heat-insulation structures of pipelines and equipment.		Phase Sheet Sheets	
Воздухопроводы прямоугольного сечения. Изоляция матов. Спецификация. Размеры 1-1... 8-8 Rectangular cross-section air ducts. Insulation by mats. Specification. Sections 1-1... 8-8		Approved by Niki ti na		53	
Designed by Niki ti na		Inspected by Niki ti na		FSUE "Atomenergoproekt" Moscow 2004	

формат А1



ЗАГОТОВКА ЭЛЕМЕНТА РАЗГРУЖАЮЩЕГО УСТРОЙСТВА (ПОЗ. 3)
UNLOADING DEVICE ELEMENT BLANK (POS. 3)



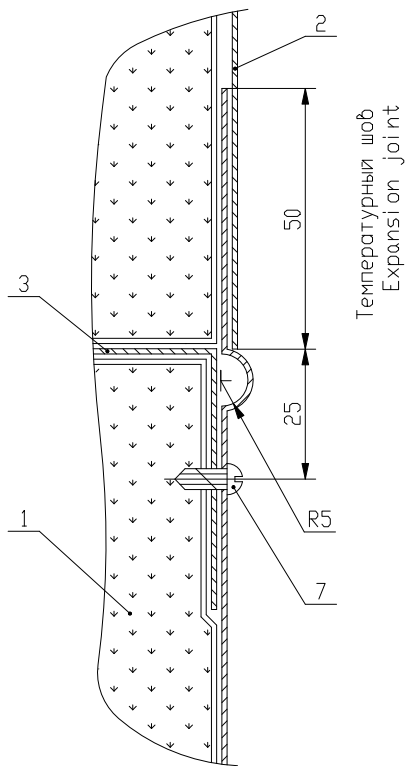
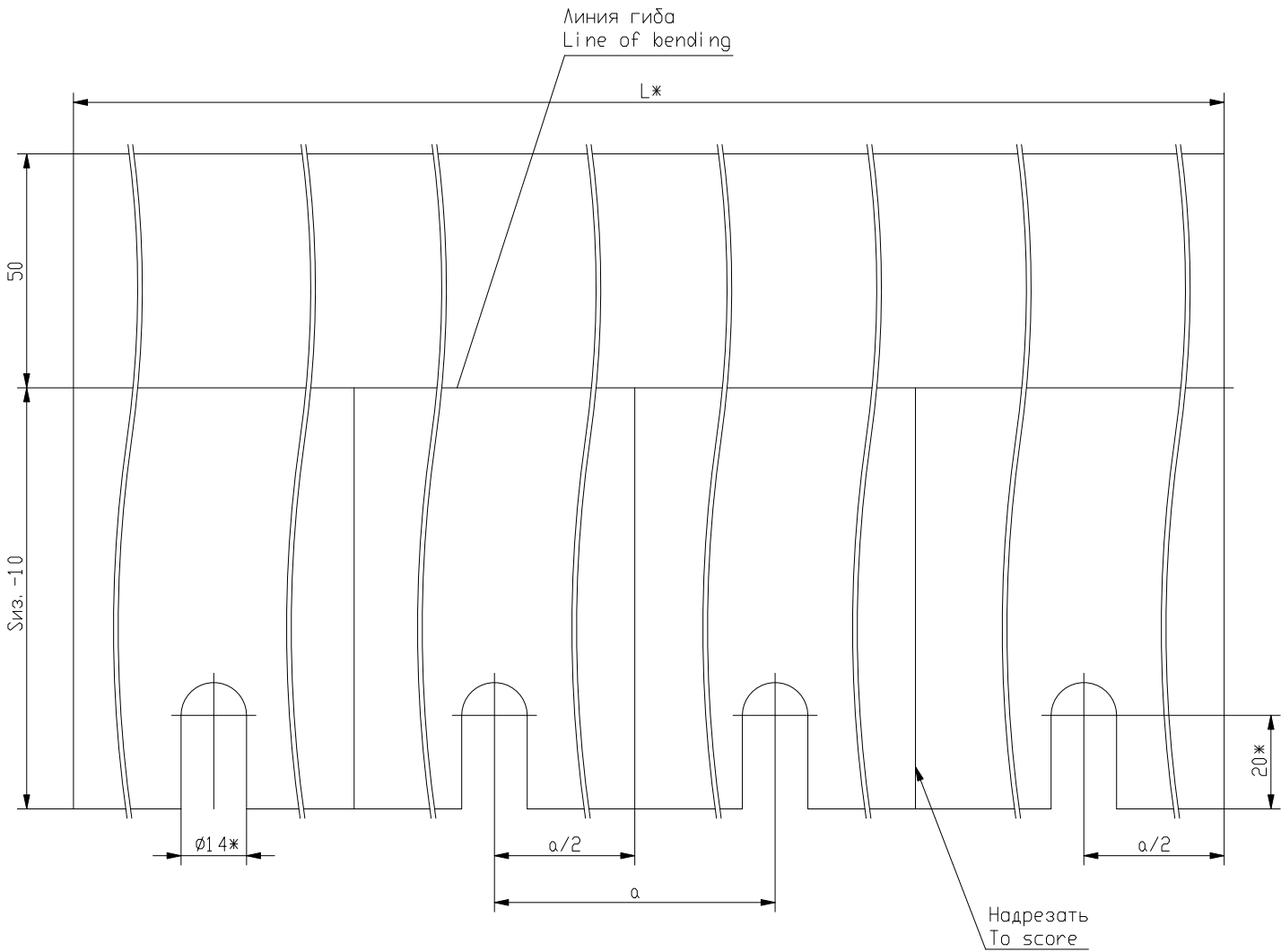
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1 The given drawing should be read together with sheet 53.

Package Number 1 11 6 124 File: R01 KK 1 0 0 TI DK WD001_054=0											
Данный чертёж не подлежит размножению или передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"						R01. KK. 1 0. 0. TI. DK. WD001					
						АЭС "КУДАНКУЛАМ" БЛОК 1 NPP "KUDANKULAM" UNIT 1					
	Изм.	N	участ	Ист N	док	Подписи	Дата	Тепловая изоляция трубопроводов и оборудования.	Стадия	Лист	Листов
	Rev.	N	pat	Sheet	Doc No	Signature	Date	Чертеж теплоизоляционных конструкций	Phase	Sheet	Sheets
	Approved	for	control	Kazachkova	Inspector	sinitsyn	Разработано	of pipelines and equipment. Drawings of heat-insulation structures	WD	54	
This drawing is not to be reproduced or transferred to other organizations without approval of the FSUE "Atomenergoproekt"	Designed							Воздуховоды прямоугольного сечения. Изоляция матов. Разрезы 9-9...15-15 Rectangular cross-section air ducts. Insulation by mats. Sections 9-9...15-15	 FSUE "Atomenergoproekt" Moscow 2004		
									формат А3х3		

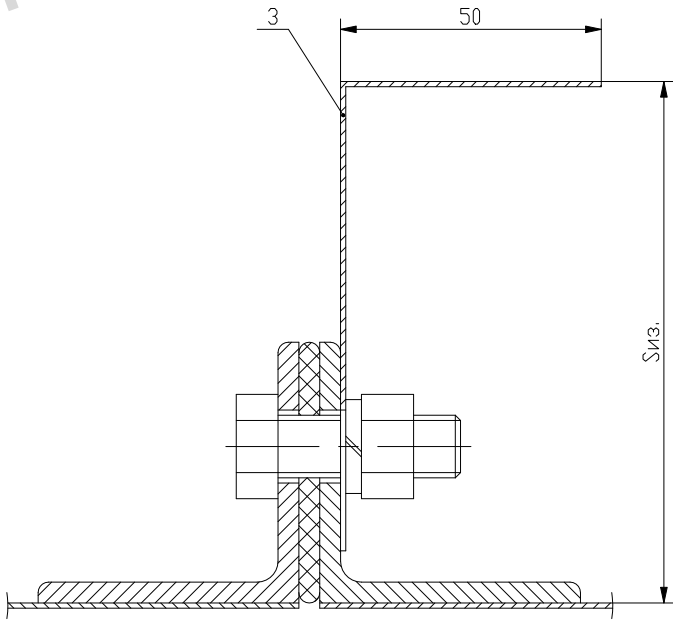
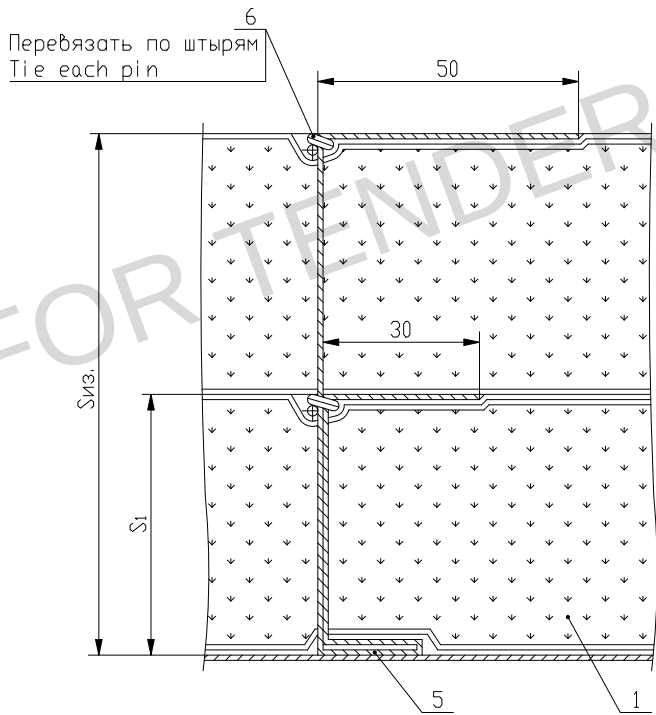
ЗАГОТОВКА ЭЛЕМЕНТА РАЗГРУЖАЮЩЕГО УСТРОЙСТВА (ПОЗ. 3)
UNLOADING DEVICE ELEMENT BLANK (POS. 3)

12 - 12 (55)



10 - 10 (55)

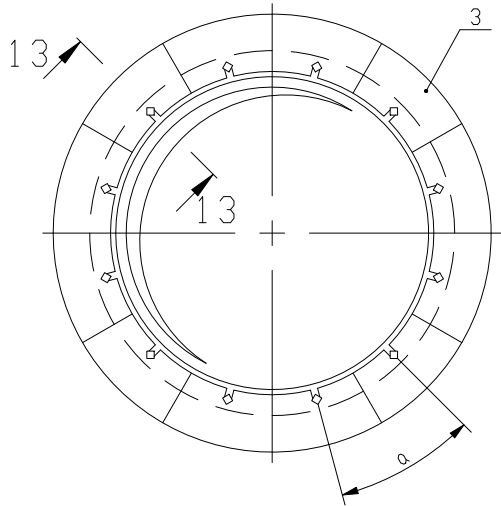
13 - 13 (55)



11 - 11 (55)

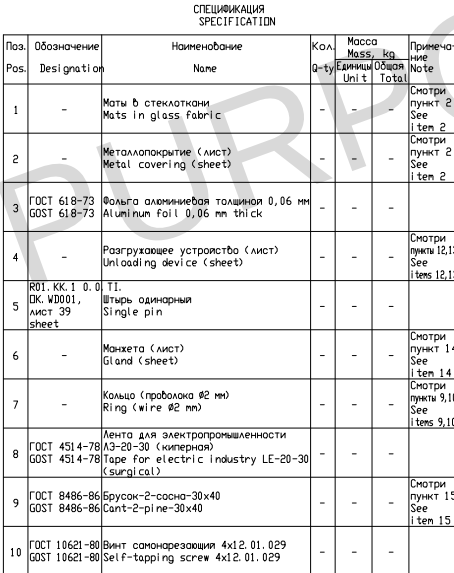
1 Данный чертеж читать совместно с листом 55.

1 The given drawing should be read together with sheet 55.



Package Number 1 11 6 124
File: R01 KK 1 0 0 TI OK WD001_056=0

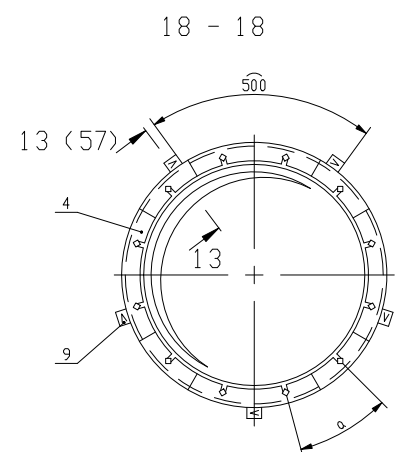
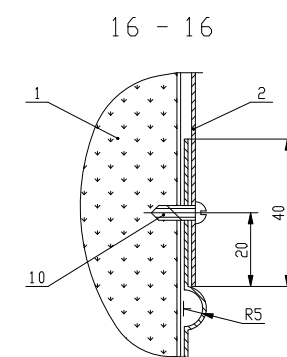
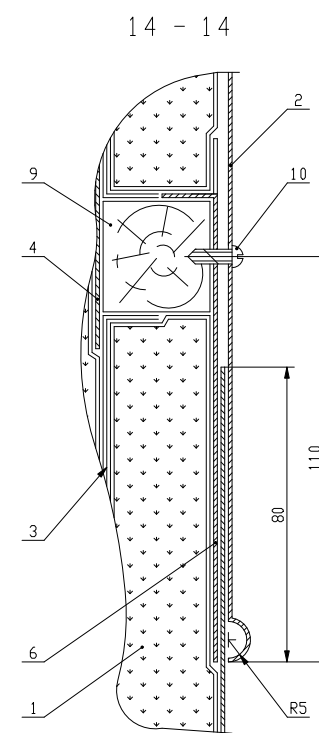
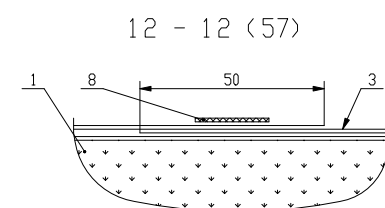
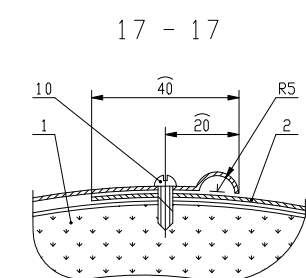
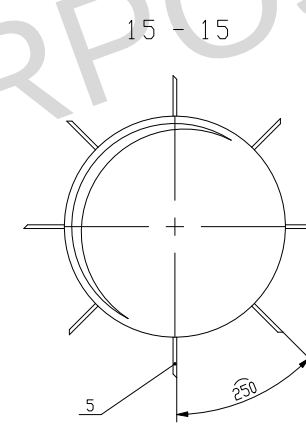
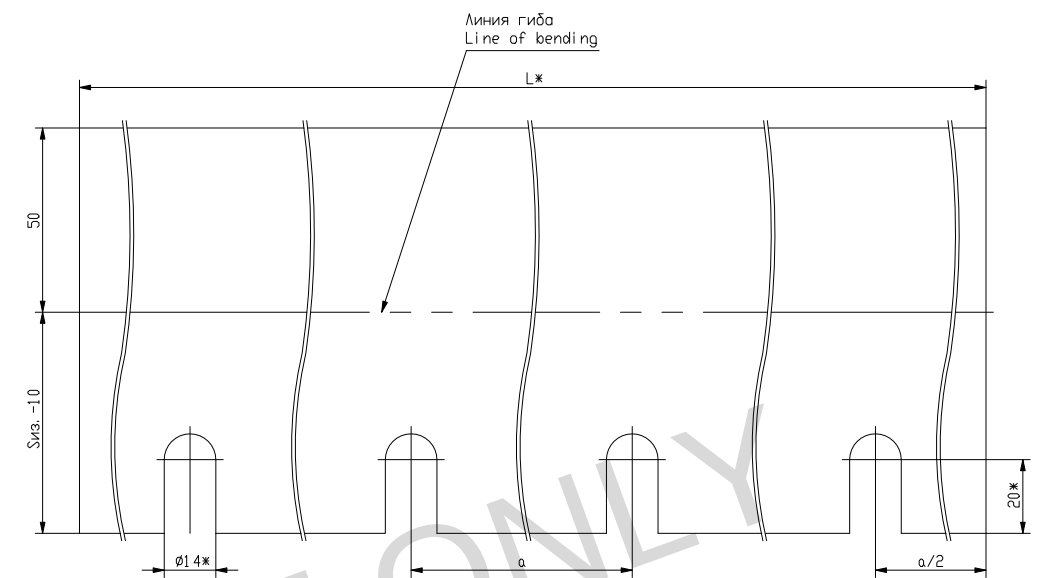
Данный чертёж не подлежит размножению или передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"						R01. KK. 1 0. 0. TI. OK. WD001			
						АЭС "КУДАНКУЛАМ" БЛОК 1 NPP "KUDANKULAM" UNIT 1			
	Изм. N уч.	Лист	N док.	Подпись	Дата	Тепловая изоляция трубопроводов и оборудования.	Стадия	Лист	Листов
	Rev. N pat.	Sheet	Doc. No	Signature	Date	Чертежи теплоизоляционных конструкций. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures	Phase	Sheet	Sheets
This drawing is not to be reproduced or transferred to other organizations or private persons without approval of the FSUE "Atomenergoproekt"	Исполн.	Казачкова				Воздуховоды круглого сечения. Изоляция матами. Разрезы 10-10...13-13 Round cross-section air ducts. Insulation by mats. Sections 10-10...13-13	WD	56	FSUE "Atomenergoproekt" Moscow 2004
	Утвердил								
	Инспектор	Синитсын							
	Разраб.	Никитина							
	Designed								

[illegible]

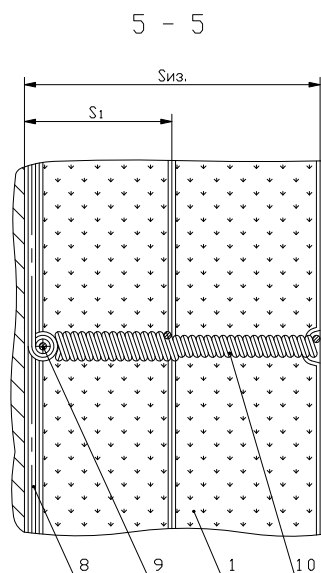
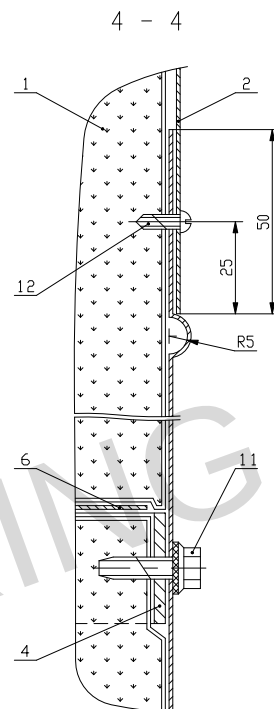
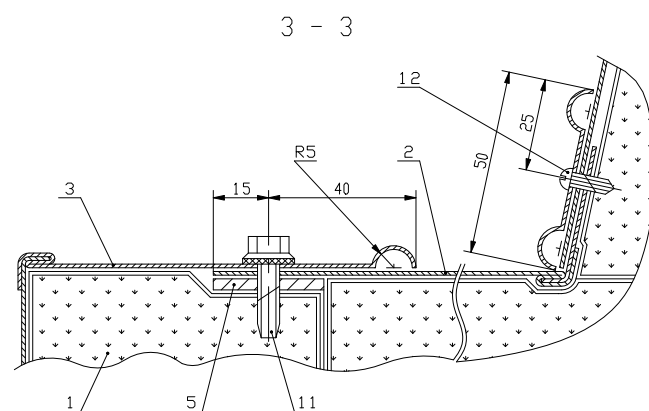
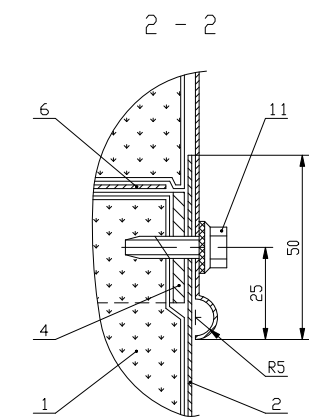
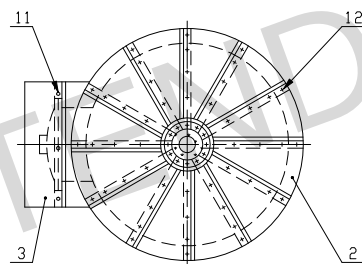
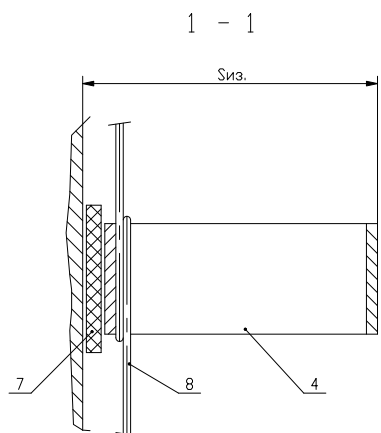
K1-5 - designation of resistance spot welded joint
- K1 - resistance spot welding;
- 5 - the spot diameter, mm.

- 1 S₁ = thickness of heat-insulation layer)
- SI - thickness of protective layer)
- 3 The space between flanges of the bolts of the air duct;
- L - length of the blank for unloading device element.
- 2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2) are indicated in the list of technical requirements for thermal insulation materials, articles and structures' R01, Kk. 0.0.71.11. V.D001 and in technological and mounting sheets.
- 3 The pins (pos. 5) shall be welded prior to air duct sections fabrication to the sheets, using resistance spot welding.
- 4 If it is impossible to weld the pins directly to the air duct surface, the pins shall be welded to the clamping rings (sheet 49).
- 5 The distance between the pins of the clamping rings and the spacing of clamping rings installation on the air duct shall correspond to the size between pins, specified on this drawings.
- 6 The pins shall be welded to the clamping rings (sheet 49) and 45° instead of pins (sheet 39).
- 5 The pins shall not be installed on the air ducts with a cross-section of 400x400 mm and less. Fastening of the heat-insulating layer shall be carried out by means of rings (sheet 49). In this case the distance between rings (pos. 7) shall not exceed 250 mm.
- 7 The pins shall not be installed on the round cross-section air ducts with a diameter less than 630 mm. Fastening of the heat-insulating layer shall be carried out by means of rings (sheet 49). In this case the distance between rings (pos. 7) shall not exceed 250 mm.
- 8 Unloading device (pos. 4) and pins (pos. 5) made of carbon steel are required for anticorrosion protection.
- 9 When performing heat insulation of air ducts made of stainless steel, 20-15 wire rings (pos. 7), ГОСТ 18143-72, shall be used.
- 10 When performing heat insulation of air ducts made of carbon steel, 20-0-0 wire rings (pos. 7), ГОСТ 3282-74, shall be used.
- 11 When performing heat insulation of air ducts it is allowed to use bars of 10 mm diameter (pos. 4) and 10 mm thick rods made of carbon steel.
- 12 The unloading devices (pos. 4) 6, 7 mm thick rods of stainless steel shall be installed on the stainless steel air ducts.
- 13 The unloading devices (pos. 4) 1.0 mm thick made of carbon steel shall be installed on the carbon steel air ducts.
- 14 The gland (pos. 6) shall be made of metal covering material.
- 15 The cant (pos. 7) shall be treated with preservative composition "KICA-A" of grade 100 (sheet 49).
- 16 To prevent the fall (pos. 3) damage, the ends of pins (pos. 5) and wire clamping (pos. 7) shall be flushed in the heat-insulating layer.
- 17 As starting pins for the jacket made of silica fabric, mark KT-11, silica thread K15S-180 (TU 6-48-92-90) shall be used.
- 18 In jacket made of glass fabric, mark T-23, glass twisted cant thread ESC-26-BuX-100 (ГОСТ 8329-70) shall be used.
- 18 When welding use:
 - For carbon steel electrodes E-464 (ГОСТ 9467-75) #3 mm;
 - For stainless steel electrodes E-309 (ГОСТ 9467-75) #3 mm;
 - #12 dimensions shall be specified in-situ.
- 19 The gland drawing should be read together with sheet 58.

[illegible]



1 The given drawing should be read together with sheet 57.



СПЕЦИФИКАЦИЯ SPECIFICATION						
Поз. Pos.	Обозначение Designation	Наименование Name	Кол- Q-ty	Масса Mass, kg	Примечание Note	
			Единицы Unit	Общая Total		
1	-	Маты в стеклоткани Mats in glass fabric	-	-	-	См. пункт 2 See item 2
2	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	-	См. пункт 2 See item 2
3	R01. KK. 1 0. 0. OK. WD001, лист 51 sheet	TI. Кожух люка Hatch casing	-	-	-	См. пункт 2 See item 2
4	R01. KK. 1 0. 0. OK. WD001, лист 46 sheet	TI. Опорная полка Support rack	-	-	-	
5	R01. KK. 1 0. 0. OK. WD001, лист 28 sheet	TI. Опорное кольцо Support ring	-	-	-	
6	R01. KK. 1 0. 0. OK. WD001, лист 47 sheet	TI. Диафрагма (лист толщиной 0,8 мм) Diaphragm (sheet 0,8 mm thick)	-	-	-	
7	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick ТУ 21-5328981-08-93)	-	-	-	
8	-	Струна (проволока Ø2 мм) String (wire Ø2 mm)	-	-	-	См. пункты 5, 6 See items 5, 6
9	-	Кольцо (проволока Ø2 мм) Ring (wire Ø2 mm)	-	-	-	См. пункты 5, 6 See items 5, 6
10	-	Стяжка (проволока Ø2 мм) Tie-rod (wire Ø2 mm)	-	-	-	См. пункты 5, 6 See items 5, 6
11	ОСТ 34 13.016- -88 ОСТ 34 13.016- -88	Болт самонарезающий М6х20 Self-tapping bolt M6x20	-	-	-	
12	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4х12.01.029 Self-tapping screw 4x12.01.029	-	-	-	

2. Материал и толщина теплоизоляционного слоя (поз. 1) и металлопокрытия (поз. 2 и 3) указаны в 'Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям' R01.КК.0.0.Т1.ТТ. WD001 и техмонтажных ведомостях.

4 Разгружающие устройства (поз. 4 и 5) изготовленные из углеродистой стали подлежат антикоррозионной защите.

5 При выполнении тепловой изоляции оборудования изготовленного из нержавеющей стали применить струны (поз. 8), кольца (поз. 9) и стяжки (поз. 10) из проволоки 2,0-ТС ГОСТ 18143-72.

6 При выполнении тепловой изоляции оборудования изготовленного из углеродистой стали применить струны (поз. 8), кольца (поз. 9) и стяжки (поз. 10) из проболоки 2,0-0-4 ГОСТ 3282-74.

7 По поверхности теплоизоляционных слоев допускается применение бандажа с пряжкой (лист 40) взамен кольца (поз. 9).

8 В качестве сшивки для матов:

- в обложке из кремнеземной ткани КТ-11 применить нить кремнеземную

- в обложке из стеклоткани Т-23 применить нить стеклянную крученную комплексную ЕС6-28х1х2(100) (ГОСТ 8325-78).

2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2 and 3) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01.KK.0.0.TI.TT.WD01 and in technological and mounting sheets.

4 Unloading devices (pos. 4 and 5) made of carbon steel are subject to anticorrosive protection.

5 When performing heat insulation of the equipment made of stainless steel 2,0-TS wire strings (pos. 8), rings (pos. 9) and tie-rods (pos. 10) GOST 18143-72 shall be used.

6 When performing heat insulation of the equipment made of carbon steel, 2,0-0-Ch wire strings (pos. 8), rings (pos. 9) and tie-rods (pos. 10) ГОСТ 3282-74 shall be used.

7 Over the surface of heat-insulation layers it is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 9).

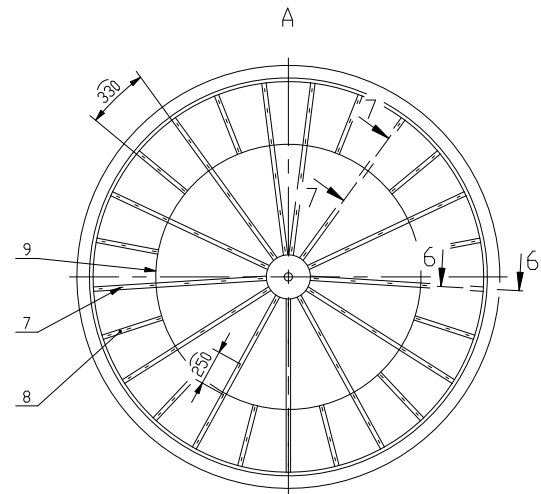
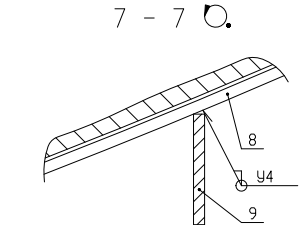
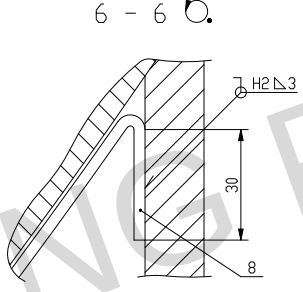
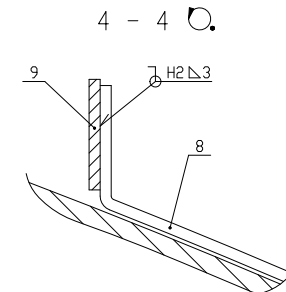
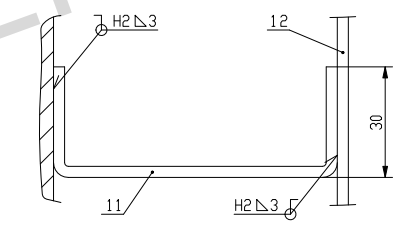
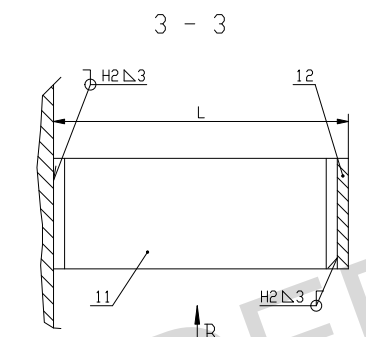
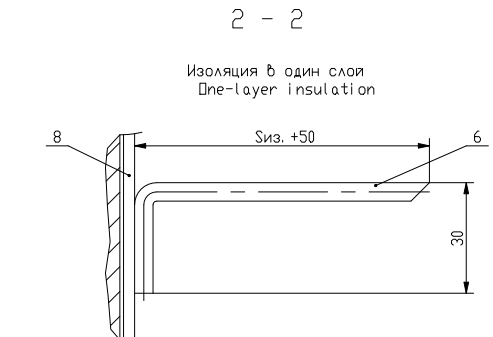
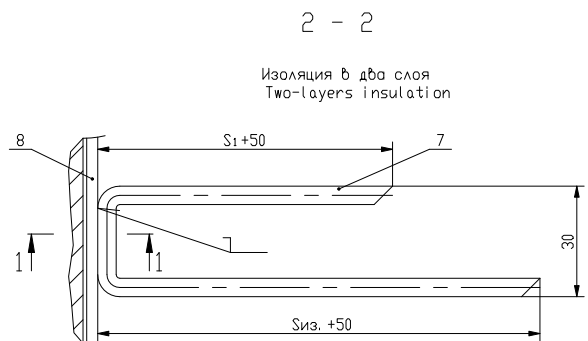
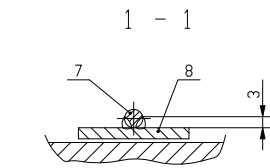
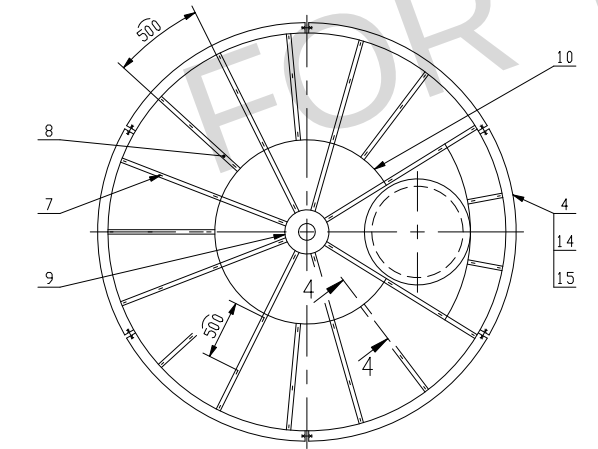
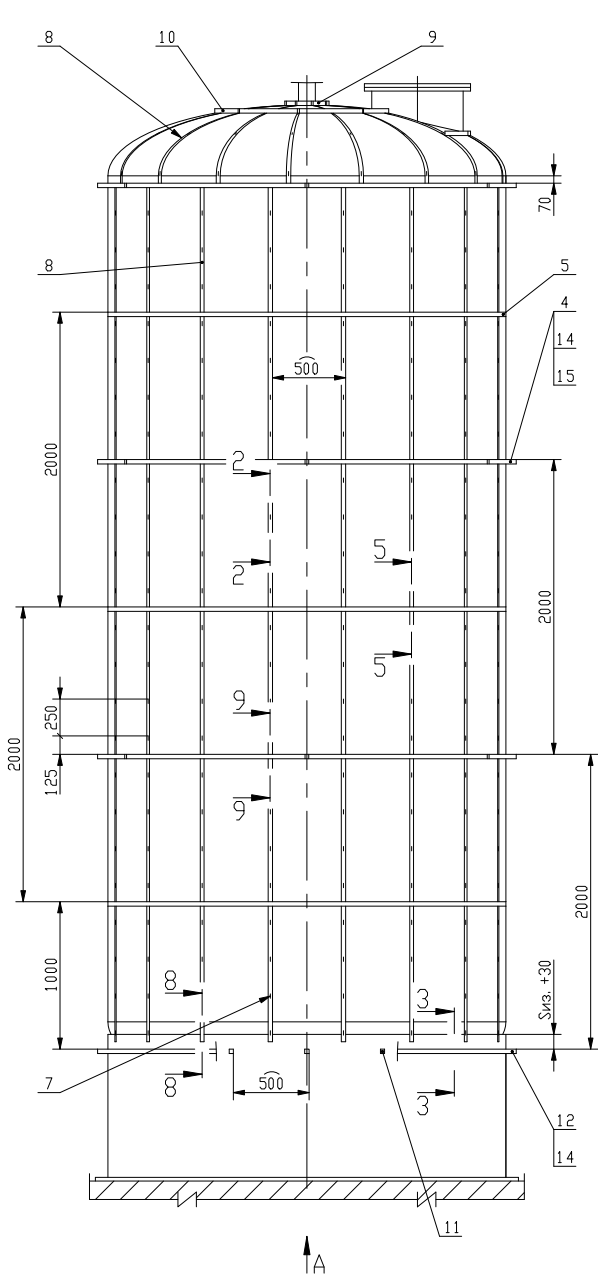
8 As stitching for mats:
- in jacket made of silica fabric, mark KT-11, silica thread K11S6-180 (TU 6-48-52-90) shall be used;

- in jacket made of glass fabric mark T-23 glass twisted complex thread ES6-28x1x2(100) (GOST 8325-78) shall be used.

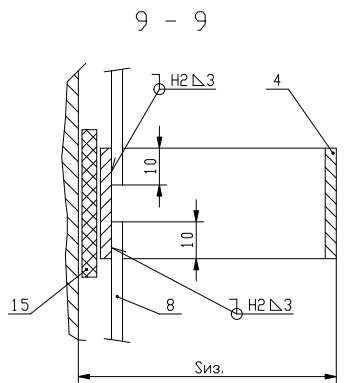
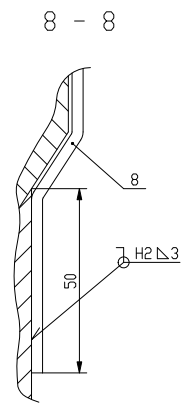
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Данный чертёж не подлежит размножению или передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"							R01. KK. 1 0. O. TI. OK. WD001		
							АЗС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 1		
This drawing is not to be reproduced or transferred to other organizations without approval of the FSUE "Atomenergoproekt"	Изм.	N уч-	Лист N док.	Подпись	Дата	Тепловая изоляция трубопроводов и оборудования. Чертежи теплоизоляционных конструкций. Heat insulation of pipelines and equipment. Drawings of heat-insulation structures	Стация	Лист	Листов
	Rev.	N pat	Sheet No	Signature	Date		Phase	Sheet	Sheets
Этот чертеж не подлежит копированию и передаче другим организациям и лицам без согласия ФГУП "Атомэнергoproект"	Утвердил	Kazachkova	Approved	Sinitysyn		Оборудование вертикальным диаметром менее 1200 мм. Изоляция толщиной 1200 мм. Спецификации. Разрезы 1-1...7-7 Vertical equipment less than 1200 mm in dia. Insulation by mass. Specification Sections 1-1...7-7		59	FSUE "Atomenergoproekt" Moscow 2004
	Designed	Nikitina	Inspected						

ØØDMQT A2x3



СПЕЦИФИКАЦИЯ SPECIFICATION					
Поз. Pos.	Обозначение Designation	Наименование Name	Кол. Q-ty	Масса Mass, kg Единицы Unit	Примечание Note
1	-	Маты в стеклоткани Mats in glass fabric	-	-	Смотри пункт 2 See item 2
2	-	Металлопокрытие (лист) Metal covering (sheet)	-	-	Смотри пункт 2 See item 2
3	R01. KK. 1 0. 0. ПК. WD001, лист 51 sheet	ТТ. Кохух люка Hatch casing	-	-	Смотри пункт 2 See item 2
4	R01. KK. 1 0. 0. ПК. WD001, лист 46 sheet	ТТ. Опорная полка Support rack	-	-	-
5	R01. KK. 1 0. 0. ПК. WD001, лист 48 sheet	ТТ. Стяжное кольцо Clamping ring	-	-	-
6	R01. KK. 1 0. 0. ПК. WD001, лист 43 sheet	ТТ. Штырь одинарный Ш1.1 Single pin Ш1.1	-	-	-
7	R01. KK. 1 0. 0. ПК. WD001, лист 45 sheet	ТТ. Штырь двойной Ш2.1 Double pin Ш2.1	-	-	-
8	-	Планка Plank	-	-	Смотри пункты 4,5 See items 4,5
9	-	Кольцо Ring	-	-	Смотри пункты 4,5 See items 4,5
10	-	Элемент кольца Element of ring	-	-	Смотри пункты 4,5 See items 4,5
11	-	Скоба (лента 3x30 мм ГОСТ 6009-74) Clamp (tape 3x30 mm GOST 6009-74)	-	-	-
12	-	Кольцо (лента 3x30 мм ГОСТ 6009-74) Ring (tape 3x30 mm GOST 6009-74)	-	-	-
13	R01. KK. 1 0. 0. ПК. WD001, лист 50 sheet	Скоба навесная (лента 3x30 мм ГОСТ 6009-74) Suspended stirrup (tape 3x30 mm GOST 6009-74)	-	-	-
14	R01. KK. 1 0. 0. ПК. WD001, лист 47 sheet	ТТ. Диафрагма (лист толщиной 0,8 мм) Diaphragm (sheet 0,8 mm thick)	-	-	-
15	-	Прокладка (картон толщиной 4 мм ТУ 21-5328981-08-93) Gasket (cardboard 4 mm thick ТУ 21-5328981-08-93)	-	-	-
16	ГОСТ 3282-74 ГОСТ 3282-74	Кольцо (проволока 2,0-0-Ч) Ring (wire 2,0-D-Ch)	-	-	-
17	ОСТ 34 13.016-88 ОСТ 34 13.016-88	Болт самонарезающий М6х20 Self-tapping bolt М6х20	-	-	-
18	ГОСТ 10621-80 ГОСТ 10621-80	Винт самонарезающий 4x12.01.029 Self-tapping screw 4x12.01.029	-	-	-
19	R01. KK. 1 0. 0. ПК. WD001, лист 40 sheet	ТТ. Бандаж с пряжкой Bandage with buckle	-	-	-
20	R01. KK. 1 0. 0. ПК. WD001, лист 41 sheet	ТТ. Бандаж с замком Bandage with lock	-	-	-

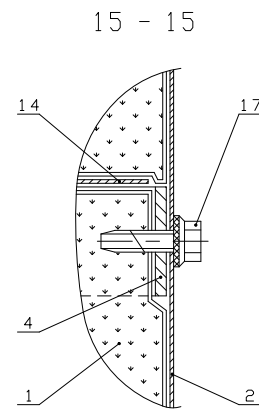
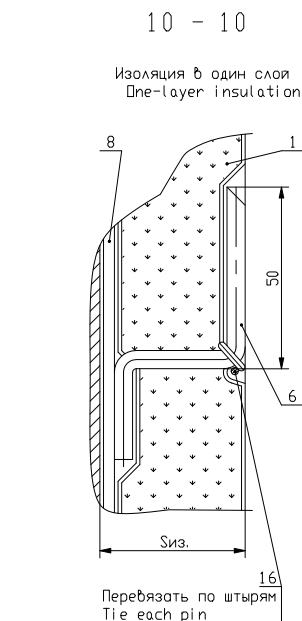
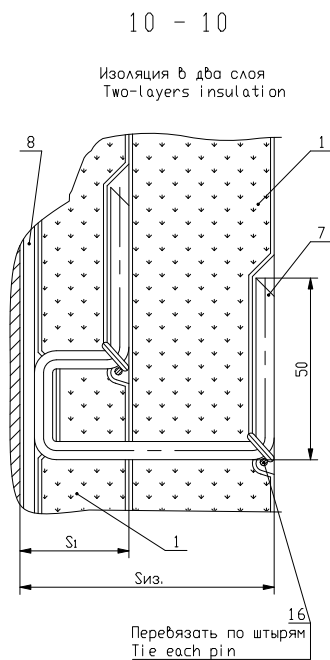
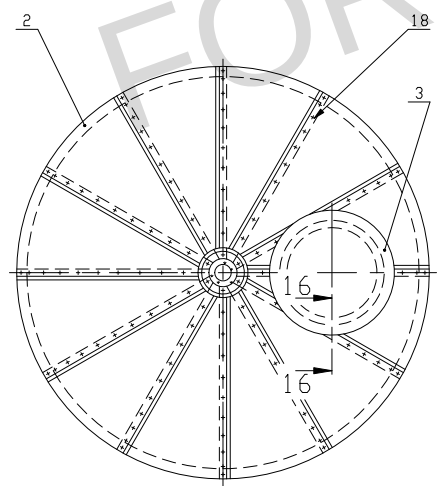
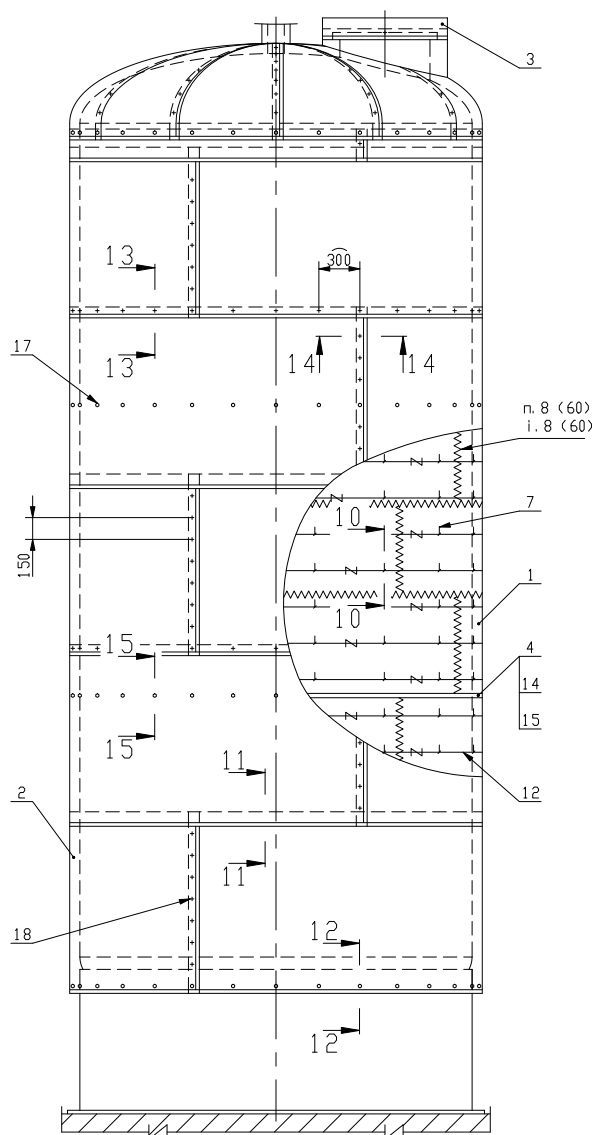


1 Siz., S1 - толщины теплоизоляционных слоев;
L, L1 - определить по месту.
2 Материал и толщина теплоизоляционного слоя (поз. 1) и металлопокрытия (поз. 2 и 3) указаны в "Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям" R01. KK. 0. 0. TI. TT. WD001 и технологических ведомостях.
3 Установку опорных полок, стяжных колец и штырей смотри на листах 43, 45, и 46.
4 Для оборудования из нержавеющей стали изготовить планки (поз. 8) и кольца (поз. 9 и 10) из полосы сечением 3x30 мм ГОСТ 4405-75 из нержавеющей стали.
5 Для оборудования из углеродистой стали изготовить планки (поз. 8) и кольца (поз. 9 и 10) из ленты сечением 3x30 мм ГОСТ 6009-74 из углеродистой стали.
6 Разгружающие и крепежные устройства (поз. 4...13) изготовленные из углеродистой стали подлежат антикоррозионной защите.
7 Допускается применение бандажа с пряжкой (лист 40) взамен кольца (поз. 16).
8 В качестве сшивки для матов:
- в обкладке из кремнеземной ткани КТ-11 применить нить кремнеземную К11С6-180 (ТУ 6-48-52-90);
- в обкладке из стеклоткани Т-23 применить нить стеклянную крученную комплексную ЕС6-28х1х2(100) (ГОСТ 8325-78).
9 При сборке применить:
- для углеродистой стали электроды Э-46А (ГОСТ 9467-75) Ø3 мм;
- для нержавеющей стали электроды ЭА-400/10У (ОСТ 5Р. 9370-81) Ø3 мм.
10 Технические требования к сборке мелких металлоконструкций смотри лист 52.
11 Данный чертеж читать совместно с листом 61.

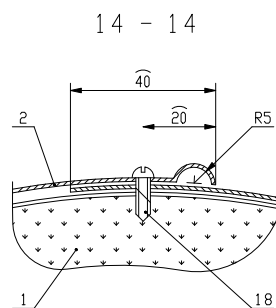
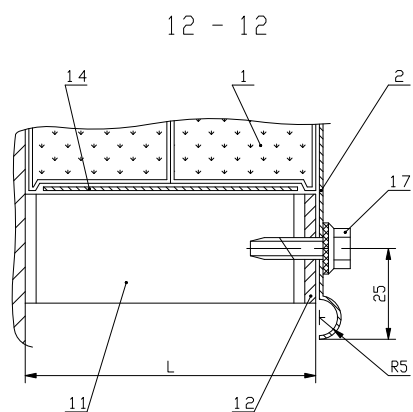
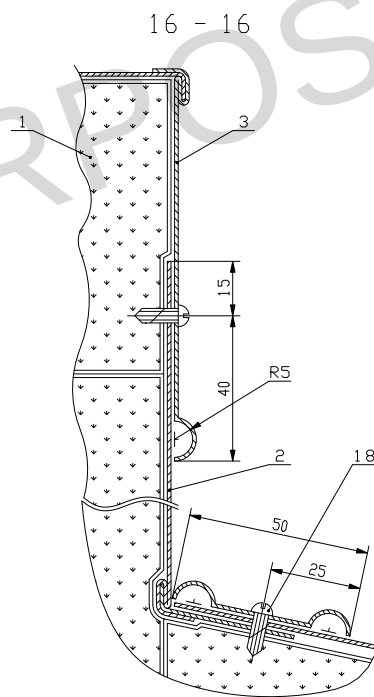
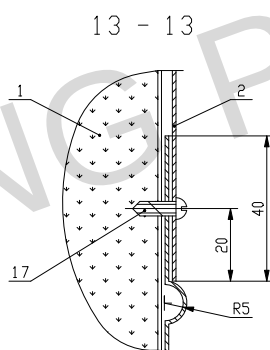
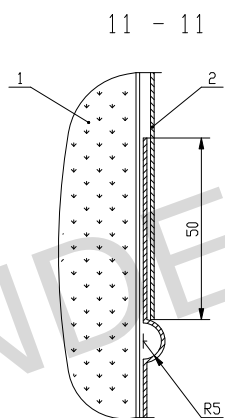
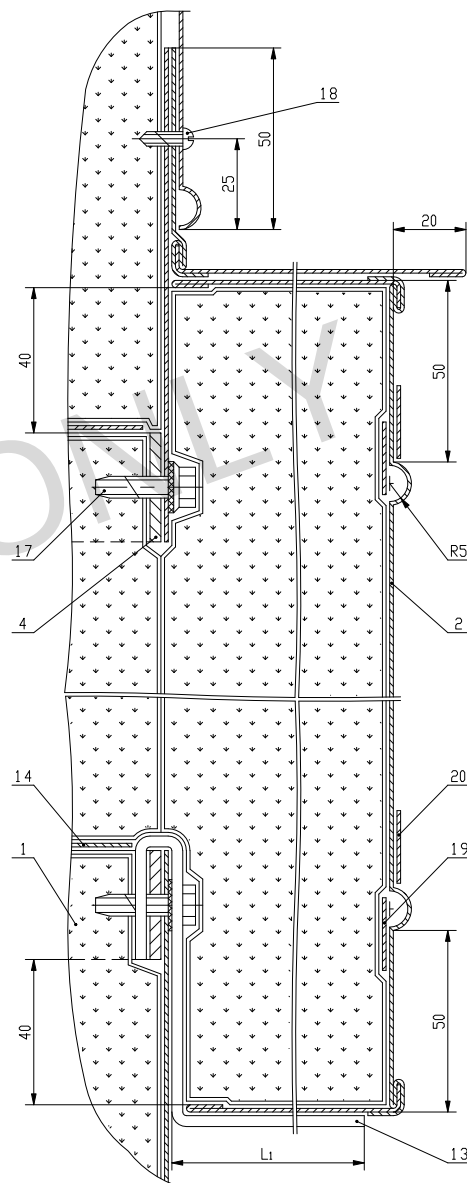
1 Siz., S1 - thicknesses of heat-insulation layers;
L, L1 - shall be specified in-situ.
2 The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2 and 3) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" R01. KK. 0. 0. TI. TT. WD001 and in technological and mounting sheets.
3 For arrangement of support racks, clamping rings and pins see sheets 43, 45 and 46.
4 For the equipment made of stainless steel, the planks (pos. 8) and rings (pos. 9 and 10) from stainless steel band with a cross-section of 3x30 mm, GOST 4405-75, shall be made.
5 For the equipment made of carbon steel, the planks (pos. 8) and rings (pos. 9 and 10) from stainless steel tape with a cross-section of 3x30 mm, GOST 6009-74, shall be made.
6 Unloading and fastening devices (pos. 4...13) made of carbon steel are subject to anticorrosive protection.
7 It is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 16).
8 As stitching for mats:
- in jacket made of silica fabric, mark KT-11, silica thread K11S6-180 (ТУ 6-48-52-90) shall be used;
- in jacket made of glass fabric mark T-23 glass twisted complex thread ES6-28x1x2(100) (GOST 8325-78) shall be used.
9 When welding use:
- for carbon steel electrodes E-46A (GOST 9467-75) Ø3 mm;
- for stainless steel electrodes EA-400/10U (DST 5R. 9370-81) Ø3 mm.
10 For the technical requirements to small metal structures welding see sheet 52.
11 The given drawing should be read together with sheet 61.

Package Number 1 11 6 124
File: R01 KK 1 0 0 TI DK WD001_060=0

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This drawing is not to be reproduced or transferred to other organizations or private persons without the approval of the FSUE "Atomenergoproekt"		Тепловая изоляция трубопроводов и оборудования. Heat insulation construction of pipelines and equipment. Drawings of heat-insulation structures		Студия Лист Листов Phase Sheet Sheets	
Оборудование вертикального диаметром 1200 мм и более. Изоляция матов. Спецификация. Разрезы 1-1...9-9. Vertical equipment 1200 mm in dia and more. Insulation by mats. Specification. Sections 1-1...9-9		Изм. N Уч-лист N док. Подпись Дата Rev. N pat. Sheet No. Signature Date		60	
FSUE "Atomenergoproekt" Moscow 2004		Nikitina		формат A1	



15 - 15
Вариант изоляции оборудования с фланцами
Variant of insulation for the equipment with flanges



1 Данный чертеж читать совместно с листом 60.

1 The given drawing should be read together with sheet 60.

Package Number 1.11.6.124
File: R01.KK.1.0.0.TI.OK.WD001_061=0

R01.KK.1.0.0.TI.OK.WD001

АЭС "КУДАНКУЛАМ" БЛОК 1
NPP "KUDANKULAM" UNIT 1

Тепловая изоляция трубопроводов и оборудования.
Чертежи теплоизоляционных конструкций.
Heat insulation of pipelines and equipment.
Drawings of heat-insulation structures.

Оборудование вертикальное диаметром 1200 мм и более. Изоляция матами.
Размеры 10-10...16-16.
Vertical equipment 1200 mm in dia and more. Insulation by mats.
Sections 10-10...16-16.

FSUE
"Atomenergoproekt"
Moscow 2004

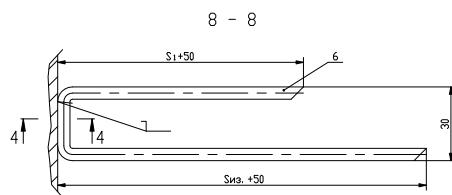
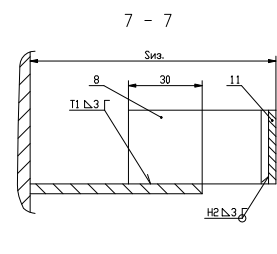
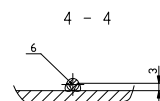
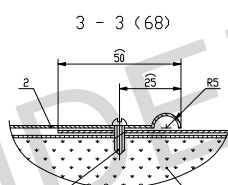
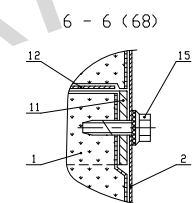
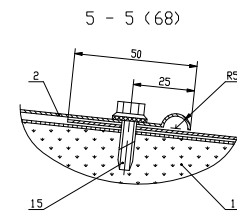
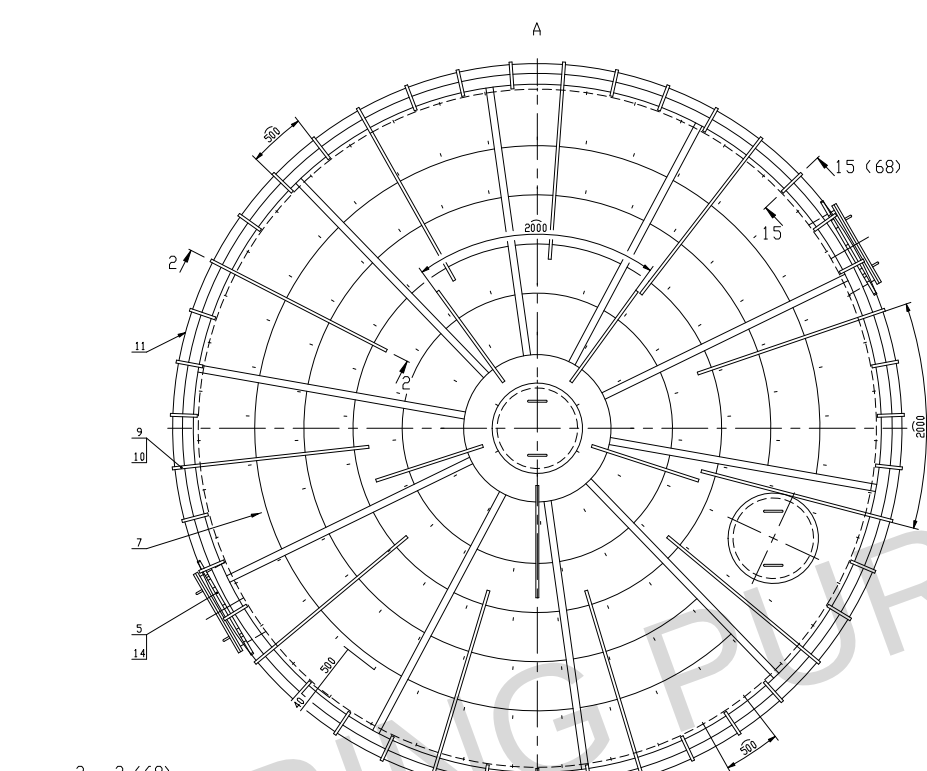
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Изм. N	участ. N	док. N	Подпись	Дата
Rev. N	part	Sheet	Signature	Date
1	1	1	Kazachkova	
2	1	1	Sinitsyn	
3	1	1	Nikitina	

Стадия	Лист	Листов
Phase	Sheet	Sheets
WD	61	

Dr. g. arch. Nr. 3009
Date 26.04.2004
Replace arch. Nr.



3. *S*ms, *S*₂ - толщина теплоизоляционных слоев на цилиндрической части бака;
h - размер опрессовки пелусты.
5. Материал и толщина теплоизоляционного слоя (пос. 1) и металлогерметик (пос. 2) указаны в Исходных технических требованиях к теплоизоляционным материалам, изделиям и конструкциям" РК.01.К.0.0.ТТ.1.00001 и технотехнических ведомости.
- 3.1. Закрепить опорные кольца и шпильки снутри на листах 28 и 45.
4. В баке на наружной стороне установить шпильки (пос. 8 и 9) с шагом сечением 3x30 мм (ГОСТ 4405-75) из нержавеющей стали.
5. Для бака из углеродистой стали изготовить шпильки (пос. 8 и 9) из ленты сечением 3x30 мм (ГОСТ 4009-75) из углеродистой стали.
6. Для герметизации и крепления устройств (пос. 1, 10) изготовленных из углеродистой стали поделает антикоррозионную защиту.
7. Допускается применение бандажа с пряжкой (лист 40) баэном кольца (пос. 13).
8. Кляммер (пос. 17) изготовить из материала металлогерметик.
9. В качестве шайбы для натов:
 - в обкладке из сетки применить прокладку низкоуглеродистой общего назначения - 04-04 (ГОСТ 2882-74)
 - в обкладке из стеклотканя Т-23 применить нить стеклянную крученную комплексную Е66-28х1x120 мм (ГОСТ 8325-78).
10. При сборке применить:
 - для сварки электродов 3-46А (ГОСТ 9467-75) #3 мм
 - для нержавеющей стали электроды 3А-400/10 (ГОСТ SP.9370-81) #3 мм
11. Технические требования к сборке мелких металлогерметических снутри лист 52.
12. Данные чертеж читать совместно с листом 68.

3. *S*ms, *S*₂ - thickness of heat-insulation on layers
*S*ms, *S*₂ - толщина теплоизоляционных слоев на цилиндрической части бака;
h - the size shall be specified in-situ.

2. The material and thickness of heat-insulating layer (pos. 1) and metal covering (pos. 2) are indicated in the "Initial technical requirements for thermal insulation materials, articles and structures" РК.01.К.0.0.ТТ.1.00001 and in technological and mounting sheets.
3. For arrangement of support rings and pins see sheets 28 and 45.
4. The pins shall be made of cross-section of 3x30 mm, GOST 4405-75, shall be made of stainless steel band with a cross-section of 3x30 mm, GOST 4405-75, shall be made.
5. For the tanks made of carbon steel, clamps (pos. 8 and 9) from carbon steel band with a cross-section of 3x30 mm, GOST 4009-75, shall be made.
6. Unloading and fastening devices (pos. 5, 10) made of carbon steel are subject to anti corrosive protection.
7. It is allowed to use bandage with a buckle (sheet 40) instead of wire ring (pos. 13).
8. The cleat (pos. 17) shall be made of metal covering material.
9. As stitching for nuts:
 - in jacket made of mesh, low-carbon wire of common purpose of 0.8-0.3h grade, GOST 2882-74, shall be used;
 - in jacket made of glass fabric, mark Т-23, glass twisted cable thread Е66-28х1х120 (GOST 8325-78) shall be used.
10. When welding use:
 - for carbon steel electrodes Е-46А (ГОСТ 9467-75) #3 mm;
 - for stainless steel electrodes А-400/10 (DST SP.9370-81) #3 mm;
11. For the technical requirements to small metal structures welding see sheet 52.
12. The given drawing should be read together with sheet 68.

[illegible]

ВЕДОМОСТЬ РАСХОДА МАТЕРИАЛОВ
LIST OF MATERIAL CONSUMPTION

Лист Sheet	Наименование Name	Примечание Note
1	Общие данные (начало) General data (beginning)	
2	Общие данные (продолжение) General data (continuation)	
3	Схема расположения элементов на отметке +12,495 Diagram of elements location at elevation +12,495	
4	Схема расположения элементов на отметке +23,730 Diagram of elements location at elevation +23,730	
5	Разрез 1-1 Section 1-1	
6	Разрез 2-2 Section 2-2	
7	Разрезы 3-3, 4-4 Sections 3-3, 4-4	
8	Разрезы 5-5, 6-6 Sections 5-5, 6-6	
9	Разрезы 7-7, 8-8 Sections 7-7, 8-8	
10	Узлы 1, 2 Details 1, 2	
11	Узлы 3...6 Details 3...6	
12	Узлы 7, 8 Details 7, 8	
13	Узлы 9...13 Details 9...13	
14	Заключная деталь EP1 Embedded part EP1	

N No	Наименование Designation	Ед. изм. M. U.	Количество Q-ty	Примечание Note
1	2	3	4	5
1	Сталь листовая горячекатаная по ГОСТ 19903-74 – толщиной 5 мм – толщиной 6 мм Hot-rolled sheet steel as per GOST 19903-74 – 5 mm thick – 6 mm thick	кг 2630 10 kg	2630 10	Сталь С245 по ГОСТ 27772-88 Steel C245 as per GOST 27772-88
2	Сталь листовая горячекатаная по ГОСТ 19903-74 – толщиной 4 мм – толщиной 5 мм Hot-rolled sheet steel as per GOST 19903-74 – 4 mm thick – 5 mm thick	кг 28020 13320 kg	28020 13320	Сталь 0808H01 по ГОСТ 7350-77 Steel 0808H01 as per GOST 7350-77
3	Сталь листовая по ГОСТ 19903-74 – толщиной 3 мм Hot-rolled sheet steel as per GOST 19903-74 – 3 mm thick	кг 3040 kg	3040	Сталь 0808H01 по ГОСТ 5582-75 Steel 0808H01 as per GOST 5582-75
4	Сталь арматурная класса A III по ГОСТ 5781-82 Ø12. AllI Reinforcement of class AllI as per GOST 5781-82 Ø12. AllI	кг 10 kg	10	Сталь С235 по ГОСТ 27772-88 Steel C235 as per GOST 27772-88
5	Трубы по IS: 1161 Ø 21,3x2,6 Pipes as per IS: 1161 Ø 21,3x2,6	кг 300 kg	300	Сталь 0808H01 по ГОСТ 5582-75 Steel 0808H01 as per GOST 5582-75

GENERAL GUIDELINES

1. Рабочие чертежи разработаны в соответствии с действующими нормами проектирования и стандартами РФ, определенными в Контракте.

2. В настоящее время проектом разработаны металлоконструкции обшивки стен боссына выверки и переверку свежего и отработанного топлива (помещения UJ23-8704 и UJ23-8705).

3. Обшивка стен выполняется по предварительно установленным и зафиксированным закладным деталям ("посур").

4. Класс безопасности конструкций – IIП по ОПБ 88/97, НП–001–97 (ПНАЗ Г–01–011–97) "Общие положения обеспечения безопасности атомных станций".

5. Категория сейсмостойкости конструкций – I по НП–031–01 "Нормы проектирования сейсмостойкости атомных станций".

6. Категория ответственности конструкций за радиационную и ядерную безопасность – II по ПНАЗ А3 – 5.6 "Нормы строительного проектирования АЭС реакторного различного типа".

7. Металлические конструкции выполняются из стали.

7.1 Обшивку боссына выверки выполнять из коррозионно-стойкой стали марки 08Х18Н10Т по ГОСТ 7550–77. Сталь должна быть горячекатаная, термически обработанная, прошедшая все необходимые отжига. Выверку поверности М4.6.

7.2 Для стали обшивки из коррозионно-стойкой стали должны быть выполнены следующие требования по ГОСТ 19903–74:

- повышенная точность (А);
- высокая пластичность (ПВ) для толщин 4 мм и более;
- обрешечка кромок (О);
- проверка 10 % листов на сплошность методом ультразвукового контроля.

Обшивку толщиной 4 мм выполнять из толстолистовой коррозионно-стойкой стали марки 08Х18Н10Т по ГОСТ 7550–77. Сталь должна быть горячекатаная, термически обработанная, прошедшая все необходимые отжига. Выверку поверности М4.6.

Закладные детали толщиной более 6 мм выполнять из толстолистовой коррозионно-стойкой стали марки 08Х18Н10Т по ГОСТ 7550–77. Сталь должна быть горячекатаная, термически обработанная, прошедшая все необходимые отжига. Выверку поверности М4.6.

7.3 Для анкерно – стальной арматуры периодического профиля класса АII по ГОСТ 5781–82;

7.4 Металлические конструкции выполнять из стали с характеристиками не ниже, чем у сталей 245 и С235 по ГОСТ 27772–88*

Марки сталей элементов указывать в спецификациях элементов на листах.

8. Элементы конструктивных металлоблиз для сборки обшивки изготавливаются в соответствии с требованиями ПНАЗ Г–01–011–92. Заборную сборку выполнять методом сварки с применением сварочных материалов, обеспечивающих получение металлоблиз с характеристиками не ниже металла свариваемых элементов. Разрешается максимально использовать автоматический или полуавтоматический способ сварки.

Монтажную сборку производить электроскотом с характеристиками не ниже, чем у электроскот:

- типа 342А по ГОСТ 9467–75 для сварки сталей марки С235, С245;
- типа 340–340Т по ОСТ 5.9244–87 для сварки сталей коррозионно-стойкой 08Х18Н10Т;
- типа 3А–395/9 по ОСТ 5.9244–87 для сварки стали марки С245, АII со сталью коррозионно-стойкой 08Х18Н10Т;
- типа 3Б50А по ГОСТ 9467–75 для сварки стали марки С245 со сталью арматурного класса АII;

Электроскот типа 3А–400/120 каждой партии перед допуском к работе должны быть испытаны на стойкость против межкристаллитной коррозии (МКК) по методу АМН по ГОСТ 6032–2003 без прибавочного названия.

9. Катеты монтажных швов пробирки обшивки принять равными толщине обшивки, катеты швов элементов закладных деталей принять в соответствии с пунктом 12.8 СНиП II–23–81, кроме оговоренных. Приварка арматурных стержней по ГОСТ 14098–91.

1 Working drawings have been developed in accordance with standards and standards specified in the Contract.

2 The metal structures of the walls liner of new and spent fuel pool (rooms UJA23 R704 and UJA23 R705) has been developed in this design.

3 The lining shall be performed in dry condition over embedded parts placed and concreted in concrete.

4 Safety class of the structures is INL as per OPB-88/97, NP-001-97 (PNAE G-001-97-97). General provisions on safety ensuring of nuclear power plants".

5 Seismic stability category of structures is I as per NP-031-01 "Codes of designing seismic nuclear power plants".

6 The radiation and nuclear safety responsibility category of the structures is I as per PN-5.6 "Codes for the Construction Design of NPPs with Reactors of Different Types".

7 Metal structures shall be made of steel:

7.1 Cavity lining shall be made of corrosion-resistant steel of grade 08X8BH10T as per GOST 7350-77;

7.2 Corrosion-resistant steel lining sheets should comply with the following requirements as per GOST 19903-74:

- increased accuracy (A);
- high flatness (HF) for thickness 4 mm and 5 mm;
- sheared edge (S);
- continuity test of 10% of sheets by ultra-sonic control.

Lining of thickness 4 mm shall be made of thick corrosion-resistant steel plate of grade 08X8BH10T as per GOST 7350-77. Steel should be hot-rolled, heat treated, etched or light annealed steel. Surface type M2a, M2b.

Embedded parts of thickness more than 5 mm shall be made of thick corrosion-resistant steel of grade 08X8BH10T as per GOST 7350-77. Steel should be hot-rolled, heat treated, etched, temper-rolled. Surface group Mb.

7.3 For anchors – reinforcement steel of die-rolled section. All class as per GOST 5781-82;

7.4 H the metal structures shall be made of steel having characteristics at least as good as those of steel C245 and C235 as per GOST 27772-88.

Steel grades of the elements are specified in the specifications on sheets.

8 Electrodes and welding materials for welding of lining shall be set in accordance with the PNAE G-001-97-92. Factory welding shall be implemented by methods and using welding materials that assure metal of joint having design parameters not lower than those of metal of welding elements. It is recommended to use maximum of automatic or semi-automatic welding method.

Erection welding shall be implemented by means of electrodes with characteristics not lower than those of the following electrodes:

- of type E42 as per GOST 9467-75 for welding of steel of grade C235, C245;
- of type EA-400/10T as per OST 5.9244-87 for welding of corrosion-resistant steel 08X8BH10T;
- of type EA-395/9 as per OST 5.9244-87 for welding of steel of grade C245, All with corrosion-resistant steel 08X8BH10T;
- of type E50A as per GOST 9467-75 for welding of steel of grade C245 with reinforcement steel of grade AIII.

Prior to admission to work, electrodes of type EA-400/10T of each lot shall be tested for intercrystalline corrosion (ICC) resistance using AMU method as per GOST 6032-2003 without sensitization heating.

9 Erection joints legs of lining welding shall be taken equal to the lining thickness, joints legs of embedded parts elements shall be taken in accordance with the Item 12.8 of SNiP 2.3-81, except for the specified. Re-bars shall be welded on per GOST 14098-91.

ВЕДОМОСТЬ ДОПОЛНИТЕЛЬНЫХ МАТЕРИАЛОВ
LIST OF ADDITIONAL MATERIALS

N No	Наименование Name	Ед. изм. M. U.	Кол. Q-ty	Примечание Note
1	2	3	4	5
1	Проникающая обмазочная гидроизоляция тип "Пенетрон" 1 слой Penetrating waterproofing coating type "Penetron", 1 layer	m ² m ²	900,0	стена wall

МОНТАЖНЫЕ ШВЫ СВАРНЫХ СОЕДИНЕНИЙ ERECTION JOINTS OF WELDED CONNECTIONS

Условное обозначение шва по ГОСТ 14771-76 Legend of joints as per GOST 14771-76	Эскиз соединения Connection sketch	Характеристика сварного шва Characteristic of welded joint	Способ сварки Method of welding	Конструктивные элементы соединения, мм Structural elements of the connection, mm		
				S	b	c
Н1		Односторонний One-sided	Инт ИИт ИП	4 5	3	4
Н1		Односторонний One-sided	Инт ИИт ИП	4 5 10-16 20 и более 20 and more	4	5 7 8
Н1		Односторонний One-sided	Инт ИИт ИП	4 5 10-16 20 и более 20 and more	5	6 7 8

File: R01 KK34 30UJA 0 KM OK WD010 001=0

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обозначение, приведенное
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Данный чертеж
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АЭС "КУДАНКУЛАМ" БЛОК 3 NPP "KUDANKULAM" UNIT 3				
30UJA. Реакторное здание. Обладано боевыми безвредно до отп+31,700. Обладано стеной 30UJA. Reactor building. Fuel pool lining up to st.+31,700. Wall liners				
			Смазоч.	Линум
			Phase	Sheet
			WD	1 14
Общие данные (начало) General data (beginning)			JSC Atomenergoprom Moscow 2017	
				

ОБЩИЕ УКАЗАНИЯ (продолжение)

- 10 Изготовление, монтаж, контроль качества и приемку конструкций (в том числе сварку) производить в соответствии с требованиями следующих документов:
- СНиП 3.03.01-87 "Несущие и ограждающие конструкции", МДС 53-1-2001 "Рекомендации по монтажу стальных строительных конструкций" (к СНиП 3.03.01-87);
 - ГОСТ 23118-99 "Конструкции стальные строительные. Общие технические условия";
 - СП 53-101-98 "Изготовление и контроль качества стальных строительных конструкций";
 - СНиП 12-04-2002 "Техника безопасности в строительстве" часть 2 "Строительное производство";
 - ПНАЭ Г-10-031-92 "Основные положения по сварке элементов локализирующих систем безопасности атомных станций" (требования к квалификация производственного персонала, сборочному оборудованию, подготовке и сборке элементов под сварку, сборке, исправлению дефектов в сварных соединениях и технике безопасности);
 - ПНАЭ Г-10-032-92 "Правила контроля сварных соединений элементов локализирующих систем безопасности атомных станций" (контроль подготовки производства и технологии сварочных работ, проверка квалификации персонала, состояния сварочного оборудования, аппаратуры для дефектоскопии, методы и объем контроля качества сварных соединений).

11 До начала изготовления конструкций на основании извещения о монтаже конструкций должны быть разработаны чертежи марки КМД в соответствии с ГОСТ 21.502-2007 (детализированные чертежи металлических конструкций).

Количество и масса элементов облицовки стен бассейна выдержки с отметки +12,495 до отметки +31,700 уточняется при разработке чертежей марки КМД.

12 Изготовление и монтаж конструкций (в том числе сварку) производить в соответствии со специально разработанным проектом производства работ (ППР) и проектом производства сварочных работ (ППСР) — заранее разработанным технологическим регламентом, обеспечивающим минимальные деформации элементов, минимальные сварочные напряжения и соблюдение допуска, заложенных в проекте.

13 Прибавка и приписка конструкций к облицовке в местах не указанных в рабочей документации, наплавлять запрещается.

14 Укрупнительные заготовки шва облицовки выполнять автоматической дуговой сваркой с полным проборм стальных листов.

15 Методы и объемы контроля качества сварных соединений листов облицовки производить на основании ПНАЭ Г-10-032-92 для категории сварных соединений "НД" (недоступные для ремонта в процессе эксплуатации) в следующем объеме:

15.1 Отступление от размеров и формы швов, превышающие допуски по ГОСТ 5264-80 и ГОСТ 8713-79, не допускаются.

15.2 Визуальный и измерительный контроль — 100 % всех швов производить в соответствии с требованиями ПНАЭ Г-10-032-92. Отступление от размеров и формы швов, превышающих допуски по вышеуказанным нормативным документам, не допускается.

15.3 Радиографический контроль стыковых сварных соединений листов облицовки из коррозионно-стойкой стали с полным проплавлением кромок при дуговом доступе производить в соответствии с требованиями ПНАЭ Г-10-032-92 в объеме 15% от общей протяженности швов (и в обязательном порядке все пересечения швов). Нормы на максимально допустимые дефекты принять по таблице 4.4 ПНАЭ Г-10-032-92;

15.4 Класс герметичности сварных соединений — V в соответствии с ПНАЭ Г-7-019-89.

Контроль герметичности сварных соединений облицовки выполняется в соответствии с требованиями ПНАЭ Г-10-032-92, ГОСТ 3242-79 и ПНАЭ Г-7-019-89:

15.4.1 Контроль проникающими жидкостями (керосином) — 100 % всех стыковых, угловых швов с полным проплавлением при дуговом доступе (в том числе стыки анкерирующих элементов и закладных деталей, выполнение до бетонирования).

15.4.2 Контроль пузырьковым вакуумным способом — 100 % для всех стыковых, угловых швов с полным проплавлением с односторонним доступом. Величина разрежения (вакуум) в вакуум-камере должна быть не менее 0,08 МПа. Образование пузырей в пенообразующем материале не допускается. Испытание проводить в соответствии с требованиями ПНАЭ Г-7-019-89 "Контроль герметичности. Газовые и жидкостные методы".

15.4.3 При невозможности проведения контроля монтажных сварных соединений облицовки вакуум-камерой, а также в местах несекторного ремонта, местах пересечения монтажных швов и участках монтажных сварных соединений, вызывающих сомнения по результатам визуального контроля, выполнять капиллярный контроль в соответствии с пунктом 4.4 ПНАЭ Г-10-032-92.

16 Нащельники привариваются на листы облицовки в зоне их монтажных соединений с анкерирующими элементами и образуют полость между собой, листами облицовки и этими анкерирующими элементами. Через эту полость организован сбор случайных протечек в дренажную (sheet) трубопровода диаметром Ø26,9x3,2 мм и Ø33,7x2,6 мм (см. R01.KK34.30UJA.O.KM.OK.WD009), через которые они отводятся в емкосты коллектора.

17 До монтажа нащельников должны быть проконтролированы все сварные соединения под ним, а дренажная система должна быть проверена на выполнение своих функций. Испытания дренажной системы выполнять методом пролива воды по специально разработанной методике Производителя работ.

18 До сдачи в эксплуатацию облицовка бассейна выдержки должна пройти гидростатические испытания с заполнением бассейна водой до отметки +30,850 и выдержкой 6 месяцев 48 часов.

Температура воды для гидравлических испытаний должна быть не более +40° С при температуре окружающей среды не менее +20° С.

В процессе испытания не должно быть падения уровня жидкости. Наличие протечек в дренажной системе при гидростатических не допускается.

Методика испытаний должна быть разработана Заказчиком.

Для анкерования облицовки из коррозионно-стойкой стали применять болты с ограничением содержания хлоридов (до 10 мг/кг) при обязательном удалении остатков из промывкой дистиллированной водой.

Испытания проводить два раза. Первый раз после выполнения монтажных работ. Второй раз во время испытаний герметичности на прочность и герметичность уровень воды должен быть не выше уровня воды при эксплуатации (отм. +23,570).

19 Выполнение герметизирующей облицовки бассейна выдержки производить после реализации мероприятий по преобразованию попавшего атмосферной влаги на отметку плита перекрытия +31,700.

20 Все элементы, установленные до бетонирования, должны быть распределены от смещения в процессе укладки бетона.

21 Анкерующие элементы облицовки заказываются с допуском ±2 мм на 1 метр, но не более 5 мм по всей поверхности облицовки. Шаг анкерирующих элементов допускается уменьшать по сравнению с указанным в проекте при разработке чертежей КМД.

22 Допустимые отклонения по плоскостности листов облицовки 4 мм на 1 метр длины.

23 Гнутые арматурные стержни выполнять с минимальными диаметрами загиба в соответствии с пунктом 8.3.30 СП52-101-2003.

24 Для гидроизоляции стен перед монтажом листа облицовки поверхность бетона покрывается проникающей обмазочной гидроизоляцией типа "Пенетрон" в соответствии с технологическим регламентом.

25 Металлоконструкции элементов облицовки должны быть защищены антикоррозионным покрытием на период хранения, транспортировки, монтажа и до сдачи в эксплуатацию с учетом воздействия климатических факторов по ГОСТ 15150-69.

26 Железобетонные конструкции бассейна выдержки смонтированы чертежи R01.KK34.30UJA.O.KZ.OK.WD041 и R01.KK34.30UJA.O.KZ.OK.WD044.

GENERAL GUIDELINES (continuation)

10 Manufacturing, erecting, quality control and accepting of structures (including welding) shall be carried out in accordance with the requirements of the following documents:

- SNIP 3.03.01-87 "Bearing and enclosing structures", MDS 53-1-2001 "Recommendations for erecting of steel civil structures" (to SNIP 3.03.01-87);
- GOST 23118-99 "Steel civil structures. General technical specification";
- SP 53-101-98 "Manufacturing and quality control of steel civil structures";
- SNIP 12-04-2002 "Work safety in civil engineering" part 2 "Civil production";
- PNAE G-10-031-92 "General provisions on welding of NPP localizing safety systems elements" (requirements for production personnel qualification, welding equipment, preparing and assembling elements for welding, welding, repairing of defects in welded joints, work safety);
- PNAE G-10-032-92 "Rules of control of NPP localizing safety systems elements welded joints" (production preparing and welding process control, test of personnel qualification, welding equipment condition, flow detection equipment methods and scopes of welded joints quality control).

11 Prior to lining manufacturing, the manufacturer of the structures shall develop Shop Drawings (detailed metal structures). In development of the Shop Drawings, the requirements of GOST 21.502-2007 (detailed metal structures drawings) shall be followed.

Quantity and mass of lining elements, fuel pool walls from elevation +12,495 up to elevation +31,700 shall be clarified during Shop Drawings development.

12 Manufacturing and erecting of structures (including welding) shall be implemented in accordance with specially developed WPP (Procedure Report (WPP) and Welding Works Procedure Report (WPPR)) — a process schedule, developed in advance that provides for minimum strain of elements, minimum welding stress and observation of tolerances included in the design.

13 Welding and tack welding of structures in lining in places not specified in the design is strictly prohibited.

14 Enlarged factory lining joints shall be implemented by means of automatic two-sided welding with full penetration of jointing sheets.

15 Methods and scopes of quality control of lining sheets welding joints shall be carried out in accordance with PNAE G-10-032-92 for welding joints category "NA" (not accessible for repair during operation) in the following scope:

15.1 Deviations from sizes and shape of joints exceeding tolerances as per GOST 5264-80 and GOST 8713-79, are not allowed.

15.2 Visual and measuring control — 100% of all joints — shall be carried out in compliance with the requirements of PNAE G-10-032-92. Deviations from sizes and shape of the joints exceeding tolerances as per the above-mentioned regulatory documents are not allowed.

15.3 Radiographic testing of butt welded joints of the lining sheets of stainless steel, with full penetration of the edges with bilateral access to be performed in accordance with the requirements of PNAE G-10-032-92 in scope of 15% of the total joints (and necessarily at intersections of the seams). Rules on maximum allowable defects to be taken per Table 4.4 of PNAE G-10-032-92;

15.4 Welded joints refer to tightness class V in accordance with PNAE G-7-019-89. Tightness control of lining welded joints shall be carried out in accordance with the requirements of PNAE G-10-032-92, GOST 3242-79 and PNAE G-7-019-89:

15.4.1 Penetrant fluid (kerosene) test — 100%, all butt, angle joints with full penetration with two-sided access (joints of anchor elements and embedded parts implemented prior to concreting).

15.4.2 Test with bubble vacuum method — 100 % for all butt, angle joints with full penetration with one-sided access. Undersurface (vacuum) value in the vacuum chamber should be no less than 0.08 MPa. Bubbles formation in the forming material is not allowed. Tests shall be carried out in accordance with the requirements of PNAE G-7-019-89 "Tightness control. Gas and liquid methods".

15.4.3 If erection welded joints of the lining cannot be controlled by the vacuum chamber, as well as in places of repeated repair, intersection of erection joints and sections of erection welded joints, causing doubts by the results of visual inspection, capillary test shall be carried out in accordance with 1.4.4 of PNAE G-10-032-92.

16 Cover strips are welded on lining sheets in the area of erection connections with anchor elements, channels and they form a cavity between each other, lining sheets and these anchor elements. This cavity is used to collect accidental leaks to drainage pipelines of diameter Ø26,9x3,2 mm and Ø33,7x2,6 mm (see R01.KK34.30UJA.O.KM.OK.WD009), through which leaks are output to check reservoirs.

17 All welds should be checked before erection of cover strips, drainage system should be tested for operation, but drainage system shall be tested by water flow method as per special procedure developed by the Work Executor.

18 Before putting into service the liner of the fuel pool, hydrostatic tests with filling the fuel pool with water up to elevation +30,850 and maintaining during 48 hours shall be made.

Water temperature for hydraulic tests shall be no more than +40° at ambient air temperature no less than of +20°.

During testing, the level of liquid should not fall. During the hydraulic tests, the anchor elements from entry of concrete shall be provided.

Testing procedure shall be developed by the Customer.

For hydraulic tests of the lining made of corrosion-resistant steel, water with limited content of chlorides (up to 10 mg/l) shall be used with obligatory removal of its residue by flushing with distilled water.

The testing shall be performed two times: at first, after performing the erection work, then—during containment testing for strength and tightness.

19 Installation of sealing liner in FP can be taken up only after implementation of measures aimed to avoid ingress of air moisture at floor el. +31,700 m.

20 All elements installed prior to concreting shall be fastened to avoid their displacement during pouring of concrete.

21 Anchoring elements of lining shall be laid with tolerance ±2 mm per 1 meter, but not more than 5 mm over the entire area of the lining. Anchoring elements spacing is allowed to be reduced in comparison with the one specified in the design during development of the Shop Drawings.

22 Permissible deviations in flatness of the lining sheets shall be 4 mm per 1 meter length.

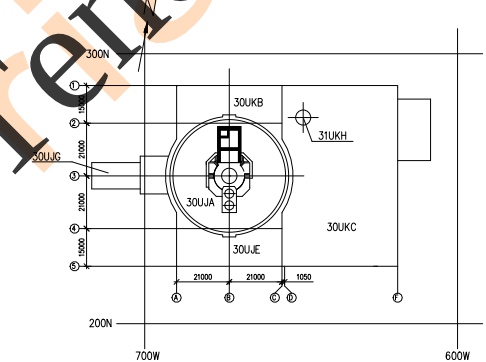
23 Bent reinforcement bars shall be implemented with minimum bend diameters in accordance with item 8.3.30 of SP 52-101-2003.

24 For walls waterproofing prior to erection of lining sheet, concrete surface shall be covered with penetrating surface waterproofing type "Penetron" in accordance with the process schedule.

25 Metal structures of lining elements should be protected by corrosion-resistant coating for the period of storing, transporting and erecting prior to commissioning into account impacts of climatic factors as per GOST 15150-69.

26 For the reinforced concrete structures of the fuel pool see drawings: R01.KK34.30UJA.O.KZ.OK.WD041 and R01.KK34.30UJA.O.KZ.OK.WD044.

СХЕМА РАСПОЛОЖЕНИЯ
KEY PLAN



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File: R01.KK34.30UJA.O.KM.OK.WD010_002=0

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Изм.	№	уч.	Лист	№	гос.	Подпись	Дата
Rev.	N	pat.	Sheet	Doc.	No.	Signature	Date
Утверждено						Kots	
Н. комп.						Subordetkaya	
Инспектор						Ivanov	
Разработ.							

Package Number 3 8 2 109

Rev	Issue	Issued for	Signature	Issue sheet N
N	N			

 **NUCLEAR POWER CORPORATION OF INDIA LTD**

R01.KK34.30UJA.O.KM.OK.WD010

АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT 3

30UJA. Реакторное здание. Облицовка бассейна выдержки до отм.+31,700. 30UJA. Reactor building. Fuel pool lining up to el. +31,700. Wall liners

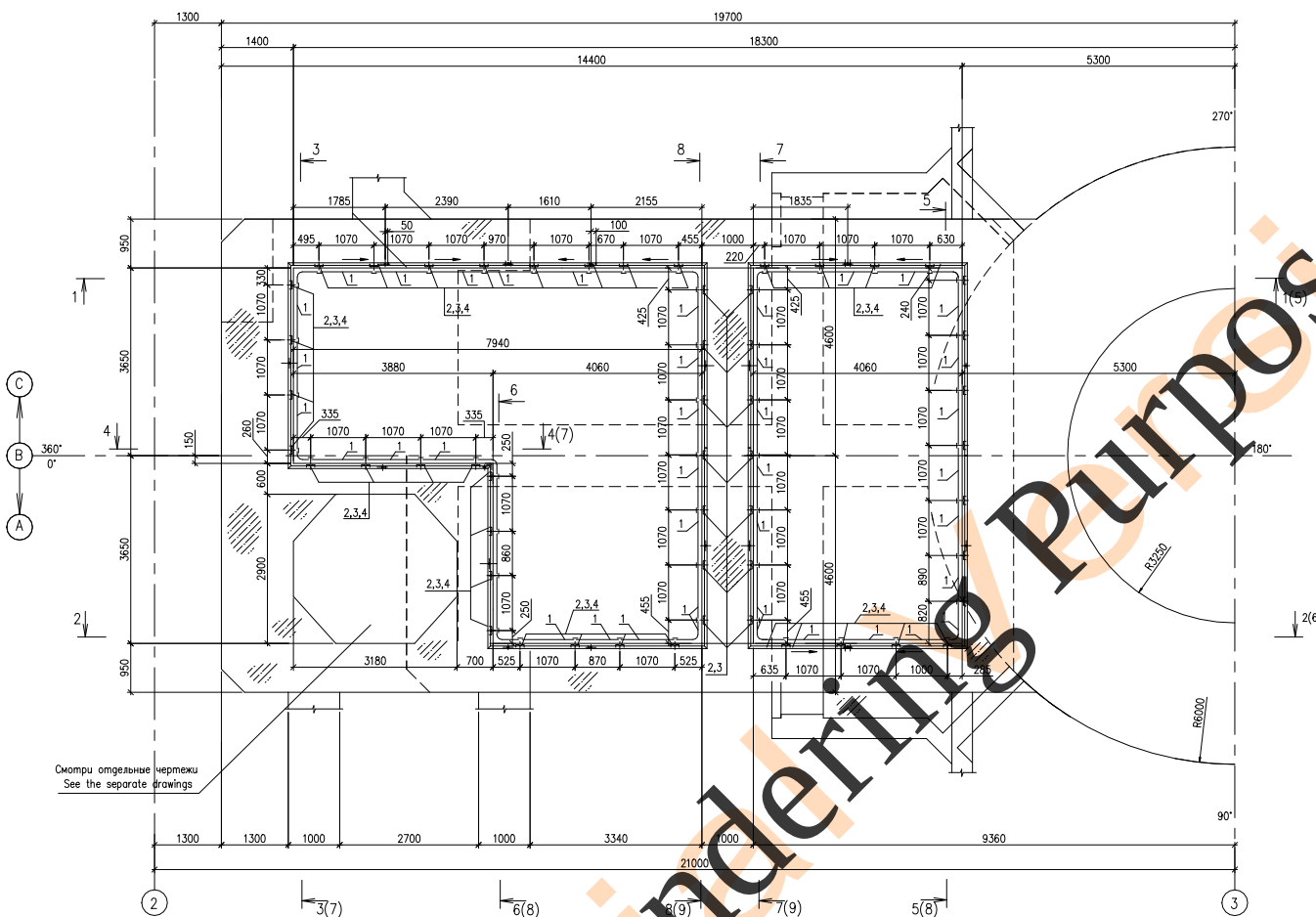
Стация	Лист	Листов
Phase	Sheet	Sheets
WD	2	

Общие данные (продолжение)
General data (continuation)

JSC "Atomenergoproekt" Moscow 2017

формат / size A1

СХЕМА РАСПОЛОЖЕНИЯ ЭЛЕМЕНТОВ НА ОТМ. +12,495
DIAGRAM OF ELEMENTS LOCATION AT ELEVATION +12,495



1 Перед монтажом облицовки все дренажные элементы
должны быть очищены от бетона и мусора.
1 Before erection of the liner all drain elements shall be cleaned
out from concrete and debris.

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File: R01.KK34.30UJA.0.KM.OK.WD010_003=0

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Изм. N	уч.	Лист N	гок. Погн. Даты
Rev. N	pat. Sheet	Doc. No	Signature Date
Умбегуа			
Approved	Kovalkin		
Н. комп. Инспектор	Subodetskaya		
Designed	Pavlova		
		30UJA. Реакторное здание. Облицовка бассейна выдержки го отм.+31,700. 30UJA. Reactor building. Fuel pool lining up to el. +31,700. Wall liners	
		Схема расположения элементов на отм. +12,495 Diagram of elements location at elevation +12,495	
		формат / size A1	

СХЕМА РАСПОЛОЖЕНИЯ ЭЛЕМЕНТОВ НА ОТМЕТКЕ +23,730
ARRANGEMENT SCHEME OF ELEMENTS AT ELEVATION +23,730

For Tendering Purpose Only

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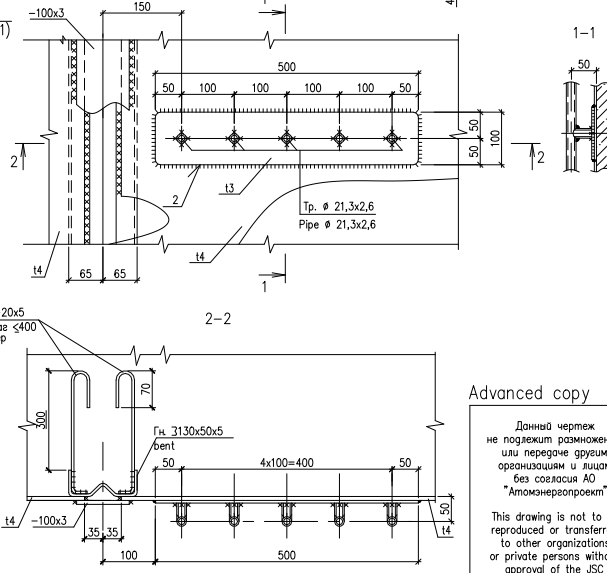
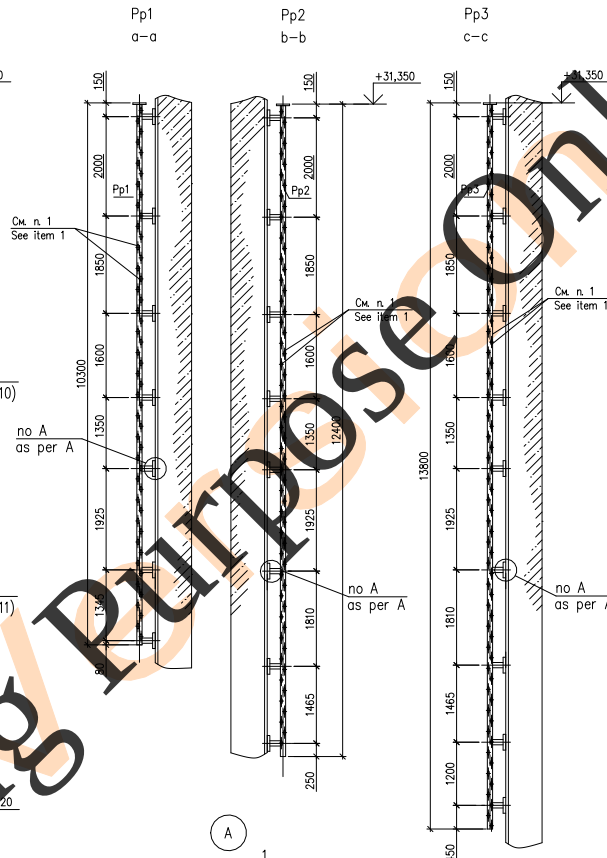
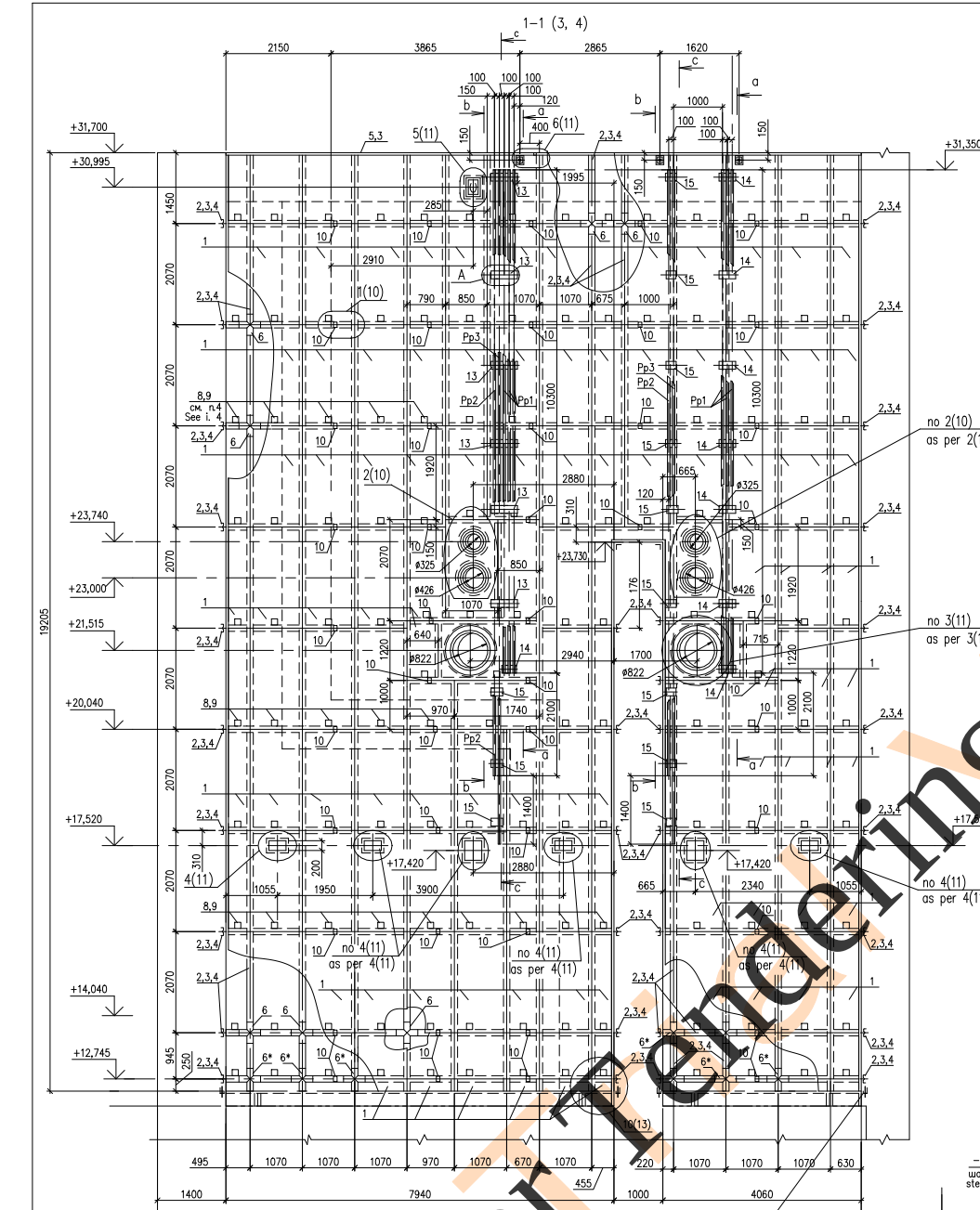
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*** – Общая площадь, м²
Total area, m²
** – Общая длина, м
Total lenght, m

Technical drawing of a reinforced concrete slab (a-a) showing reinforcement details. The drawing includes dimensions: 80 (width), 50 (height), and 80 (height). Reinforcement bars are labeled: $\Gamma_{KL} L 80 \times 80 \times 3$ Bent $L 80 \times 80 \times 3$, $\Gamma_{KL} L 80 \times 50 \times 5$ Bent $L 80 \times 50 \times 5$, and -20×5 was ≤ 400 step. The drawing also shows a section line a-a and a level marker $+23,730$.

1 Cover strips shall be welded to the lining of walls using argon-arc welding as per GOST 14771-76.

формат / size A1



СПЕЦИФИКАЦИЯ SPECIFICATION										Примечание Note	
Марка Grade	Поз. Pos.	Сечение Cross-section	Кол., шт. Q-ty, pcs	Длина Length m	Масса, кг Mass, kg		Марка или наим. стали Grade or name of steel				
					шт. pcs.	общ. total					
Линия обшивки Lining of wall as per section 1-1	1	t4		243,0	—	—	7630,2	08X18H10T		***	
	2	Гн. 3130x50x5 bent		265,7	—	—	2555			**	
	3	-20x5	1980	0,5	0,4	792,0	792,0		C245	**	
	4	-100x3		381,2	—	—	898		**		
	5	Гн. 70x40x5 bent		14,4	—	—	62,2		**		
	6*	130x50x5	95	0,86	8,27	—	786,0		**		
	7	130x50x5		14,5	—	—	139,5		**		
	8	130x50x5		19,3	—	—	185,6	08X18H10T	**		
	9	Гн. 100x25x5 bent		22,3	—	—	132			See item 4	
	10	-25x5	135	0,09	0,09	—	12,2			**	
	11	Гн. 25x30x5 bent		3,29	—	—	7,1		**		
	12	-3x100	6	0,5	—	—	7,07				
	13	-3x100	8	0,3	—	—	5,7				
	14	-3x100	12	0,2	—	—	5,7				
	Pp1	1	Гр. # 21,3x2,6 pipe # 21,3x2,6	6	10,3	12,4	74,4	79,2		**	
		2	Гр. # 21,3x2,6 pipe # 21,3x2,6	42	0,05	0,1	4,2			**	
3		-80x3	6	0,08	0,1	0,6			**		
Pp2	1	Гр. # 21,3x2,6 pipe # 21,3x2,6	2	12,4	15,0	30,0	31,8		**		
	2	Гр. # 21,3x2,6 pipe # 21,3x2,6	16	0,05	0,1	1,6			**		
	3	-80x3	2	0,08	0,1	0,2			**		
Pp3	1	Гр. # 21,3x2,6 pipe # 21,3x2,6	2	13,8	16,6	33,2	35,2		**		
	2	Гр. # 21,3x2,6 pipe # 21,3x2,6	18	0,05	0,1	1,8			**		
	3	-80x3	2	0,08	0,1	0,2			**		
*** - Общая площадь, м ² Total area, m ²											
** - Общая длина, м Total length, m											

- 1 В марках Pp1, Pp2 и Pp3 выпилить отверстия Ø8 мм с шагом 200 мм в шахматном порядке.
 - 2 Работать совместно с листами 4...9.
 - 3 Размеры со "+" уточняются при разработке чертежей КМД.
 - 4 Перед монтажом облицовки все элементы должны быть очищены от монтажной пены, бетона и мусора.
- 1 The holes Ø8 mm shall be carried out in elements Pp1, Pp2 and Pp3 with a spacing of 200 mm in staggered order.
 - 2 To work along with sheets 4...9.
 - 3 "+" - Size is specified on Shop drawings design stage.
 - 4 Prior to erection of sealing liner, all elements shall be cleaned of remnants of polyurethane foam, concrete and foul.

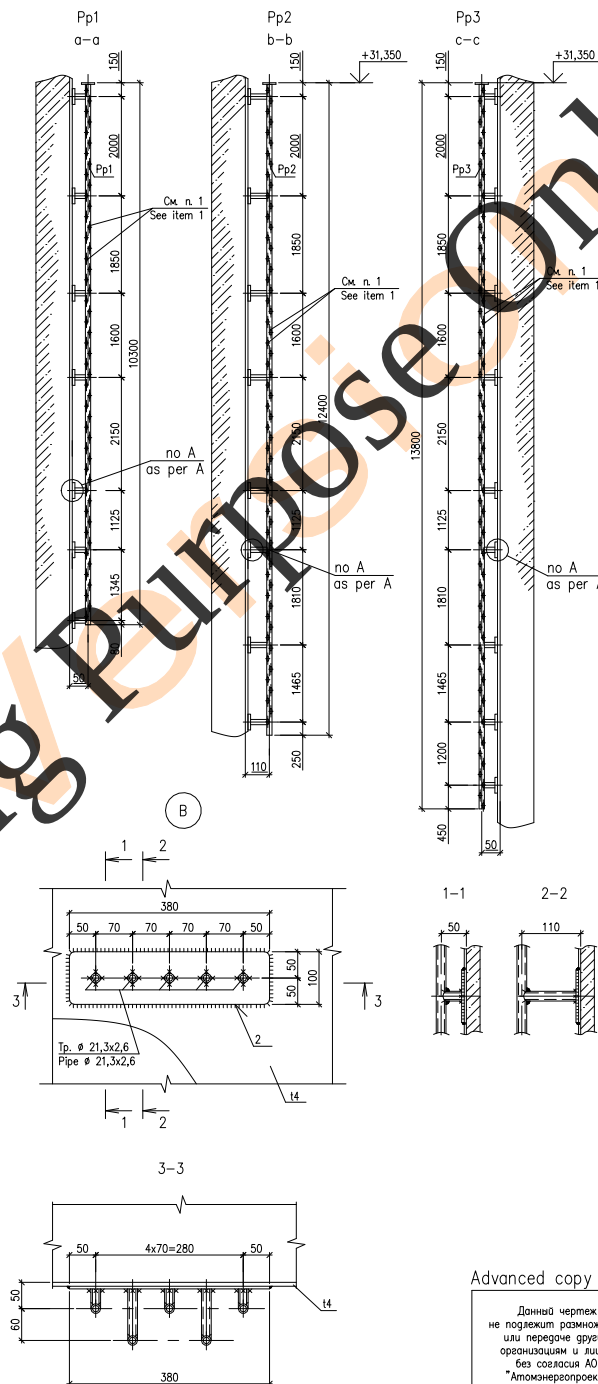
Orig. arch. №
Date

См. металлоконструкции облицовки пола
R01.KK34.30UJA.0.KM.OK.WD009
See metal structures of floor liner
R01.KK34.30UJA.0.KM.OK.WD009

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Package Number 3 Б 2 109 File: R01.KK34.30UJA.0.KM.OK.WD010_005=0										R01.KK34.30UJA.0.KM.OK.WD010	
										АЭС "КУДАНКУЛАМ" БЛОК 3 NPP "KUDANKULAM" UNIT 3	
Изм.	№	уч.	Лист	№	гос.	Подпись	Дат.	30UJA. Реакторное здание. Облицовка бассейна выдержки го отк.+31,700.	Стр.	Лист	Листов
Rev.	N	pat.	Sheet	Doc.	No	Signature	Date	30UJA. Reactor building. Fuel pool lining up to el. +31,700.	Phase	Sheet	Sheets
Умбегула	Approved	Kovalkin						Стр.	Лист	Листов	
Н. комп.	Inspector	Subodetskaya						WD	5		
Павлова	Designed	Pavlova						Разрез 1-1 Section 1-1	JSC "Atomenergoproekt" Moscow 2017 формат / size A1		



Марка Grade	Поз. Pos.	Сечение Cross-section	Кол. шп D-ty, pcs	Длина Length m	Масса, kg Mass, kg			Марка или наим. стали Grade or name of steel	Примечание Note
					шт. pcs.	общ. total	элемент, elem.		
Лининг стенок по радиусу 2-2	1	t4		164,0	-	-	5150,0	08Х8Н10Т	""
	2	Гн. L 130x50x5		177,8	-	-	1710,0		""
	3	-20x5	1342	0,5	0,4	536,8	C245		""
	4	-100x3		259,0	-	-	610,0	08Х8Н10Т	""
	5	Гн. L 70x40x5 bent		9,2	-	-	39,8		""
	6	Гн. L 130x50x5 bent	45	0,86	8,27	-	372,0		""
	6*	Гн. L 130x50x5 bent		6,6	-	-	63,5		""
	7	Гн. L 130x50x5 bent		3,23	-	-	31,1		""
	8	Гн. C 100x25x5 bent		15,4	-	-	90,7		See item 4
	9	-25x5	93	0,09	0,09	-	8,2		""
10	Гн. L 25x30x5 bent		1,9	-	-	4,1	""		
Pp1	16	-3x100	6	0,38	0,9	-	5,4	38,2	""
	17	-3x100	1	0,24	0,6	-	0,6		""
	18	-3x100	3	0,17	0,4	-	1,2		""
	1	Гр. # 21,3x2,6 pipe # 21,3x2,6	3	10,3	12,4	37,2	15,9		""
	2	Гр. # 21,3x2,6 pipe # 21,3x2,6	27	0,05	0,1	2,7			""
	3	-80x3	3	0,08	0,1	0,3			""
Pp2	1	Гр. # 21,3x2,6 pipe # 21,3x2,6	1	12,4	15,0	15,0	17,6	""	
	2	Гр. # 21,3x2,6 pipe # 21,3x2,6	8	0,05	0,1	0,8		""	
	3	-80x3	1	0,08	0,1	0,1		""	
Pp3	1	Гр. # 21,3x2,6 pipe # 21,3x2,6	1	13,8	16,6	16,6	17,6	""	
	2	Гр. # 21,3x2,6 pipe # 21,3x2,6	9	0,05	0,1	0,9		""	
	3	-80x3	1	0,08	0,1	0,1		""	
***		Общая площадь, м² Total area, m²							
**		Общая длина, м Total length, m							

- 1 В марках Pp1, Pp2 и Pp3 выполнить отверстия Ø8 мм с шагом 200 мм в шамотном порадке.
 - 2 Работать совместно с листами 4..9.
 - 3 Размеры с "+" указываются при разработке чертежей КМД.
 - 4 Перед монтажом облицовки все элементы должны быть очищены от монтажной пены, бетона и мусора.
-
- 1 The holes Ø8 mm shall be carried out in elements Pp1, Pp2 and Pp3 with a spacing of 200 mm in staggered order.
 - 2 To work along with sheets 4..9.
 - 3 "+" - Size is specified on Shop drawings design stage.
 - 4 Prior to erection of sealing liner, all elements shall be cleaned of remnants of polyurethane foam, concrete and foul.

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Package Number 3 8 2 109
File: R01 KK34 30UJA 0 KM OK WD010_006=0

R01.KK34.30UJA.0.KM.OK.WD010

300JA. Реакторное здание. Облицовка бассейна выщелачивания от отм.+31.700	Стадия	Лист	Листов
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Облицовка стен	Phase	Sheet	Sheets
30UJA. Reactor building. Fuel pool			

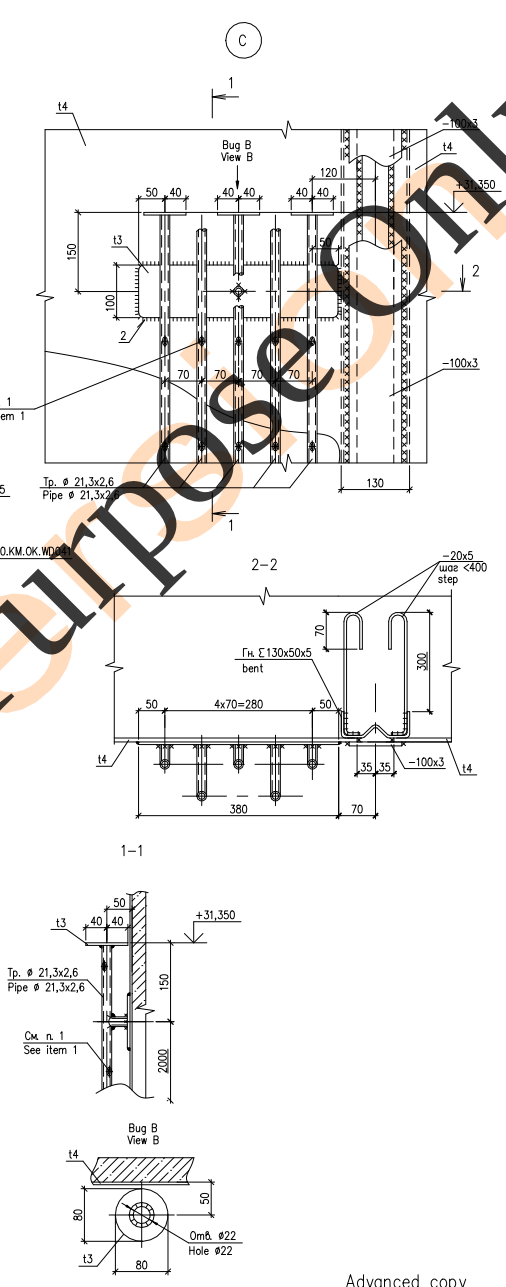
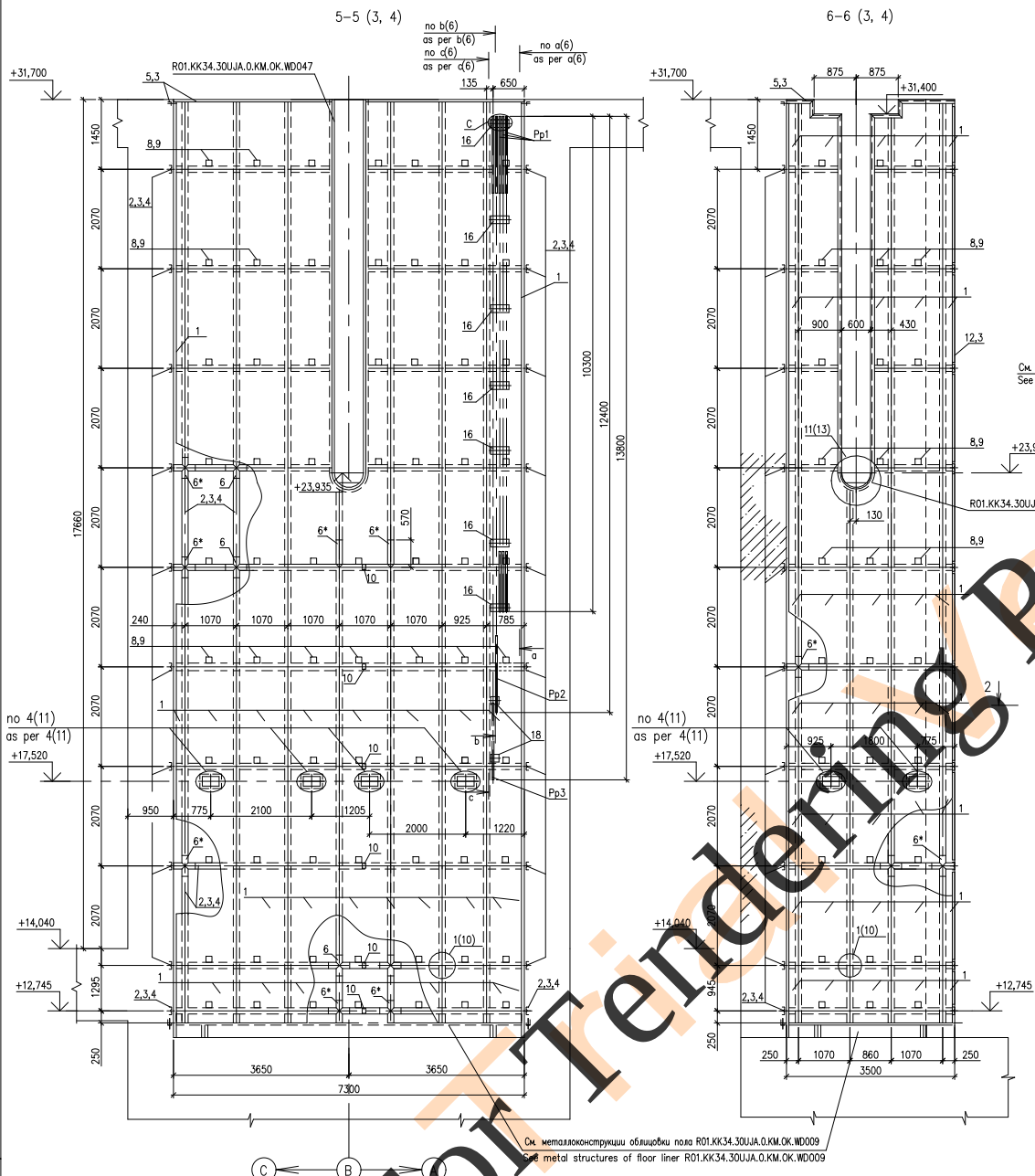
lining up to el. +31,700. Wall liners	WD	6	
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Разрез 2-2

формат / size A1

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Fig. arch. №
Date



СПЕЦИФИКАЦИЯ SPECIFICATION											
Марка Grade	Поз. Pos.	Сечение Cross-section	Кол. шт. Q-ty pcs	Длина, м Length m	Масса, кг Mass, kg			Марка или наим. стали Grade or name of steel	Примечание Note		
					шт. pcs.	общ. total	элемент. elem.				
Облицовка стенок Wall liners	1	t4	—	167,0	—	—	5244,0	08X18H10T	***		
	2	Гн. 3130x50x5 bent	—	146,0	—	—	1404,0	08X18H10T	**		
	3	~20x5	1014	0,5	0,4	405,6	405,6	C245			
	4	~100x3	—	195,0	—	—	460,0		**		
	5	Гн. L 70x40x5 bent	—	7,5	—	—	32,4		**		
	6*	Гн. L 130x50x5 bent	39	0,86	8,27	—	323,0		**		
	7	Гн. L 130x50x5 bent	—	7,8	—	—	75,0	08X18H10T	**		
	8	Гн. L 100x25x5 bent	—	13,9	—	—	82,0		**	See item 4	
	9	~25x5	84	0,09	—	—	7,4				
	10	Гн. L 25x30x5 bent	—	0,42	—	—	0,9		**		
	16	~3x100	7	0,38	—	—	6,3				
	18	~3x100	2	0,17	—	—	0,4				
	1	Гн. Ø 21,3x2,6 pipe Ø 21,3x2,6	3	10,3	12,4	37,2					
	2	Гн. Ø 21,3x2,6 pipe Ø 21,3x2,6	27	0,05	0,1	2,7	38,2				
	3	~80x3	3	0,08	0,1	0,3					
	1	Гн. Ø 21,3x2,6 pipe Ø 21,3x2,6	1	12,4	15,0	15,0					
	2	Гн. Ø 21,3x2,6 pipe Ø 21,3x2,6	8	0,05	0,1	0,8	15,9				
	3	~80x3	1	0,08	0,1	0,1					
	1	Гн. Ø 21,3x2,6 pipe Ø 21,3x2,6	1	13,8	16,6	16,6					
	2	Гн. Ø 21,3x2,6 pipe Ø 21,3x2,6	9	0,05	0,1	0,9	17,6				
	3	~80x3	1	0,08	0,1	0,1					
*** — Общая площадь, м² Total area, m²											
** — Общая длина, м Total length, m											

- 1 В марках Pp1, Pp2 и Pp3 выполнить отверстия Ø8 мм с шагом 200 мм в шахматном порядке.
2 Работать совместно с листами 4...9.
3 Размеры со * — уточняются при разработке чертежей КМД.
4 Перед монтажом облицовки все элементы должны быть очищены от монтажной пены, бетона и мусора.
- 1 The holes Ø8 mm shall be carried out in elements Pp1, Pp2 and Pp3 with a spacing of 200 mm in staggered order.
2 To work along with sheets 4...9.
3 * — Size is specified on Shop drawings design stage.
4 Prior to erection of sealing liner, all elements shall be cleaned of remnants of polyurethane foam, concrete and foul.

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Rev. N	pat. Sheet	Doc. No	Signature
Умбегуа	Approved	Kovalkin	
Н. комп.	Inspector	Subodetskaya	
Разработ	Designed	Pavlova	
Разделы 5-5, 6-6 Sections 5-5, 6-6		Package Number 3 8 2 109 File: R01.KK34.30UJA.O.KM.OK.WD010_008=0	
R01.KK34.30UJA.O.KM.OK.WD010		AЭС "КУДАНКУЛАМ" БЛОК 3 NPP "KUDANKULAM" UNIT 3	
30UJA. Реакторное здание. Облицовка бассейна выдержки го отм.+31,700. 30UJA. Reactor building. Fuel pool lining up to el. +31,700.		Облицовка стен Wall liners	
Phase		Sheet	
WD		8	
JSC "Atomenergoproekt" Moscow 2017		формат / size A1	

8-8 (3, 4)

СПЕЦИФИКАЦИЯ
SPECIFICATION

Марка Grade	Поз. Pos.	Сечение Cross-section	Кол. шт. D=10, pcs	Длина, м Length m	Масса, кг Mass, kg		Марка или наим. стали Grade or name of steel	Примечание Note	
					шт. pcs.	общ. total			
Общая длина Total length	1	14		164,0	—	—	5150	08Х18Н10Т	***
	2	Гн. 3130х50х5 bent		250,0	—	—	1100,0		**
	3	—20х5 —100х3	1244	0,5	0,4	337,6	337,6	C245	
	6	□ 130х50х5 bent	39	0,86	8,27	—	340,0	08Х18Н10Т	**
	7	□ 130х50х5		12,8	—	—	123,2		**
	7	□ 130х50х5		7,1	—	—	68,3		**
	8	Гн. С 100х25х5 bent		13,1	—	—	77,2		**
	9	—25х5	79	0,09	—	—	7,0		See item 3
	10	Гн. L 25х30х5 bent		0,9	—	—	2,0		**
	*** — Общая площадь, м² Total area, m²								
** — Общая длина, м Total length, m									

- 1 Работать совместно с листами 4...9.
- 2 Размеры со * - уточняются при разработке чертежей КМД.
- 3 Перед монтажом облицовки все элементы должны быть очищены от монтажной пены, бетона и мусора.

- 1 To work along with sheets 4...9.
- 2 * - Size is specified on Shop drawings design stage.
- 3 Prior to erection of sealing liner, all elements shall be cleaned of remnants of polyurethane foam, concrete and foul.

Package Number 3 8 2 109

File: R01 KK34 30UJA 0 KM OK WD010_009=0

R01.KK34.30UJA.0.KM.OK.WD010

АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT	3
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300UA. Реакторное здание. Облицовка бассейна выдержки до отм.+31,700.	Стация	Лист	Листов
Облицовка стен			

ite 300JA. Reactor building. Fuel pool lining up to el. +31,700. Wall liners	Phase	Sheet	Sheets
	WD	9	

Разрезы 7-7, 8-8.
Sections 7-7, 8-8

формат / size A1

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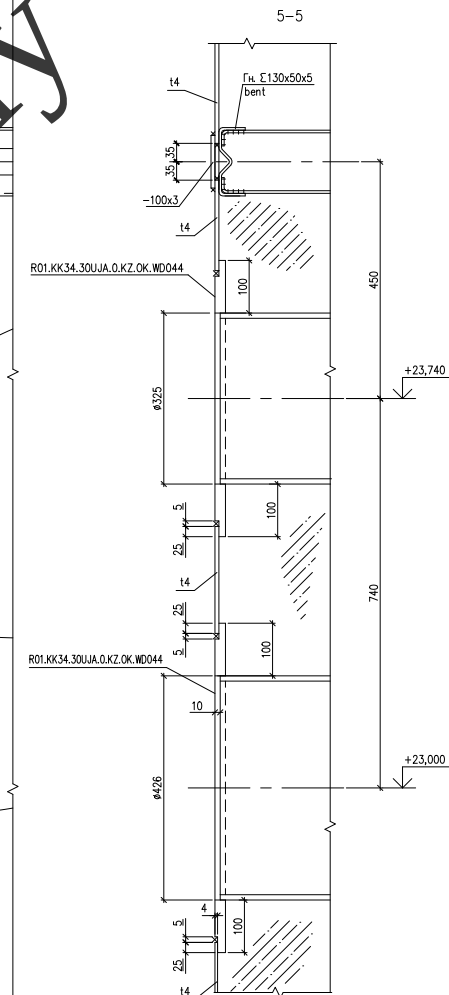
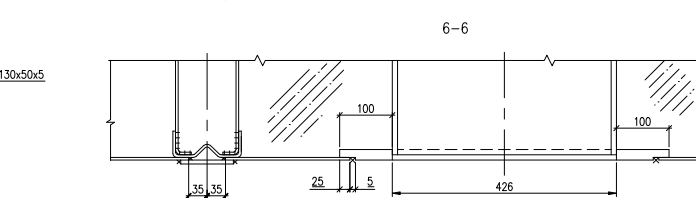
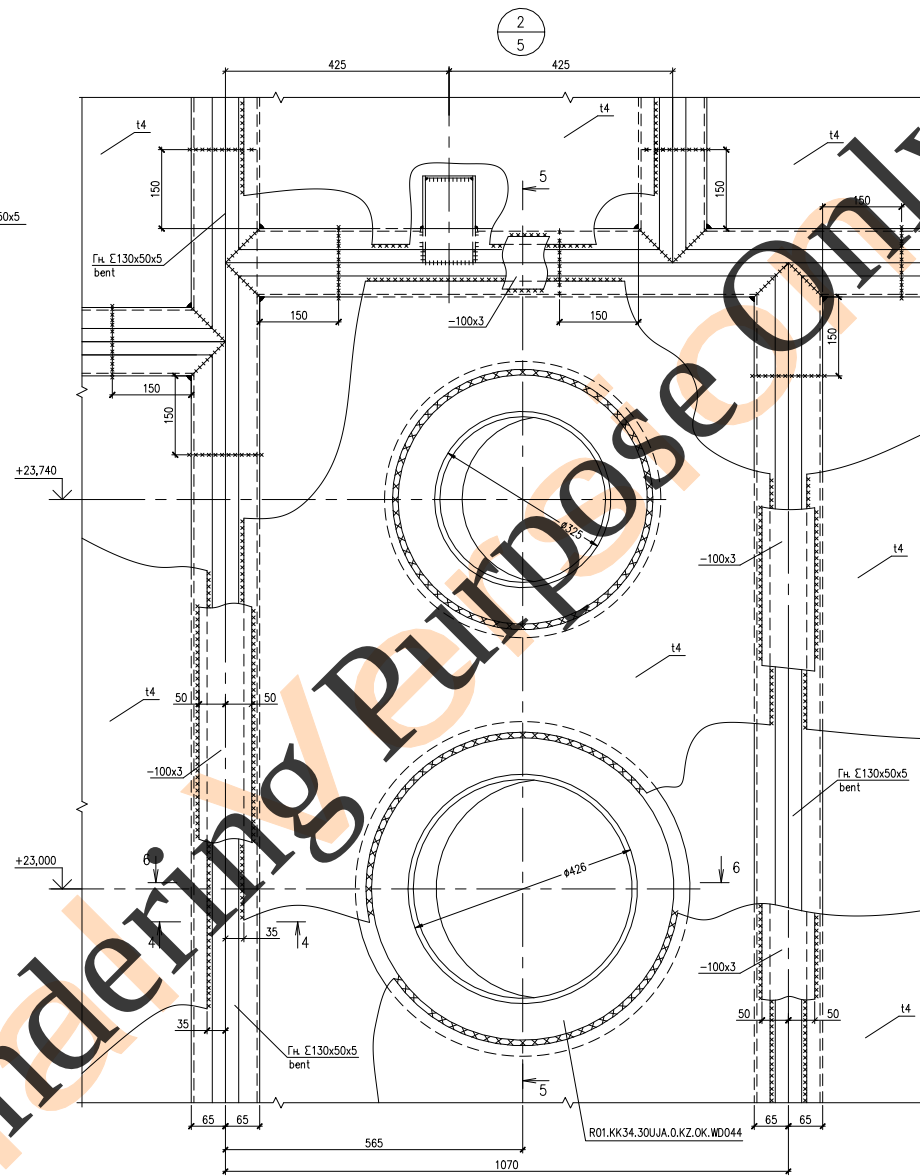
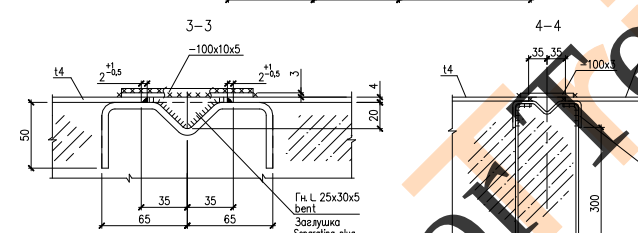
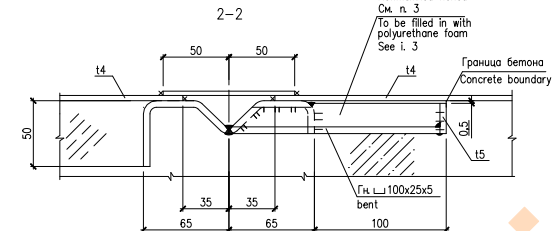
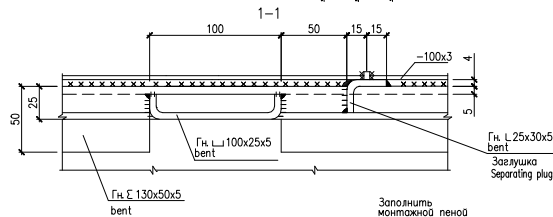
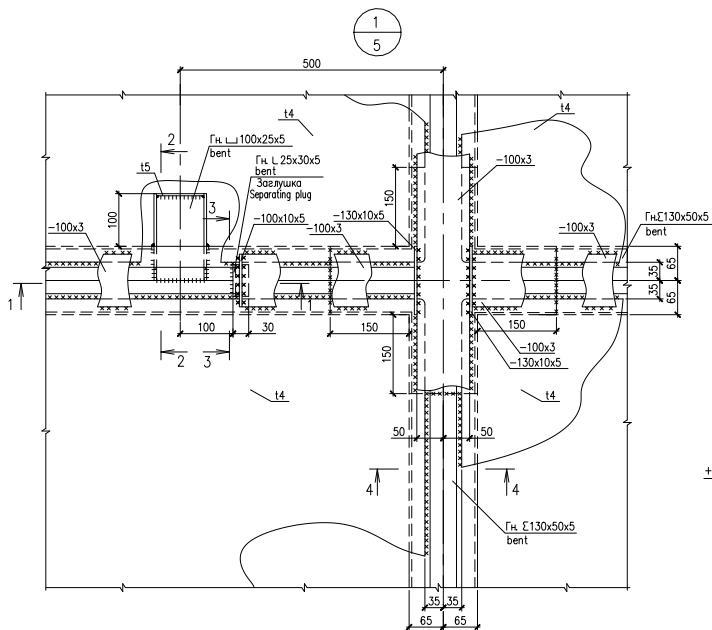
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организациям и лицам
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"Атомэнергоспроект"

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Разрезы 7-7, 8-8.



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Moscow 2017



- 1 Стыковые швы зачистить заподлицо с основным металлом.
- 2 Сварные соединения облицовки стен и изоляционных элементов аргоновой сваркой по ГОСТ 14771-76.
- 3 Перед монтажом облицовки все элементы должны быть очищены от монтажной пены, бетона и мусора.

- 1 Butt joints shall be flush cleaned with base metal.
- 2 Cover strips shall be welded to the lining of walls using argon-arc welding as per GOST 14771-76.
- 3 Prior to erection of sealing liner, all elements shall be cleaned of remnants of polyurethane foam, concrete and foul.

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Изм.	N	уч.	Лист	N	гос.	Получено	Дата
Rev.	N	pat.	Sheet	Doc.	No	Signature	Date
Умбергул							
Approved				Kovalkin			
Н. комп.				Siabodetskaya			
Inspector							
Разраб.							
Designed				Pavlova			

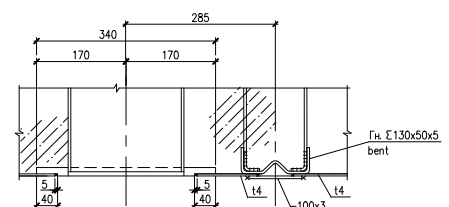
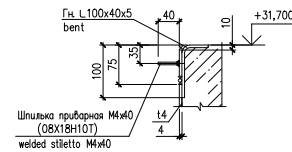
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АЭС "КУДАНКУЛАМ" БЛОК 3
NPP "KUDANKULAM" UNIT 3

30UJA. Реакторное здание. Облицовка бассейна выдержки до отк.+31,700.
Облицовка стен 30UJA. Reactor building. Fuel pool lining up to el. +31,700.
Wall liners

Уста 1, 2
Details 1, 2

JSC "Atomenergoproekt" Moscow 2017
формат / size A1

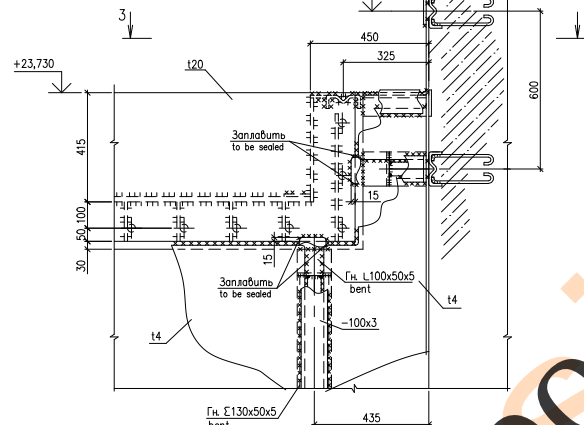
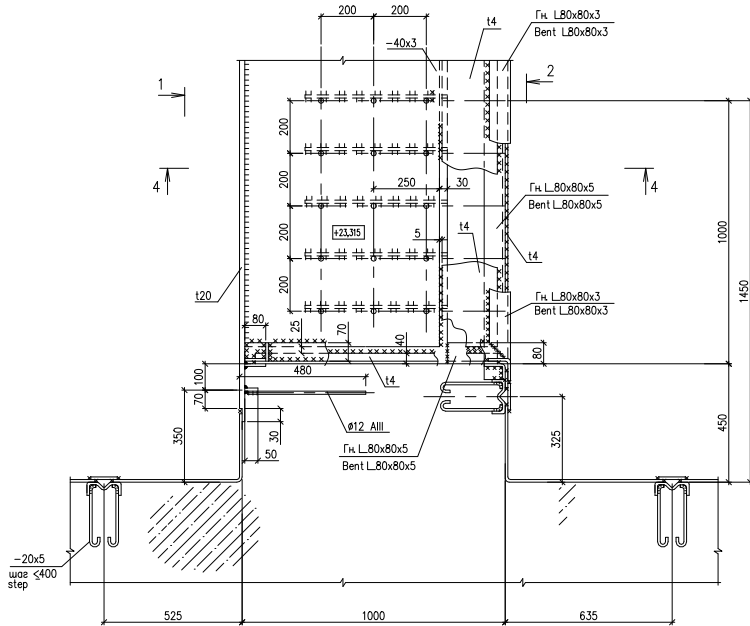


- 1 Butt joints shall be flush cleaned with base metal.
- 2 Cover strips shall be welded to the lining of walls using argon-arc welding as per GOST 14771-76.

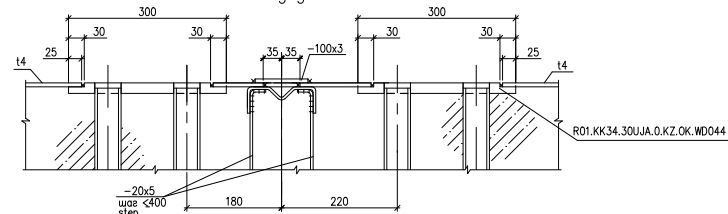
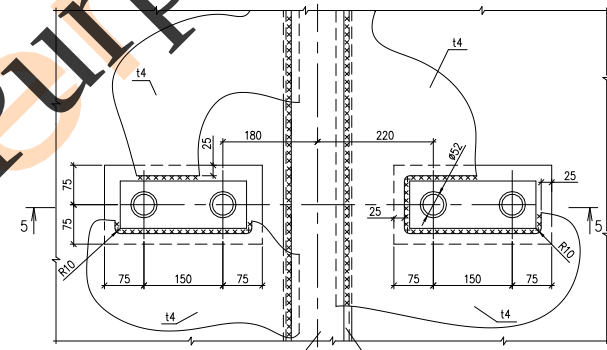
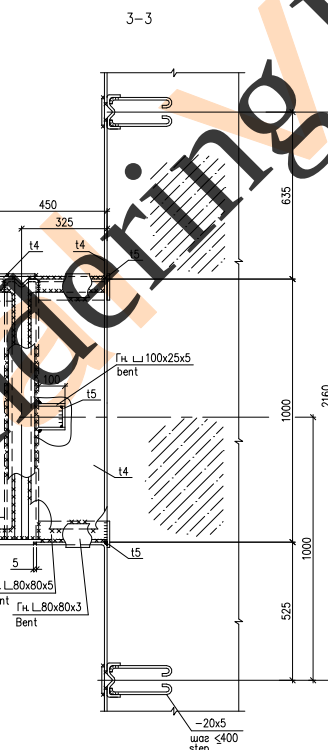
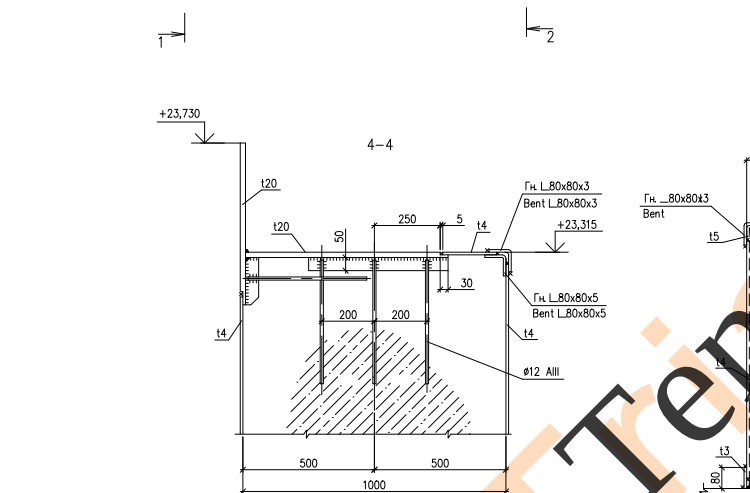
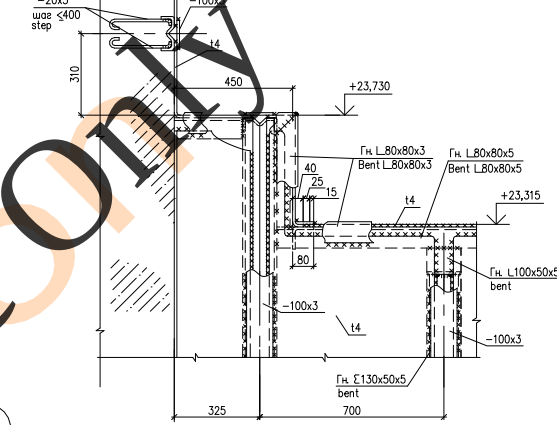
7
4

1-1

2-2



8
6



1 Стыковые швы должны быть зачищены до чистого металла.
2 Сварные соединения облицовки стен и нащельников
выполнять аргонодуговой сваркой по ГОСТ 14771-76.

1 Butt joints shall be flush cleaned with base metal.
2 Cover strips shall be welded to the lining of walls using
argon-arc welding as per GOST 14771-76.

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Package Number 3 8 2 109
File: R01.KK34.30UJA.0.KM.OK.WD010_012=0

R01.KK34.30UJA.0.KM.OK.WD010

АЭС "КУДАНКУЛАМ" БЛОК 3
NPP "KUDANKULAM" UNIT 3

30UJA. Реакторное здание. Облицовка
бассейна выдержки до отк.+31,700.
30UJA. Reactor building. Fuel pool
lining up to el. +31,700.
Облицовка стен
Wall liners

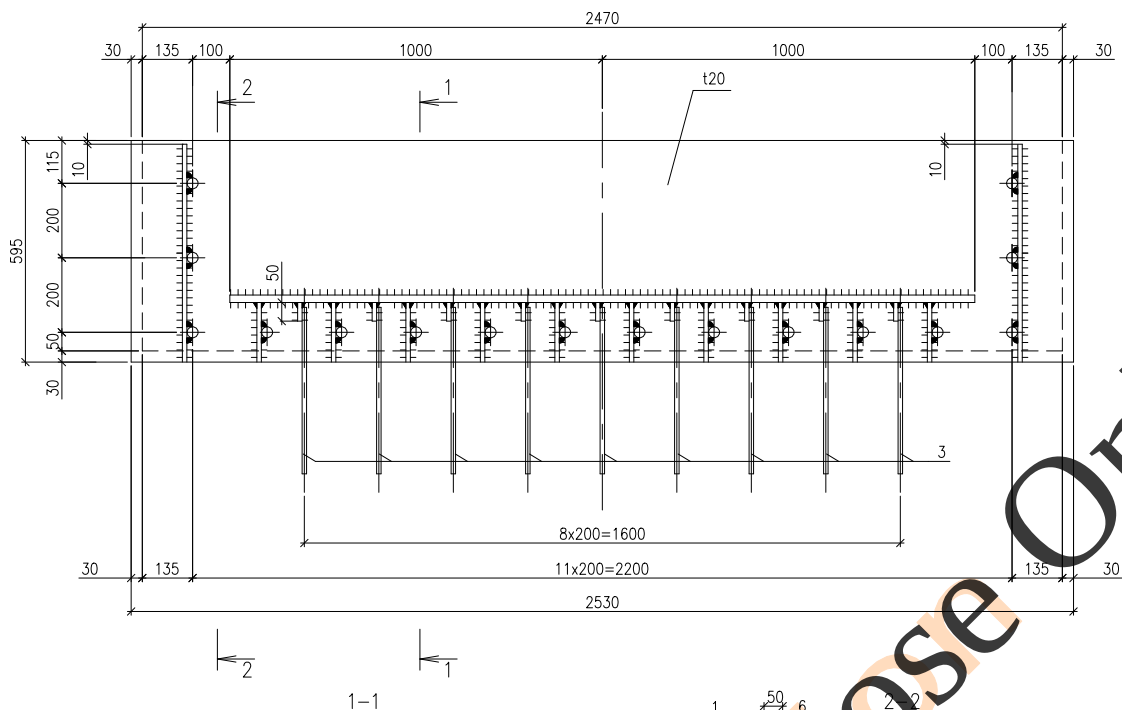
Узлы 7, 8
Details 7, 8

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Moscow 2017

формат / size A1

Изм.	№	уч.	Лист	№	гос.	Получено	Дата
Rev.	N	pat.	Sheet	Doc.	No	Signature	Date
Умвер.	Approved	И. комп.	Inspector	Subodetskaya			
Разраб.	Designed	Павлова					

EP1



СПЕЦИФИКАЦИЯ
SPECIFICATION

Марка изг. Mark of item	Поз. Pos.	Наименование Name	Кол. Q	Масса ед. изг. Mass unit, kg
EP1	1	t20 Ø8X18H10T ГОСТ 7350-77 Ø8X18H10T GOST 7350-77	595x2530	226,3
	2	t20 Ø8X18H10T ГОСТ 7350-77 Ø8X18H10T GOST 7350-77	760x1000	238,6
	3	Ø12 AIII ГОСТ 5781-81 Ø12 AIII GOST 5781-81	16x480	0,5
	4	t6 C245 ГОСТ 14637-89 C245 GOST 14637-89	530x50	1,3
	5	t6 C245 ГОСТ 14637-89 C245 GOST 14637-89	160x50	0,4
	6	t6 C245 ГОСТ 14637-89 C245 GOST 14637-89	585x50	1,4
		Наплавленный металл Deposited metal	1%	5,0

ВЕДОМОСТЬ ПОТРЕБНОСТИ МАРК
LIST OF REQUIREMENT TO MANUFACTURE OF MARKS

Марка Mark	Количество, шт. Quantity, pcs.	Масса, кг Mass, kg		Примечание Notes
		Марки Marks	Всего Total	
1	2	3	4	5
EP1	1	501,4	501,4	

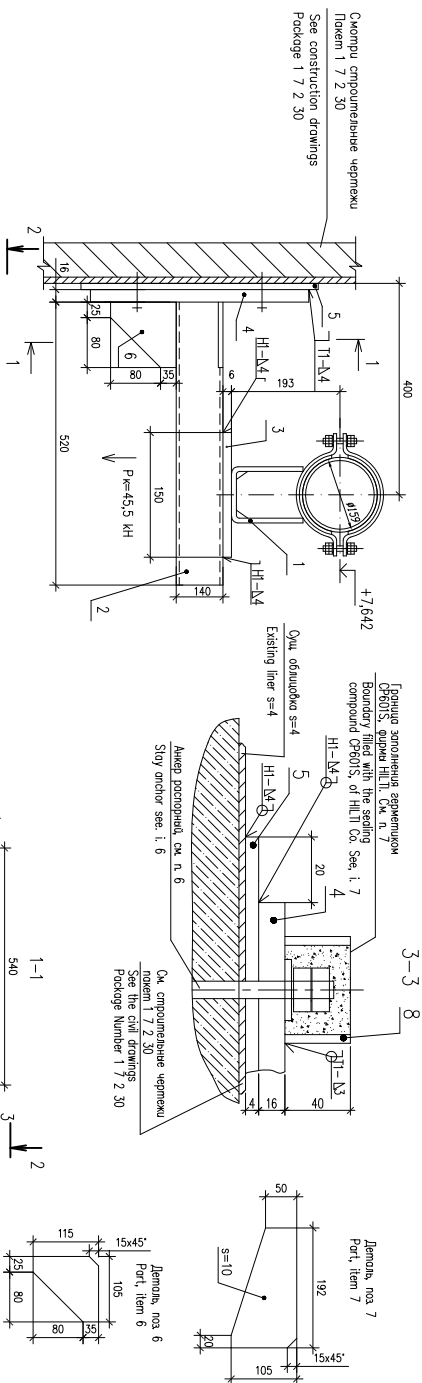
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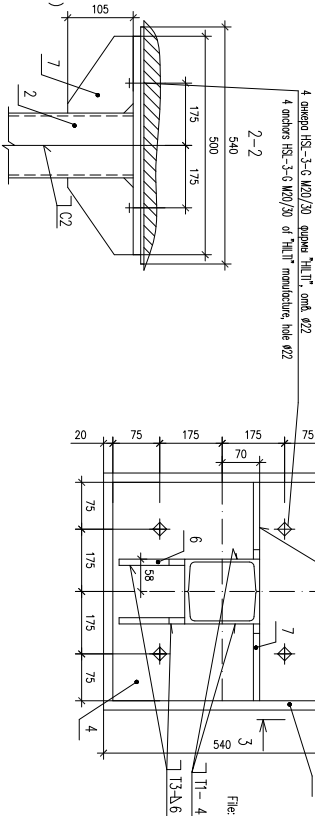
R01.KK34.30UJA.0.KM.OK.WD010						3		
АЭС "КУДАНКУЛАМ" БЛОК NPP "KUDANKULAM" UNIT						3		
30UJA. Реакторное здание. Облицовка бассейна выдержки до отм.+31,700. Облицовка стен 30UJA. Reactor building. Fuel pool lining up to el. +31,700. Wall liners						Стадия Phase	Лист Sheet	Листов Sheets
Закладная деталь ЭП1. Embedded part EP1						WD	14	
Изм. N уч. Лист N гок. Погнись Дата Rev. N pat. Sheet Doc. No Signature Date Умвергил Approved Н. комп. Inspector Разраб. Designed						JSC "Atomenergoproekt" Moscow 2017		

СПЕЦИФИКАЦИЯ SPECIFICATION

[illegible]

- 1 For the location of the supports see mounting-assembly drawing sheet 10.
- 2 Welding is performed as per CEN 5264-B0.
- 3 The control scope of welds – visual and measuring – 100 %.
- 4 The sliding surface shall be cleaned and polished by gritblasting.
- 5 After installation of the stay anchor fill the space with the sealing compound CP801S, of Hilti Co.
- 6 The depth of the anchor seating fit it is to be assumed based on the thickness of the fixed part equal 24 mm.

For methods and criteria scope of welds to coating see drawings R07KK-2 UUL-DKMK-MDD06 (Package Number 1 6 2 33; sheet 2; item 11) R07KK-2, mechanism 1 set.



Package Number 1 13 6 5
UJA JND10 TM OK WD003_022=

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ОБЩИЕ УКАЗАНИЯ
работаны в соответствии с нормами, приложениями и

стандартами РФ.

1 Рабочие чертежи разработаны в соответствии с нормами, применимыми к станкам.

2 При установке, монтаже и креплении оборудования соблюдать требования ВСН 361-85, СНиП 3.05.05-84, СНиП 2.09.03-85.

3 Технические требования, выходящие требования по надежности, конструктивные особенности, требования к материалам, изготовлению, сборке и окраске, консервации и упаковке, комплектности, пробная приемка и летотестирование, транспортирование и хранение, а также указания по эксплуатации, представлены в заводской документации.

GENERAL GUIDELINES

1 The working drawings have been developed in compliance with RF standards.

2 When installing, mounting and fastening the equipment, the requirements of VSN 361-85, SNIP 3.05.05-84, SNIP 2.09.03-85 shall be followed.

3 Technical requirements, including requirements on reliability,

GENERAL GUIDELINES

- 1 The working drawings have been developed in compliance with RF codes, regulations and standards.
- 2 When installing, mounting and fastening the equipment, the requirements of VSN 361-85, SNIP 3.05.05-84, SNIP 2.09.03-85 shall be followed.
- 3 Technical requirements, including requirements on reliability, structural peculiarities, requirements to materials, manufacturing, assembly and painting, conservation and packaging, completeness of sets, acceptance rules and testing procedures, transportation and storage, as well as operation instructions are given in the factory documentation.

СХЕМА РАСПОЛОЖЕНИЯ

The Key Plan shows the layout of the structure with the following dimensions and grid lines:

- Grid Lines:** 1, 2, 4, 5 (horizontal) and A, B, C, D, E, F (vertical).
- Overall Dimensions:**
 - Horizontal: 15000 (left of grid 1), 42000 (between grid 1 and 2), 15000 (right of grid 2).
 - Vertical: 21000 (between grid E and F), 24000 (between grid C and D), 42000 (between grid A and B), 1050 (between grid B and C).
- Structural Features:**
 - A circular structure labeled 30UL4 is centered between grid lines A and B.
 - A rectangular structure labeled 30UL5 is located between grid lines 1 and 2, and grid lines E and F.
 - A rectangular structure labeled 30UL6 is located between grid lines 1 and 2, and grid lines D and E.
- Orientation:** A North arrow points towards the top right of the plan.
- Scale:** 1:1000.



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File: R01.KK34.30UKC.0.TM.OK.WD008_001=0



NUCLEAR POWER CORPORATION
OF INDIA LTD

BEZOMOST' PASYKH CHEPTENEN OCHOBOHO KOMPAKTA
LIST OF WORKING DRAWINGS OF THE MAIN SET



БЕДОМОСТЬ ССЫЛОЧНЫХ И ПРИНАДЛЕЖАЮЩИХ ДОКУМЕНТОВ
LIST OF REFERENCE AND ATTACHED DOCUMENTS

[illegible]

26	30KUE70AT001	Kempe orlope prod/ Sampling chamber
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[illegible]

GENERAL GUIDELINES

27	Metastandovaya vopros komepy otbora nrod 30KLE70A1001 Installation drawing of sampling chamber 30KLE70A100
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БЕДОМОСТЬ ССЫЛАЮЩИХ И ПРИЛАГАЕМЫХ ДОКУМЕНТОВ
LIST OF REFERENCE AND ATTACHED DOCUMENTS

Observation Part 1 on	Household Name	Household No.
MOI, KCSA, SHAC, O, TN, SD, VIMBO	Chunguunzua obidigwaba, Specialization of equi parent, sons and sisters etc	

GENERAL GUIDELINES

1. The working drawing have been developed in compliance with the codes, regulations and standards.
2. When installing, mounting and fastening the equipment, the requirements of EN 361-05, SIF 2, EN 361-04, SIF 2, EN 361-05 shall be followed.
3. Technical requirements, including requirements on reliability, structural, special (e.g., requirements to materials, manufacturing, assembly and painting, conservation and packaging, completeness of sets, acceptance tests and testing procedures, transportation and storage, as well as operation instructions) are given in the factory documentation.

[illegible]

Rank	Project Name	Investment Amount	Percentage of Total
1	Project A: Development of a new software platform for data analytics.	\$1,200,000	20.0%
2	Project B: Expansion of manufacturing facilities in the Midwest region.	\$950,000	15.8%
3	Project C: Research and development of a new biotech product.	\$800,000	13.3%
4	Project D: Acquisition of a smaller company to diversify the product line.	\$750,000	12.5%
5	Project E: Upgrade of the company's IT infrastructure and cybersecurity.	\$600,000	10.0%
6	Project F: Launch of a new marketing campaign for the flagship product.	\$500,000	8.3%
7	Project G: Implementation of a new HR system to improve employee productivity.	\$450,000	7.5%
8	Project H: Development of a new line of eco-friendly consumer products.	\$400,000	6.7%
9	Project I: Expansion of the company's presence in the Asian market.	\$350,000	5.8%
10	Project J: Research and development of a new sustainable packaging solution.	\$300,000	5.0%
11	Project K: Upgrade of the company's fleet of delivery vehicles.	\$250,000	4.2%
12	Project L: Implementation of a new quality control system.	\$200,000	3.3%
13	Project M: Development of a new mobile app for customer engagement.	\$180,000	3.0%
14	Project N: Expansion of the company's presence in the European market.	\$150,000	2.5%
15	Project O: Upgrade of the company's website and digital marketing strategy.	\$120,000	2.0%
16	Project P: Development of a new line of sustainable packaging.	\$100,000	1.7%
17	Project Q: Expansion of the company's presence in the Latin American market.	\$90,000	1.5%
18	Project R: Implementation of a new HR system to improve employee productivity.	\$80,000	1.3%
19	Project S: Development of a new line of eco-friendly consumer products.	\$70,000	1.2%
20	Project T: Expansion of the company's presence in the Asian market.	\$60,000	1.0%
21	Project U: Research and development of a new sustainable packaging solution.	\$50,000	0.8%
22	Project V: Upgrade of the company's fleet of delivery vehicles.	\$40,000	0.7%
23	Project W: Implementation of a new quality control system.	\$30,000	0.5%
24	Project X: Development of a new mobile app for customer engagement.	\$20,000	0.3%
25	Project Y: Expansion of the company's presence in the European market.	\$10,000	0.2%
26	Project Z: Upgrade of the company's website and digital marketing strategy.	\$5,000	0.1%
27	Project AA: Development of a new line of sustainable packaging.	\$5,000	0.1%
28	Project AB: Expansion of the company's presence in the Latin American market.	\$5,000	0.1%
29	Project AC: Implementation of a new HR system to improve employee productivity.	\$5,000	0.1%
30	Project AD: Development of a new line of eco-friendly consumer products.	\$5,000	0.1%
31	Project AE: Expansion of the company's presence in the Asian market.	\$5,000	0.1%
32	Project AF: Research and development of a new sustainable packaging solution.	\$5,000	0.1%
33	Project AG: Upgrade of the company's fleet of delivery vehicles.	\$5,000	0.1%
34	Project AH: Implementation of a new quality control system.	\$5,000	0.1%
35	Project AI: Development of a new mobile app for customer engagement.	\$5,000	0.1%
36	Project AJ: Expansion of the company's presence in the European market.	\$5,000	0.1%
37	Project AK: Upgrade of the company's website and digital marketing strategy.	\$5,000	0.1%
38	Project AL: Development of a new line of sustainable packaging.	\$5,000	0.1%
39	Project AM: Expansion of the company's presence in the Latin American market.	\$5,000	0.1%
40	Project AN: Implementation of a new HR system to improve employee productivity.	\$5,000	0.1%
41	Project AO: Development of a new line of eco-friendly consumer products.	\$5,000	0.1%
42	Project AP: Expansion of the company's presence in the Asian market.	\$5,000	0.1%
43	Project AQ: Research and development of a new sustainable packaging solution.	\$5,000	0.1%
44	Project AR: Upgrade of the company's fleet of delivery vehicles.	\$5,000	0.1%
45	Project AS: Implementation of a new quality control system.	\$5,000	0.1%
46	Project AT: Development of a new mobile app for customer engagement.	\$5,000	0.1%
47	Project AU: Expansion of the company's presence in the European market.	\$5,000	0.1%
48	Project AV: Upgrade of the company's website and digital marketing strategy.	\$5,000	0.1%
49	Project AW: Development of a new line of sustainable packaging.	\$5,000	0.1%
50	Project AX: Expansion of the company's presence in the Latin American market.	\$5,000	0.1%



**NUCLEAR POWER CORPORATION
OF INDIA LTD**

00
B01 K734 301K3 0 TH OK WIND03

NOI.KKJ4:J00KC.V.1MI.VK.MDOUZ
A3C /K119AIK114AM/ FAKK

BAUK 3
K9JAHK9AAM-
M3L
MPP 'KIDANKILL AM'
UNIT

NAME	DATE	REMARKS
...	...	...

Итого	Множ	Всего
Итого	Множ	Всего

	SHEET	PIANO	SMALL
Installation drawings of equipment			

et al 1991	1991	1
------------	------	---

Other losses	JSC
From the structure -3,529	AKA Abanico

General data
Plan view at elevation -2.63
Moscow 2

ПЛАН НА ОТМЕТКЕ -8,050
PLAN VIEW AT ELEVATION -8,050

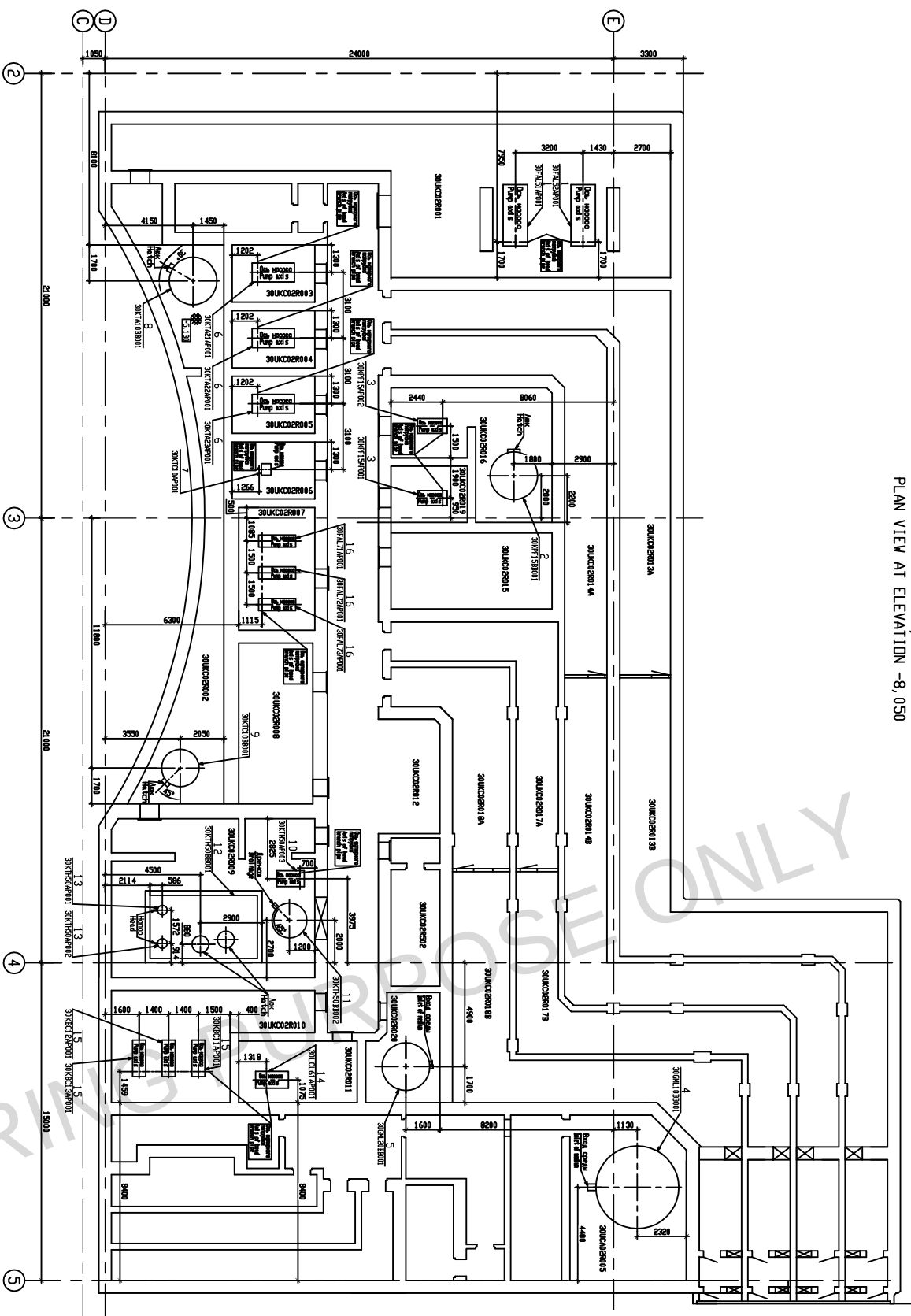
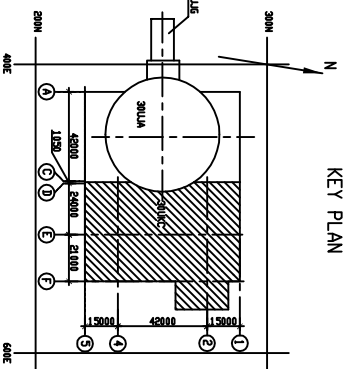


СХЕМА РАСПОЛОЖЕНИЯ
KEY PLAN



ПЕРЕЧЕНЬ ОБОРУДОВАНИЯ
LIST OF EQUIPMENT

Pos. Pos.	Материал Material	Назначение Name	Длина Length m, m	Примечание Note
1	30K7.SI.DB001 30K7.SI.DB001	Насос заливной ёмкости баппаса Fuel tank filling pump	-8,050	Длина шв. 2 Шв. sheet 2
2	30K7.SI.DB001 30K7.SI.DB001	Система откачки воды из баппаса Water draining system	-8,050	Длина шв. 3 Шв. sheet 3
3	30K7.SI.DB001 30K7.SI.DB001	Насос баппаса Baппasa pump	-8,050	Длина шв. 4 Шв. sheet 4
4	30K7.SI.DB001 30K7.SI.DB001	Бок для откачки воды из баппаса Water draining box	-8,050	Длина шв. 15 Шв. sheet 15
5	30K7.SI.DB001 30K7.SI.DB001	Бок для откачки воды из баппаса Water draining box	-8,050	Длина шв. 16 Шв. sheet 16
6	30K7.SI.DB001 30K7.SI.DB001	Фильтр воды баппаса Water filter	-8,050	Длина шв. 6 Шв. sheet 6
7	30K7.SI.DB001 30K7.SI.DB001	Насос баппаса баппаса Baппasa pump	-8,050	Длина шв. 8 Шв. sheet 8
8	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 5 Шв. sheet 5
9	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 7 Шв. sheet 7
10	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 9 Шв. sheet 9
11	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 10 Шв. sheet 10
12	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 11 Шв. sheet 11
13	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 12 Шв. sheet 12
14	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 13 Шв. sheet 13
15	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 14 Шв. sheet 14
16	30K7.SI.DB001 30K7.SI.DB001	Помпа для баппаса баппаса Baппasa pump	-8,050	Длина шв. 17 Шв. sheet 17

ВЕДОМОСТЬ РАБОЧИХ ЧЕРТЕЖЕЙ ОСНОВНОГО КОМПЛЕКТА
LIST OF WORKING DRAWINGS OF THE MAIN SET

[illegible]

СВЕДЕНИЯ И ПРИЛОЖЕНИЯ
LIST OF REFERENCE AND ATTACHED DOCUMENTS

Обозначение Designation	Наименование Name	Примечание Note
Р01 КСЗ4. ЗОУДС. В. ТН. СИ. УП001	Прикрепление документов Attached documents	
	Описанием оборудования, механизмов и компонентов Specification of equipment, mechanisms and components	

ОБЩИЕ УКАЗАНИЯ

1) Роль чертежа разработана в соответствии с нормами, предписаниями и стандартами РФ.

2) При установлении норматив и цены на оборудование следует:

а) при установлении норматива, выходящего за пределы нормативов, действующих в настоящее время, проводить анализ существующих нормативов, применяемых в настоящее время, и определять необходимость установления нормативов, превышающих действующие, с учетом особенностей производства, технологии, применяемых материалов, оборудования, транспортных средств и хранения, а также указания на эксплуатацию оборудования в заводских документах.

GENERAL GUIDELINES

1. The lifting drawings have been developed in compliance with BS codes, regulations and standards.
2. When installing, mounting and fastening the equipment, the requirements of VSI 361-95, SNiP 3.05-05-94, SNiP 3.05-05-95 shall be followed.
3. Technical requirements, including requirements on reliability, structural peculiarities, requirements to accessories, manufacturing, assembly and painting, conservation and prolonging, completeness of sets, acceptance tests and testing procedures, transportation and storage, as well as operation instructions are given in the factory documentation.

Package Number 3 8 6 10



**NUCLEAR POWER CORPORATION
OF INDIA LTD.**

File: R01_KK34_30UKC_0_TM_OK_WD001_001=C

При переводе в состав
документа (лист графика)
следует указать авторское
обозначение, приданное
в основной надписи

Долгий чертёж
поддерживает различие
или переводит другие
организации и ли
без согласия Ад
"Аммонерпропел"

Not yet	Run	in	gen.	logrus	Jan
by pers.	Doc	Sheet	to	Signature	Dot
Unofficial Approved	Kits				
H. seim.	Tony				
Inspector					
Passport	Korzhonov				

R01.KK34.30UKC.0.TM.OK.WD001	A3C 'KYJAHKBYAM' EAK 3 NPP 'KUDANKULAM' UNIT 3 SUOLC Korotkova, Yegorova, Olegovich no other SWAGS - 0-020 no other SWAGS of equipment at external - 0-020	Chengam Phase Shells Shells	flum Shells Shells Shells	flum Shells Shells Shells
Other assets flum no other SWAGS - 0-020 General assets - 0-020	flum no other SWAGS - 0-020 General assets - 0-020	flum no other SWAGS - 0-020 General assets - 0-020	flum no other SWAGS - 0-020 General assets - 0-020	flum no other SWAGS - 0-020 General assets - 0-020

ПЛАН НА ОТМЕТКЕ -4,250
PLAN VIEW AT ELEV. -4,250

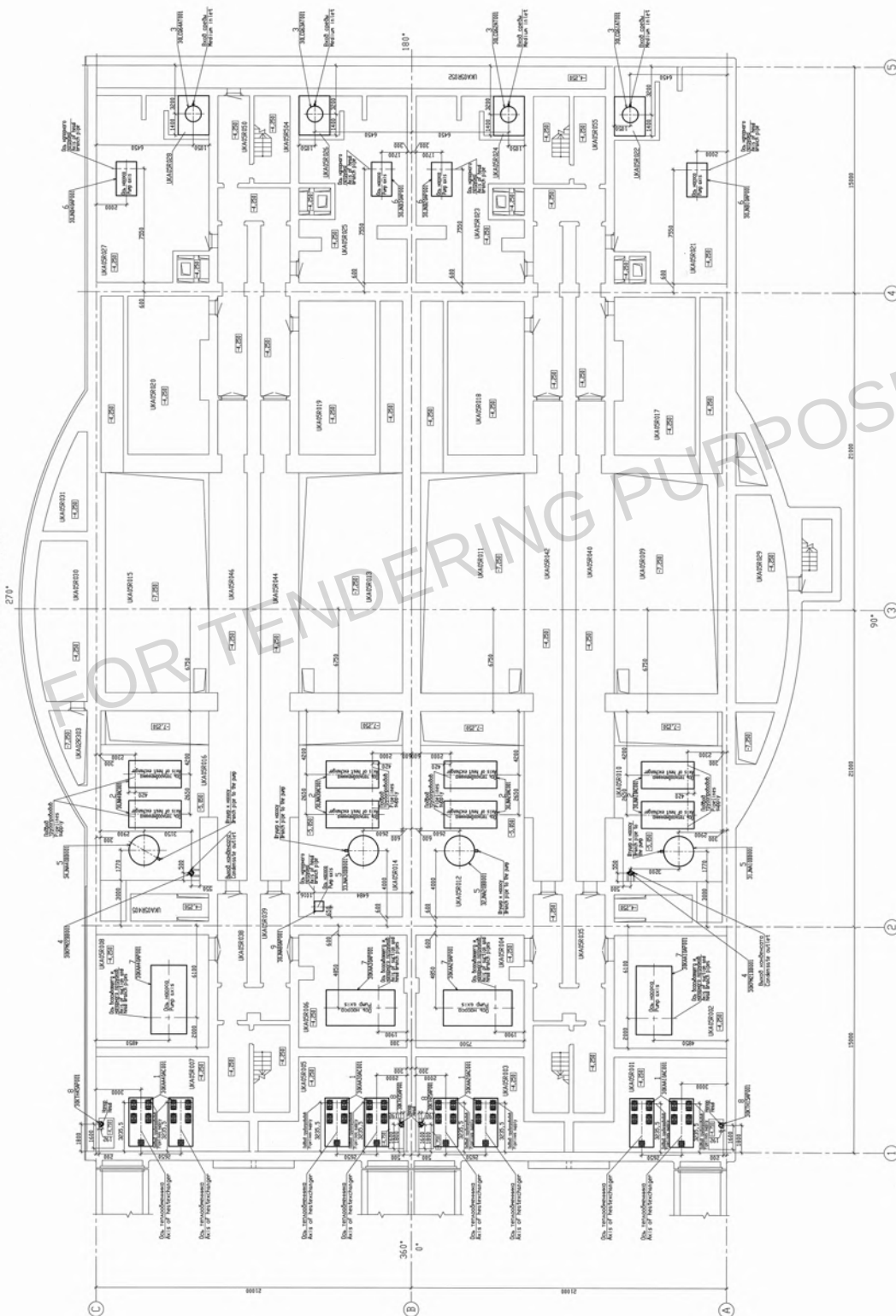
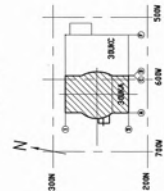


СХЕМА РАСПОЛОЖЕНИЯ
KEY PLAN



Test	Requirement	Normal mode	None	Time cost (min)	Time cost (min)
1	1.1	1.1	1.1	0.250	0.250
2	1.2	1.2	1.2	0.250	0.250
3	1.3	1.3	1.3	0.250	0.250
4	1.4	1.4	1.4	0.250	0.250
5	1.5	1.5	1.5	0.250	0.250
6	1.6	1.6	1.6	0.250	0.250
7	1.7	1.7	1.7	0.250	0.250
8	1.8	1.8	1.8	0.250	0.250
9	1.9	1.9	1.9	0.250	0.250
10	1.10	1.10	1.10	0.250	0.250
11	1.11	1.11	1.11	0.250	0.250
12	1.12	1.12	1.12	0.250	0.250
13	1.13	1.13	1.13	0.250	0.250
14	1.14	1.14	1.14	0.250	0.250
15	1.15	1.15	1.15	0.250	0.250
16	1.16	1.16	1.16	0.250	0.250
17	1.17	1.17	1.17	0.250	0.250
18	1.18	1.18	1.18	0.250	0.250
19	1.19	1.19	1.19	0.250	0.250
20	1.20	1.20	1.20	0.250	0.250
21	1.21	1.21	1.21	0.250	0.250
22	1.22	1.22	1.22	0.250	0.250
23	1.23	1.23	1.23	0.250	0.250
24	1.24	1.24	1.24	0.250	0.250
25	1.25	1.25	1.25	0.250	0.250
26	1.26	1.26	1.26	0.250	0.250
27	1.27	1.27	1.27	0.250	0.250
28	1.28	1.28	1.28	0.250	0.250
29	1.29	1.29	1.29	0.250	0.250
30	1.30	1.30	1.30	0.250	0.250
31	1.31	1.31	1.31	0.250	0.250
32	1.32	1.32	1.32	0.250	0.250
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34	1.34	1.34	1.34	0.250	0.250
35	1.35	1.35	1.35	0.250	0.250
36	1.36	1.36	1.36	0.250	0.250
37	1.37	1.37	1.37	0.250	0.250
38	1.38	1.38	1.38	0.250	0.250
39	1.39	1.39	1.39	0.250	0.250
40	1.40	1.40	1.40	0.250	0.250
41	1.41	1.41	1.41	0.250	0.250
42	1.42	1.42	1.42	0.250	0.250
43	1.43	1.43	1.43	0.250	0.250
44	1.44	1.44	1.44	0.250	0.250
45	1.45	1.45	1.45	0.250	0.250
46	1.46	1.46	1.46	0.250	0.250
47	1.47	1.47	1.47	0.250	0.250
48	1.48	1.48	1.48	0.250	0.250
49	1.49	1.49	1.49	0.250	0.250
50	1.50	1.50	1.50	0.250	0.250
51	1.51	1.51	1.51	0.250	0.250
52	1.52	1.52	1.52	0.250	0.250
53	1.53	1.53	1.53	0.250	0.250
54	1.54	1.54	1.54	0.250	0.250
55	1.55	1.55	1.55	0.250	0.250
56	1.56	1.56	1.56	0.250	0.250
57	1.57	1.57	1.57	0.250	0.250
58	1.58	1.58	1.58	0.250	0.250
59	1.59	1.59	1.59	0.250	0.250
60	1.60	1.60	1.60	0.250	0.250
61	1.61	1.61	1.61	0.250	0.250
62	1.62	1.62	1.62	0.250	0.250
63	1.63	1.63	1.63	0.250	0.250
64	1.64	1.64	1.64	0.250	0.250
65	1.65	1.65	1.65	0.250	0.250
66	1.66	1.66	1.66	0.250	0.250
67	1.67	1.67	1.67	0.250	0.250
68	1.68	1.68	1.68	0.250	0.250
69	1.69	1.69	1.69	0.250	0.250
70	1.70	1.70	1.70	0.250	0.250
71	1.71	1.71	1.71	0.250	0.250
72	1.72	1.72	1.72	0.250	0.250
73	1.73	1.73	1.73	0.250	0.250
74	1.74	1.74	1.74	0.250	0.250
75	1.75	1.75	1.75	0.250	0.250
76	1.76	1.76	1.76	0.250	0.250
77	1.77	1.77	1.77	0.250	0.250
78	1.78	1.78	1.78	0.250	0.250
79	1.79	1.79	1.79	0.250	0.250
80	1.80	1.80	1.80	0.250	0.250
81	1.81	1.81	1.81	0.250	0.250
82	1.82	1.82	1.82	0.250	0.250
83	1.83	1.83	1.83	0.250	0.250
84	1.84	1.84	1.84	0.250	0.250
85	1.85	1.85	1.85	0.250	0.250
86	1.86	1.86	1.86	0.250	0.250
87	1.87	1.87	1.87	0.250	0.250
88	1.88	1.88	1.88	0.250	0.250
89	1.89	1.89	1.89	0.250	0.250
90	1.90	1.90	1.90	0.250	0.250
91	1.91	1.91	1.91	0.250	0.250
92	1.92	1.92	1.92	0.250	0.250
93	1.93	1.93	1.93	0.250	0.250
94	1.94	1.94	1.94	0.250	0.250
95	1.95	1.95	1.95	0.250	0.250
96	1.96	1.96	1.96	0.250	0.250
97	1.97	1.97	1.97	0.250	0.250
98	1.98	1.98	1.98	0.250	0.250
99	1.99	1.99	1.99	0.250	0.250
100	2.00	2.00	2.00	0.250	0.250

ЛИСТ OF SHOP DRAWINGS OF THE MAIN SET

Serial Number	Statement/Issue	Note	Disposal Date
1	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
2	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
3	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
4	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
5	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
6	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
7	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
8	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018
9	Older Street	Older Street has been replaced by a new road. The old road is now a public area.	1/1/2018

ВЕДОМОСТЬ ССЫЛЧНЫХ И ПРИЛАГАЕМЫХ ДОКУМЕНТОВ
LIST OF REFERENCE AND ATTACHED
DOCUMENTS

[illegible]

ОБЩИЕ УКАЗАНИЯ

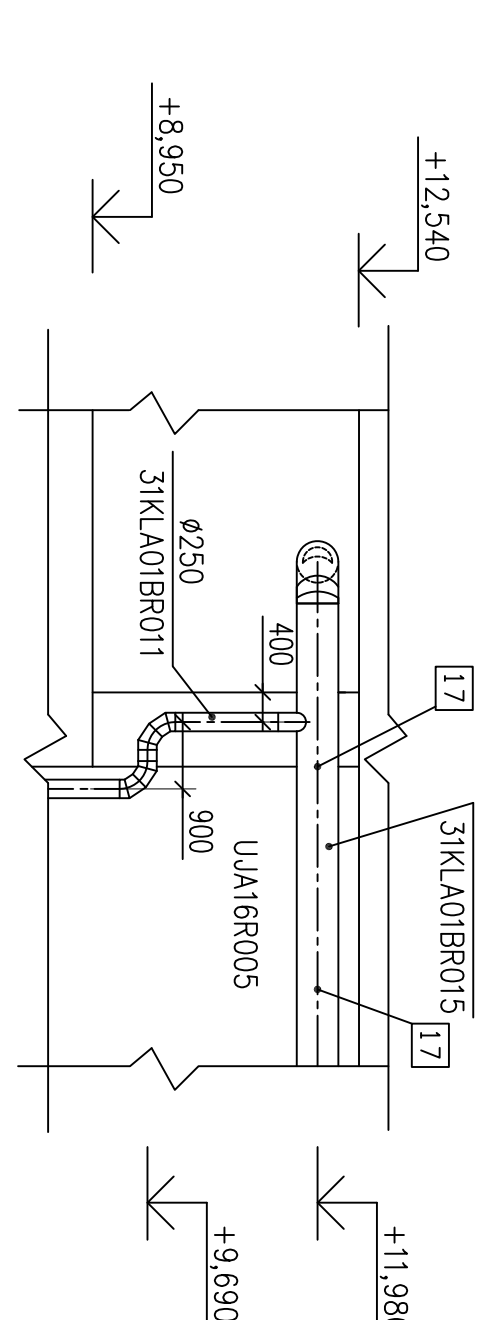
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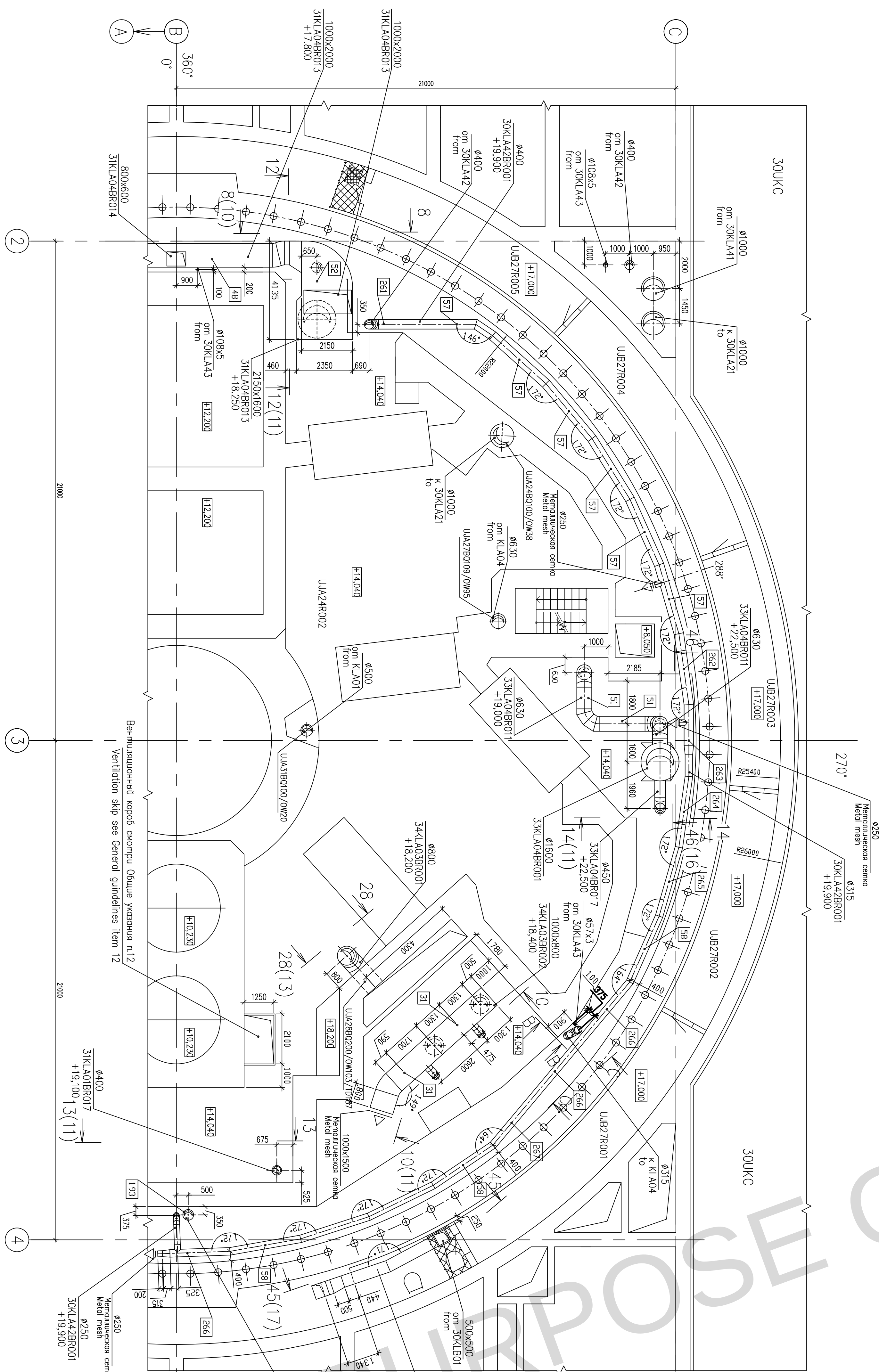
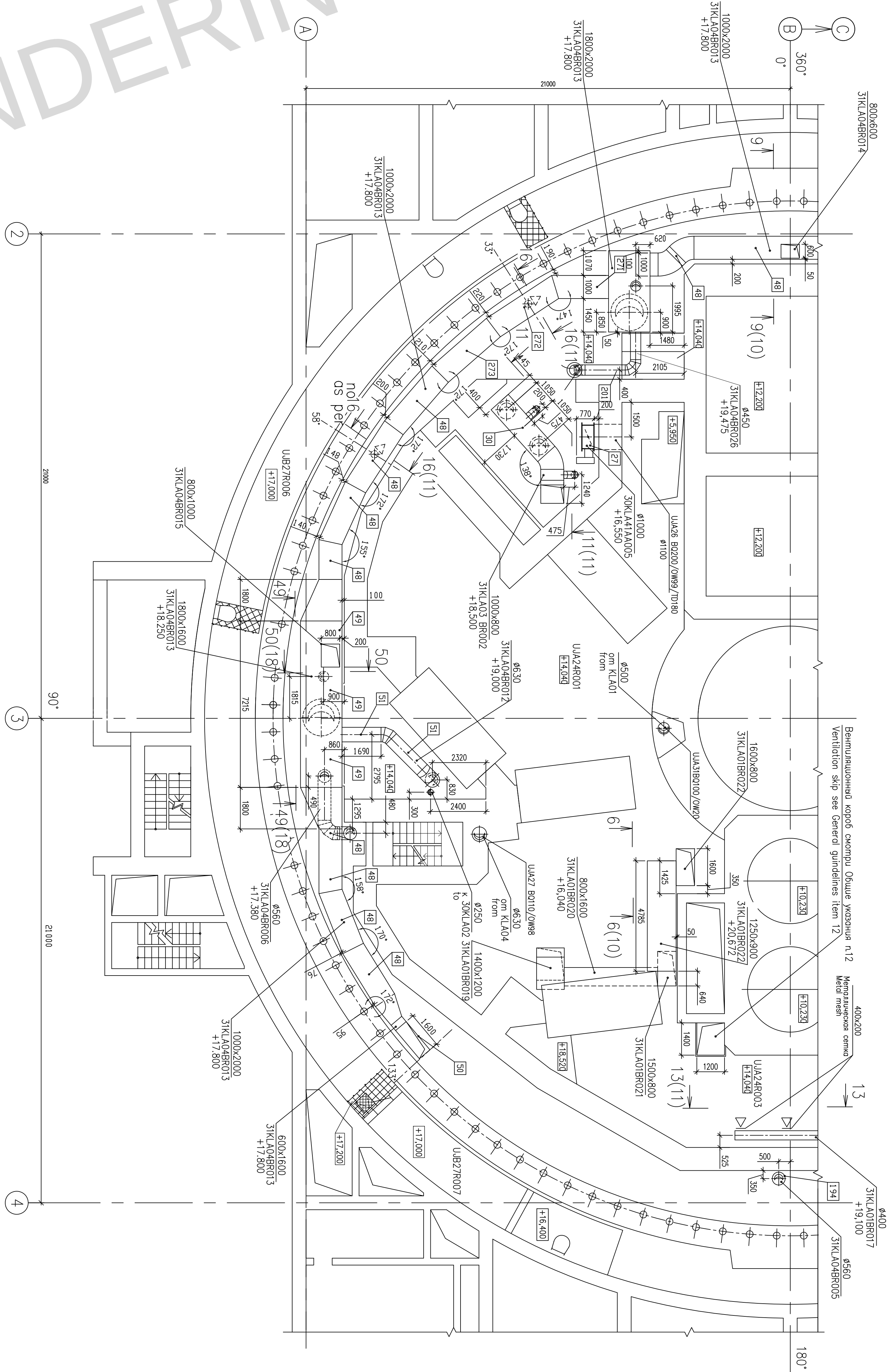
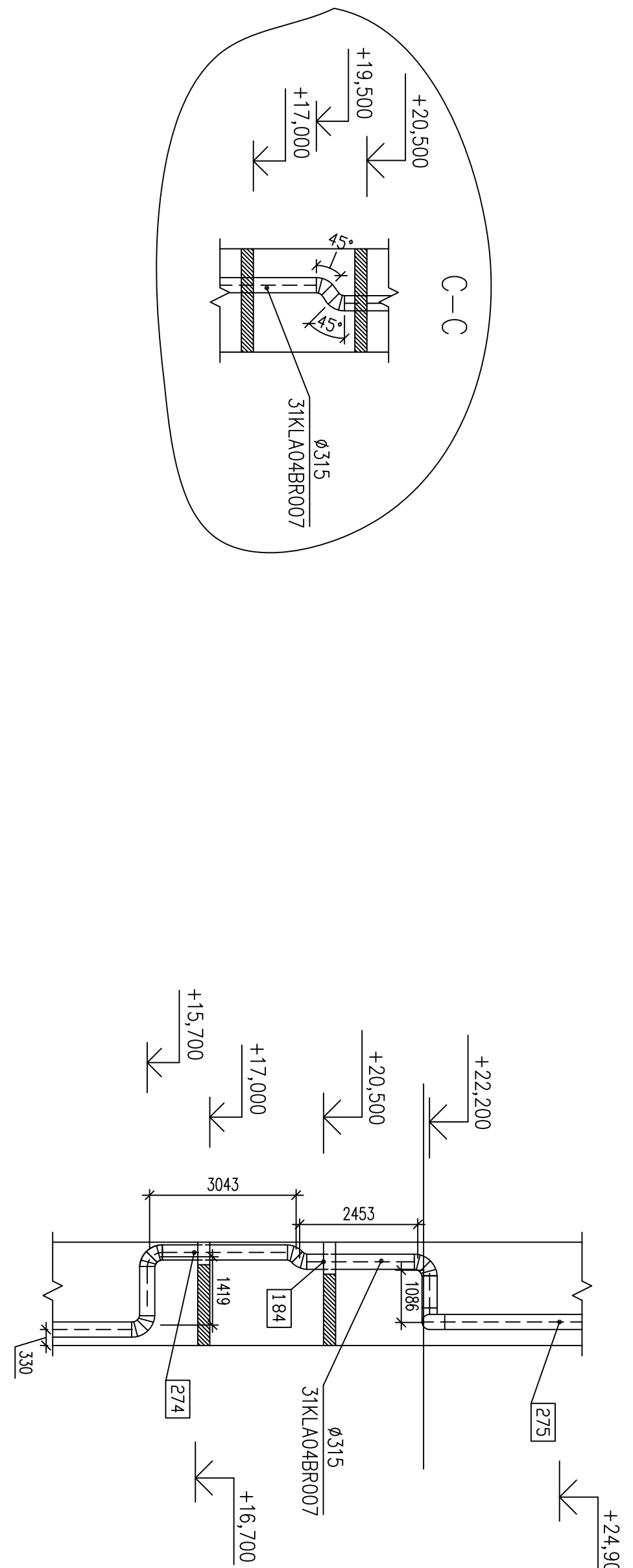
GENERAL GUIDELINES

[illegible][illegible]

File: R01_KK34_30JUL01THE.0K.WP002_001.w0

This document is a copy of the original document (hereinafter referred to as the "document") and is not to be used for any other purpose. The document is the property of the Ministry of Defense and is to be kept confidential. The document is to be destroyed after the expiration of the term of its validity. The document is to be kept in a secure place and is to be protected from unauthorized access. The document is to be handled in accordance with the instructions of the Ministry of Defense. The document is to be kept in a secure place and is to be protected from unauthorized access. The document is to be handled in accordance with the instructions of the Ministry of Defense.	This document is a copy of the original document (hereinafter referred to as the "document") and is not to be used for any other purpose. The document is the property of the Ministry of Defense and is to be kept confidential. The document is to be destroyed after the expiration of the term of its validity. The document is to be kept in a secure place and is to be protected from unauthorized access. The document is to be handled in accordance with the instructions of the Ministry of Defense. The document is to be kept in a secure place and is to be protected from unauthorized access. The document is to be handled in accordance with the instructions of the Ministry of Defense.
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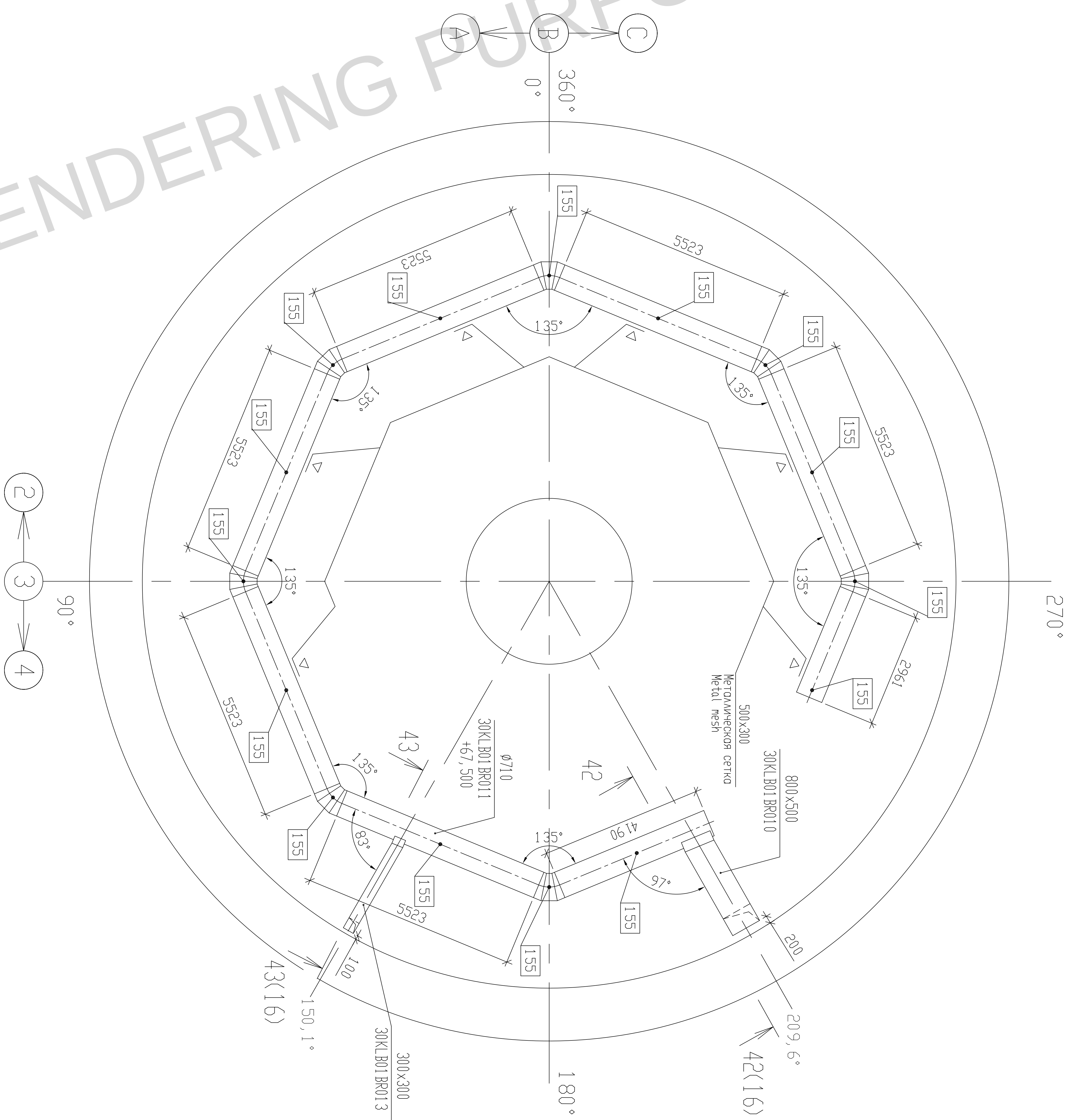
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$$B-B(4,5)$$


Package Number 3 7 6 33
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[illegible]

PLAN AT ELEVATION +67,000



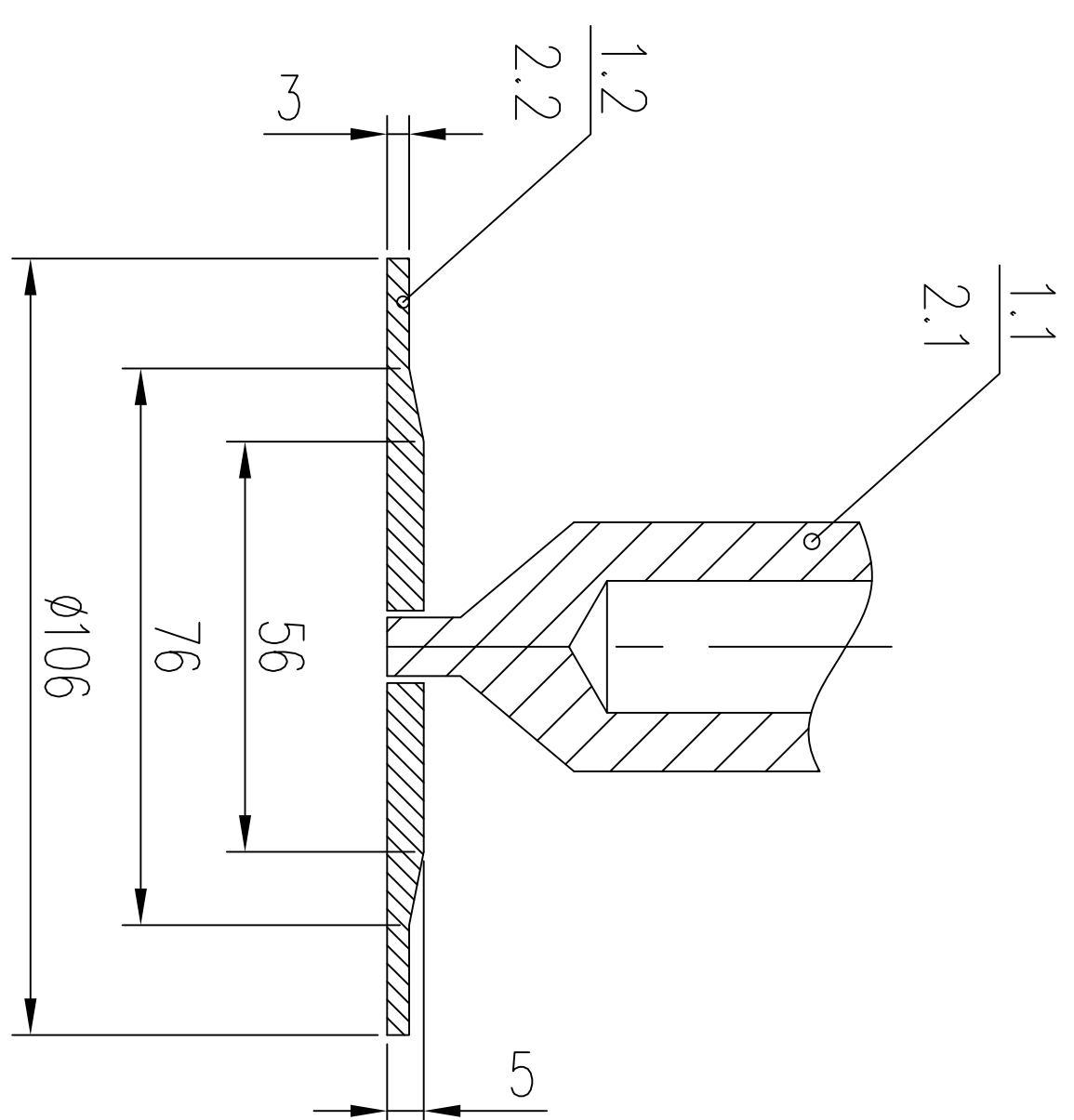
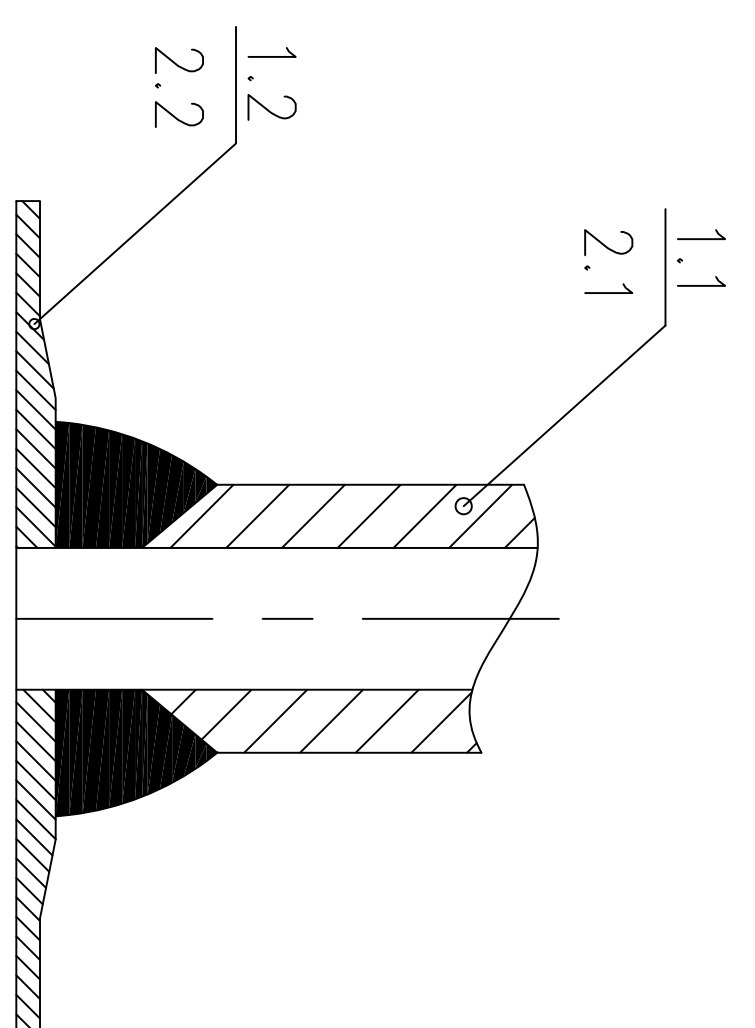
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File: R01_KK34_30UJA_0_0W ОК WD002_009=0

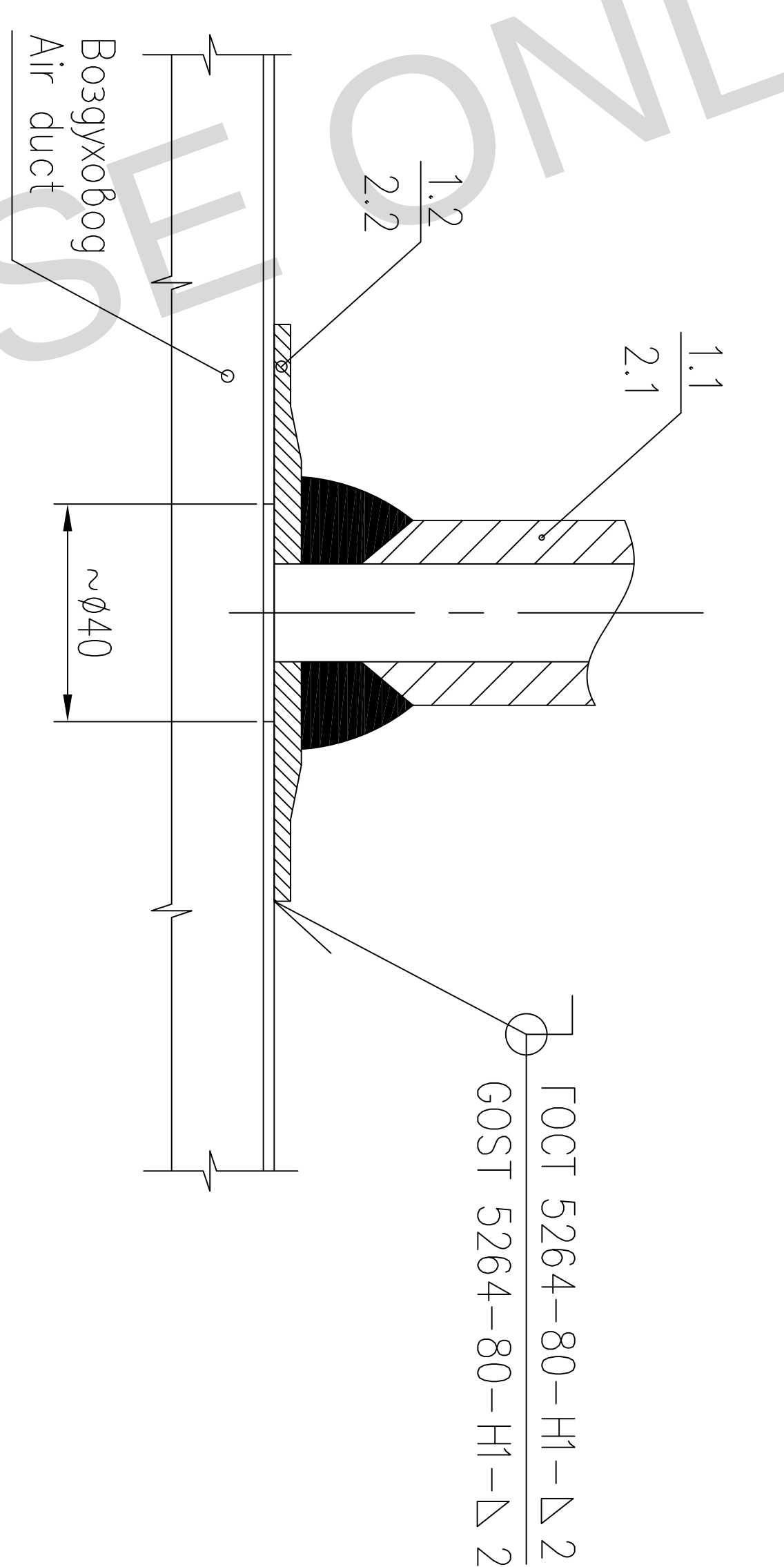
УСТАНОВКА БОБЫШКИ НА ПРЯМОУГОЛЬНЫЙ ВОЗДУХОВОД INSTALLATION OF LUG ON THE RECTANGULAR AIR DUCT

СПЕЦИФИКАЦИЯ SPECIFICATION

Закончена
Half-finished product

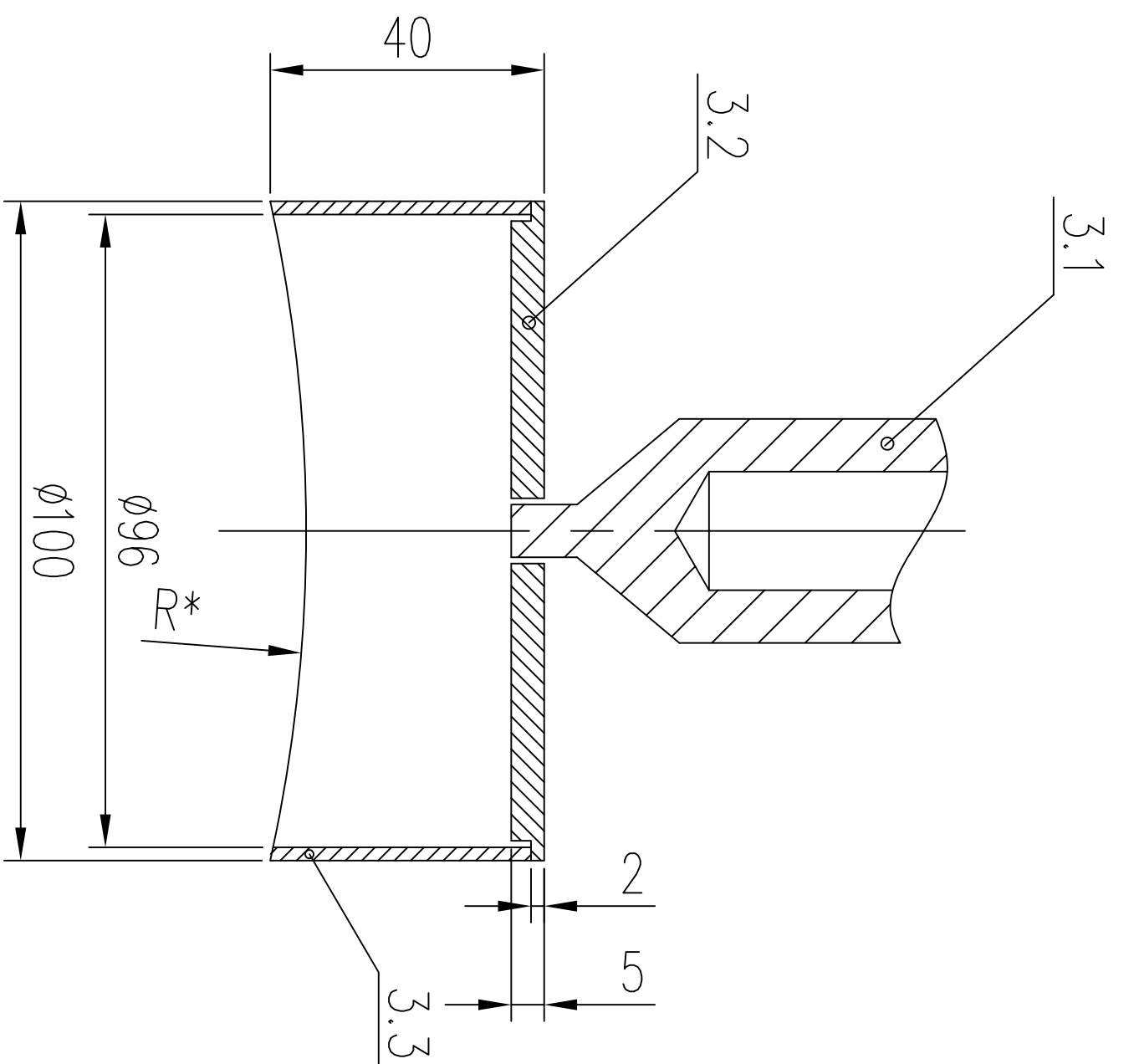
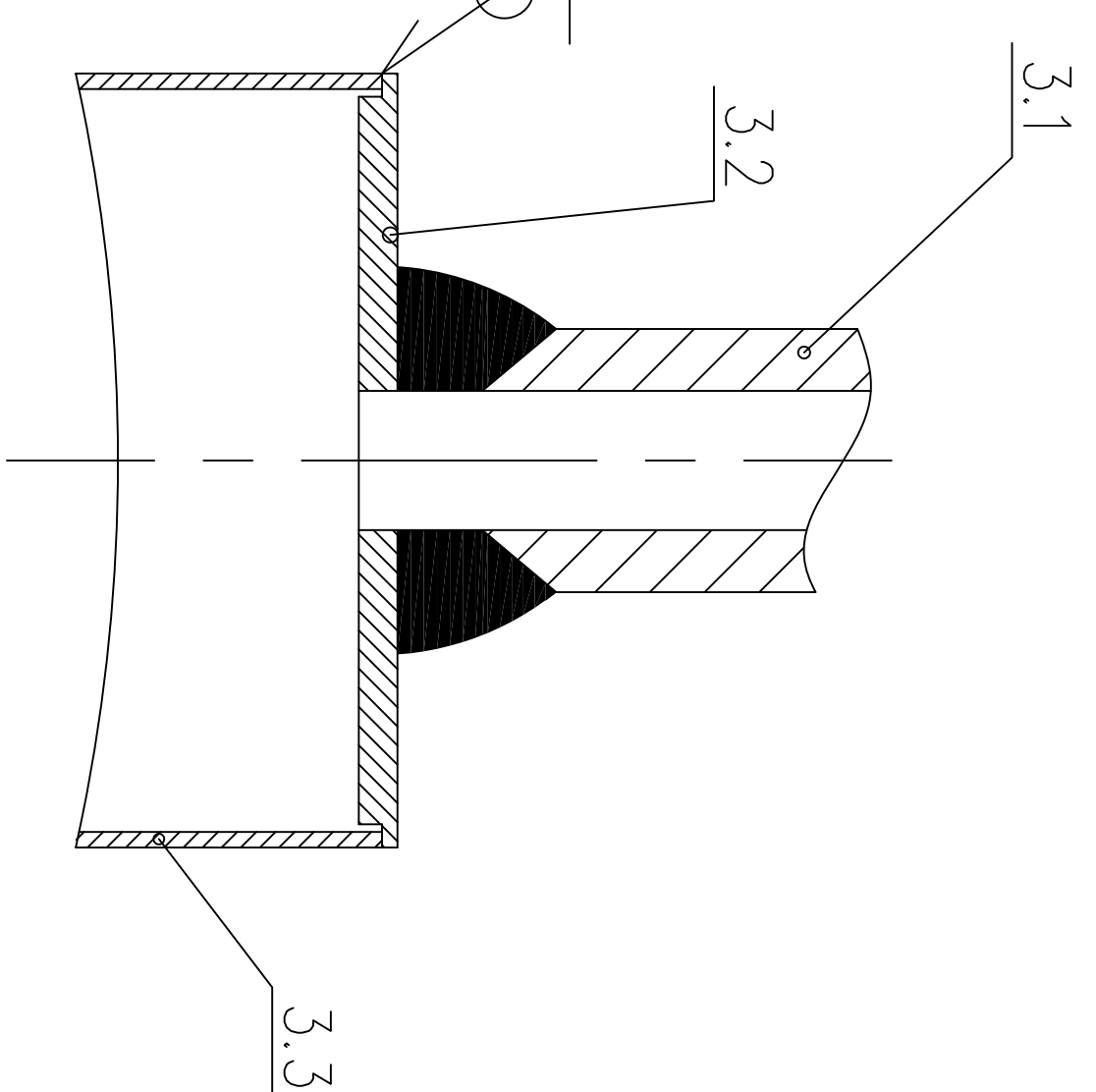
Изготовление
Fabrication

Монтаж
Ассембли

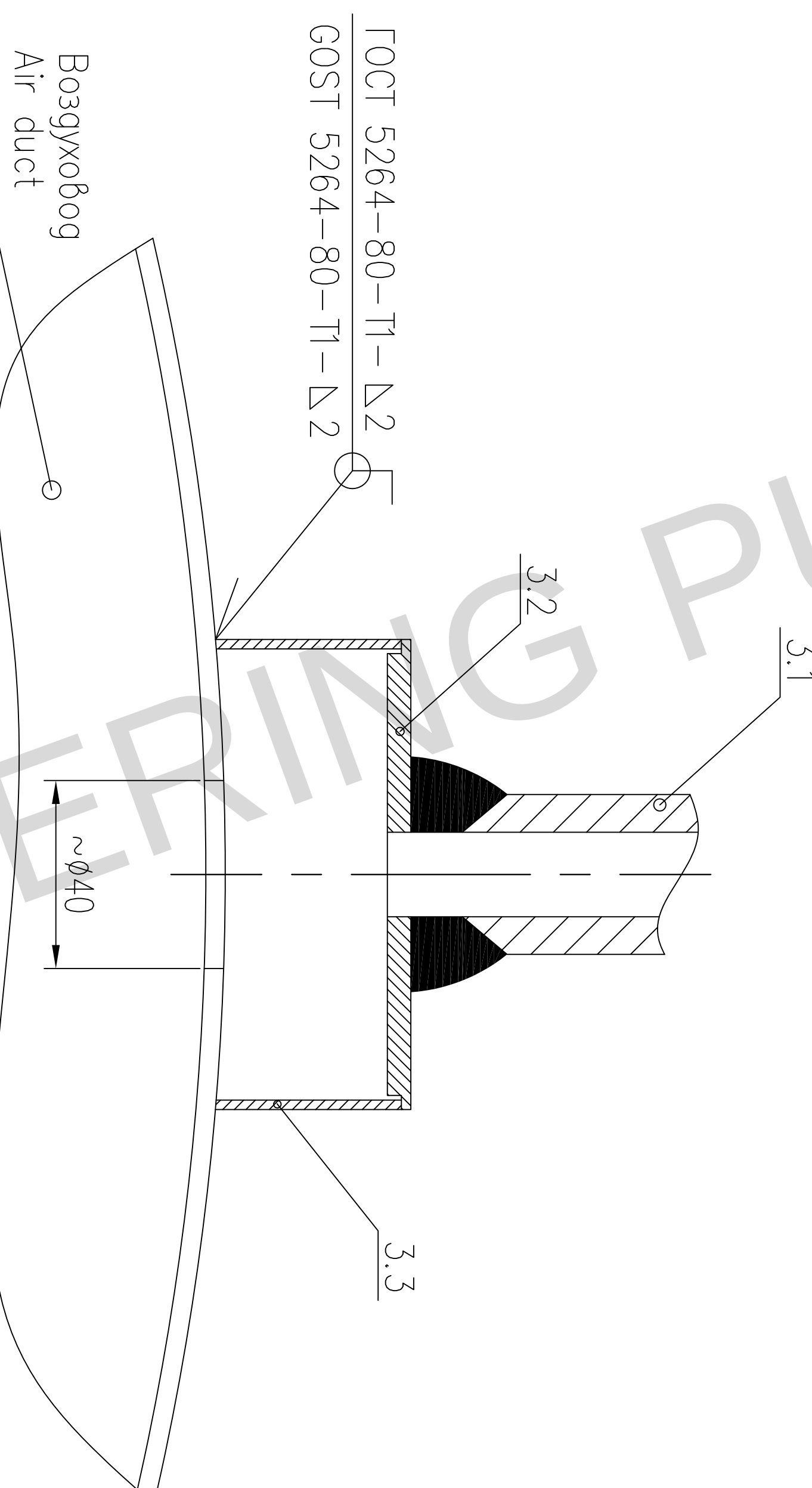


УСТАНОВКА БОБЫШКИ НА КРУГЛЫЙ ВОЗДУХОВОД INSTALLATION OF LUG ON THE ROUND AIR DUCT

Зазомбка
Half-finished product

Изготовление
Fabrication

Монтаж
Ассембли

УСТАНОВКА ТРУБКИ НА ВОЗДУХОВОД
INSTALLATION OF PIPE ON AIR DUCT

Bozuyobog
Air duct

100

4.1

ГОСТ 5264-80-Т1-А2
ГОСТ 5264-80-Т1-А2

- 1 Спецификация составлено на один комплект.
- 2 * – величину расхода R уточняют по фактическому возмужоводу
- 3 Приварку бобышки поз. 1.1 выгоинить по ОСТ 24.125.57–89.
- 4 Приварку бобышки поз. 2.1 и 3.1 выгоинить по ОСТ 24.125.22–89.

- 1 The specification was compiled for 1 set.
- 2 * – radius R shall be clarified as per actual air duct.
- 3 A lug item 1.1 shall be welded as per OST 24,125.57–89.
- 4 A lug item 2.1 and 3.1 shall be welded as per OST 24,125.22–89

Поз. Item	Обозначение Designation	Наименование Name	Код. Q-ty	Материал Material	Масса eg. Mass of unit, kg	Примечание Note
1.1	ОСТ 24.125.57-89 OST 24.125.57-89	Бобышка M20x1,5 от ОСТ 24.125.57 LUG M20x1,5 от OST 24.125.57	1	См.20 ГОСТ 1050-88 St.20 ГОСТ 1050-88	0,35	
1.2	ГОСТ 19903-90 ГОСТ 19903-90	Пластина Platen	1	C245 ГОСТ 27772-88 S245 ГОСТ 27772-88	0,04	
	ГОСТ 9467-75 ГОСТ 9467-75	Электроды (углеродистая сталь) Electrodes (carbon steel)	-	-	0,006	
2.1	ОСТ 24.125.22-89 OST 24.125.22-89	Бобышка M20x1,5 от ОСТ 24.125.22 LUG M20x1,5 от OST 24.125.22	1	08Х18Н10Т ГОСТ 5949-75 08Н18Н10Т ГОСТ 5949-75	0,42	
2.2	ГОСТ 19903-90 ГОСТ 19903-90	Пластина Platen	1	08Х18Н10Т ГОСТ 5582-75 08Н18Н10Т ГОСТ 5582-75	0,04	
	ГОСТ 9467-75 ГОСТ 9467-75	Электроды (нержавеющая сталь) Electrodes (stainless steel)	-	-	0,006	
3.1	ОСТ 24.125.22-89 OST 24.125.22-89	Бобышка M20x1,5 от ОСТ 24.125.22 LUG M20x1,5 от OST 24.125.22	1	08Х18Н10Т ГОСТ 5949-75 08Н18Н10Т ГОСТ 5949-75	0,42	
3.2	ГОСТ 19903-90 ГОСТ 19903-90	Пластина Platen	1	08Х18Н10Т ГОСТ 5582-75 08Н18Н10Т ГОСТ 5582-75	0,04	
3.3	ГОСТ 19903-90 ГОСТ 19903-90	Воздуховод Ø100, l=40 мм Air duct Ø100, l=40 mm	1	08Х18Н10Т ГОСТ 5582-75 08Н18Н10Т ГОСТ 5582-75	0,21	
	ГОСТ 9467-75 ГОСТ 9467-75	Электроды (нержавеющая сталь) Electrodes (stainless steel)	-	-	0,02	
4.1	ОСТ 34-10-416-90 OST 34-10-416-90	Трубка Ø14x2, l = 100 мм Pipe Ø14x2, l = 100 mm	1	12Х18Н10Т ГОСТ 5632-72 12Н18Н10Т ГОСТ 5632-72	0,06	
	ГОСТ 9467-75 ГОСТ 9467-75	Электроды (нержавеющая сталь) Electrodes (stainless steel)	-	-	0,001	

Package Number 3 7 6 33

File: R01 KK34 30UJA 0 OW OK WD002_029=0

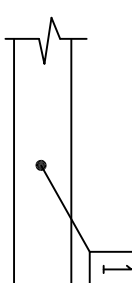
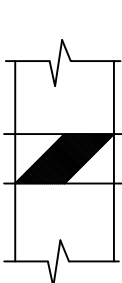
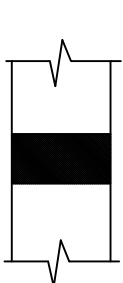
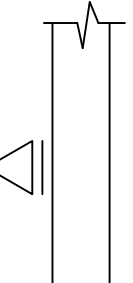
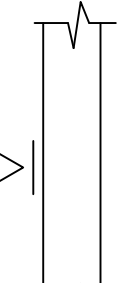
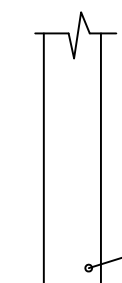
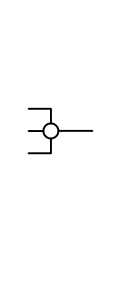
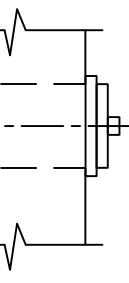
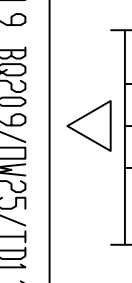
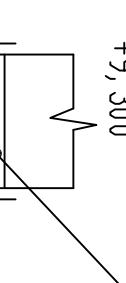
Orig.arch.Nr	Date	Replace arch.Nr

Данный чертёж не подлежит размножению или передаче другим организациям и лицам без согласия АО "Атомenergoproekt" This drawing is not to be reproduced or transferred to other organizations or private persons without approval of the JSC "Atomenergoproekt"										R01.KK.34.30UJA.0.0W.OK.WD002 АЭС "КУДАНКУЛАН" БЛОК NPP KUDANKULAN UNIT 3
Изм.	Кол. уч.	Лист	N ок.	Подпись	Дого					30UJA. Реакторное здание. Помещения UJA, UVB. Компонобачные
Авт.	Ред.	Docum	Sheet N	Signature	Date					чертежи систем вентиляции 30UJA. Reactor building. Rooms UJA, UVB. Layout drawings of the ventilation systems
Утвердил	Approved									
Н. контр.	Inspector	TSOY								Узлы для присоединения к воздушным изверительным приборам
Разроб.	Designed	GORODILOVA								Details for connection to air ducts of measuring devices
										Столция Лист Листов
										Phase Sheet Sheets
										WD 26
										JSC "Atomenergoproekt" Moscow 2017

ВЕДОМОСТЬ РАБОЧИХ ЧЕРТЕЖЕЙ ОСНОВНОГО КОМПЛЕКТА
LIST OF THE WORKING DRAWINGS OF THE MAIN SET

Лист Sheet	Наименование Name	Примечание Note
1	Общие данные General data	
2	Узлы локализации систем 30KLA21, 30KLA41 Localization detail of 30KLA21, 30KLA41 systems	
3	Узлы локализации систем 30KLA22, 30KLA42 Localization detail of 30KLA22, 30KLA42 systems	
4	Узел локализации системы 30KLA43 Localization detail of 30KLA43 system	

УСЛОВНЫЕ ОБОЗНАЧЕНИЯ
LEGEND

Обозначение Designation	Наименование Name
	Опора под воздуховод Support for air duct
	Обратный клапан Check valve
	Клопан противопожарный с электромотором Fire valve with electric drive
	Оберезание (вакуум) gas vacuum release Hole (grote) for air release
	Оберезание (вакуум) gas suction vacuum Hole (grote) for air intake
	Размер воздуховода Size of air duct
	Маркировка Marking
	Ометка Elevation
	Гребенка для пилочна електродов Terminal block for driving suits feeding
	Клапан усамозначнаго гадзавення (КВД) Overpressure relief valve (ORV)
	Резервовая прокладка с заглушкой Standby gasket with a plug

ВЕДОМОСТЬ ОСНОВНЫХ КОМПЛЕКТОВ РАБОЧИХ ЧЕРТЕЖЕЙ
ПАКЕТА № 3 6 7 33
LIST OF THE MAIN SETS OF WORKING DRAWINGS
OF PACKAGE NUMBER 3 6 7 33

Обозначение Designation	Наименование Name	Примечание Note
R01.KK34.30UUA.0.0W.OK.WD001	300U. Реакторное здание. Повышения UUA, UUB. Принципиальные схемы систем Вентиляции 300U. Reactor building. Rooms UUA, UUB. Basic diagrams of the ventilation systems	
R01.KK34.30UUA.0.0W.OK.WD002	300U. Реакторное здание. Повышения UUA, UUB. Компобные чертежи систем Вентиляции 300U. Reactor building. Rooms UUA, UUB Layout drawings of the ventilation systems	
R01.KK34.30UUA.0.0W.OK.WD003	300U. Реакторное здание. Повышения UUA, UUB. Компобные чертежи систем Вентиляции Узлы локализации 300U. Reactor building. Rooms UUA, UUB. Layout drawings of the ventilation systems Localization centers	
R01.KK34.30UUA.0.0W.OK.WD004	300U. Реакторное здание. Повышения UUA, UUB. Аксонметрические схемы систем Вентиляции 300U. Reactor building. Rooms UUA, UUB. Axonometric diagrams of the ventilation systems	
R01.KK34.30UUA.0.0W.OK.WD005	300U. Реакторное здание. Повышения UUA, UUB. Учебные чертежи систем Вентиляции 300U. Reactor building. Rooms UUA, UUB. Instruction drawings of the ventilation systems	
R01.KK34.30UUG.0.0W.OK.WD001	300U. Реакторное здание. Повышения реакторного помещения UUG. Чертежи систем Вентиляции 300U. Reactor building Transport part of rooms UUG. Drawings of ventilation systems	

МЕТОДЫ И ОБЪЕМЫ КОНТРОЛЯ СВАРНЫХ СОЕДИНЕНИЙ
ПРАЗМАТИЧЕСКИХ ВОЗДУХОВОДОВ *

METHODS AND SCOPES OF THE CONTROL OF WELD JOINTS
FOR TRANSIT AIR DUCTS *

KL403, KL441, KL421, KL442, KL422, KLB01, 33KLB02		Номер трубопровода No of pipeline			
IIIc		Категория сварных соединений Category of weld joints			
2.0		Номинальная толщина свариваемых металлов, мм Nominal thickness of welded parts, mm			
100		Визуального и измерительного Visual and measuring		Объем контроля Scope of control Неправдоподобие, % Non-destructive, %	
—		Гидравлические испытания Hydraulic tests			
100 (**)		Капиллярного или магнитопорошкового Capillary or magnetic-powder			
—		До D=315 мм включительно Up to NB=315 mm inclusively			
—		Свыше D=315 мм Greater than NB=315 mm		Рентгенографический Radiographic	
—		Ультразвукового Ultrasonic			
100 (***)		Контроль герметичности Tightness control			

*) Методы измерения контроля уровня локализации сморты листы...4

*) Методы "вращения на жёлт" или "вращения" ГОСТ 3242-79

*) Периодическое испытание переплетных устройств поперечного разреза для проверки качества работы

*) Методы 22, 23, 24 — рабочие графические материалы. По

*) For the methods and scopes of control of the localization details see sheet 25, 27

*) The "kerosene on disk" method or flow detection ГОСТ 3242-79

*) An approved tests of inaccessible zones of the art. discs shall be performed under pressure equal to 22, where P is working pressure of the fan. Pa

ОБЩИЕ УКАЗАНИЯ

GENERAL GUIDELINES

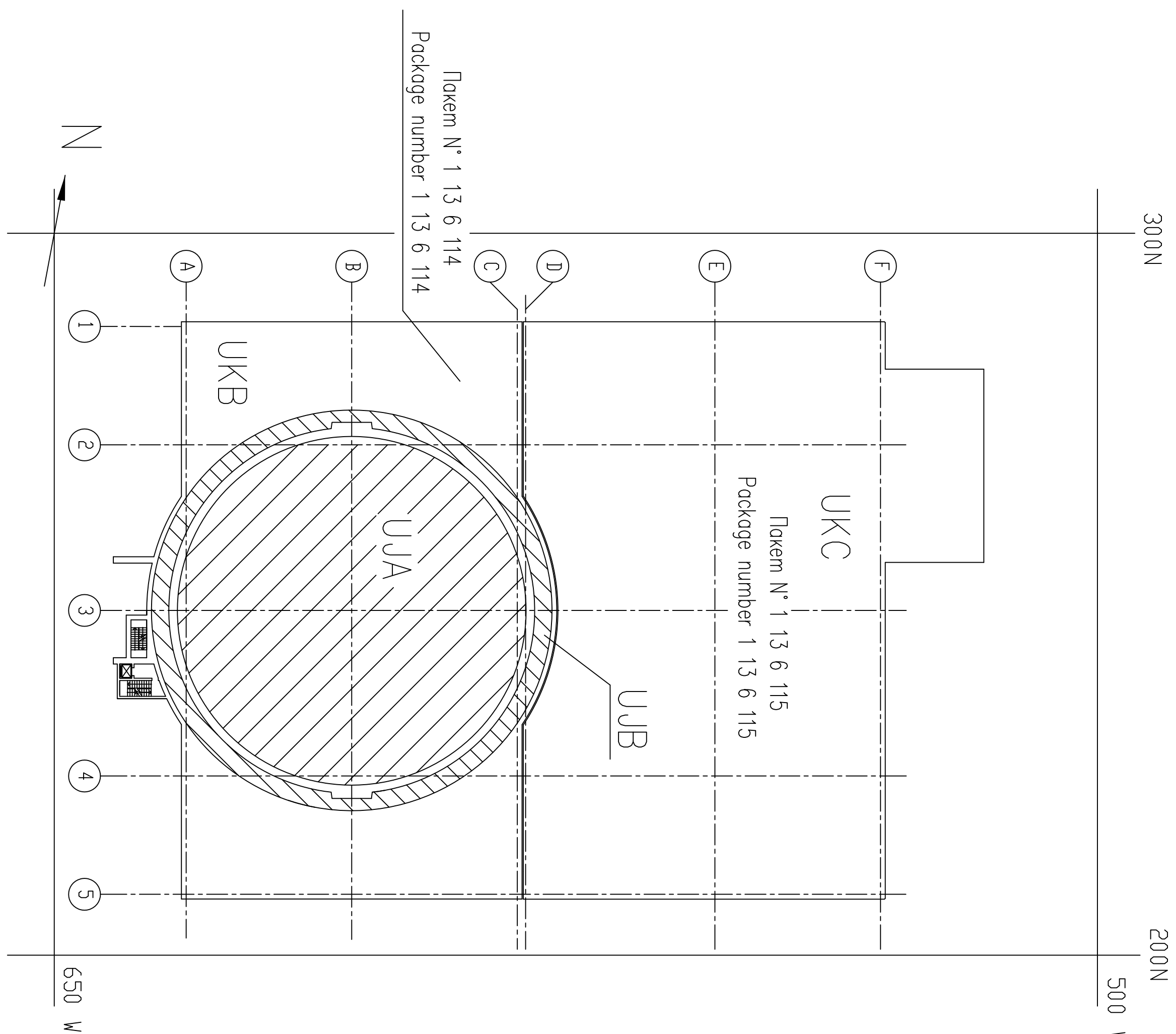
1. Рабочие чертежи разработаны в соответствии с нормами правил и стандартами РФ.
2. В соответствии с НП-001-97 (ПНЗ-1-01-01-97, ОПБ-89/97)
"Общие положения обеспечения безопасности атомных станций":
Указ кода/системы: ЗОК.А422, ЗОК.А422, ЗОК.А422 имеет классификационное обозначение 2Н2.
3. В соответствии с НП-031-01 "Нормы проектирования систем атомных станций"
категория безопасности: "воздуховоды и оборудование расположенные в ЦА, выполняющие функции по ликвидации -1."
4. Трубопроводы спроектированы в соответствии с "Правилами устройства и безопасной эксплуатации оборудования и трубопроводов атомных энергетических установок"

(ПНЗ-1-7-008-89) и с "Правилами устройства и эксплуатации лодкающих систем безопасности атомных станций"(НП-010-89). Трубопровод относится к группе "В"

по ПНЗ-1-7-008-89.

- 1 The wiring drawings have been developed in accordance with codes, regulations and standards of PE.
- 2 According to NP-001-97 (PNAE G-01-011-97, OPB-88/97) "General Provisions for Assuring Nuclear Power Plants Safety".
- The localization unit of 30KA.A22, 30KA.A42 system has classification designation 2N1; The localization unit of 30KA.A41, 30KA.A21, 30KA.A43 system has classification designation 2L
- 3 in accordance with NP-031-01 "Codes for designing aseismic nuclear power plants" the seismic category of air ducts and equipment located in UUA is I.
- 4 Pipelines have been designed in compliance with the requirements of PNAE G-7-008-88 "Rules for arrangement and safe operation of equipment and pipelines of nuclear power facilities" and RH-010-98 "Regulation for the design and operation of localizing systems of NPP"; Pipelines are related to group 'B' as per PNAE G-7-008-88.

СХЕМА РАСПОЛОЖЕНИЯ THE KEY PLAN



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File: R01 KK34 30UJA 0 0W OK WD003_001=0

NUCLEAR POWER CORPORATION

10

R01.KK34.30UJA.0.0W.OK.WD003

ЭБС "КУДАНКУЛАМ" БЛОК 3
KUDANKULAM UNIT

[illegible]

Package Number 3 7 6 33

Rev.	Issue N	Issued for	Signature	Issued sheet N

при переписке в ссылке
документ (лист документа)
следует указать его
обозначение, приведенное
в основной подписи

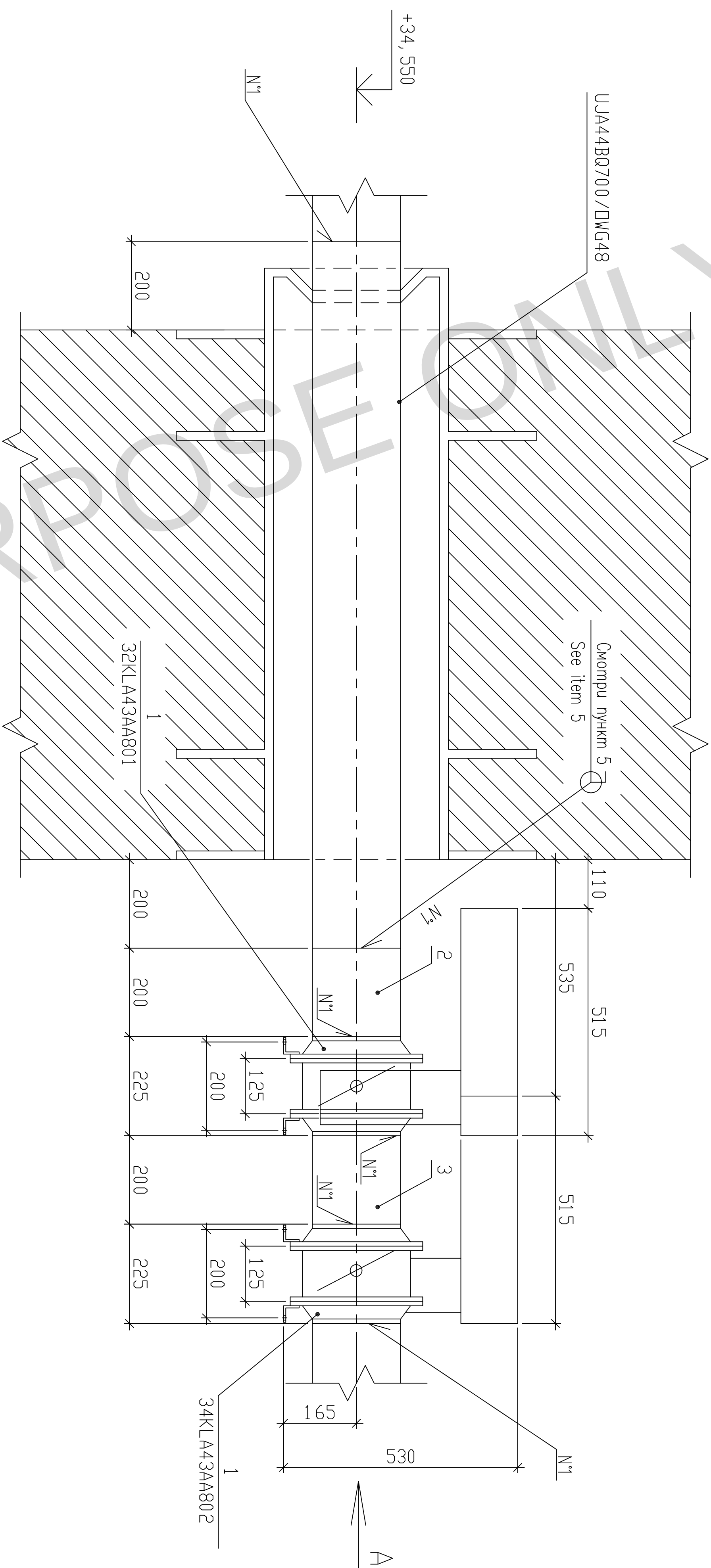
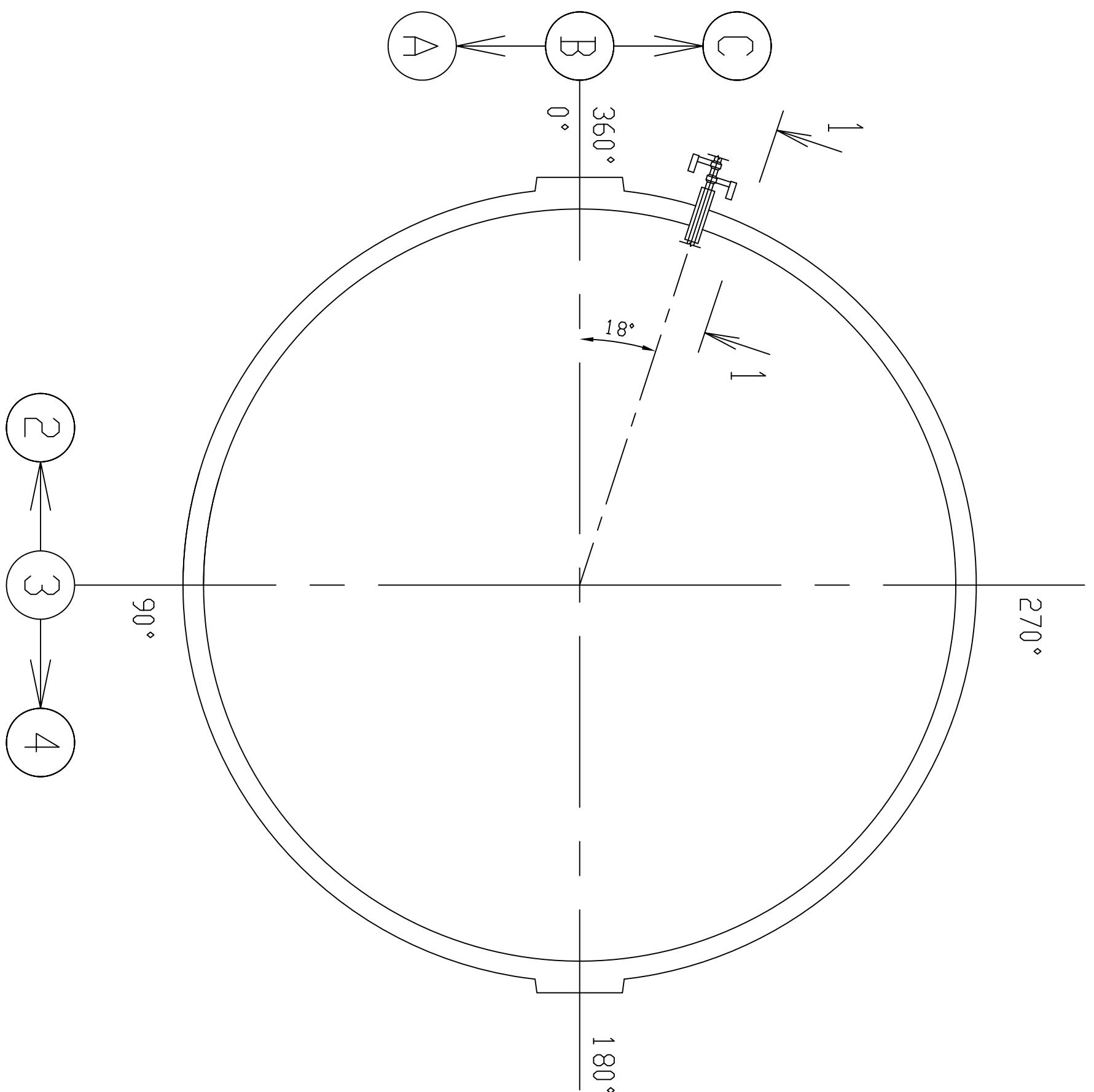
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Mx.						
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Yimbergun						
Approved	KATS					
H. kompr.						
Incorporator	TSOY					

А. Реакторное здание.
 шение Уд. УВ.
 повороте чертежи систем вентиляции
 локализации
 А. Реактор building.
 is Uд. UВ.
 ts drawings of the ventilation systems.
 ization centers

Material	Fluon	Fluonob
Emogua	Fluon	Fluonob
Phase	Sheet	Sheets
WD	1	4

ПЛАН РАЗМЕЩЕНИЯ ЛОКАЛИЗУЮЩИХ ТЕРМОПАЛАНОВ D200 (1:400)
ARRANGEMENT OF LOCALIZING SEALED VALVES NB200 (1:400)


$$1 - 1(1:10) \text{ O.}$$

№ п/п	Обозначение №, код и наименование детали	Наименование детали	Кол-во	Материал	Масса, кг		Примечание
					Единица	Объем	
					шт	л	
1	ЛКБМ1030 -200 ТУ 3742-023- 34390194-2003 ТсКБМ1030 -200 ТУ 3742-023- 34390194-2003	Кромка перемешивающая DN 200 мм Седельный клапан DN 200 мм	2	-	145	290	-
2	ОСТ 34-00-416-90 ОСТ 34-00-416-90 Pipe Ø220x7 l=200 mm	Труба Ø220x7 l=200 mm Pipe Ø220x7 l=200 mm	1	08X18H0T ГОСТ 5632 08X18H0T ГОСТ 5632	7,4	7,4	-
3	ОСТ 34-00-416-90 ОСТ 34-00-416-90 Pipe Ø220x7 l=200 mm	Труба Ø220x7 l=200 mm Pipe Ø220x7 l=200 mm	1	08X18H0T ГОСТ 5632 08X18H0T ГОСТ 5632	7,4	7,4	-
4	ИПА9 Г-7-009-89 ПАМЕ G-7-009-89	Дискоты (неперемешивающие) Electrodes (stainless steel)	-	-	-	0,5	-

СПЕЦИФИКАЦИЯ ОБОРУДОВАНИЯ И МАТЕРИАЛОВ SPECIFICATION OF EQUIPMENT AND MATERIALS

ТЕХНИЧЕСКИЕ ТРЕБОВАНИЯ

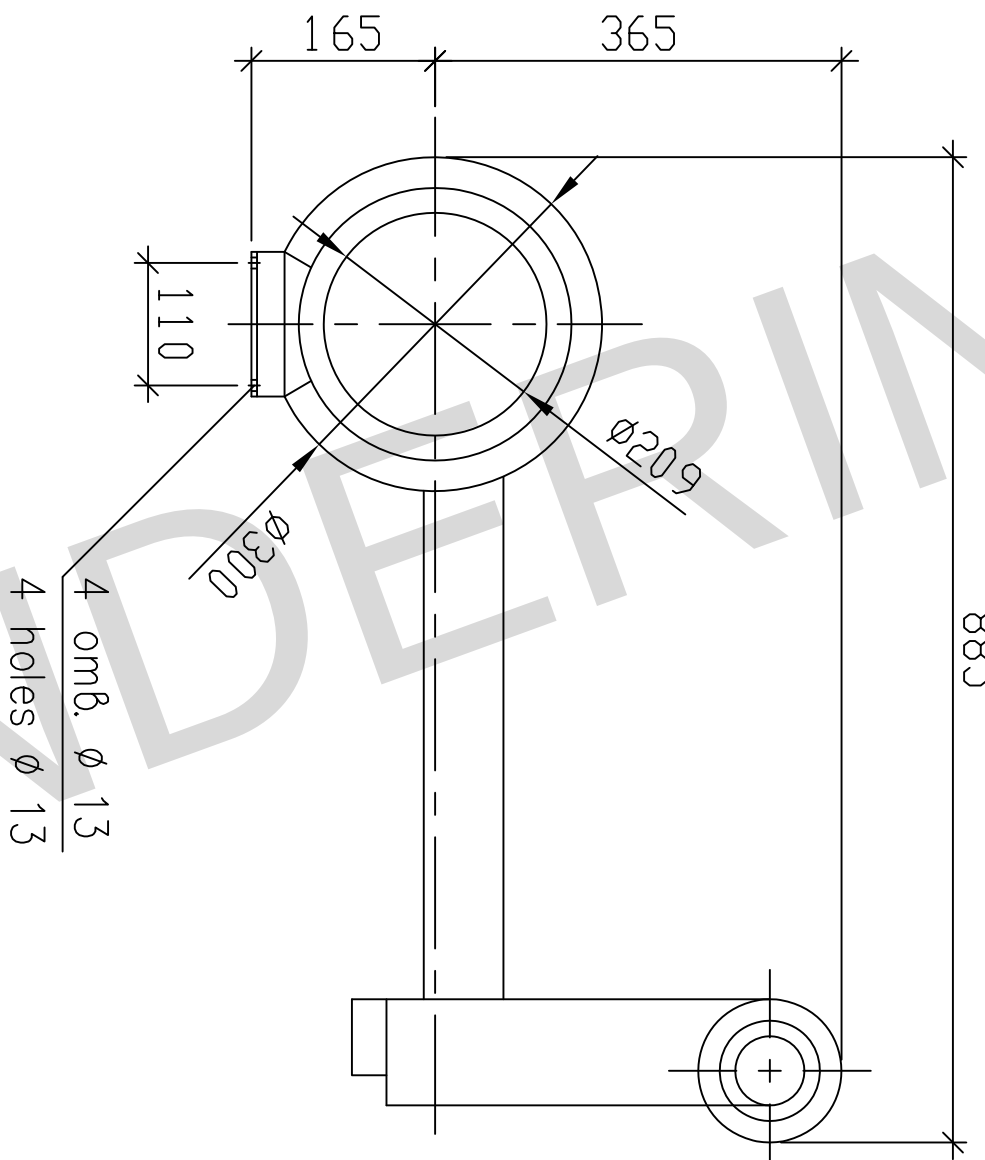
1. Тробопродовы 2-го и 3-го омышения, классу безопасности 2 по НН-001-97 (НН4-01-01-197-005-88/92) "Общие положения безопасности стомых спонцидов". Кислотостойкость по отношению к тробопродов – 211.
2. Тробопродовы по пазам 2 и 3 омышения к 1 омышению по НН-033-01 ("Нормы проектирования безопасности стомых спонцидов").
3. Тробопродовы спроектированы в соответствии с "Правилами изготовления и безопасной эксплуатации безопасности и тробопродов стомых энергетических установок" (НН4-7.2-008-88) "Правила изготовления и безопасности стомых спонцидов" (НН-010-98). Тробопродовы омышения "а" и "агине" "В" по НН4-7.2-008-88.
4. Оварку и сборку герметиз тробопродов производить в соответствии с НН43-7.7-008-88.
5. Оварные стомые соединения тробопродов выносятся по НН4-7.7-009-89 ("Обварочные и тробопродов стомых энергетических установок. Оварку и контроль безопасности"), тип оварных соединений – 25-1 (с-42) для $\Delta t \geq 50$ мм.
6. Катедра, герметиз и оварку контроля, оварку соединений оварных соединений тробопродов производить в соответствии с указаниями НН4-7.7-010-89 ("Обварочные и тробопродов стомых энергетических установок. Оварные соединения и контроль безопасности").
7. Оварные материалы применять в соответствии с разделом 2 НН4-7.7-009-89.
8. Срок службы тробопродов 30 лет.

TECHNICAL REQUIREMENTS

1. Pipefitment item 2.3) is related to safety class 2 as per NP-001-97 ("PNAE G-01-01-197-009-B8.97") "General provisions on ensuring safety of nuclear power plants". Classification designation of pipelines is 2L.
2. Pipelines (item 2.3) is related to Seismic stability Category I as per NP-031-01 ("Codes of designing aseismic NPP").
3. Pipelines have been designed in compliance with the requirements of PN AE G-7-7-008-89 "Rules for arrangement and safe operation of equipment and pipelines of nuclear power facilities" and PN-010-98 "Regulation for the design and operation of localizing safety systems of NPP"). Pipelines are related to group "B" as per PNAE G-7-7-008-89.
4. Welding and assembly of ports of pipelines shall be carried out in conformity with the requirements of PN AE G-7-7-008-89.
5. Weld butt joints of pipelines shall be performed as per PNAE G-7-7-009-89 ("Equipment and pipelines of nuclear power facilities. Welding and building-up. Main provisions"). Type of weld butt joint is –1S–1 (G-42) for NB > 50 mm.
6. Category, methods and scope of control, quality assessment of weld joints of pipelines shall be adopted in compliance with PNAE G-7-7-010-89 ("Equipment and pipelines of nuclear power facilities. Welding joints and building-ups. Control rules").
7. Welding materials should be adopted in compliance with section 2 of PNAE G-7-7-009-89.
8. Service life of pipelines is 30 years.

ТЕХНИЧЕСКАЯ ХАРАКТЕРИСТИКА
TECHNICAL CHARACTERISTIC

Толщина сварных элементов	Категории соединений	Объем контроля %						Контроль герметичности	
		Визуального и измерительного	Просонкой металлоискат. порошкового	Scope of control					
				Радиационного	Ультразвукового	Нагретого	Автоматического		
									Рентгеновского
Thickness of elements being welded, mm	Categories of welded joints	Visual and measurement control	Metallic ball run	Capillary or Magnetic Powder control	On the equipment	On the pipelines	On the equipment	On the pipelines	Air-tightness control
7,0	III c	100	—	100	—	10	—	—	+

 $A(1:10)$

Трубопровод в передаче (подключенный фланцевым или фланцевым соединением) Pipelines with localizing valves (with open valve disk)	N' трубопровода N' of pipeline	Наименование Name	Среда Medium	Подверженность (категория) Category	Активный воздух Active air	Параметры при рабочем давлении Operating pressure parameters		Параметры при предельном давлении Limiting pressure parameters		Масса трубопровода Mass of pipeline		Примечание Note		
						давление pressure MPa	температура °C	давление pressure MPa	мин. температура стенки minimum wall t °C	Общая Total	В пак. числе including Valves		290	—
						0,005	33	0,56	20	305,3				
						0,5	150							

Orig.arch.Nr	Date	Replace arch.Nr

[illegible]