

Unless otherwise specified actuators for modulating valves and dampers shall either be pneumatic or electrically operated. Self contained sealed hydraulic units may be considered where high thrusts or high speeds of operation are required.

Actuators for ON/OFF duty or manually positioned units shall generally be electrical motor and/or pneumatic driven, however the use of solenoid types on small valves shall be allowed dependent on duty.

The various types and sizes of actuators shall be rationalized and as far as possible each type shall be from a common manufacturer to facilitate interchangeability and spares.

In order to prevent the risk of fire or explosion pneumatic actuators shall be used in hazardous areas and associated equipment (e.g. positioners) must be intrinsically safe in accordance with IEC 60079-11.

Pneumatic actuators must be designed in such a way that in the event of air failure the actuator will remain in the position immediately prior to loss of power, or assume a position which is safe for the process.

With either action the failure mode shall be suitably monitored and the Plant operator informed by some form of alarm. The failure response of all actuators in the event of the loss of the prime mover (air pressure, oil pressure, electrical power) shall be indicated on the Piping and Instrumentation (P&I) diagrams, valve schedules, etc.

All pneumatic tubing to control drives or actuators shall, unless otherwise agreed to by the Employer/Engineer, be in copper which shall be sheathed in PVC or alternatively in stainless steel.

For all actuators of control valves and dampers of main systems local indicating pointer and position transmitters for remote indication and closed loop feedback shall be provided in accordance with the most severe operating conditions to be expected. The transmitters shall be designed to withstand conditions such as high temperature, vibrations and leakage of steam and of hot water wherever required. The protection class shall be IP 65 according to IEC 60529.

All actuators shall have a handwheel for direct manual operation. The diameter of the handwheel and geared effort shall be such that they can be reasonably operated by one man. A lockable mechanical clutch mechanism shall be provided to inhibit power control of the actuators when the handwheel is operated.

The speed of response of actuators used for modulating control shall be chosen to suit each particular application. Facilities shall be provided for limiting the actuator movement in each direction.



Special attention must be paid to adequately dimensioned drives and care must be taken to avoid any unintended displacement of the actuator on sudden rises of pressure in the piping.

Actuators shall have fail safe operation and actuator locking device in the event of abnormal conditions. Any abnormality on the valve shall be transmitted to the DCS.

All electrical actuator drives necessary for the safe operation and shut-down of the Plant in the event of 0.4 kV switchgear failure shall be connected to the UPS.

B0.6.19.17 Solenoid valves

In lines with nominal diameters of up to DN 25, as well as for piloting pneumatic actuators, suitable solenoid valves shall be used. Valves with power ratings up to 30 W shall be controlled directly at 24 V DC from the DCS. For powers over 30 W, solenoid valves for 230 V AC shall be employed. Solenoid valves for 110 V, 230 V AC and above shall be secured with blade fuses. Electrical connections are made by means of plug connectors, with the mating connector forming part of the scope of supplies.

B0.6.19.18 Cabling and wiring

The general requirements for cabling are as stated under relevant chapter in Section B0.

In particular, wiring within desks and panels shall be supported on trays and shall be segregated according to voltage level. Wiring carrying AC and D.C. voltage shall also be segregated.

All desks, panels, cubicles and racks shall be factory-wired with regard to the internal connections. Where desks or panels will be supplied in more than one Section, electrical connections between the Sections shall be by terminal strips provided for this purpose.

All cables must be provided at both ends, at every 20 m and every bend with identification with identification in the form of numbered labels corresponding to the coding system. The individual cores will be numbered or identified by colour-coding.

Instrumentation cables will be identified by colour codes and band marking, follow VDE 0815. The cables must be laid to ensure that they can be replaced or renewed in a simple manner.

Spare cores shall be terminated at terminal strips in such a way as to give a maximum length of core and shall be ferruled in such a way as to indicate that they are spare cores.



All instrumentation cables including both prefabricated and non-prefabricated type shall be with Fire Retardant Low Smoke (FRLS) type Poly Vinyl Chloride (PVC) overall sheath. For cables that are exposed to ambient temperatures above 60°C, teflon or silicone cables are to be provided. For safety related equipment fire survival cables shall be provided. The cables must be suitable for laying indoors, in the open (direct or indirect sunlight), in ducts, on trays, in the ground and in water. The cables must be resistant to solar radiation, the effect of oil, seawater, bacterial action, insects and rodents. Shields for individual pair and overall shield shall be provided for cables for analogue signals. Cables for binary signals shall have an overall shield. Multipair cables of 0.5 sq. mm, shall be used extensively for I&C cables, wherever required, prefabricated cables may also be used.

For thermocouple measurements compensation cable NiCr-Ni 2x0.5sq. mm or 4x0.5 sq. mm with silicone insulation and pair screen will be used. Fiber optic cables shall be provided for Remote I/O bus, CCTV, Station LAN etc.

The fiber and cable specifications shall comply with ITU-T Recommendation G652 and the relevant IEC standards. Each fiber cable shall be supplied with at least 50% spare cores. A minimum number of four spare cores are required.

Suitable fiber optic cable junction boxes, patch panels and patch leads shall be provided. These shall conform to the following:

- They shall support, organize, and protect the optical fibers and the fiber splices whilst ensuring that the optical fiber minimum-bending radius is not exceeded.
- The splice tray shall not have any sharp edges or protrusions that may damage the optical fiber cable.
- They shall provide entry for all cables.
- Include number tags for tube and fiber identification.
- They shall provide mounting positions for the bulkhead mounted connectors on which the cable will be terminated.
- They shall allow patching of fibers.
- Outdoor mounted boxes shall be rated to IP65 in accordance with IEC 60529.



The junction boxes/ patch panels shall have a fiber capacity equal to the total number of fibers (connected and spares) for all cables to be connected. Patch panels shall be designed for 19-inch rack mounting within a standard equipment cabinet.

All unused couplings shall have protective dust covers. The patch area in patch panels shall be accessible and covered behind a door or removable cover.

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Sufficient factory manufactured patch cords with suitable colour coding shall be provided.

Fiber optic connectors shall be standardized for ease of maintenance.

B0.6.19.19 Instrument and measuring impulse piping

Instrument impulse piping shall be supported at intervals as defined in BS 6739. The correct size of tube clips shall be used to suit the tube outside diameter.

The Contractor shall fabricate and erect all mounting brackets for control and monitoring apparatus including all pressure switches and miscellaneous instrumentation. If it is found after commissioning that any mounting frame vibrates excessively under operating conditions, instruments within the frames shall be isolated with vibration dampers by the Contractor or moved to areas of low vibration.

Impulse lines shall have venting, draining and blowdown facilities. Impulse lines between process and sensor shall be as direct as possible and shall include allowance for vibration and vertical and horizontal movement. Joints in impulse lines shall be kept to a minimum.

All pneumatic instrument lines shall be soap tested and any leakage shall be rectified.

While process instrument lines are being pressure tested all instruments shall be completely isolated or disconnected.



B0.7 Inspection and Testing

B0.7.1 General

This Section contains general requirements for inspection of material, parts, equipment and workmanship of the Plant during manufacture, assembling and erection and upon completion to demonstrate compliance with specification, codes and standards and to ensure overall reliability of Plant operation and performance.

Development and implementation of test procedures for the construction inspection, start-up and performance testing and capacity demonstration of the Plant shall be the responsibility of the Contractor.

The Contractor shall be responsible for providing all supplies required for carrying out such tests, except to the high speed diesel and coal used during Reliability Test Run and Performance Tests.

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- unit not available (not engaged/test)
- unit OFF - due to fault.

The following signals shall be additionally provided in the infeed panels of the switchgear:

- no control voltage 220 V DC
- no busbar voltage
- ground fault (for the 220 V DC system only).

Circuit breakers shall be equipped with operation counters.

Control and signalization

The control of the circuit breakers and motor units shall be carried out as described in clause "Low Voltage AC Switchgear".

Local auxiliary relays and measuring instruments

All infeeds to DC switchgears shall be equipped with ammeters.

For the rectifiers and inverters, the incoming and outgoing currents and voltages are to be indicated separately. The busbar voltages of the main 220 V DC distributions are also to be indicated.

The current and voltage measurements for the 415/240 V Safe AC is to be executed in the same way as for the 0.415 kV distributions in Section "Low Voltage AC Switchgear".

Remote indications and measurements

The remote indications of the circuit breakers and motor unit shall be carried out as described in Section "Low Voltage AC Switchgear".

The minimum scope of measurement transducers for measurement in the central control room are:

- battery current and voltage
- current measuring transducers for all infeeds
- voltage measuring transducers for each half busbar voltage.

B7.3.4.3 Battery charging equipment

Each battery charger must be suitable for the charging and floating of the **nickel-cadmium battery** and for supplying of all the DC consumers or the inverters for the 415/240 V Safe AC system at the same time. Above requirements shall also be applicable if the battery was drained prior to start of charging.

The rectifiers are preferably to be provided as thyristor controlled devices with current-voltage characteristic for stand-by parallel operation with the associated batteries.



Instead of thyristor controlled chargers other state of the art and proven technology will also be accepted.

The following technical features and monitoring equipment is to be provided for the individual battery chargers:

- radio interference suppression of the battery chargers according to the appropriate IEC regulations
- monitoring the charging circuit for interruption
- voltage monitoring of the incoming three-phase supply, with an overvoltage of + 15% and an undervoltage of – 15%, automatic disconnection of the battery charger must occur
- voltage monitoring of the DC output, with an overvoltage of + 15%, automatic disconnection of the battery charger must occur.

All cases of disconnection must be indicated as a fault alarm in the front door of the unit.

The local fault alarms and indications disconnections are to be connected to combined as a common alarm - rectifier fault - to the central control room (DDCMIS by serial interfaces).

The battery chargers meant for lead acid batteries are to be equipped with high rate charging stages that can be set at 2.65 V/cell or as per manufacturer's recommendation between 1 to 6 hours after input failure. For NiCad batteries High rate of charging shall be as per manufacturer's recommendation.

However the provision of adjustable boost charging features shall be provided and compliance with minimum requirements shall be ensured.

On the front of the rectifier cubicles, the Contractor has to provide all the necessary monitoring equipment, measuring instruments, other devices, switches, indicator lamps and corresponding fixings for the cables.

Alternatively the Contractor may offer an integrated numeric control device (visible during normal operation through inspection window in front door), which combines all functions.

B7.3.4.4 Batteries

For the DC and safe AC systems, the Contractor shall supply batteries of the Ni-Cd or lead-acid plant type.

Battery main fuses in a separate fuse box to be provided. The battery fuses shall be monitored.

The intercell connections shall be fully insulated. Welded intercell connections are not permitted.



The batteries are to be mounted on insulated subframes with the necessary consoles and fixing material.

Each battery shall have the capacity to supply the load for a period of at least thirty (30) minutes.

B7.3.4.5 Inverter with electronic change-over equipment

In order to be able to maintain an uninterruptable supply in the event of grid and generating failure, 2 x100% inverters with automatic static bypass -over equipment and manual bypass switch/facility is to be provided.

Each static inverter must be suitable for 100% of the power requirement.

The following features and monitoring equipment is to be provided for the AC inverter:

- radio interference suppression according to the appropriate IEC publications
- DC undervoltage monitoring
- AC overvoltage monitoring
- AC undervoltage monitoring.

On activation of the above devices, switch-over to power supply from the AC bus shall occur; the fault is to be individually indicated locally.

All individual alarms and indications are to be connected to the DDCMIS by serial interfaces.

The inverter is to be protected on the input and output sides and is to be equipped with the necessary isolating points. It must be possible to block the inverter on the input side in the case of high rate battery charging or they must be so designed that no damage will occur during this phase of charging.

In case of operation in bypass mode backfeeding into the 220 V DC system shall not be possible.

On the front of the inverter cubicles, the Contractor has to provide all the necessary monitoring equipment, measuring instruments, other devices, switches, indicator lamps and corresponding fixings for the cables.

Alternatively the Contractor may offer an integrated numeric control device (visible during normal operation through inspection window in front door) which combines all functions.

In the case of a short circuit at a consumer on the safe busbar, the voltage tolerances shall not be exceeded.

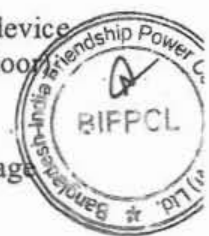
Sizing of fuses and inverter output in case of short circuits shall be properly coordinated and shall be fully selective under all operating conditions.

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B0.6.18.12 Cable and cable trays

B0.6.18.12.1 Cable laying and routing requirements

The Contractor responsible for cable routing and laying has to observe a strict unit separation. The cables must be routed in different cable channels or, as the minimum requirement, on different cable trays, so that in case of a fire or any accident in a cable channel or tray two units will not be affected. Further in case of two critical drives of the same unit with both drives operating in normal conditions cable for the same shall be routed through two completely redundant routes.

On vertical cable risers, walls and ceilings the cables must be secured with corrosion-resistant cable clips (e.g. cable clamps with cable protecting cable sleeves).

Cable risers near gangways or in electrical rooms that are exposed to possible mechanical damage are to be protected up to 1 meter from ground by suitable metal cover.

All holes in ceilings, floors and wall made for cable routing must be sealed fire-resistant, when the cables have been laid. This also applies to switchgear panels and cubicles, passages between cable ducts, at vertical risers etc. As there is an increased danger of fire during the construction period the holes shall be fire-resistant sealed at that stage already. This applies especially to vertical runs.

When the cables are no longer supported on cable trays or risers etc. the power, DC and instrument transformer cables must generally be run singly in galvanized steel conduit. With lighting cables, measuring and control cables and telephone cables, several similar cables can be run in one conduit. Surface-mounted conduits must be secured every 1.5 m.

The control and communication cables must be laid sufficiently apart from the power cables so that no interference will occur and the transmission of fault signals is excluded. For this purpose the following minimum separations are to be observed:

- 300 mm between low voltage power cables and measuring and control cables at voltages of 60 V and below,
- 300 mm between power cables and measuring and control cables at voltages above 60 V,
- 600 mm between medium voltage power cables and measuring and control cables at voltages of 60 V and below.

The laying of cables outside of buildings should be preferably on cable bridges that preferably are to be naturally ventilated.



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If the cables are laid in the ground, after excavating the trench a layer of sand must be introduced. On the sand the cables are laid separately from each other according to voltage systems. The cables must be laid at a depth of 0.8 m at least. The trench is filled with sand and covered with concrete covers or bricks. The thermal resistance of the backfilling shall not exceed 150 Kcm/W. A ground temperature of 28 °C has to be considered. Where cables have to pass under streets cable duct blocks with a suitable bore(s) should be provided. The marking of cable routes by cable warning tapes must be provided.

When laying the cables on cable trays, cable risers, cable channels, etc. and when choosing the size of the cables care must be taken that sufficient ventilation is available and that there is no possibility of thermal overheating, or strain on the cables.

Cables that must move with connected apparatus owing to thermal expansion (e.g. boilers) must be provided in a flexible form or they must have sufficient slack at the location.

All the ends of the cables must be prepared according to the particular requirements of the manufacturers and connected to existing terminal strips, terminal screws, apparatus terminals, etc.

The necessary cable sealing ends and the stripped and fanned-out cable ends, where no sealing ends are provided, must be fixed to the appropriate supporting structures.

B0.6.18.12.2 General cable construction requirements

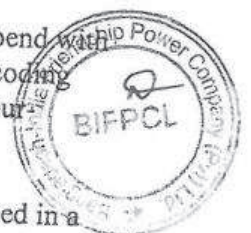
The medium and low voltage cables shall be of Fire Retardant Low Smoke (FRLS) with XLPE insulation. For cables that are exposed to ambient temperatures above 60°C, teflon or silicone cables are to be provided.

For safety related equipment fire survival cables shall be provided.

The cables must be suitable for laying indoors, in the open (direct or indirect sunlight), in ducts, on trays, in the ground and in water. The cables must be resistant to solar radiation, the effect of oil, seawater, bacterial action, insects and rodents. Outer sheaths are to be manufactured from non-combustible or flame retardant low smoke material.

Cables must be provided at both ends, at every 20 m and every bend with identification in the form of numbered labels corresponding to the coding system. The individual cores will be numbered or identified by colour coding.

The cables must be laid to ensure that they can be replaced or renewed in a simple manner.



B0.6.18.12.3 Medium voltage (MV) power cables

The design of the MV cables shall be screened, stranded, single-core or three-core copper conductor cables of FRLS with XLPE insulation. The cable shall be sealed with a red, non-fading PVC outer sheath. Three-core cables shall be designed with individually screened cores.

The MV power cables must be designed for the thermal and short-circuit characteristics of the electrical systems, taking into consideration the following minimum short circuit duration:

- for incoming cables and cables to sub-distribution: fault clearing time of the back-up protection.
- for all other cables: the fault clearing time of the main protection.

The cables must be terminated and connected to the indoor metal-clad switchgear or the sealing ends are installed in cable connection hoods mounted on the power transformers.

In the event of outage of the air-conditioning plants of the switchgear buildings the internal and external conditions will become the same. Therefore, sealing ends are to be used which shall be suitable for the maximum conditions at site.

B0.6.18.12.4 Low voltage (LV) power cables

The low voltage power cables shall be standard single and multi-core cables of FRLS with copper conductor and XLPE insulation.

To ensure the elimination of excessive contact potentials on any object, effective earthing must be carried out as a safety measure and suitable 3-core, 4-core and 5-core low voltage power cables must be provided. The minimum conductor cross-section of the low voltage power cables is 2.5 mm². If 3 1/2-core cables are used, the reduced conductor for protective neutral must have a cross-section of at least 16 mm². In lighting systems (especially discharge lighting circuits) the use of a reduced conductor for the protective neutral is to be avoided.

Depending on the site conditions the DC cables must be single-core, 2-core or 4-core. Between batteries or rectifiers and the DC switchgear single-core power cables should in general be used.

The LV power cables must be designed for the dynamic and thermal characteristics of the electrical system and for continuous operation.



B0.6.18.12.5 Current carrying capacity of power cables

The ratings for continuous loading of the cables shall be calculated according to the relevant IEC regulations. The Contractor must submit corresponding tabulations for all cables to be used.

The maximum voltage drop under normal conditions shall not exceed 2.5%.

B0.6.18.12.6 Measuring and control cables above 60 V/ instrument transformer cables

For voltages above 60 V the cables shall be of Fire Retardant Low Smoke (FRLS) with PVC insulation and a minimum conductor cross-section of 1.5 mm^2 . If they lead to outlying buildings, cables with a common core screen and protection against induction must generally be used.

For instrument transformer cables inside buildings the minimum conductor cross-section must be 2.5 mm^2 .

Instrument transformer cables leading to outlying buildings must have a minimum size of 4 mm^2 and must generally have a common core screen.

The maximum voltage drop shall not exceed 2%.

B0.6.18.12.7 Measuring and control cables below 60 V

For voltages up to 60 V, measuring and control cables shall be of FRLS with PVC insulation and shall have stranded or solid copper conductors of minimum 0.8 mm diameter. Multi-pair control cables with paired lay-up of the leads and lay-up of the pairs themselves shall be used.

Instrumentation cables shall be identified by colour codes and bank marking as per VDE 0815.

Wherever necessary, e.g. for all cables leading outside the relay rooms and/or control rooms, the control cables shall have a common screen (Al-foil or Cu-foil).

Cables must generally have appropriate electrical protection against inductive/resistive influences and lightning.

The required compensating wires for temperature measurements must be at least 0.5 mm^2 .

The maximum voltage drop shall not exceed 2%.

The individual cores of the multi-pair control cables shall be identified by numbers or a colour coding system.



B0.6.18.12.8 Fiber optic cables (FOC)

All fiber optic cables as well as their deployment and the entire test procedure shall comply with IEC 60794. The cables shall be able to operate continuously in temperatures up to 70°C. The fiber optic cables shall be loose tube type with the fibers fed into tubes. The tubes shall be sufficiently strong to hold their shape and provide protection for the fibers against deformation and friction. Each fiber shall be colour coded acc. to IEC 60304.

Buried fiber optic cables shall always be laid inside adapted conduits. Installation shall ensure rodent protection and be water tight. The conduits system shall supply all equipment necessary for the deployment acc. to FOC manufacturer's specification. Occupancy shall allow future cable installation.

For out-door applications cables shall be suited for out-door deployment, longitudinally water tight, filling material standardized for all cables, yield minimum 3,000 N.

The fiber optic cables shall be complete with non metallic strain relief elements. Fiber optic cables that are installed outdoors shall be armored. Cables used indoors shall be reinforced with a steel wire braid.

Graded index fibers cables and monomode fiber cables shall comply with IEC 24702:

Graded index fibers cables shall consist of always 24 fibers

- fiber - type 50/125 μm , OM-3.

Monomode fiber cables shall consist of always 24 fibers

- fiber - type 9/125 μm , OS-1.

19" patch panels shall be used for termination, connectors shall be LC-Duplex as standardized by IEC 61076-3-106 var. 4. All fibers shall be terminated / connected.

Each fiber of all FOC shall be deployed and tested according to IEC 60794. Resulting test protocols of all single fibers of all FOC shall be handed over to the Employer, stating all details in written.

B0.6.18.12.9 Cable supporting structures

Construction requirements

Basically, pre-fabricated cable trays, cable risers, hanger rods, screws, clamps and all fixing material of corrosion-resistant finish, hot-dip galvanized, shall be used. If in certain sections the use of trays and risers is not possible, cable racks are to be provided in such places. These shall be made of corrosion-resistant, steel angle Sections, hot dip galvanized. The steel angles must be cut to size on site and exposed cut surfaces must be suitably treated on the spot to prevent corrosion before being fitted. The minimum requirement for this treatment is the application of an anti-corrosion layer of zinc coating.

All cable tray T-junctions, cross-overs, vertical and other shelving, bends, etc. must consist of pre-fabricated tray elements so that crushing of the cables at these transition points is avoided.

The cables laid on the trays must be carefully arranged and ordered. All cable tray routings consisting of several individual cable trays that are located outside buildings and exposed to the sunlight shall be provided with sun-shades made of the material as described for the cable tray equipment. In all areas where an accumulation of coal dust must be expected, e.g. coal handling plant, conveyor belt ways, bunker area, the cable trays shall be installed vertically.

The trays and risers must be installed in such a way that in accessible manways an escape route at least 800 mm wide by 2100 mm high is available for the personnel.

For safety reasons the lower parts of the hanger rods and all other exposed parts in manways and escape routes must be fitted with plastic covers.

In indoor installations hot dip galvanized material with an average coating thickness according to ASTM A123/123M is to be used.

In all external areas, in not complete closed buildings and in areas with corrosive gas or steam Fibre Reinforced Plastic (FRP) cable trays tested according to international standards shall be provided..

The cable trays must be designed to ensure that there is 5% spare space on all trays when commissioning and handing-over is complete.

The fixing materials for the cable trays and risers must be corrosion-resistant or at least be hot-dip galvanized. The rods, brackets and risers must be fitted with appropriate support brackets to be fixed to anchor rails or fixed by dowels and screws in walls and ceilings.



Welding to steel structures and the welding together of hot-dip galvanized cable-laying accessories is not permitted.

After completion of the cable-laying work the maximum deflection of the cable trays shall not exceed 2.5 mm per 1.5 m (specified distance between two hanger rods).

B0.6.18.13 EMC measures

All EMC measures shall ensure that during subsequent operation, no impermissible malfunctions or damage to equipment occurs due to violating electromagnetic compatibility.

The description of the measures is not limited to this chapter, but also forms a part of other chapters, in particular "Protective measures", "Earthing and lightning protection" and "Cabling".

The EMC requirements are set out in the following.

Under consideration of the conditions and constraints, the equipment used shall emit the lowest interference signals and exhibit the highest immunity to interference.

All equipment items shall operate properly when connected to networks with a power supply corresponding to the maximum permissible tolerances as laid down in EN 50160 (as regards, harmonics, voltage fluctuations etc.).

Priority is given to reducing sources of interference.

Additionally, by means of high-capacity screening, generation of overvoltages due to inductive or capacitive coupling shall be reduced. Influencing by electrical and magnetic fields shall be reduced.

Earthing and potential equalization systems designed for low-impedance shall reduce generation of overvoltages due to ohmic coupling.

If EMC resulting from the measures named above is still not adequate, further measures shall be taken within buildings, for example by isolation and suppressor circuits.

Thanks to the lightning protection and screening measures taken at the buildings, within them an EMC protection zone is formed.

All installations penetrating this protection zone, that is where they pass through the external walls of buildings, shall be incorporated into a lightning protection-potential equalization system as close as possible to the points of entry and exit of the building. This applies also for conductors carrying a potential. At entry or exit, these shall be included in the lightning protection-potential equalization system by way of suppressor circuits.



B0.6.6 Vibration**Steam turbine generator**

The steam turbine and generator have to be statically and dynamically balanced in the workshop such that the following levels of vibrations can be achieved:

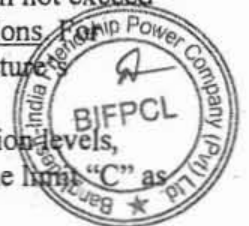
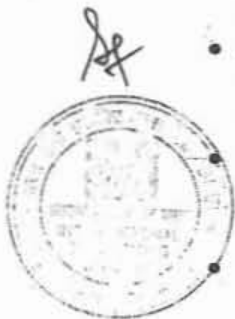
- For the steam turbine and the generator the vibration level, measured on the rotating parts at each main bearing shall not exceed the upper limit of the zone "A" as defined in ISO 7919 at steady conditions.
- For the steam turbine and the generator, the vibration level, measured on the rotating parts at each main bearing shall not exceed the upper limit of zone "B" as defined in ISO 7919 for transient operation at rated speed.
- In no case (except alarm condition), the vibrations measured on the rotating parts shall exceed 0.5 of the minimal clearance of the bearings, for the measurements installed near the bearings. This requirement is valid for all speed ranges and load conditions. If conflicts exist between the different specifications, the more restrictive value shall be applied.

The location of sensor element shall be according established standards and generally recognised codes of practice.

Other rotating equipment

Unless otherwise stated or agreed by the Employer all rotating equipment must have statically and dynamically balanced in the workshop such that the following levels of vibrations can be achieved:

- For large rotating equipment (boiler feedwater pumps, main cooling water pumps, fans (PAFs, FDFs, IDFs), condensate pumps, etc.) the vibration levels, measured on the non-rotating parts, shall not exceed the upper limit of zone "A" as defined in ISO 10816 at steady conditions. For other areas e.g. min flow or run out flow, zone limit "B" shall be maintained.
- For standard pumps, other rotating equipment and reciprocating pumps, the vibration levels, measured on the non-rotating parts, shall not exceed the zone limit "B" as defined in ISO 10816 at steady conditions. For equipment which is not covered by ISO 10816, the manufacturer's standard shall be applied.
- For all rotating equipment at transient conditions, the vibration levels, measured on the non-rotating parts, shall not exceed the zone limit "C" as defined in ISO 10816.
- For all motors, the vibration levels, measured on the non-rotating parts, shall not exceed the limit as described in the relevant Sections for MV and LV motors.
- The vibrations measured on the rotating parts may not exceed 0.5 of the minimal clearance of the bearings. This requirement is valid for all speed ranges and load conditions. If conflicts exist between the different specifications, the more restrictive value must be applied.



Whenever necessary, equipment shall be put on vibration dampers.

Vibration Monitoring System

Vibration shall be measured at large rotating or reciprocating machinery for protection and predictive maintenance. This includes the turbine, the generator, large rotating equipment (boiler feedwater pumps, main cooling water pumps, fans (PAFs, FDFs, IDFs), condensate pumps, etc.).

Suitable indications shall be provided in the control room for each measurement point and the measurement shall be suitably alarmed where high vibration levels may cause possible damage or affect the safety of the Plant. All the vibration signals, unprocessed, which are present on the machine as well the result of the VMS shall be available in the PADO as well as in DCS.

The vibration monitoring system (VMS) shall be reliable, accurate, easy to maintain, and suitable for use in such ambient conditions appertaining to the intended plant installation. Vibration monitoring signals for trip commands, protection functions or process interlocks shall be hardwired. The VMS shall comprise all the necessary hardware and software modules and shall be configured according the design and the needs of the specific installation and technology.

Standardization and interchangeability of components shall be implemented where feasible.

The following features and requirements shall be considered for the vibration and displacement monitoring system:

- self-checking and single fault tolerant system
- modular and reliable system
- 2 out of 3 voting, if signals shall be used for trips (shaft vibration measurement shall be as per ISO 7919-2)
- hardwired or redundant serial communication have to be foreseen
- All buffered outputs signals shall be passed through to the analysis system as unprocessed (raw) input signals.



The following criteria shall be used as a guideline for rotating machinery such as steam turbine, generator, blowers and fans, mills and main feed water pumps as well as other main pumps, in order to ascertain the monitoring points, principles of what signal shall be measured, what is displayed, and what mechanical conditions entail alarm and/or trip status:

- non-contacting proximity probes shall be provided unless otherwise specified for measuring rotor shaft vibration and axial position,
- vibration measurements shall be in displacement microns peak to peak,



- in cases which, because of process conditions, accessibility or non-critical service, may entail the use of machine casing mounted vibration transmitters, the transmitters shall be of the "acceleration" type incorporating a filter network, if necessary along with integration in the monitor unit for vibration read-out in velocity mm/sec RMS. For alarm only, one transducer may be used. For alarm and trip conditions 3 transmitters shall be used with a voting system (i.e. one high reading out of three = alarm, two out of three = trip). Contacting type of equipment shall meet the requirements of ISO 2954,
- velocity type transmitters shall be used as an alternative to velocimeters when machine rotational speed and generated vibration frequency conditions dictate,
- individual read-out of all channels shall be provided in HMI as well as in the vibration monitoring module. Display shall be by means of a multi-point indicator and digital selector,
- facilities for trend monitoring using trend functions of the DCS shall be provided on the turbo-generator bearings as an aid for predictive maintenance purposes,
- vibration parameters of the turbine shall also be fed in the turbine control system
- buffered signals at the monitor shall be a requirement to enable external data acquisition, if such is necessary,
- facilities shall be provided for the calibration of the instrumentation system.

Further requirements on the analysis functions of the VMS are given in Section B8.

B0.6.7 Standardization of makes

The works shall be designed to facilitate access and facility for inspection; cleaning, maintenance and repair. Continuity of supply is a prime concern. The design shall incorporate every reasonable precaution and provision for the safety of all those concerned in the operation and maintenance of the works. The Plant shall be designed to operate satisfactorily under all variations of load, pressure, and temperature.

Corresponding parts throughout shall be made to gauge and be interchangeable wherever possible.

No prototype will be permitted. Continuity of operation and lowest maintenance requirements are of prime concern. The design shall incorporate every reasonable precaution and provision for the safety of all those concerned in the operation and maintenance of the equipment and plant.

The equipment must be standardized as much as possible.



B0.7.2.3 Mechanical equipment**Rotating units****Balance testing of rotating units**

Each rotating unit shall be first statically balanced and then dynamically balanced according to ISO 1940 (in the case of impellers this shall be done before and after mounting of the service rotor shaft). However, Generator rotor will be dynamically balanced according to ISO 11342. A check balance of items that have undergone overspeed test shall also be made.

Vibration testing of rotating units

The vibration characteristics of rotating units shall be measured during performance tests. Locations of measurement and standards to be achieved shall, on request, be subject to agreement by the Employer's Representative.

Pumps

Running tests and performance tests shall be conducted on all pumps: Performance tests shall be conducted through the full operation range of the pump to closed valve conditions. Graphs indicating flow/head, flow/ power absorbed, flow/ efficiency, flow/NPSH and speed shall be produced. Results for feedpumps shall be assessed with reference to ISO 9906 class 1 (without construction tolerances), and results for other pumps to class II or III as agreed. No negative tolerance on head, capacity and efficiency and no positive tolerance on power are accepted.

The lubricating oil used in the test shall be of the same brand and grade as that recommended by the manufacturer for service use.

Dismantling of the pump for visual examination of parts for damage following test shall be done when required by the inspection standard, when considered necessary by the manufacturer, or when requested by the Employer's representative witnessing the running or performance tests. Replacement of parts following test shall necessitate repeat testing.

Clearance check of the pumps and balancing test of the impeller (acc. to VDI 20160 or eq.) shall be conducted before pump commissioning.

Pump tests shall be carried out with the motor, as supplied with the pump. In case several pumps of same size and type are supplied, test can be carried out with the same motor.

Pumps under the scope of auxiliary package/systems shall be tested with calibrated shop motor. The high energy pumps including turbine lube oil and control oil pumps shall be tested with job motor (with the motor, as supplied with the pump).

Full load full speed/back to back locked rotor torque test for one gearbox shall be ensured.



No-load mechanical run test for boiler feed pump drive turbine as per API 612 / ISO 10437 to be ensured.

Steam turbines

The turbines shall be completely assembled with their control; on a suitable erection rig at the manufacturer's works and shall be carefully inspected and measured for manufacture and assembly tolerances.

Stop and governing valves shall be delivered and installed separately. Therefore stop and governing valves will be inspected and measured for manufacture and assembly tolerance separately.

Functional tests shall be performed on the safety equipment (running with steam is not requested).

Important items of turbine control equipment which cannot be adequately tested during the main tests shall be separately bench tested.

Furthermore, testing shall be in accordance with IEC 60953-1 and comprise:

- balancing and overspeed test of the assembled rotor,
- measurement of radial and axial clearances,
- assembling inspection.

Minimum clearances between shaft seal casing and shaft seal ring, radial and axial blade clearances in blading section, axial and radial alignment of rotor in respect of shaft seals, alignment of overspeed governor etc. shall be ensured and verified by Bidder/Contractor.

Testing of free standing blades natural frequency and moment weight shall be performed for IP & LP blades.

All moving blades over 225 mm of active length shall be moment weighed and assembled on shaft in a prescribed sequence to ensure optimum balancing of rotor. Natural frequency of LP turbine blades shall be determined before mounting on rotors to ensure that the same are outside operating frequency range.

 No load run test or a rig test at the workshop as per Bidder's/Contractor's/OEM's practice for the two main turbines is acceptable.

Air compressors

 Air compressors shall be tested in accordance with the requirements of ISO 1217 or equivalent standards. Any request for deviation from the test conditions shall be accompanied by the manufacturers' proposals for the adjustment of the correction factors contained in the standard. Tolerances will be allowed according to ISO 5167-1.



Cooling towers

One Cooling Tower per unit shall be tested on site to an appropriate CTI standard. Any request for deviation from the test conditions shall be accompanied by the manufacturers' proposals for the adjustment of the correction factors contained in the standard.

In addition performance testing to be carried out for the whole system (all cells).

Cranes and hoists

Where size permits cranes and hoists shall be completely assembled at the manufacturers works and functional tests without load conducted.

Flue gas (IDF) and air fans (IDF, PAF, SAF)

Axial and radial fans shall be tested in accordance with the requirements of ISO 14694 or equivalent standards for vibration. ISO 12499 shall also apply. Any request for deviation from the test conditions shall be accompanied by the manufacturers' proposals for the adjustment of the correction factors contained in the standard.

Performance tests shall follow VDI 2044, ISO 5801 or equivalent standard.

Before commissioning, the following tests shall be conducted: NDT, trial assembly of casing, blue matching, and clearances.

Dampers and Gates

Large dampers and valves shall be leakage / tightness tested (type test) in the workshop and at site the whole system shall be tested.

Rotary air preheater (RAPH)

Before commissioning, the following tests shall be conducted: NDT, trial assembly of casing, blue matching, and clearances.

Coal Pulverizer

Before commissioning, the following tests shall be conducted: NDT, trial assembly, blue matching, and clearances. The tests will be carried out during manufacturing stage wherever possible.

B0.7.2.4 Electrical equipment

Electrical equipment and material which is not covered by the tests specified elsewhere in this document shall be inspected and tested in accordance with the latest edition of standards listed hereafter. Alternatively, equivalent standards approved by the Employer's Representative may be used. Type tests shall be carried out if type test certificates certified by an independent test authority are not available.

Installation Material

IEC 60130

Connectors for frequencies below 3 MHz

IEC 60364	Low voltage electrical installations/ Electrical installations of buildings
IEC 60423	Conduits for electrical purposes

Materials for earthing and lightning protection

IEEE 80	Guide for safety in AC Substation Grounding
IEEE 81	Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface potentials for Ground system
NFPA 780	Installation of lightning protection systems

Insulators and Bushings

IEC 60383	Insulators for overhead lines with a nominal voltage above 1000 V
IEC 60507	Artificial pollution tests on high voltage insulators to be used on AC systems
IEC 60137	Insulating bushings for AC voltages above 1000 V

Surge Protection Equipment

The surge protection equipment shall be tested in accordance with IEC 60099.

AC Switchgear for voltages above 1 kV

IEC 62271	High-voltage switchgear and control gear
IEEC37.013	IEEE standard for AC-High-Voltage generator circuit breakers on a symmetrical current.

At least the following tests shall be performed in the manufacturer's workshop on the individual apparatus and on the complete installation, respectively, all in accordance with IEC Standards:

- Visual inspection
- Power frequency HV tests
- Dielectric tests of the auxiliary circuits
- Measurement of the main contacts resistance with dc
- Temperature rise test on circuit breakers (type test certificate)
- Test of mechanical endurance (type test certificate)
- Measurement of the contact opening period (type test certificate)
- Functional tests of the control circuits
- Check of the operational sequence
- Measurement of the instrument transformer's angle and ratio errors (according to IEC-standards 60044)
- Check of the denominations.



Note 1: All MV switchgear shall be type tested according IEC 62271-1, IEC62271-100 and IEC 62271-200 including internal arc classification IAC

= AFLR. Related type test certificates shall be provided with the Tender. If the test has already been carried out on similar type switchgear, type test certificates may also be accepted.

Note 2: All GIS above 52 kV shall be tested according IEC 62271-1, IEC 62271-203.

Type tests shall be carried out, at the expense of the Contractor and without any impact on the projects overall time schedule, if type test certificates certified by an independent test authority are not available.

Note 3: Generator circuit breakers shall be tested according IEEE Std C37.013.

High voltage fuses

IEC 60282 High voltage fuses

IEC 60644 Specification for high voltage fuse links for motor circuit applications

Oil-immersed power transformers

IEC 60076 Power transformers

IEC 60214 On-load tap-changers

IEC 60404-2 Magnetic materials

a) Tanks

- Inspection of weld preparations, approved crack detection of major strength welds.
- Hydraulic test and vacuum test
- Visual and dimensional checks
- Certification of test results.

b) Cores

• Material

- Checks on flatness
- Checks for absence of burrs such as may be caused by slitting, cropping and punching
- Electrical insulated tests
- Visual and dimensional checks.

• Assembly

- Inspection during assembly stage, whilst core is still horizontal
- Visual and dimensional checks on complete core
- Checks on straightness of clamps
- Checks on clamp welding
- High voltage tests between core packets, clamps and belts in all relevant combinations
- Check actual weight of core steel in magnetic circuit against design weight
- Check that all block and sheet insulation and all spacers are in position
- Check earthing of core packets to clamps.



c) Windings

- Windings
 - Copper checks
 - Fewest possible number of welds
 - Quality of weld and finishing
 - Insulation on copper
 - Check for correct material
 - Check correct application to conductor
 - Visual and dimensional checks
- Winding of turns
 - Checks during winding of different Sections of winding
 - Checks on positions of starts and finishes of Sections
 - Checks on correct directions of windings of turns (Polarity)
 - Visual checks
- Assembly of windings together
 - Check on relative positions and numbers of leads
 - Check that vertical and horizontal coolant ducts are clear and to full design dimensions
 - Visual checks
- Assembly of windings on core
 - Visual and dimensional checks.

d) Leads

- Checks on disposition, insulation and support of tapping leads
- Checks on insulation support and positioning of bushing leads and provision for connection to bushings
- Checks on lead connections (crimping, brazing etc.)
- Checks on interphase connections
- General visual checks.

e) Insulation

- Checks on arrangement of petalling
- Checks on inter-phase and earth barriers
- Checks on shields
- Checks on clearance and creepage distances
- General visual checks.

f) Coolant flow ducts

- Check that vertical and horizontal passages are clear and to full design dimensions
- General visual checks.

g) Current transformers, links and connections

- Check that built-in current transformers are in the correct leads
- Check that the connections and alternative connections are clearly marked and that the marked ratios are correct.



- h) Assembly of transformer in Tank
- Check insulation between transformer and tank
 - Check security of fixing of transformer in tank and of any packing used
 - Check electrical clearances between tank and leads and windings
 - Checks for cleanliness and freedom from debris of inside of tank
 - General visual check.
- i) Valves
- Check action of valves after welding into position (especially butterfly valves)
 - Checks for leaks under pressure.
- j) Paint work
- Checks for preparation of surfaces
 - Checks for use of correct paint system
 - Visual checks on general finish.
- k) Conservator
- Check for leakage
 - Check capacity
 - Visual checks.
- l) Bushings
- Check against standards
 - Check that routine tests have been done
 - Checks for leakage when mounted on transformer
 - Checks for distortion, flaws and chips.
- m) Tap-changers (on-load and off-circuit as appropriate)
- Inspection on completion of manufacture, including a review of manufacturer's stage test records and procedures
 - Mechanical and electrical checks in the manufacturer's works
 - Tests in accordance with the appropriate IEC or other standard as applicable
 - Check ten complete cycles from end to end of the range
 - Check five cycles on full current
 - Check five cycles at full voltage
 - Check transmitters for correct number of steps and impedance values
 - Check interlocks
 - Check warning, alarm and trip contacts
 - Visual and dimensional checks.
- n) Pumps and fans
- Checks for direction of rotation against motor terminal markings



- Visual and dimensional checks.

o) Heat exchangers

- Checks on radiators for leaks
- Checks on radiators for paint finish and inner cleanliness
- Checks on oil-to-water heat exchangers for leaks at manufacturer's works
- Checks on oil-to-water heat exchangers for cleanliness of oil chambers and passages
- General visual and dimensional checks.

p) Processing

- Checks on pressures and temperatures with manufacturer's process charts available.

q) Control cubicles, kiosks and terminal boxes

- Checks on functioning of contactors, overloads isolators and general operation of control circuits for cooling gear
- Checks on operation of circuits for thermometers, thermal images, pressure relief valves, oil and gas operated relays, flow detectors, heaters, lights and power output sockets
- Checks on wiring arrangements and terminal boards
- Checks on weather sealing of doors, cable glands and other external features
- Visual and dimensional checks.

r) Workshop tests on complete transformer

The following routine test in accordance with IEC 60076:

- Measurement of winding resistance
- Measurement of voltage ratio and check of voltage vector
- Measurement of impedance voltage, short circuit impedance and load loss
- Measurement of no-load loss and current at U_r , $1.05 \times U_r$ and $1.1 \times U_r$
- Dielectric routine tests in accordance with IEC 60076-3
-
- Test on on-load tap changers
- Insulation resistance
- Separate source voltage withstand test
 - Induced overvoltage test to be carried out on all main transformers (see item 3) acc. to IEC 60076-3, table 1 (ACLD/ACSD).
 - PD test to be carried out for all generator transformers, interconnecting transformers and start-up/standby transformer together with ACLD.
- Frequency response analysis.
- FRA test to be carried out on all main transformers (see item 3).

The above tests shall be carried out on all transformers.



The following tests in accordance with IEC to be carried out as type tests (type tests shall not be repeated if type test certificates of an identical/similar rated transformer issued by a recognized test laboratory are available):

- Temperature rise test including direct measurement of hot-spot temperature
- Measurement of the harmonics of the no-load current
- Dielectric type tests in accordance with IEC 60076-3
- Measurement of zero sequence impedance
- For the above type tests, test certificates may be accepted at the discretion of the Employer/Engineer, in place of tests on the first transformer of each basic type excepting the generator transformer. In the case of generator transformers the type tests must be carried out
- Noise measurements.
- The generator step-up transformer, the 400/230 kV interconnection transformer, the unit auxiliary and the auxiliary transformers shall be dynamic short circuit withstand tested according IEC 60076-1 & -5 either in the manufacturers workshop or in a recognized 3rd party test lab (as special test).

In addition to the above tests, the following tests shall be made as routine tests:

- Tangent delta measurements on the insulation, the method to be agreed with the Employer/Engineer
- Core insulation test on magnetic circuit
- On windings of 30 kV rating or above either:
 - ration influence voltage tests, the method to be agreed with the Employer/Engineer or
 - partial discharge measurements in accordance with IEC
- Transformer oil analysis according to IEC 60296, IEC 60567 and according IEC 62535 for detection of potential corrosive sulphur in mineral oils
- Transformer tanks, conservators, oil pipework and air cooled cooling plant shall withstand without leaking or permanent distortion, the application for 24 hours of a pressure which is such that the test pressure at any point in the equipment is twice the working pressure at that point or 0.7 kg/cm² plus the working pressure at the point or 0.3 kg/cm² plus the pressure exerted at that point when the pressure relief is opened slowly by oil pressure whichever is the greatest.
- Tank vacuum & pressure test
- Pressure test of radiators
- Oil leakage test
- Pressure relief device, Buchholz relay, oil, winding meters, oil level indicator, dry cool breather, dissolved gas analyzer test / check.



Fault withstand (fault versus time) curve for all transformers shall be submitted by the Contractor.

Over-excitation curves shall be provided by the manufacturers for the station transformers.

Separate type and routine tests shall be carried out for all accessories like bushings, bushings CTs, tap changers, cooling fans, control panels, etc.

Dry type transformers

The following routine tests in accordance with IEC 60076 shall be carried out on all transformers:

- Measurement of winding resistance
- Measurement of voltage ratio and phase displacement
- Measurement of short circuit impedance and load loss
- Measurement of no-load loss and current
- Separate source AC withstand test
- Induced AC voltage test
- Lightning Impulse test
- Partial discharge measurement.

The following tests in accordance with IEC 60076 to be carried out as type tests (type tests shall not be repeated if type tests certificates of an identical transformer issued by a recognized test laboratory are available):

- Temperature rise test
- Measurement of sound level
- Short circuit test
- Environmental Test according Class E2
- Climatic test according Class C1
- Fire behaviour test according to Class F1.

Also, Lightning impulse test shall be a type test.

Fault withstand (fault versus time) curve for all transformers shall be submitted by the Contractor.

Separate type and routine tests shall be carried out for all accessories like bushings, bushings CTs, tap changers, etc.

Current and voltage transformers

The current and voltage transformer shall be tested in accordance with IEC 61869

Generators

IEC 60034, IEEE 115, ISO 1680 and ISO 10816.



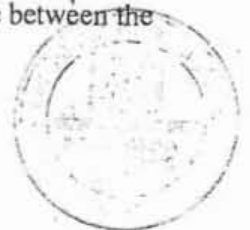
a) Generator test report

Comprehensive test reports for the generators are to be compiled and submitted by the Contractor, which shall include:

- Description of the test method, equipment used and any limitations of the test plant.
- Copies of the oscillographs recorded with appropriate calibration data
- Open circuit saturation, short circuit and loss curves for the generator
- A performance chart of the generator (being a diagram of constant stator and rotor current curves plotted on rectangular axis of MVAR and MW load) The recommended loading, stator core end heating and stability limits shall be shown on the chart.
- Calculations of full load temperature rise for the stator, rotor and exciter. Any correction factors used to allow for different voltage current and cooling conditions shall be justified by reference to published literature or to previous type tests.
- Calculations of the efficiency of the complete generator at 100%, 75% and 50% load. Any correction factors for losses that could not be measured at routine tests shall be justified by reference to published literature or to previous type tests.
- Calculations of machine parameters (according to IEC 60034-4) such as transient reactance and time constant, sub-transient reactance and time constant, short circuit ratio, synchronous reactance, negative phase sequence reactance, zero sequence reactance, capacitance and also the harmonic analysis of the neutral current.
- Calculation of full load excitation of the machine at rated power factor lagging and at unity power factor, excitation V curves.

b) Routine tests on generator

- Generator stator frame
 - hydrostatic test (if H2 cooling)
 - resistance check of temperature detectors
- Generator rotor
 - ultrasonic examination
 - mechanical balance
 - over-speed test
 - measurement of 50 Hz rotor impedance (at 3000 RPM).
- Stator core laminations
 - Magnetization of stator core lamination layer resistance between the layers of the core
- Generator H2 cooler (if H2 cooling)
 - hydrostatic test
- Generator assembled:
 - three phase short circuit characteristic test and current balance check
 - dielectric test



- measurement of insulation resistance
- measurement of winding resistance
- open circuit characteristic test and voltage balance, phase sequence check
- segregation of mechanical loss and core loss
- segregation of stray load loss
- efficiency calculation
- unbalanced load test for negative-phase sequence and zero sequence reactance
- shaft voltage measurement
- oscillographing of verified voltage wave form and harmonic analysis
- measurement of vibration
- polarization index
- tan delta measurement of complete winding
- bearing insulation resistance.

c) Type tests on generator (as far as type test certificates are not available)

- Sudden short circuit test at reduced voltage (30%, 50% and 70% of rated voltage), extrapolated to 100% voltage
- Equivalent heat run test consisting of:
 - windage and friction heat run, open circuit heat run at 105% rated voltage, short-circuit heat run at rated line current, open-circuit heat run at rated line voltage
 - measurement of open-circuit direct-axis transient time constant
 - noise measurement
 - moment of inertia
- Measurement of excitation response time*)
 - overall characteristic coupled with generator and AVQC cubicle at no load*)

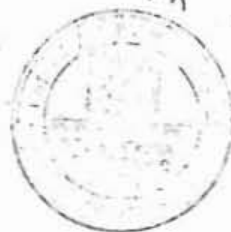
*) applicable to assembled unit consisting of generator, exciter and voltage regulator, may be carried out on site

Type tests shall be carried out if type test certificates (Not older than 5 years as on date of bid opening) certified by an independent test authority are not available.

Sudden short circuit test shall be carried out in line with IEC at voltage level to be finalized during detailed engineering.

d) Routine tests on generator exciter

- Resistance of windings
- Insulation resistance
- High voltage tests
- Short-circuit characteristic
- No-load characteristic.



Motors

IEC 60034, ISO 1680, ISO 10816

- Type tests (each motor type) as far as type test certificates are not available
 - measurement of starting (locked rotor) current and torque
 - power factor and efficiency measurement
 - heat run test
 - noise measurement
 - temperature rise measurement
- Routine tests (each motor)
 - measurement of winding resistances
 - measurement of shaft current
 - no-load and current measurement
 - no-load short circuit measurement
 - open circuit secondary induced voltage test at stand still (wound rotor)
 - dielectric test (high voltage test)
 - measurement of insulation resistance
 - overspeed tests (120% for 2 minutes)
 - check of motor vibrations
 - oscillographic measurement of starting current.

Emergency diesel sets

All relevant routine and type tests according to:

ISO 3046	Reciprocating internal combustion engines - Performance
ISO 8528	Generating sets with reciprocating internal combustion engines

a) Type tests

The diesel generator unit (DGU) and all auxiliary equipment shall be fully type tested. These tests shall include all type tests as defined in the relevant latest IEC and ISO recommendation (as a minimum requirement).

Evidence shall be given that the DGU together with the auxiliary equipment to be provided, under these specifications, have successfully passed all type tests of design, service frequency, impulse, insulation level, dynamic operating range, and electrical and mechanical endurance performance, as appropriate and as specified.

However, if deemed necessary, the Employer shall decide if additional tests are required to be performed by the Tenderer/Contractor.

The Tenderer/Contractor shall supply certified copies of type test certificates covering the proposed DGU of similar capacity or higher, operating range, data features, design and construction.



b) Sample tests

Sample Tests shall be performed, comprising as a minimum the following tests:

- Visual checks and measurements of dimensions
- Functional tests.

c) Routine tests

The Tenderer/ Contractor is required to carry out routine tests on each assembled and finished diesel generator unit and its relevant auxiliary equipment to demonstrate the integrity of the system.

Routine test certificates shall be submitted for the Employer's review and approval before shipment of the DGU.

The DGU shall pass all the routine tests as laid down in the relevant latest revisions of IEC & ISO Standards. In addition, the visual Inspection, which shall determine conformity of the DGU & the relevant equipment with the requirement, shall be part of the routine tests.

The acceptance test for the diesel engine at the Manufacturer's workshop test bed shall include the measurements, calculations and functional checks stated in ISO 3046-1 (E).

A test report in English shall be issued according to ISO 3046-1 (E) giving evidence of the following data:

- Engine model, order No., rated output, operating speed, number of cylinders, bore, stroke, compression ratio, cylinder displacement, no. of strokes, date of test, the Employer's name, inspector's name, ambient air temperature, relative humidity, barometric pressure, fuel specific gravity, fuel net calorific value, setting data of injection pump, firing sequence, valve timings, type of fuel oil filter, type of lube oil filter, type of turbocharger and inter-cooler, type of governor, type of injectors.

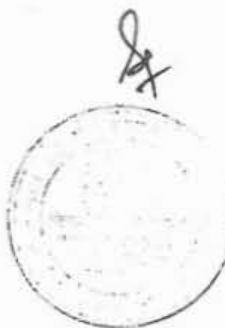
The Tenderer/Contractor shall submit together with the test report a certificate showing the emission levels of the exhaust gases: NOx, CO and PM (particulate matter).

The diesel engine shall be proven to be capable of operating in steady state condition on all above mentioned loads. If the diesel engine fails to operate in steady state condition on one or more loads, this engine type shall be not accepted for the scope of the diesel generator units.

d) Special tests

The diesel engine shall be at least tested in total for one hour at the following loads:

- | | |
|--------------------------------|-------------|
| • Warm-up of the diesel engine | as required |
| • 25 % load operation | 10 minutes |
| • 50 % load operation | 10 minutes |



- 75 % load operation 10 minutes
- Full load operation 20 minutes
- 110 % load operation 20 minutes
- Cool down of the diesel engine.

During the test run, temperatures, pressures and fuel consumption shall be measured and recorded.

The diesel engine shall be proven to be capable for operation in steady state condition on all above mentioned loads. If the diesel engine fails to operate in steady state condition on one or more loads, this engine type shall not be accepted.

Low voltage switchgear

The following standards and regulations or equivalent shall be used:

IEC 60947	Low-voltage switchgear and control gear
IEC 61439	Low-voltage switchgear and control gear assemblies
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 60898	Specifications for circuit-breakers
IEC 60079	Electrical apparatus for potentially explosive atmospheres
IEC 60947	Regulations for low-voltage switchgear

The "Design Verification" of all low voltage switchgears/ motor control centers shall be carried out by following methods:

- "Testing" for the Pos. No. 1., 2., 3., 4., 5., 9., 10., 11., 12. and 13 of IEC 61439-1/Annex D, Table D.1
- "Assessment" for the Pos. No. 6., 7. and 8 of IEC 61439-1/Annex D, Table D.1

In addition to the above tests for which certificates shall be submitted, at least the following tests shall be performed in the manufacturer's workshop on the individual apparatus and on the complete installation, respectively, all in accordance with IEC Standards:

- Visual inspection
- Power frequency HV tests at main circuit
- Dielectric tests of the auxiliary and control circuits
- Functional test of the control circuits
- Check of the operational sequence.



Capacitors

IEC	60831	Shunt power capacitors
IEC	60871	Shunt capacitors for A.C. power systems
IEC	60931	Shunt power capacitors
IEC	60143	Series capacitors for power systems
IEC	60358	Coupling capacitors and capacitor dividers
IEC	60384	Fixed capacitors for use in electronic equipment

Batteries, charging equipment inverters and DC/DC converters

IEC	60086	Primary batteries
IEC	60119	Recommendations for polycrystalline semiconductor rectifier stacks and equipment
IEC	60146	Semiconductor converters
IEC	60896	Stationary lead-acid batteries
IEC	61204	Low voltage power supply devices DC output

Chargers and batteries shall be tested together in the factory. Testing of chargers and batteries together at site will also be accepted. All factory tests shall be repeated at site.

Chargers

- Visual inspection (to be repeated on site)
- Functional tests (to be repeated on site)
- Heat run (type test)
- Output voltage stability measured for 25% load steps
- Ripple voltage measurement without connected battery
- Ripple measurement (voltage and current) with connected battery (at site will also be accepted).
- Insulation test (to be repeated on site).

Batteries

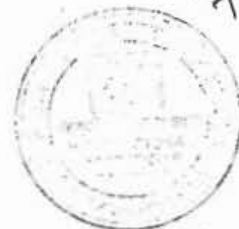
- Visual inspection (to be repeated on site)
- Insulation test (to be repeated on site)
- Charge test and discharge tests

Fuse Box

- Visual inspection (to be repeated on site)
- Functional tests (on site)
- Insulation test (on site)

Inverters and DC/DC converters

- Visual inspection (to be repeated on site)
- Functional tests (to be repeated on site)
- Heat run (type test)
- Insulation test (to be repeated on site).



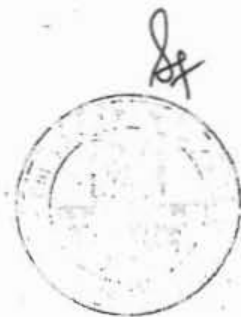
Lamps and accessories

IEC	60081	Double-capped fluorescent lamps
IEC	61347	Lamp control gear
IEC	60921	Ballasts for tubular fluorescent lamps
IEC	60155	Glow starters for fluorescent lamps
IEC	60598	Luminaries
IEC	60188	High-pressure mercury vapor lamps
IEC	60400	Lampholders and starter holders for tubular fluorescent lamps
IEC	60901	Single-capped fluorescent lamps
IEC	60662	High pressure sodium vapor lamps
IEC	60192	Low pressure sodium vapor lamps
IEC	60923	Auxiliaries for lamps
IEC	61347	Part 2-13: lamp control gear for LED Modules
IEC	62031	LED modules for general lighting - Safety specifications
IEC	62560	Self-ballasted LED-lamps for general lighting services by voltage > 50 V - Safety specifications
IEC	62612	Self-ballasted LED-lamps for general lighting services by voltage > 50 V - Performance requirements
IEC	62471	Photobiological safety
IEC	62384	DC or AC supplied electronic control gear for LED modules - Performance requirements
IEC	60838	Part 2-2: miscellaneous lampholders - Connectors for LED-modules
IEC/PAS	62717	LED Modules for general lighting - Performance requirements
IEC/PAS	62722	Luminaires Performance

HV-, MV- and LV-cables

All relevant routine and type tests according to:

IEC	60060	High voltage test techniques
IEC	60071	Insulation co-ordination
IEC	60230	Impulse tests on cables and their accessories
IEC	60811	Common test methods for insulating and sheathing materials of electric cables
IEC	60840	Power cables with extruded insulation and their accessories for rated voltages above 30 kV up to 150 kV
IEC	62067	Power cables with extruded insulation and their accessories for rated voltages above 150 kV up to 500 kV
IEC	60502	Power cables with extruded insulation and their accessories for rated voltages from 1 kV up to 30 kV



a) LV-cables

LV cables shall be workshop tested as per IEC 60502-1 with the following tests as a minimum:

Type tests:

- electrical type tests acc. to: IEC 60502 - 1 Clause 17
- non electrical type tests acc. to: IEC 60502 - 2 Clause 18.

Also following additional type tests shall be carried by the Contractor at their own cost prior to the first shipment of all offered cable if no type test certificates of identical cables are available:

- Fire Resistant according to IEC 60331, BS 6387
- Flame Retardant according to IEC 60332
- Low Smoke Test according to IEC 61034
- Halogen Content Test according IEC 60754
- Water Tree Test of XLPE Insulation (accelerated)
- Test voltage = $3 \times U_0$
- Test frequency = 500 Hz
- Core environment = 400C water
- Duration of test = 4 month
- Test after 4 months: Dielectric stress withstand >14kV/mm.

Moreover, test certificates shall be provided, proving that each cable type to be used has successfully passed type tests as required by the applicable standards during the last 12 months before award of contract. Otherwise, these tests have to be repeated on sample Sections.

Routine tests: according IEC 60502 – 1, Clause 15

- measurements of electrical resistance of conductors according to Clause 15.2
- voltage tests according to clause 15.3.

Sample tests: according IEC 60502 – 1, Clause 16

- conductor examination according Clause 16.4
- check of dimensions according Clause 16.5 to 16.8
- hot set test for EPR, HEPR and XLPE insulations and elastomeric sheath according Clause 16.9.

b) MV-cables

MV cables shall be workshop tested as per IEC 60502-2 with the following tests as a minimum:

Type tests:

- electrical type tests acc. to: IEC 60502 - 2 Clause 18
- non electrical type tests acc. to: IEC 60502 - 2 Clause 19.

Also following additional type tests shall be carried by the Contractor at their own cost prior to the first shipment of all offered cable if no type test certificates of identical cables are available:

- Fire Resistant according to IEC 60331, BS 6387
- Flame Retardant according to IEC 60332
- Low Smoke Test according to IEC 61034
- Halogen Content Test according IEC 60754
- Water Tree Test of XLPE Insulation (accelerated)
- Test voltage = $3 \times U_0$
- Test frequency = 500 Hz
- Core environment = 400C water
- Duration of test = 4 month
- Test after 4 months: Dielectric stress withstand >14kV/mm.

Moreover, test certificates shall be provided, proving that each cable type to be used has successfully passed type tests as required by the applicable Standards during the last 12 months before award of contract. Otherwise, these tests have to be repeated on sample Sections.

Routine tests: according IEC 60502 – 2, Clause 16

- measurements of electrical resistance of conductors according to Clause 16.2
- partial discharge test according to Clause 16.3 on cables having cores with conductor screens and insulation screens in accordance with Clause 7.1 and 7.2
- voltage tests according to clause 16.4.

Sample tests: according IEC 60502-2 Clause 17

- conductor examination according Clause 17.4
- check of dimensions according Clause 17.5 to 17.8
- voltage test for cables of rated voltages above 3.6/6 (7.2) kV according to Clause 17.9
- hot set test for EPR, HEPR and XLPE insulations and elastomeric sheath according Clause 17.10.

c) HV-cables

The 230 kV XLPE-Insulated Single-Core Underground Cables and Accessories shall be tested as per latest IEC 62067 including all subsequent amendments and relative standard. The Employer/Engineer shall witness the required Type and Sample tests.

The approval of the Employer/ Engineer or the passing of any such inspection or test will not however, prejudice the right of the Employer/ Engineer to reject the 230 kV XLPE-Insulated Single-Core Cables and accessories if it does not comply with the Specification.

Defects discovered during the type/routine/sample tests shall entitle the Employer/Engineer to reject the cables/accessories fabricated for this Project.

The Tenderer/ Contractor shall fabricate without additional cost the cable lengths and accessories necessary for the tests, over and above those required to complete the Works at Site.

For the definitions of the Type Tests, Sample Tests, Routine Tests and Tests after installation, reference shall generally be made to the relevant IEC Standards.

HV cables and accessories shall be workshop tested as per IEC 62067 with the following tests as a minimum:

Type tests on cable systems: according clause 12:

- Electrical type test according Clause 12.4
 - Check of insulation thickness acc. to Clause 12.4.1
 - Bending test on the cables acc. to Clause 12.4.4 followed by installation of accessories and a partial discharge test acc. to Clause 12.4.5
 - Tan δ measurement acc. to Clause 12.4.6
 - Heating cycle voltage test acc. Clause 12.4.7
 - Partial discharge test acc. to Clause 12.4.5 (at ambient and at high temperature)
 - Switching impulse voltage test acc. to Clause 12.4.8
 - Lightning impulse voltage test followed by a power frequency voltage test acc. to Clause 12.4.9
 - Test of outer protection for joints
 - Examination of cable system with cable and accessories after completion of tests acc. to Clause 12.4.10.
 - Test of semi-conducting screen acc. to Clause 12.4.11.
- Non electrical type tests according to Clause 12.5
 - Check of dimensions acc. to Clause 12.5.1
 - Tests for determination the mechanical properties of insulation acc. to Clause 12.5.2
 - Tests for determination the mechanical properties of oversheats acc. to Clause 12.5.3
 - Aging tests acc. to Clause 12.5.4
 - Pressure test at high temperature on oversheats acc. to Clause 12.5.6
 - Other test on oversheats according to the type used.
 - Hot set test for XLPE insulation acc. to Clause 12.5.10
 - Measurement of carbon black of black PE oversheats acc. to Clause 12.5.12
 - Water penetration test acc. to Clause 12.5.14.

Also following additional type tests shall be carried by the Contractor at their own cost prior to the first shipment of all offered cable if no type test certificates of identical cables are available:

- Fire Resistant according to IEC 60331, BS 6387
- Flame Retardant according to IEC 60332
- Low Smoke Test according to IEC 61034
- Halogen Content Test according IEC 60754
- Water Tree Test of XLPE Insulation (accelerated)
 - Test voltage = $3 \times U_0$
 - Test frequency = 500 Hz
 - Core environment = 400C water
 - Duration of test = 4 month
 - Test after 4 months: Dielectric stress withstand >14kV/mm.

Cables and accessories shall have passed type approval tests in accordance with IEC Specifications and details of the cable designs offered shall be given in the appropriate place in the Technical Schedules. Type test reports shall include cable design details and design drawings of each jointing accessory included in the type test.

The Tenderer/Contractor shall submit certified copies of type test certificates covering the proposed Cables.

Routine tests: according Clause 9

- partial discharge test according to Clause 9.2
- voltage tests according to according to Clause 9.3
- electrical test on oversheath according to Clause 9.4

Sample tests: according to Clause 10

- conductor examination according Clause 10.4
- measurement of electrical resistance of conductor according to Clause 10.5
- measurement of thickness of insulation and oversheath according to Clause 10.6
- measurement of thickness of metallic sheath according to Clause 10.7
- measurement of diameters according to Clause 10.8
- hot set test XLPE insulations and elastomeric sheath according Clause 10.9
- measurement of capacitance according to Clause 10.10
- lightning impulse voltage test follows by a power frequency voltage test according to Clause 10.12
- water penetration test according Clause 12.5.14
- Lead alloy composition and behavior (BS 3908, BS EN 12548).

Type tests of accessories

All accessories shall be tested as per IEC 62067 and all subsequent amendments and relative standards considering Test of Outer protection for buried joints (if applicable).

Routine Tests, Insulation Joints

The insulation flange shall be designed to withstand tests voltages as specified in the Technical Data Sheets and shall be tested accordingly.

Routine Tests, Bonding/Earthing Leads

The Bonding/Earthing Leads shall be designed to withstand tests voltages and currents as specified in the Technical Data Sheets and shall be tested accordingly.

Telecommunication installations

IEC 60215 Safety requirements for radio transmitting equipment

Aerials

IEC 60169 Radio-frequency connectors

Power installations up to 1000 V

IEC 60364 Electrical installations of buildings

IEC 61439-4 Particular requirements for assemblies for construction sites (ACS)

Power installation above 1000 V

IEC 60060 High-voltage test techniques

IEC 62271 HV switchgear and control gear
(incl. Appendix AA "Internal Arc Test")

Protection equipment

Equipment for modular static protection systems (e.g. generator, distance, busbar, protection, etc.) pre-assembled in the relevant standardized boards/cubicles etc. shall be tested in the manufacturers' workshops according to IEC 60255 as far as wiring and proper function is concerned. Simulated inputs (binary signals, current and voltage inputs from test power supplies) shall be used.

Fire alarm system

All relevant routine and type tests according to:

NFPA National Fire Protection Association

DIN VDE 0800 Telecommunications

DIN VDE 0833 Alarm systems for fire, intrusion and hold-up

Where possible valve nameplates shall be circular and shall be fitted under the handwheel captive nut. They have to be of such a diameter that there is no danger for persons operating the valve or that they do not prevent lock-off of this valve; on check valves and small valves the Contractor may provide rectangular nameplates fitted to brackets on the valve or attached to a wall or steelwork in a convenient position adjacent to the valve.

B0.6.4 Marking and labelling

Each crate or package is to contain a packing list in a waterproof envelope. All items of material are to be clearly marked for easy identification against the packing list.

All cases, packages, etc. are to be clearly marked on the outside to indicate the total weight, where the weight is bearing and the correct position of the slings and are to bear an identification mark relating them to the appropriate shipping documents.

All stencil marks on the outside of cases are either to be made in waterproof material or protected by shellac or varnish to prevent obliteration in transit.

B0.6.5 Corrosion protection, coating and galvanizing

This specification shall be used for the corrosion protection of steel structures, components, pipings and equipment in general which are installed in confined areas (indoors) or outdoors.

Surface preparation, as well as protective coatings and coating systems are based on this specification in order to assure that structural parts of different suppliers will get a corrosion protection of similar and high quality.

Coating material shall only be supplied by manufacturers with international experience and their products can be obtained internationally.

Regarding maintenance work (storage), application and supervision of coating work, choice of coating suppliers should be minimized. At any rate, similar parts of structures/components (such as structural steel, containers, piping, etc.) shall only be coated with products of one individual manufacturer.

The materials and equipment used, the methods of application and the quality of work shall at all times be subject to the inspection and approval of the Employer or his Representative.

To mitigate crevice corrosion, the designs and construction of structures and equipment shall ensure that no collection of water occurs in crevices which could lead to crevice corrosion.

It is the responsibility of the Contractor to ensure that, for all supplied equipment (including that from sub suppliers):

- The protection system is perfectly suitable for the Site conditions and for the specific purpose.
- The shop paints provide a sufficient protection during transport, storage and erection.
- The shop paints are suitable for handling and erection conditions (slinging, Site welding works etc.) and are compatible with the Site finishing coats
- All necessary precautions are taken in order to prevent damage to paints during storage, handling, welding.
- The necessary repairs are carefully executed as soon as possible.
- The colour RAL number of the finishing coat has been approved by the Employer, including identification code for piping.
- Standardised equipment will be painted according to the manufacturer's standard.
- All corrosion protection and coating on site shall be done in a workshop specifically for the purpose of the application of corrosion protection and coating.

Codes and standards

Applicable standards are:

- Product data of coating manufacturer
- DIN 2403 Indication of pipe-lines according to flowing material
- DIN 4762 Surface roughness
- ISO 8503 Surface roughness
- DIN 8201 Part 1-9 tight blasting agents
- DIN 50976 Corrosion protection, hot dip batch galvanizing of single parts, requirements and testing
- DIN 55928 Part 1-9 corrosion protection of structural steel work through protective coatings and topcoats
- ISO 8501 Preparation of steel substrates before application of paints and associated products
- ISO 12944 Paints and varnishes – corrosion protection of steel structures by protective paint systems
- RAL Colour card
- ISO 8501-1 Preparation of steel substrates before application of paints and related products
- SSPC Vol. 1 and 2 Steel structure painting council

Surface preparation and cleaning of surfaces in the shop

Prior to blasting, areas have to be cleaned from oil, grease, paint residues, splatters, welding splashes and welding slag using a suitable aqueous degreaser, or solvent for more severe grease contamination. The cleaning should be to provide a "water break free surface".

Sharp edges have to be rounded off.

Contaminations caused by salts, acids and alkali solutions shall be eliminated by rinsing with water up to a pH value of 6-8. Soluble salt contamination is to be tested using the Weber Reilly test method (or similar approved) and pH is to be tested using universal indicator paper strips prior to continuation with the blasting.

The preparation of substrates shall be carried out on the basis of the specifications of ISO 12944 part 4 and ISO 8501. The preparation of steel before application of paint and related products shall be in line with ISO 11124 for metallic blast cleaning abrasives and ISO 11126 for non-metallic blast cleaning abrasives. No recycled blast grit may be utilised.

After blasting, an anchor profile of 25 - 50 µm shall be achieved. Blasted surfaces have to be provided with a prime coat of the approved coating system immediately within 4 hours of blasting. All blasting and priming must take place outside of the high humidity periods of the day (i.e. maximum relative humidity of 80%).

Cleaning to be performed on site

Steel work protected by shop primer after arrival on site must be cleaned of salt, sand, oil, etc. before the first coat of paint is applied on site. Shop primer damaged during transport must be rectified by blast-cleaning and coating before application of the site coats.

Wood surfaces shall be sanded clean. All nail holes shall be puttied and sanded before priming, unless the specific coating system allows for coating onto damp concrete, in which case only with approval from the Employer.

If a protective coating of concrete is required, concrete shall be allowed to cure before painting.

Transport and erection damages, as well as damages which result out of additional welding have to be repaired as soon as possible. The damaged areas have to be derusted with rotating or steel brushes, abrasive wheels, and abrasive blasting according to DIN ISO 8501-1.

Cleaning of prime and intermediate coats (if required)

To prevent contamination by mineral oil products, areas with prime and intermediate coat have to be treated with suitable cleaning agent. Cleaning has to be done free of residues, e.g. with alkaline detergents and thorough washing done with fresh water. Rusty spots have to be removed according to required purity. Metallic areas which are provided with temporary corrosion protection have to be cleaned. No oxidation products shall remain on the surface. Further care shall be taken that on hot components, no destructive or reaction products will be released when heating which could injure insulation.

Application procedure

When using the provided coating material, strict adherence to all application instructions given in product data of coating manufacturer is necessary. To obtain the maximum performance, technical data as well as application instructions for the individual coating material have to be strictly followed. For a multi-layer coating system each layer has to have a different colour shade in order to clearly identify number of coats applied. The last finish coat has to be applied in the specified colour shade.

All paintings shall be performed according to ISO 12944. The durability of all paintings shall be "high" which corresponds to 15 years.

The interval between applying the different coats has to follow according to supplier's precautions. Each layer has to be cleaned and released from spray dust before the next layer will be applied. Prior to applying a further layer, the last one has to be repaired. All coatings have to be applied without retarding.

Following application procedures are allowed:

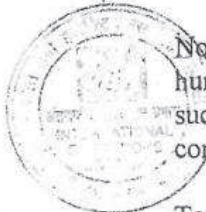
- prime coats by airless spray
areas like disconnections, angles, corners, etc. which are difficult to be reached can be applied by brush or roller
- repair of prime coat by brush
- finish coats
 - at works by airless spray, roller or brush
 - at site by roller or brush or airless spray.



When applying coating systems by roller, rollers have to be of kind and quality which make an appropriate application possible.

Control areas in accordance with the coating supplier's instructions have to be applied. For this procedure, a schedule for control areas has to be prepared by the Contractor and coating supplier which corresponds with the requirements of the warranty agreement.

Number and performance of the control areas have to be done in accordance with ISO 12944 part 7 and have to be documented in writing.



No application shall take place either in the condition of the relative humidity not within the given limit or in case of poor weather conditions such as fog, dust, rain, snow, hail or when it can be assumed that such conditions of poor weather will arise within 2 hours after application.

Temperature of the coated parts has always to be above 5 °C and 3 K above dew point.

All specified dry film thicknesses (DFT) are minimum thicknesses.

Welding seams executed at site have to be taped with an adhesive tape of about 30-50 mm after surface preparation (blasting or manual derusting) and prior to application in the manufacturing plant and to be coated with stripping coat.

Chequered plates, nap plates, etc. have not to be covered with adhesive tape, but have to be coated with stripping coat in a dry film thickness of at least 150 μm .

Edging lines on steel structure have to be taped prior to application and after blasting in sufficient width or have to be protected with varnish before application. Thickness of prime coat may be 50 μm maximum.

During repairing works at site on shop-primed structures, it is important that different coats will have different colour shades. Numbers of layers have to be the same as the original coating system to be used.

Application of temporary primer on structures which have to be insulated has to be in accordance with a sufficient corrosion protection for the period of storage respectively erection time.

Galvanizing

Galvanizing work shall conform in all respects to ISO 1461 or equivalent standards and shall be performed by the hot dip process unless otherwise specified.

It is essential that details of steel members and assemblies which are to be hot-dip galvanized should be designed to suit the requirements of the process. They should be in accordance with ISO 12944.

Vent holes and drain holes shall be provided to avoid high internal pressures and air locks during immersion and to ensure that molten zinc is not retained in pockets during withdrawal.

Careful cleaning of welds is necessary before welded assemblies are dipped. All defects of the steel surface including cracks, surface laminations, laps and folds shall be removed in accordance with BS 4360. All drilling, cutting, welding, forming and final fabrication of unit members and assemblies shall be completed, where feasible, before the structures are galvanized.

The minimum coating thickness shall be as specified in Table 1 of BS 729. Structural steel items shall be first grit-blasted to BS 4232, second quality, (Sa 2 1/2) or pickled in a bath, and the minimum average coating weight on steel Sections 5 mm thick and over shall be 900 g/m^2 , on steel Sections 2 - 5 mm thick 600 g/m^2 .

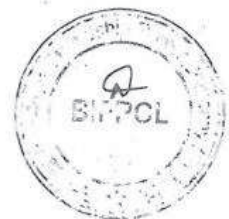
Galvanized contact surfaces to be joined by high-tensile friction-grip bolts shall be roughened before assembly so that the required slip factor is achieved. Care shall be taken to ensure that the roughening is confined to the area of the mating faces.

Protected slings must be used for off-loading and erection. Galvanized work, which is to be stored at the works or on site shall be stacked so as to provide adequate ventilation for all surfaces to avoid wet storage staining (white rust).

Small areas of the galvanized coating damaged in any way shall be restored by:

- cleaning the area of any weld slag and thorough wire brushing to give a clean surface
- The application of two coats of zinc-rich paint, or the application of a low melting point zinc alloy repair rod or powder to the damaged area, which is heated to 300 °C or the treatment with suitable cold galvanizing paint, such as ORAPI n.z.a.b 706. All zinc rich paint used for such repairs must contain a minimum of 81% by mass of zinc in the dry film.

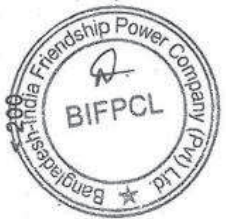
Connections between galvanized surfaces and copper, copper alloy or aluminium surfaces shall be protected by suitable tape wrapping.



Coating Systems System-No.	Surface location	Temp. °C	Surface preparation	Coating systems	No. of coats	Generic type	Dry film thickness (DFT) per coat µm	Total DFT µm
1	Structural steel works, piping, vessels, tanks INDOOR	up to 120	SA 2.5	Primer Finish	1 1	Zinc-Epoxy Epoxy High Solid	80 80	80 160
2	Structural steel works, piping, vessels, tanks OUTDOOR	up to 120	SA 2.5	Primer Intermediate Finish	1 2 1	Zinc-Epoxy Epoxy High Solid 2 Comp Polyurethane	80 160 50	80 160 290
3	Piping, tanks, etc. INDOOR and OUTDOOR Insulated	up to 120	SA 2.5	Primer	1	Zinc-Epoxy	50	50
4	Pumps, motors, other equipment OUTDOOR	up to 120	SA 2.5	Primer Intermediate Finish	1 1 1	Zinc-Epoxy Epoxy High Solid 2 Comp Polyurethane	80 110 50	80 110 240
5	Pumps, motors, other equipment INDOOR	up to 120	SA 2.5	Primer Finish	1 2	Zinc-Epoxy Epoxy High Solid	80 50	80 100 180
6	Piping, reactors OUTDOOR Insulated	> 120	SA 2.5	Primer	1	Zinc Ethylsilicate	75	75
7	Stacks OUTDOOR	< 120	SA 2.5	Primer Finish	1 2	Zinc Ethylsilicate Silicone Acrylic	75 50	75 100 175



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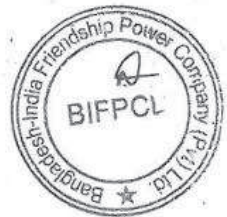


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8140A01/FICHT-15702705-v5
BIFPCL/EPC-Main Plant/1/

Coating Systems	System-No.	Surface location	Temp. °C	Surface preparation	Coating systems	No. of coats	Generic type	Dry film thickness (DFT) per coat µm	Total DFT µm
	8	Steel surfaces Uninsulated.	200-450	SA 2.5	Primer Finish	1 2	Zinc Ethylsilicate Silicone Aluminium	75 25	75 50 125
	9	Galvanized surfaces	up to 120	Mechanical cleaning from contaminants and zinc salts by means of washing or steam jetting or sweep-blasting with fine sand	When Finish Coat is required, such as sea climate with chloride exposure	1	Epoxy High Solid*	125	125
	10	Steel surfaces permanently in contact with water, also river water splash zone	Medium temp. C up to 60	SA 2.5	Primer and Finish Coat in One	1	Glassflake reinforced High Solid Epoxy	500	500
	11	Plant / Cooling water pipes	GRP, or steel lined concrete pipes with cathodic protection and coating according to AWWA C 203						

* Additional 1 x Finish Coat 2-Comp. Polyurethane, 50 µm, when exposed to UV or weathering conditions and colour retention is required.



8140A01/FICHT-15702705-v5
BIFPCL/EPC-Main Plant/71

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All equipment performing similar duties shall be of the same type and manufacture in order to limit the stock of spare parts required and maintain uniformity of plant and equipment to be installed. Especially the number of types and manufacturers of actuators, valves and instruments shall be reduced to a minimum.

If a piece of equipment is present several times, then all of these pieces shall be identical. All their constituting parts must be exchangeable between them.

The Employer reserves the right to advise the Contractor of preferred type and manufacture to secure the above-mentioned requirements.

Bidder's/Contractor's sub-suppliers and vendors shall comply with Provennes Criteria as stipulated elsewhere in the bidding document.

Throughout the Power Plant metric units, scales and measures shall be used; this applies especially to all fittings.

B0.6.8 Accessibility

The Contractor shall supply and erect sufficiently large safe platforms, galleries, stairways or ladders and access ways necessary for providing safe and easy access to all the plant items for operation and maintenance. The Contractor shall ensure that the whole of the access ways is of uniform design and pattern throughout the works.

The design of all stairways, access ways etc. shall conform to the requirements of the relevant chapters is **Section B0**.

B0.6.9 Signs & colour code

General

Safety colours, safety symbols and safety signs must comply in construction, geometrical form, colour and meaning with the ISO 3864.

Signs for plant identification during the erection period must be to Employer's approval.

The signs should be of a material which is weather-resistant and of sufficient durability for the conditions prevailing on site.

Mounting and installation

The positions for the signs must be chosen so that they are within the field of vision of the persons to whom they apply. The signs should be permanently attached. Temporarily dangerous areas (e.g. construction sites, assembly areas) may also be marked by movable signs. The safety signs



must be mounted or installed in such a manner that there is no possibility of misunderstanding.

Information signs

Information signs should supply the necessary information to acquaint personnel with the physical arrangement and structure of site, buildings and equipment, e.g. floor numbers, load-carrying capacities including marking of floor areas, working loads of cranes, lifting gear and lifts, room identification, etc. The routing of underground pipes and cables is to be indicated by substantial marker blocks showing the relevant identification numbers.

In the choice of information signs in situations not covered by ISO Draft Recommendation 507 the possibility of using pictograms should be considered. Pictograms are particularly suitable for the identification of rooms, areas and buildings in the non-technical areas of the Plant, sanitary and amenities buildings, etc.

Emergency signs

In the event of accidents, all necessary information should be available immediately to those affected. Thus, a sufficient number of signs of appropriate size should be installed, e.g. escape routes (including marking of floor areas), emergency exits, fire alarms, fire extinguishers, instructions for special fire-extinguishing agents, warnings against fire-extinguishing agents (CO₂), first aid equipment, first aid points, accident reporting points, telephones, etc.

Mandatory signs

Signs indicating obligatory actions must be provided installed wherever certain action is necessary, e.g. do not obstruct the entrance; keep right, etc. Signs should also indicate when the wearing of protective clothing and equipment is necessary and obligatory, e.g., protective goggles, protective clothing, helmets, head guards, breathing equipment, ear muffs, etc.

Warning Signs

Warning signs should refer to the existence or possible existence of danger, e.g., flammable substances, explosive substances, corrosive or noxious substances, suspended loads, general danger, width/height restriction, steps, risk of trapping, slipping, falling, etc.

In addition to warning signs, appropriate black-yellow strip markings should also be used where necessary.

Equipment and Piping Colour Code

For colour code for all equipment and piping see table below, for any other items Employer's approval shall be obtained. For safety issues relevant standards and regulations shall prevail in case of discrepancy. Final colour selection is to be discussed and approved by Employer.

Colour Code (based on DIN 2403:2007-05 & DIN 5381)

Medium	Base	RAL	Band/ Ring	RAL	Let- tering	RAL
Flammable liquids and solids e.g. high speed diesel, lube oil, seal oil, hydraulic oil, coal	Signal Brown	8002	Signal Red	3001	Signal White	9003
Flammable gases e.g. hydrogen	Signal Yellow	1003	Signal Red	3001	Signal Black	9004
Non-flammable liquids and solids e.g. ash	Signal Brown	8002	Signal Black	9004	Signal White	9003
Non-flammable gases e.g. nitrogen, carbon dioxide	Signal Yellow	1003	Signal Black	9004	Signal Black	9004
Fire fighting, e.g. fire fighting water	Signal Red	3001			Signal White	9003
Water e.g. service, demin., condensate, feed, river, cooling, closed cooling water except fire fighting water	Signal Green	6032			Signal White	9003
Steam e.g. main steam, HRH, CRH, aux. steam	Signal Red	3001			Signal White	9003
Acids e.g. HCl, ferrous sulphate	Signal Orange	2010			Signal Black	9004
Alkali, e.g. ammonia, caustic	Signal Violet	4008			Signal White	9003
Air e.g. station air, service air, instrument air	Signal White	9003			Signal Black	9004
Oxygen	Signal Blue	5005			Signal White	9003
Driven machines (e.g. fans and pumps) including motor, Vents, drains, vacuum	Follow medium color					
Structural steel, steel skids for equipment	Window Grey RAL 7040					
Safety caution, e.g. fall or trip hazards, handrails, head room clearance	Alternating stripes Signal Yellow RAL 1003 / Signal Black RAL 9004					
Panels, cubicles, junction boxes	Light Grey RAL 7035					

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	PROJECT :NORTH KARANPURA STPP STPP (3X660MW) Main Supplier : BHEL PACKAGE: FDPS PACKAGE SUPPLIER: BHEL-HYDERABAD CONT. NO.:CS- 4410 -001-2		INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB- SUPPLIER APPROVAL SUB SYSTEM: MECHANICAL			DOC. No. : CS- 4410-001-FDPS	
						Revision No. : 00	
						DATE: 22.01.2015	
						PAGE 1 OF 9	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS

1.	Motor: As per NTPC approved vendor list						
2.	DIESEL ENGINE	I		KBL	KIRLOSKARWADI	A	
		I		GREAVES COTTON (R & H)	PUNE	A	
		I		CUMMINS	KOTHRUD / VIMAN NAGAR	A	
		I		CATERPILLAR	USA	A	
		I		ASHOK LEYLAND	CHENNAI	A	FOR BOOSTER PUMP
3.	HYDRANT VALVE (SS)	I		KOEL	PUNE	A	FOR BOOSTER PUMP
		I		SUKAN	AHMEDABAD	A	
		I		SHAH BHOGILAL	AHMEDABAD	A	
4.	SAFETY RELIEF VALVE	I		NEWAGE INDUSTRIES	SURENDRA NAGAR	A	
		III		LEADER	JULLANDHER	A	
		III		SPIRAX MARSHALL	PUNE	A	
5.	STRAINER	III		FISHER SANMAR	CHENNAI	A	
		I		OTOKLIN GLOBAL BUSINESS	MUMBAI	A	
		I		SAROJINI ENTERPRISE	HOWRAH	A	FOR SIMPLEX STRAINER UPTO 300 NB
		I		FILTRATION ENGINEERS	MUMBAI	A	
		I		HAWA ENGINEERS LTD.	AHMEDABAD	A	FOR ONLY Y TYPE STRAINER OF PRESSURE CLASS UP TO 150 & SIZE UP TO 300 MM

		PROJECT :NORTH KARANPURA STPP STPP (3X660MW) Main Supplier : BHEL PACKAGE: FDPS PACKAGE SUPPLIER: BHEL-HYDERABAD CONT. NO.:CS- 4410 -001-2			INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB- SUPPLIER APPROVAL SUB SYSTEM: MECHANICAL		DOC. No. : CS- 4410-001-FDPS	
							Revision No. : 00	
							DATE: 22.01.2015	
							PAGE 2 OF 9	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS	

		I		GRAND PRIX	FARIDABAD	A	
		I		MULTITEX	NOIDA	A	
		I		GUJARAT OTOFILT	AHMEDABAD	A	
6.	CI BUTTER FLY VALVE (UPTO 500 NB PN 16,UPTO 900 NB PN 10)	I		INTERVALVE	PUNE	A	
		I		WEIR BDK	HUBLI	A	
		I		KIRLOSKER	KONDHAPURI	A	
		I		R & D MULTIPLE	VALSAD	A	
		I		IL	PALAKKAD	A	
		I		CRANE PROCESS FLOW	SATARA	A	UPTO 600 NB
		I		FOURESS ENGG	BANGALORE	A	
		I		PENTAIR	BARODA	A	
7.	CI GATE / GLOBE / CHECK VALVES (UPTO 600 NB PN 16)	I		H SARKAR	HOWRAH	A	
		I		BANKIM	KOLKATA	A	
		I		KIRLOSKAR BROTHERS	KONDHAPURI	A	
		I		A V VALVE	AGRA	A	UP TO 300 NB PN 10
		II		LEADER	JULLANDHER	A	
8.	SS BUTTERFLY VALVE (UP TO 400 NB - PN 10)	I		Weir -BDK	HUBLI	A	
		I		FOURESS ENGG.	BANGALORE	A	
		I		IL	PALAKKAD	A	
		I		INTERVALVE	PUNE	A	
		I		CRANE PROCESS	SATARA	A	
9.	SS GATE /GLOBE/ CHECK VALVE (UP TO 300 NB - CL 300)	I		LEADER	JULLANDHAR	A	
		I		FOURESS ENGG	AURANGABAD	A	
		I		WEIR BDK	HUBLI	A	
		I		STEEL STRONG VALVE	NAVI MUMBAI	A	
		I		HITECH	AHMEDABAD	A	
		I		KSB WATER PUMPS AND VALVES	COIMBATORE	A	
		I		BHEL	GOINDWAL	A	
10.	SEAMLESS PIPE (FOR INERT GAS SYSTEM)	II		ISMT	AHMEDNAGAR/BAR AMATI	A	AHMEDNAGAR UP TO 150 NB , BARAMATI UPTO 200 NB



PROJECT :NORTH KARANPURA STPP
STPP (3X660MW)
Main Supplier : BHEL
PACKAGE: FDPS PACKAGE
SUPPLIER: BHEL-HYDERABAD
CONT. NO.:CS- 4410 -001-2

INDICATIVE LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB- SUPPLIER
APPROVAL

SUB SYSTEM: MECHANICAL

DOC. No. : CS- 4410-001-FDPS

Revision No. : 00

DATE: 22.01.2015

PAGE 3 OF 9

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
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		II		MAHARASHTRA SEAMLESS	RAIGAD	A	
11.	MS PIPE (IS:1239 / IS:3589 UPTO 150 NB/ 900 NB)	I		MUKAT TANKS AND VESSELS	TARAPUR	A	LONGITUDINAL SAW (SINGLE SIDE WELD) AS PER IS 3589
		II		SAIL	ROURKELA	A	
		I		PSL	CHENNAI/ VIZAG/ KUTCH/DAMAN	A	SPIRAL WELD SAW AS PER IS 3589
		I		MAHARASHTRA SEAMLESS	RAIGAD	A	200 NB TO 500 NB ERW PIPES AS PER IS 3589
		I		RATNAMANI	KUTCH	A	ERW PIPES AS PER IS 3589 UPTO 400 NB
		I		JINDAL	GHAZIABAD	A	UPTO 350 NB ERW PIPES AS PER IS 1239/3589
		I		SURYA ROSHNI	BAHADURGARH	A	UPTO 400 NB ERW PIPES AS PER IS 1239/3589
		I		RATNAMANI	KUTCH	A	SPIRAL WELD SAW AS PER IS 3589
		I		RATNAMANI	CHHATRAL	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 600 NB
		I		JCO GAS PIPES	CHINDWARA	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 400 NB
		I		PRATIBHA PIPES & STRUCTURE PVT. LTD.	THANE	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 400 NB
		I		LALIT PROFILE	THANE	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 355 MM
		I		SURENDRA ENGG.	RAJPURA	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 500 NB
		I		SAMSHI PIPES INDUSTRIES	VADODARA	A	SPIRAL WELDED SAW AS PER IS 3589 ABOVE 450 NB



PROJECT : NORTH KARANPURA STPP
STPP (3X660MW)
Main Supplier : BHEL
PACKAGE: FDPS PACKAGE
SUPPLIER: BHEL-HYDERABAD
CONT. NO.: CS- 4410 -001-2

INDICATIVE LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB- SUPPLIER
APPROVAL

SUB SYSTEM: MECHANICAL

DOC. No. : CS- 4410-001-FDPS

Revision No. : 00

DATE: 22.01.2015

PAGE 4 OF 9

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
		I		MUKUT PIPES	RAJPURA	A	LONGITUDINAL SAW (SINGLE SIDE WELD) AS PER IS 3589 UPTO 500 NB
		I		INDUS TUBES	G B NAGAR	A	UPTO 300 NB ERW PIPES AS PER IS 1239/3589
		I		MANN IND	INDORE	A	SPIRAL WELD SAW AS PER IS 3589
		II		TATA	JAMSHEDPUR	A	UPTO 150 NB ERW PIPES AS PER IS 1239
		I		WELSPUN	BHARUCH	A	SPIRAL WELD SAW AS PER IS 3589
		I		DADU PIPES	SIKRANDRABAD	A	UP TO 300 NB ERW PIPE AS PER IS 3589
		I		JINDAL INDUSTRIES LTD.	HISSAR	A	UP TO 300 NB ERW BLACK PIPE AS PER IS 1239/3589
		I		APL APOLLO TUBES LTD.	SIKANDRABAD	A	MS pipes (Black & GI) as per IS 1239 & MS pipes (Black & GI) as per IS 3589 up to 250 NB size, 8 mm thickness and Grade up to Fe 410.
		I		LLYODS LINE PIPES LTD.	THANE	A	MS pipes (Black & GI) as per IS 1239 & MS pipes (Black) as per IS 3589 up to 350 NB size, 8 mm thickness and Grade up to Fe 410.
		I		WELPSUN	ANJAR	A	UPTO 400 NB ERW PIPES AS PER IS 1239/3589
12.	FIRE HOSE	II		BIS APPROVED SOURCES WITH VALID LICENCE		A	

	PROJECT :NORTH KARANPURA STPP STPP (3X660MW) Main Supplier : BHEL PACKAGE: FDPS PACKAGE SUPPLIER: BHEL-HYDERABAD CONT. NO.:CS- 4410 -001-2			INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB- SUPPLIER APPROVAL SUB SYSTEM: MECHANICAL		DOC. No. : CS- 4410-001-FDPS	
						Revision No. : 00	
						DATE: 22.01.2015	
						PAGE 5 OF 9	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS

13.	WATER MONITOR	II		HD FIRE	JALGAON	A	
		II		NEWAGE	SURENDRA NAGAR	A	
		II		SHAH BHOGILAL	AHMEDABAD	A	
14.	BRANCH PIPE , COUPLING & NOZZLE (SS & GM)	II		BIS APPROVED SOURCES WITH VALID LICENCE			
15.	DELUGE VALVE WITH TRIMS	I		HD FIRE	THANE/JALGAON	A	
		II		TYCO (GRINEEL)	UK/USA	A	
		I		UTC FIRE & SECURITY INDIA LTD.	BANGALORE	A	FOR PISTON TYPE* DELUGE VALVE ONLY
16.	HV/ MV SPRAY NOZZLE	II		HD FIRE	THANE	A	
		II		TYCO	UK/USA	A	
17.	QB DETECTOR	II		TYCO (GRINELL)	UK	A	
		I		HD FIRE	THANE	A	
		II		MINIMAX	GERMANY	A	
18.	WRAPPING & COATING MATERIAL	II		MP TAR PRODUCTS	BHILAI	A	
		II		PORWAL INDUSTRIES	RAIPUR	A	
		II		STP	JAMSHEDPUR	A	
		II		RUSTECH	KOLKATA	A	
19.	INERT GAS EXTINGUISHING SYSTEM (SUB-QR ITEM)	II		ANSUL	USA	A*	*SUBJECT TO SUB-QR CLEARANCE FROM ENGG.
		II		KIDDE (GINGEKERR)	DANMARK	A*	
		II		MINIMAX Gmbh & Co. KG	GERMANY	A*	
		II		TOTAL WALTHER	GERMANY	A*	
		II		NOHMI BOSAI	JAPAN	A*	
20.	GM VALVE	III*		LEADER VALVES	JULLANDHER	A	*MAIN CONTRACTOR COC + MANUFACTURER STD TC AS PER IS : 778
		III*		SANT VALVES	JULLANDHER	A	
21.	FIRE EXTINGUISHER	I		BIS APPROVED SOURCES WITH VALID LICENCE			
22.	HOSE BOX	III		MAIN CONTRACTOR APPROVED SOURCES			

Amruth

Rumarganjan

		PROJECT :NORTH KARANPURA STPP STPP (3X660MW) Main Supplier : BHEL PACKAGE: FDPS PACKAGE SUPPLIER: BHEL-HYDERABAD CONT. NO.:CS- 4410 -001-2			INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB- SUPPLIER APPROVAL SUB SYSTEM: MECHANICAL		DOC. No. : CS- 4410-001-FDPS	
							Revision No. : 00	
							DATE: 22.01.2015	
							PAGE 6 OF 9	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS	

23.	MALLEABLE FITTINGS	III*		MAIN CONTRACTOR APPROVED & REGULAR SOURCES			*MAIN CONTRACTOR COC + MANUFACTURER STD TC AS PER IS :1879
24.	MS FITTINGS (BLACK /GI)	III		MAIN CONTRACTOR APPROVED SOURCES			
25.	FITTINGS (ASTM A 234/ A 105)	II		NL HAZRA	KOLKATA	A	
		II		GUJRAT INFRA PIPES	BARODA	A	
		II		TUBE PRODUCTS	BARODA	A	
		II		PIPEFIT ENGINEERS	BARODA	A	
		II		MS FITTINGS	KOLKATA	A	
		II		SIDDARTH & GAUTAM	FARIDABAD	A	
		II		EBY	MUMBAI	A	
26.	SS ERW/SEAMLESS PIPES	III*		APEX TUBES	BEHROR	A	*MAIN CONTRACTOR COC + MANUFACTURER STD TC AS RELEVANT STD
		III*		RATNAMANI	AHMEDABAD	A	
		III*		REMI	MUMBAI	A	
27.	EOT CRANES (UPTO 10 T) / ELECTRIC HOISTS (UPTO 10 T)	I		ARMSSELL	BANGALORE	A	
		I		EDDY CRANES	PUNE	A	
		I		LIFTING EQUIPMENTS	DELHI	A	ONLY FOR ELECTRIC HOIST UPTO 5 T
		I		TRACTOR TRIFEL	PALVEL	A	FOR ELECTRIC HOIST ONLY
		I		CONSOLIDATED HOIST PVT. LTD.	SATARA / PUNE	A	
		I		ALPHA SERVICES	BHIWADI	A	
		I		TUOBRO FURGUSON INDIA PVT. Ltd	KOLKATA	A	FOR ELECTRIC HOIST UPTO 5 T
		I		MUKAND	THANE	A	FOR EOT CRANE ONLY
		I		FAFCO	VADODARA/MUMBAI	A	FOR EOT CRANE ONLY
		I		WMI	MUMBAI	A	FOR EOT CRANE ONLY

		PROJECT : NORTH KARANPURA STPP STPP (3X660MW) Main Supplier : BHEL PACKAGE: FDPS PACKAGE SUPPLIER: BHEL-HYDERABAD CONT. NO.: CS- 4410 -001-2		INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB- SUPPLIER APPROVAL SUB SYSTEM: MECHANICAL		DOC. No. : CS- 4410-001-FDPS	
						Revision No. : 00	
						DATE: 22.01.2015	
						PAGE 7 OF 9	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
		I		AVON CRANES	GURGAON	A	
		I		MILLARS INDIA LTD.	KARANSAD	A	FOR EOT CRANE ONLY
		I		TISCO GROWTH	JAMSHEDPUR	A	FOR EOT CRANE ONLY
		I		UNIQUE INDUSTRIAL HANDLERS	NASHIK	A	FOR EOT CRANE ONLY
		I		ANUPAM INDUSTRIES LTD.	V.U.NAGAR	A	FOR EOT CRANE ONLY
		I		HEC	RANCHI	A	FOR EOT CRANE ONLY
		I		CENTURY CRANE	BALLABHGARH	A	
		I		GRIP	FARIDABAD	A	FOR ELECTRIC HOIST ONLY
		I		HERCULES HOIST	RAIGAD	A	FOR ELECTRIC HOIST ONLY
		I		REVA INDUSTRIES	FARIDABAD	A	
		I		GRIP	HYDERABAD	A	
28.	CHAIN PULLEY BLOCK (UPTO 5 TONS)	III*		TRACTEL TRIFEL	PALVEL	A	*MAIN CONTRACTOR COC + MANUFACTURER STD TC AS PER IS : 3832
		III*		ARMSSELL	BANGALORE	A	
		III*		LEAP	DELHI	A	
		III*		HERCULES (INDEF)	RAIGAD	A	
		III*		CENTURY CRANE	BALLABHGARH	A	
29.	MULTI PURPOSE NOZZLE	II		SHAH BHOGILAL	AHMEDABAD	A	
		II		NEWAGE INDUSTRIES	SURENDRA NAGAR	A	
30.	PRESSURE RELIEF DAMPER(GRAVITY DAMPER)	III		MAIN CONTRACTOR APPROVED SOURCES			
31.	ALARM VALVE WITH TRIMS	I		HD FIRE	THANE	A	
		I		HD FIRE	JALGAON	A	
32.	PRESSURE REDUCING VALVE (PRV)	III*		RAPHEAL VALVES (TYCO VALVES)	ISREAL	A	*MANUFACTURER COC + UL/FM/LPCB/VDS APPROVAL FOR SPECIFIC MODEL SHALL BE SUBMITTED



PROJECT :NORTH KARANPURA STPP
STPP (3X660MW)
Main Supplier : BHEL
PACKAGE: FDPS PACKAGE
SUPPLIER: BHEL-HYDERABAD
CONT. NO.:CS- 4410 -001-2

INDICATIVE LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB- SUPPLIER
APPROVAL - -
C R - -
SUB SYSTEM: MECHANICAL

DOC. No. : CS- 4410-001-FDPS
Revision No. : 00
DATE: 22.01.2015
PAGE 8 OF 9

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
33.	AIR RELEASE VALVE	I III		DARLING MUESCO MAIN CONTRACTOR APPROVED SOURCES	AHMEDABAD	A	
34.	FOAM SYSTEM (BLADDER TANK TYPE)	I I		FIRETECH HD FIRE	MUMBAI JALGAON	DR DR	
35.	CLEAN AGENT DIRECT/INDIRECT LOW PRESSURE AUTOMATIC FIRE DETECTION & SUPPRESSION SYSTEM WITH LINEAR PNEUMATIC HEAT DETECTION TUBE	II* II*		FIRE TRACE ROTAREX	UK LUXEMBURG	DR DR	* SUBJECT TO APPROVAL OF UL/FM/VDS/LPCB
36.	CONTROL PANEL	I I I I I I I I I I I I I I I I I I		L&T GE SIEMENS SCHEINDER UNILEC CONTROL & SWITCHGEAR CONTROL & SCHEMATIC JACKSON ANAND POWER PYROTECH SWITCHING CIRCUIT POSITRONICS MAKTEL TRICOLITE HINDUSTAN CONTROL & EQUIPMENT CONTROL DEVICES	MUMBAI/ COIMBATORE BANGALORE MUMBAI NASHIK GURGAON NOIDA/ HARDWAR HYDERABAD G. NOIDA NOIDA UDAIPUR KOLKATA VADODARA VADODARA SAHIBABAD/ MANESAR KOLKATA KOLKATA	A A A A A A A A A A A A A A A A A A	

WALL MOUNTED PANEL

		PROJECT :NORTH KARANPURA STPP STPP (3X660MW) Main Supplier : BHEL PACKAGE: FDPS PACKAGE SUPPLIER: BHEL-HYDERABAD CONT. NO.:CS- 4410 -001-2		INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB- SUPPLIER APPROVAL SUB SYSTEM: MECHANICAL		DOC. No. : CS- 4410-001-FDPS	
						Revision No. : 00	
						DATE: 22.01.2015	
						PAGE 9 OF 9	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER THE PRESENT DATABASE	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS

		I		VIDYUT CONTROL	GHAZIABAD	A	
		I		ADLEC POWER	ROHAD (JHAJJHAR)	A	
		I		JOLLY ENGG.	KOLKATA	A	
		I		JASPER	NOIDA	A	
		I		HAVELL	FARIDABAD	A	WALL MOUNTED PANEL
37.	Push Button Station	III		BHEL approved source for the box. Push Button: Any make with VDE/CE/UL/CSA Marking or BIS approved with CML number.		A	
38.	For other electrical items			Please refer NOA for the Project			
39.	FQP FOR FIRE WATER TANK *	I		MAIN CONTRACTOR			*REFER NOTE 1
40.	FQP (MATL RECEIPT , STORAGE & ERECTION)	I		MAIN CONTRACTOR			

LEGENDS:

1. SYSTEM SUPPLIER / SUB-SUPPLIER STATUS CATEGORY (SHALL BE FILLED BY NTPC).

A – Indicated acceptable sub-suppliers to NTPC along with condition of approval, if any.

2. INSPECTION CATEGORY:

Cat I : For these items the quality plans are approved by NTPC and final acceptance will be after physical inspection witness by NTPC.

CAT II : For these items the quality plans are approved by NTPC. However no physical inspection will be done by NTPC. The final acceptance by NTPC shall be on the basis of review of documents as per QP.

CAT III: For these items Main Supplier approves quality plans. The final acceptance by NTPC shall be on the basis of certificate of conformance by Main Supplier

Note 1:

a) Steel Plate shall be procured from Main steel producers like SAIL/TISCO/RINL/ JINDAL Steel & Power/ESSAR Steel Ltd/ISPAT Industries Ltd/LLOYD'S Steel Industries Ltd/JSW Steel Ltd. (b) Material will be delivered directly from manufacturer's plant/stock yard/godown to NTPC project site (c) Correlation of material with MTC will be done by Main contractor before delivery and Correlated MTC along with delivery challan will be submitted to NTPC-RIO for issuance of MDCC (Category of Inspection of Plates shall be Cat-III with the above mentioned conditions). (c) Misc Supporting structural steel for Fire water tanks or other applications shall be sourced from Main Contractor Approved sources with Marking/Logo of Main Steel producers as indicated in (a) above.



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan &
subcontractor approval

C&I list for FDPS Package

DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 1 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
1	INSTRUMENTATION CABLE (REFER NOTE-2)	I		DELTON CABLES LTD	FARIDABAD	A	PVC, FRLS TYPE
				PARAMOUNT COMMUNICATION LTD	KHUSHKHERA	A	PVC, FRLS TYPE
				CORDS CABLE INDUSTRIES LTD	BHIWADI/ KAHARANI	A	PVC, FRLS TYPE
				KEI INDUSTRIES LTD	BHIWADI	A	PVC, FRLS TYPE
				POLYCAB WIRES PVT. LTD.	DAMAN	A	PVC, FRLS TYPE
				THERMOCABLES	HYDERABAD	A	PVC, FRLS TYPE
				ELKAY TELELINKS	FARIDABAD	A	PVC, FRLS TYPE
				GUPTA POWER	KHURDHA	A	PVC, FRLS TYPE
				NICCO	KOLKATA	A	PVC, FRLS TYPE
2	FIRE ALARM PANEL -MICROPROCESSOR BASED	II		NOTIFIER	USA	A	
				TYCO	USA	A	SIMPLEX BRAND
				AUTRONICA	NORWAY	A	
				SCHRACK	AUSTRIA	A	
				EDWARDS	USA	A	
		*		ESSER (HONEYWELL)	GERMANY	DR	* - INSPECTION CATEGORY IS TO BE DECIDED DURING VENDOR EVALUATION
3	ADDRESSABLE DETECTORS (MULTI SENSOR, PHOTO & HEAT DETECTORS TYPE), INTERFACE UNITS & MANNUAL CALL POINTS	II		NOTIFIER	USA	A	
				TYCO	USA	A	SIMPLEX BRAND
				AUTRONICA	NORWAY	A	
				SCHRACK	AUSTRIA	A	

Boadec

Kumar



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan & subcontractor approval

C&I list for FDPS Package

DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 2 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
				EDWARDS	USA	A	
		*		ESSER (HONEYWELL)	GERMANY	DR	* - INSPECTION CATEGORY IS TO BE DECIDED DURING VENDOR EVALUATION
4	FIBRE OPTIC CABLES	II		BIRLA ERICSSON OPTICAL	REWA	A	
				AKSH FIBER	BHIWADI	A	
				FINOLEX	PUNE/GOA	A	
				R&M	SWITZERLAND	A	
				HFCL	GOA	A	
5	PRESSURE./ VACCUUM/ DP GAUGES	III		GLUCK(I) MANUFACTURING CO.	MUMBAI	A	
				AN INSTRUMENTS	NARENDRAPUR	A	
				MANOMETER INDIA	MUMBAI	A	
				WIKI	PUNE	A	
				GIC (GAUGES BOURDON)	PANVEL	A	
				BAUMER	VAPI	A	
				H GURU INDUSTRIES LTD	RISHRA/ MUZAFFARPUR	A	
				ASHCROFT	GANDHINAGAR	A	
				H GURU (SI)	BANGALORE	A	
				FORBES MARSHALL	HYDERABAD	A	
6	LEVEL SWITCHES (FLOAT/DISPLACER)	III		LEVCON	KOLKATA	A	
				SIGMA	MUMBAI	A	
				SBEM	PUNE	A	
				FLOW STAR	FARIDABAD	A	
				D.K.INSTRUMENTS	KOLKOTTA	A	
				V-AULOMAT	NEWDELHI	A	
7	ELECTRICAL ACTUATOR	II		ROTORK CONTROLS	CHENNAI/ BANGALORE	A	
				LIMITORQUE	FARIDABAD	A	
				AUMA	BANGALORE	A	



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan &
subcontractor approval

C&I list for FDPS Package

DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 3 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
8	SOLENOID VALVE	III		ROTEX	VADODARA	A	
				AVCON	MUMABI	A	
				ASCO	CHENNAI	A	
				NUCON	HYDERABAD	A	
				SMC	NOIDA	A	
9	TERMINAL BLOCK	III		PHOENIX	BRAND NAME	NOTED	
				WAGO	BRAND NAME	NOTED	
				WIED MULDER	BRAND NAME	NOTED	
				ELEMAX	BRAND NAME	NOTED	CE MARKED ONLY
10	24V INTELLIGENT BATTERY CHARGER /DCDB & BHMS	I		ELTEK	GURGAON	A	MODULES FROM ELTEK
				MASS TECH	JALGAON	A	MODULES FROM ELTEK
				CHHABI	JALGAON	A	MODULES FROM EMERSON
				EMERSON	AMBERNATH	A	WITH MODULES FROM EMERSON- CHINA
11	GRAPHICAL INTERFACE UNITS (GIU)	III		DIGITAL INSTRUMENTS & CONTROL SYSTEM	BANGALORE	A	PROFACE BRAND
				ROCKWELL AUTOMATION		A	
				RENU ELECTRONICS	PUNE	A	
				SCHNEIDER ELECTRIC		A	
				RED LION		NOTED	
12	INSTRUMENT FITTINGS	III		HP VALVES AND FITTINGS	CHENNAI	NOTED	
				BALDOTA	MUMBAI	NOTED	

Handwritten signature



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan & subcontractor approval

C&I list for FDPS Package

DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 4 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
				HYDAIR	LONAVALA	NOTED	
				EXCEL HYDRO	MUMBAI	NOTED	
				PRECESSION	MUMBAI	NOTED	
				ASTEC	THANE	NOTED	
				VIKAS	DELHI	NOTED	
13	OWS/PC	III		COMPAQ / HP		NOTED	
				IBM / LENOVO		NOTED	
				DELL		NOTED	
14	ULTRASONIC TYPE LEVEL TRANSMITTER	III		E & H	GERMANY/ AURANGABAD	A	
				SIEMENS MILTRONICS	CANADA	A	
				EMERSON	PAWANE	A	MAIN KIT FROM MOBREY-UK
		II		NIVELCO	HUNGARY	A	FOR L.IQUID APPLICATION ONLY
15	PLC SYSTEM	I		SIEMENS	NASIK	A	
				SCHNEIDER ELECTRIC	NASIK	A	
				ROCKWELL AUTOMATION	SAHIBABAD	A	
				ABB	BANGALORE	A	
				GE INTELLIGENT PLATFORM	BANGALORE	A	
				HONEYWELL	PUNE	A	
16	PRESSURE TRANSMITTER (PRESSURE, DP,FLOW,LEVEL APPLICATION)	III		EMERSON (ROSEMOUNT)	USA/ PAWANE	A	
				FUJI ELECTRIC	CHINA	A	
				SIEMENS	FRANCE/KALWA	A	
				YOKOGAWA INDIA LIMITED	BANGALORE	A	MAKE : YOKOGAWA, JAPAN
				HONEYWELL	USA / PUNE	A	
				LAXONS AUTOMATION INDIA PVT LTD	DAMAN	A	MAKE- SMAR BRAZIL
		I		ABB	BANGALORE	A	2600T SERIES ONLY
17	FLOW SWITCH	III		SWITZER	CHENNAI	NOTED	
				KHRONE MARSHALL	PUNE	NOTED	
				DK INSTRUMENT	KOLKATA	NOTED	



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan &
subcontractor approval

C&I list for FDPS Package

DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 5 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
18	LEVEL INDICATOR (TRANSPARENT/ REFLEX TYPE)	III		LEVCON	KOLKATA	NOTED	
				LEVCON	KOLKATA	NOTED	
				SIGMA	MUMBAI	NOTED	
				D.K.INSTRUMENTS	KOLKATA	NOTED	
				FLOW STAR	FARIDABAD	NOTED	
				V-AUTOMAT	NEWDELHI	NOTED	
				PUNE TECHTROL	PUNE	NOTED	
19	NI-CD BATTERY FOR PLC SYSTEM	I		AMCO SAFT	BANGALORE	A	
				HBL POWER SYSTEM	HYDERABAD	A	
		II		SAFT	FRANCE/ SWEDEN	A	
20	LEVEL INDICATOR / GAUGE (FLOAT / BOARD TYPE & TUBULAR TYPE)	III		SBEM	PUNE	NOTED	
				PUNE TECHTROL	PUNE	NOTED	
				V AUTOMAT	DELHI	NOTED	
				GAUGES BOURDEN	PANVEL	NOTED	
				LEVCON	KOLKATA	NOTED	
				D K INSTRUMENTS	KOLKATA	NOTED	
				SCIENTIFIC DEVICES	MUMBAI	NOTED	
				SIGMA INSTRUMENTS	MUMBAI	NOTED	
				FLOW STAR	FARIDABAD	NOTED	
21	IR DETECTORS	III		NEOLA CORP (ODTI)	USA/CANADA	A	
				PATOL	UK	A	
22	LHS CABLE	III		KIDDE	UK	A	
				PROTECTOWIRE	UK	A	
				PATOL	UK	A	
				SYSTEM SENSOR	UK	DR	* - INSPECTION CATEGORY IS TO BE DECIDED DURING VENDOR EVALUATION
		*					
23	PROBE TYPE HEAT DETECTORS(FLAME PROOF)	III		KIDDE FENWAL	USA	A	
		*		TYCO	USA	DR	SIMPLEX BRAND



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan & subcontractor approval

C&I list for FDPS Package

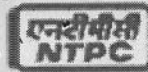
DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 6 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
24	SHORT TERM FIRE PROOF CABLES, MICC CABLES	III		TYCO	UK / CHINA	A	
				WREXHAM	UK	A	
				KME	ITALY	A	
25	MINI UPS (UP TO 2.5KVA)	III		APC	BANGALORE	NOTED	
				DELTA	GURGAON	NOTED	
				HITACHI-HIREL	GANDHINAGAR	NOTED	
				EMERSON	MUMBAI	NOTED	
				DB POWER	PUNE	NOTED	
				APLAB	MUMBAI	NOTED	
26	DC UPS FOR PLC	III		PHOENIX / SIEMENS		NOTED	COVERED IN PLC QP
27	PRESSURE /DP / VACUUM SWITCH	II					UP TO 40KG/CM2 & NOT FOR COMPOUND SWITCH AND EXCEPT 900 SERIES
				SWITZER	CHENNAI	A	
				GIC (GAUGES BOURDON)	PANVEL	A	UP TO 40KG/CM2 & NOT FOR COMPOUND SWITCH
				TRAFAG	MANESAR	A	UP TO 40KG/CM2 & NOT FOR COMPOUND SWITCH
				ASHCROFT	GANDHINAGAR	A	
				INDFOS	GHAZIABAD	A	UP TO 40KG/CM2 & NOT FOR COMPOUND SWITCH
		III		SOR	USA	A	
				ASHCROFT	USA /GERMANY	A	
				DELTA CONTROL	UK	A	
28	LASER PRINTER	III		HP/CANON/ IBM/ XEROX / EPSON/LEXMARK	BRAND NAME	NOTED	
29	COMPUTER FURNITURE	III		MAIN CONTRACTOR APPROVED SOURCES		NOTED	
30	LOCAL CONTROL PANEL (BLANK	II		PYROTECH	UDAIPUR	A	
				PENTAIR (HOFFMAN)	BANGALORE	A	



PROJECT : North Karanpura STPP (3 x 660 MW)
PACKAGE: FDPS Package
SUPPLIER: M/s BHEL, Hyderabad
CONT. NO.: CS- 4410 -001-2

List of items requiring quality plan & subcontractor approval

C&I list for FDPS Package

DOC. No. : 4410 - 001-QOI-R-00

Revision No. : 00

DATE: 22/01/2015

PAGE : 7 OF 8

SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS
	ENCLOSURES) FOR FIRE ALARM PANEL (NOT APPLICABLE FOR SCHEDULE -I SUPPLY)			RITTAL	BANGALORE	A	
				VENUS	MUMBAI	A	FOR ASSEMBLY/WIRING ONLY; PANEL & ACCESSORIES FROM NTPC APPROVED SOURCES
31	SMF LEAD-ACID BATTERY FOR MICROPROCESSOR BASED FIRE ALARM PANEL	III		AMARRAJA	TIRUPATI	NOTED	
				EXIDE	KOLKATTA	NOTED	
				HBL POWER SYSTEM	HYDERABAD	NOTED	
32	SIREN	III		MAIN CONTRACTOR APPROVED SOURCES		NOTED	
33	LOCAL CONTROL PANEL FOR DIESEL ENGINE/DELUGE VALVE	I		JASPER	GURGAON	A	
				KMG A TOZ	NOIDA	A	
				C & S	NOIDA/ HARIDWAR	A	
				ICA	MUMBAI	A	
				ISC	MUMBAI	A	
				PYROTECH	UDAIPUR	A	
				ANAND CONTROL	NOIDA	A	
				VIDUT CONTROL	GHAZIABAD	A	
				VENUS	MUMBAI	A	
34	LIMIT SWTCH	III		JAI BALAJI	MUMBAI	NOTED	
				VAISHNAV	CHENNAI	NOTED	
				OMRON	BRAND NAME	NOTED	
				HONEYWELL	BRAND NAME	NOTED	
35	BEAM DETECTOR	*		SYSTEM SENSOR	UK	DR	* - INSPECTION CATEGORY IS TO BE DECIDED DURING VENDOR EVALUATION
				TYCO	UK	DR	
				ESSER(HONEYWELL)	GERMANY	DR	
				EDWARD SYSSTEM	USA	DR	

NOTED LEGENDS:

Kunagur

		PROJECT : North Karanpura STPP (3 x 660 MW) PACKAGE: FDPS Package SUPPLIER: M/s BHEL, Hyderabad CONT. NO.: CS- 4410 -001-2			List of items requiring quality plan & subcontractor approval C&I list for FDPS Package		DOC. No. : 4410 - 001-QOI-R-00	
							Revision No. : 00	
							DATE: 22/01/2015	
							PAGE : 8 OF 8	
SL.NO.	ITEM	QP/INS PN CAT	QP NO.	ACCEPTABLE SUPPLIER AS PER DATABASE	PLACE	SC APPL STATUS	REMARKS	

1. SYSTEM SUPPLIER / SUB-SUPPLIER STATUS CATEGORY (SHALL BE FILLED BY NTPC).

A – For those items, proposed Sub-vendors are acceptable to NTPC subject to meeting NTPC Technical specification requirement, along with condition of approval, if any.

DR - For those items “Details Required” for NTPC review. To be indicated with letter “DR” in the list.

Noted: For those items vendors are approved by Main Supplier and accepted by NTPC without specific sub-vendor approval from NTPC. To be indicated with “NOTED” in the list.

2. INSPECTION CATEGORY:

Cat I : For those items the quality plans are approved by NTPC and final acceptance will be on physical inspection witness by NTPC.

CAT II : For those items the quality plans are approved by NTPC. However no physical inspection will be done by NTPC. The final acceptance by NTPC shall be on the basis of review of documents as per QP.

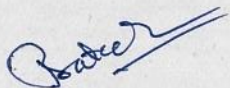
CAT III: For those items Main Supplier approves quality plans. The final acceptance by NTPC shall be on the basis of certificate of conformance by Main Supplier.

* - Inspection category is to be decided during vendor evaluation.

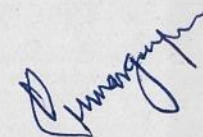
NOTE-1: For item not appearing in the pre-award list, bidder and NTPC will mutually discuss in future.

NOTE-2: If Contract Quantity of Cable is less than 1KM of each type/size, NTPC Inspection CAT-III & if Contract Quantity of Cable is less than 2.5 KM of each type / size, NTPC Inspection CAT-II.

NTPC



Main Contractor



ESP-001- 2A Rev.00	 	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION RAMACHANDRAPURAM: HYDERABAD - 502 032	Std. / Doc. Number	
			Annexure-6	
			Rev. No.	00

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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19



भारत हेवी इलेक्ट्रिकल्स लिमिटेड
BHARAT HEAVY ELECTRICALS LIMITED
रामचन्द्रापुरम, हैदराबाद - ५०२०३२
RAMACHANDRAPURAM, HYDERABAD - 502 032
परियोजना इंजीनियरिंग एवं प्रणाली विभाग
PROJECT ENGINEERING & SYSTEMS DIVISION



परियोजना / PROJECT : 2 X 660 MW MAITREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH

विषय / SUB : PQC format for Foam Pump and Drive assembly

The bidder shall have engineered, packaged, supplied, installed, commissioned and tested in the last Ten(10) years, at least Two (02) nos. FM approved/UL listed Foam Pump package [1 no Motor driven & 1 no Diesel Engine Driven] of identical or similar packages (or higher capacity packages) in terms of Flow, Discharge pressure, Material of construction (CS/CI/SS), speed in the last Ten years and same shall have commissioned and kept in trouble free operation. Vendor to give documentary evidence for the same. The ten years time period mentioned above shall be reckoned from the Initial bid due date.

As a proof for the same, Date of Supply/ Commissioning report/Customer Satisfaction report will be considered and same to be provided by Bidder.

Bidders shall furnish the details as per the below mentioned table along with technical offer for assessment of Bidder with reference to PQC indicated as above.

S.no	Name of Customer	Service	Pump Model	FM approved / UL listed	Quantity	Flow (M3/HR)	Discharge Pressure Kg/cm2(g)	Speed (RPM)	Material of construction	Motor / Engine Rating	Order ref no & date (copy to be enclosed)	Performance certificate/ Inspection Report/ Dispatch Clearance to be enclosed	Remarks

ESP-001- 2A Rev.00	 	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION RAMACHANDRAPURAM: HYDERABAD - 502 032	Std. / Doc. Number	
			Annexure-7	
			Rev. No.	00

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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19

TD-201 Rev No. 00	Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - 7 Rev No. 00 Page 1 of 3
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. QAP GUIDELINES & FORMAT (ANNEXURE - 7) The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement. Note : 1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval. 2. No deviation to reference document is acceptable.				

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - 7 Rev No. 00 Page 2 of 3
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<u>GUIDELINES TO VENDORS FOR PREPARATION OF QUALITY ASSURANCE PLAN</u> - QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. - Each page of QAP shall contain the following information. - Vendor's name & address. - Customer: BHEL, Hyderabad. - Project. - BHEL Product Standard Number/revision number as referred in P.O. - BHEL Purchase Order Number & Date. - Product as per P.O. description. - QAP Number (unique and shall not repeat)/revision number/date. - Page number and number of pages - QAP shall contain four parts / stages as follows. - Raw materials and bought out items. - In process Control / Inspection. - Final assembly, Inspection & Testing. - Painting, preservation & packing. - Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). - Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.) - Under 'Class', indicate minor, major or critical depending on the importance of characteristic. - Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) - Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) - Under 'Reference document' and 'Acceptance norms', appropriate National & International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review & approval by our Engineering dept. - Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc.		
	11. Please refer 'Agency' in QAP format. Under P: Perform, W: Witness, V: Verify Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR 2: (Vendor / Sub vendor)		

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - 7 Rev No. 00 Page 3 of 3
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code1. 12. Under 'D' please put (Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification. 13. Vendor's signature & stamp should be available on each page of QAP. 14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings. 15. The following operations/characteristics/check points may be included (AS APPROPRIATE) a) Visual check b) Dimensional check c) Mechanical and Chemical properties. d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.) e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc. f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc. g) Verification of test certificate for protection class for the enclosures. h) Mechanical functioning of switches. i) Continuity of earthing and provision of earth points. j) Colour coding of wiring, size, tightness & dressing of wiring. k) Review of test certificates of assembled items, raw materials, internal test reports etc. l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc. m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc. n) Material identification (for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.) o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non-Destructive Tests. p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating) q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole. r) Packing and Preservation. 16. QAP Format enclosed. 17. Typical Manufacturing QAP(s) is /are attached.	
	Ref. Doc		

VENDOR'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN							QP. NO.:				
		CUSTOMER: BHEL, HYDERABAD – 32.				BHEL P.O.NO.:			REV NO:		DATE:		
		PROJECT: PRODUCT:				P.O.DATE: BHEL SPEC:			REV:		PAGE 1 OF 1		
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
2.0	INPROCESS INSPECTION												
3.0	FINAL INSPECTION & TESTING												
4.0	PRESERVATION & PACKING												

VENDOR TO NOTE: THIS FORMAT IS IN MICROSOFT WORD. HEADER & FOOTER SHALL BE AVAILABLE IN EACH PAGE OF QP. QP SHALL BE IN LANDSCAPE & A4 SIZE ONLY. FONT SIZE SHALL BE MIN 10. VENDOR SHALL SIGN & STAMP IN EACH PAGE OF QP. LOI REF. & DATE ARE NOT ACCEPTABLE. P.O.NO. & DATE SHALL BE INDICATED. QP NO. SHOULD BE UNIQUE AND SHALL NOT REPEAT. ALL THE TESTS / CHECKS INDICATED IN THE BHEL SPEC. SHALL BE INDICATED IN THE QP.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032				PROJECT: PACKAGE: GEAR PUMPS (FM APPROVED/UL LISTED) BHEL TECH SPEC:		REV NO:		DATE:			
								PAGE 1 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	Casing	Visual check	Major	Visual	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		--	--	2	2	--	
1.2		Dimensional check	Major	Measurements	100%			--	--	2	2	--	
1.3		Chemical & Mech. Properties	Major	Chemical & Mech. analysis	1 per heat/lot			MTC	√	2	2	1	
1.4		Heat treatment for all castings	Major	HT	100%			HT chart	√	2	2	1	
1.5	Stator and rotor	Chemical & Mech. Properties	Major	Chemical & Mech. analysis	1 per heat/lot			MTC	√	2	2	1	
1.6	Mechanical seal	Material and leakage check (Air test)	Major	OEM's certificate review	100%			OEM's certificate	√	2	2	1	
1.7	Bearing and bearing housing	Make and Model	Major	OEM's certificate review	100%			OEM's certificate	√	2	2	1	
1.8	Coupling	Chemical & Mech. Properties	Major	Chemical & Mech. analysis	1 per heat/lot			MTC	√	2	2	1	
1.9	Strainer (as applicable)	Chemical & Mech. Properties and	Major	Chemical & Mech. analysis	1 per heat/lot			OEM's certificate	√	2	2	1	
1.10		NDT and hydro test	Major	DP and RT and testing	100%			NDT reports and hydro test reports	√	2	2	1	

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED √ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: GEAR PUMPS (FM APPROVED/UL LISTED) BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 2 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.10	Instruments and JB (as applicable)	MOC, hydro test reports, Calibration reports and Type test certificates	100%	OEM's certificate review	100%			OEM's certificate	√	2	2	1	
1.11	Interconnecting pipes and fittings (as applicable)	Chemical & Mech. Properties	Major	Chemical & Mech. Analysis	1 per heat/lot			MTC	√	2	2	1	
1.12	Gaskets, Flanges, and Fasteners	Chemical & Mech. Properties	Minor	Chemical & Mech. Analysis	1 per heat/lot			MTC	√	2	2	1	
2.0	INPROCESS INSPECTION												
2.1	Fabrication of casing and other components	WPS, PQR and WQR	Major	Document verification	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		WPS, PQR and WQR	--	2	2	1	
2.2	Casing	NDE	Major	DPT/MPI	100%			NDE reports	√	2	1	--	
2.3		Casing hydrostatic strength and flange & gasket tightness	Critical	Hydrostatic test	100%			Test reports	√	2	1	--	
2.4	Butt welds on casing (if any)	NDE	Major	RT	100%			IR	√	2	2	1	
2.5	Fillet welds on casing (if any)	NDE	Major	MPI	100%			IR	√	2	2	1	
2.6	Stator	NDE	Major	DPT / MPI	100%			NDE reports	√	2	2	1	

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: GEAR PUMPS (FM APPROVED/UL LISTED) BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 3 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
2.7	Rotor	NDE	Major	DPT / MPI and UT (if shaft diameter > 50 mm)	100%			NDE reports	√	2	2	1	
2.8	Wear rings	NDE and hardness test	Major	DPT and hardness test	100%			DP and hardness test reports	√	2	2	1	
2.9	Interconnecting Piping (as applicable)	NDE and leakage	Major	DPT and hydro test	100%			DPT and hydro test report	√	2	2	1	
2.10	Coupling	Dynamic balancing	Critical	Balancing	100%			IR	√	2	2	1	
2.12	Rotor assembly with coupling half	Dynamic balancing	Critical	Balancing	100%			IR	√	2	2	1	
3.0	FINAL INSPECTION & TESTING												
3.1	Pump Assembly with job motor and job coupling	Overall Dimensions	Major	Measurement	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		IR	√	2	1	--	Only 10% witness by BHEL / BHEL's TPIA, subjective to minimum 1 pump of each size & type.
3.2		Performance test as per FM standard/UL standard	Critical	Testing	100%			TC	√	2	1	--	
3.3		Dry Operation and Self-Priming	Critical	Testing	100%			TC	√	2	1	--	
3.4		Endurance test	Critical	Testing	100%			TC	√	2	1	--	
3.5		Relief valve setting	Critical	Testing	100%			TC	√	2	1	--	
3.6		Strip Examination	Major	Dismantling	100%			TC	√	2	1	--	
LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED √ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.													

 TYPICAL MANUFACTURING QUALITY PLAN PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032 PROJECT: PACKAGE: GEAR PUMPS (FM APPROVED/UL LISTED) BHEL TECH SPEC: MQP. NO.: REV NO: DATE:													
PAGE 4 OF 4													
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.8		Accessories and Spares (if any)	Major	BOM check	100%			IR	√	2	1	--	
4.0	PRESERVATION & PACKING												
4.1	Pump and its components	Direction of rotation, Stamping and Painting	Major	Visual, Shade & DFT	Random	Tech Spec/ Approved Datasheet/ Approved Drawing		IR	√	2	2	--	
4.2		Inspection reports/ certificate traceability index	Major	Visual	100%			Index	√	2	2	--	
4.3		Packing #	Major	Visual	100%			Packing List	√	2	2	--	# Seaworthy packing for export orders

Notes:-

1. This MQP should be read along with specification, approved drawings & approved datasheet. (Latest revisions to be considered as per PO).
2. Specification/Drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.
4. PMI to be witness by inspection agency for all accessible SS or AS parts.

Abbreviations:-

MTC	-	Material Test certificate	WPS	-	Welding Procedure Specification
IBR	-	Indian Boiler Regulations	PQR	-	Procedure Qualification Record
DFT	-	Dry Film Thickness	WPQ	-	Welder Performance Qualification
TC	-	Test Certificate	NDE	-	Non Destructive Examination
UTS	-	Ultimate Tensile Strength	Appd. Dwg.	-	Approved Drawing
PMI	-	Positive Material Identification	OD	-	Outer Diameter
G.I	-	Galvanized Iron	ID	-	Internal Diameter
MOC	-	Material of construction			

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		TYPICAL MANUFACTURING QUALITY PLAN							MQP. NO.:				
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: LT MOTOR BHEL TECH SPEC:				REV NO:		DATE:		
									PAGE 1 OF 4				
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS

1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	<u>COPPER WIRE</u> Enameled Copper Wire	Overall diameter, elongation, Mandrel winding test, Peel test, springiness, Abrasion test, Cut through test, Heat shock test, Continuity test	Major	Measurement and mechanical & electrical testing	One sample per heat/lot	National & international standard (IS or IEC) / technical specification/ approved drawing/ datasheet	IR / supplier test certificate	√	2	2	1		
1.2	<u>STEEL SHAFT</u> Straightened Steel bar in black Finish	Dimensions, surface finish, chemical composition	Major	Visual, measurement and chemical testing	One sample per heat/lot		supplier test certificate	√	2	2	1		
1.3		NDT	Major	UT	100%		supplier test certificate	√	2	2	1		
1.4	<u>ALUMINIUM INGOTS</u>	Chemical properties	Major	Chemical testing	One sample per heat/lot		supplier test certificate	√	2	2	1		
2.0	INPROCESS INSPECTION												
2.1	ASSEMBLY	Completeness and correctness of assembly	Major	Visual verification	100%	MO and manufacturer's internal processes	Log book	--	2	2	2		
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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: LT MOTOR BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 2 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.0	FINAL INSPECTION & TESTING												
3.1	ROUTINE TESTING	Measurement of winding resistance in cold condition	Major	Testing	100%	National & international standard (IS or IEC) / technical specification		TC	√	2	1	--	
3.2		SH heater resistance (if applicable)	Major	Testing	100%			TC	√	2	1	--	
3.3		Insulation resistance (before and after HV test)	Major	Testing	100%			TC	√	2	1	--	
3.4		High voltage test at 1.8 KV for 1 minute and space heater HV test	Major	Testing	100%			TC	√	2	1	--	
3.5		Direction of rotation	Major	Testing	100%			TC	√	2	1	--	
3.6		No load test (measurement of NL A, voltage, NL power and NL RPM)	Major	Testing	100%			TC	√	2	1	--	
3.7		Reduced run up voltage test at (rated volt√3)	Major	Testing	100%100%			TC	√	2	1	--	
3.8		Locked rotor test at full load current	Major	Testing	100%			TC	√	2	1	--	
3.9		Vibration measurement	Major	Testing	100%			TC	√	2	1	--	
3.10		Measurement of noise level	Major	Testing	100%			TC	√	2	1	--	
3.11		120% over speed test	Major	Testing	100%			TC	√	2	1	--	

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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: LT MOTOR BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 3 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
3.12	TYPE TESTS	Measurement of winding resistance in cold condition	Major	Testing	One /rating	National & international standard (IS or IEC) / technical specification		TC	√	2	--	1	Verification of Identical Type test Report of same Rating
3.13		Temp. rise test at full load (load point for 100%, 75% & 50% load (full load, ¾ and ½ load)	Major	Testing	One /rating			TC	√	2	--	1	
3.14		160% momentary overload test	Major	Testing	One /rating			TC	√	2	--	1	
3.15		Locked rotor amp and torque test	Major	Testing	One /rating			TC	√	2	--	1	
3.16		No load test	Major	Testing	One /rating			TC	√	2	--	1	Identical type test reports for motor ratings (not more than 5 years old) will be provided.
3.17		Reduced voltage running up test	Major	Testing	One /rating			TC	√	2	--	1	
3.18		Insulation resistance test (before and after HV test)	Major	Testing	One /rating			TC	√	2	--	1	
3.19		HV test – 1.8 KV for winding and 1.5 KV for space heater	Major	Testing	One /rating			TC	√	2	--	1	
3.20		Vibration test	Major	Testing	One /rating			TC	√	2	--	1	
3.21		120% over speed test	Major	Testing	One /rating			TC	√	2	--	1	
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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
								REV NO:		DATE:			
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: LT MOTOR BHEL TECH SPEC:			PAGE 4 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	V	
4.0	PRESERVATION & PACKING												
		Painting*, (Shade, DFT,) Marking	Major	Visual, Measurem ent	Random	Technical specification/ approved drawing/datasheet	TC	√	2	--	1		
		Packing*	Major	Visual	Random		Packing List	√	2	--	--		

Notes:-

1. This MQP should be read along with specification ((Latest revisions to be considered as per PO), approved drawings & approved datasheet.
2. Specification/drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

Abbreviations:-

MTC	–	Material Test certificate	COC	–	Certificate of Compliance	DFT	–	Dry Film Thickness
TC	–	Test Certificate	NDE	–	Non Destructive Examination	IR	–	Inspection Report
DFT	–	Dry Film Thickness	IBR	–	Indian Boiler Regulations	IS	–	Indian Standards

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: HT MOTOR BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 1 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.0 RAW MATERIALS & BOUGHT OUT ITEMS													
1.1	Shaft forging, Magnetic Steel sheet, Stator winding copper, Rotor winding copper	Properties as per Specification/ drawing.	Major	Elec./ Mech./ Chem./ NDT	Sample	Tech Spec/ Approved Datasheet/ Approved Drawing		TC/COC	√	2	2	1	
2.0 INPROCESS INSPECTIONS													
2.1	Stator Complete	Measurement of RTD's resistance	Major	Electrical	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		TR	√	2	2	1	
		Inter turn insulation Surge Voltage (Baker) test	Major	Electrical	100%			TR	√	2	2	1	
		HV & IR of stator Winding, Tan delta Test	Major	Electrical	100%			TR	√	2	2	1	>3.3KV, values for information only
2.4	Rotor Complete	HV & IR of rotor winding (For SRIM)	Major	Electrical	100%			TR	√	2	2	1	
		Dynamic Balancing at rated speed	Major	Testing	100%			TR	√	2	2	1	
2.5	Motor Assy.	Dimensional checks (Shaft center height, Key way dimensions, Shaft ext. dimensions)	Major	Measure ment	100%			TR	√	2	2	1	

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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: HT MOTOR BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 2 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.0 FINAL INSPECTION AND TESTINGS													
3.1	MOTOR ROUTINE TESTS	Verification of DOR, Name plate, Terminal box location, Phase sequence	Major	Electrical	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		TR	√	2	1	--	
3.2		Measurement of stator winding resistance	Major	Electrical	100%			TR	√	2	1	--	
3.3		Insulation Resistance Test before & after HV Test	Major	Electrical	100%			TR	√	2	1	--	
3.4		High Voltage Test	Major	Electrical	100%			TR	√	2	1	--	
3.5		Polarization Index	Major	Electrical	100%			TR	√	2	1	--	
3.6		No Load running of Motor & Measurement of Current ,Voltage, Power Input & Speed	Major	Electrical	100%			TR	√	2	1	--	
3.7		Functional testing of Accessories and auxiliaries (RTD, BTM, Space heater)	Major	Electrical	100%			TR	√	2	1	--	
3.8		Reduced voltage running up test	Major	Electrical	100%			TR	√	2	1	--	
3.9		Open CKT. Voltage test (For SRIM only)	Major	Electrical	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		TR	√	2	1	--	

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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: HT MOTOR BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 3 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.10		Vibration Test During no load run	Major	Electrical	100%			TR	√	2	1	--	APPLICABLE FOR HORIZONTAL MOTORS
3.11		Shaft Voltage Measurement during No Load Run	Major	Electrical	100%			TR	√	2	1	--	
3.12	MOTOR TYPE TEST	All test covered in routine test	Major	Electrical	1 Motor			TR	√	2	2	1	
3.13		Full load measurement Of voltage, current & Power input , Slip	Major	Electrical	1 Motor			TR	√	2	2	1	
3.14		PF at 50%,75% & 100%	Major	Electrical	1 Motor			TR	√	2	2	1	
3.15		Over Speed Test during No load run	Major	Electrical	1 Motor			TR	√	2	2	1	
3.16		Temperature rise test	Major	Electrical	1 Motor			TR	√	2	2	1	
3.17		Calculation of efficiency (by summation of loss method) at ½,3/4, & full load	Major	Electrical	1 Motor			TR	√	2	2	1	
3.18		Noise Measurement during No Load Run	Major	Electrical	1 Motor	Tech Spec/ Approved Datasheet/ Approved Drawing		TR	√	2	2	1	
3.19		Momentary over load test	Major	Electrical	1 Motor			TR	√	2	2	1	
3.20		Starting torque, starting current, and pullout torque calculation	Major	Electrical	1 Motor			TR	√	2	2	1	Based on no load reading

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		TYPICAL MANUFACTURING QUALITY PLAN							MQP. NO.:				
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: HT MOTOR BHEL TECH SPEC:				REV NO:		DATE:		
									PAGE 4 OF 4				
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
4.0 PRESERVATIONS AND PACKING													
4.1		Check for Painting (Paint shade & thickness)	Major	Visual, DFT	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		IR	√	2	2	1	
4.2		Check for fitment of all components & accessories	Major	Visual	100%			IR	-	2	2	1	

Notes:-

1. This MQP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Specifications/drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

ABBREVIATIONS:-

BDV: Break Down Voltage	IP: Ingress Protection	CIMFR: Central Institute of Mining & Fuel Research
OD: Outer Diameter	HV: High Voltage	DGMS: Directorate General of Mines Safety
ID: Internal Diameter	TC: Test Certificate	CCOE: Chief Controller of Explosives
BIS: Bureau of Indian Standards	CPRI: Central Power Research Institute	PESO: Petroleum and Explosives Safety Organization

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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: DIESEL ENGINE (FM APPROVED/UL LISTED) BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 1 OF 3					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	Piston crown, Connecting rod, Crankshaft, Camshaft	Chem. & mech. properties	Major	Chem. & mech. Testing	1 per lot/heat	Tech Spec/ Approved Datasheet/ Approved Drawing	MTC	√	2	2	1		
1.2		Crack test	Major	NDE	100%		MTC	√	2	2	1		
1.3		Dimensions	Major	Measure ment	100%		MTC	√	2	2	1		
1.4	Cylinder block, Cylinder head, Cylinder liner	Chem. & mech. properties	Major	Chem. & mech. Testing	1 per lot/heat		MTC	√	2	2	1		
1.5		Pressure test	Major	Hydro test	100%		MTC	√	2	2	1		
1.6		Dimensions	Major	Measure ment	100%		MTC	√	2	2	1		
2.0	INPROCESS INSPECTION												
2.1	Crankshaft	Dynamic balancing	Critical	balancing	100%	Tech Spec/ Approved Datasheet/ Approved Drawing	IR	√	2	2	1		
2.2	Fuel and Lube oil pump	Functional test	Major	Testing	100%		TC	√	2	2	1		

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		TYPICAL MANUFACTURING QUALITY PLAN							MQP. NO.:				
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: DIESEL ENGINE (FM APPROVED/UL LISTED) BHEL TECH SPEC:				REV NO:		DATE:		
									PAGE 2 OF 3				
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
3.0 FINAL INSPECTION & TESTING													
3.1	Diesel engine	FM approvals/UL listed	Major	Certificate review	100%	FM Standard	TC	√	2	2	1	Only 10% witness by BHEL / BHEL's TPIA, subjective to minimum 1 engine of each size & type.	
3.2		Performance test as per FM standard	Critical	Testing	100%	Tech Spec/ Approved Datasheet/ Approved Drawing	TC	√	2	1	--		
3.3		Overall Dimensions	Major	Measurement	100%		IR	√	2	1	--		
3.4	Spares (if any)	Major	BOM check	100%	IR		√	2	1	--			
4.0 PRESERVATION & PACKING													
4.1	Diesel engine and its components	Stamping and Painting	Major	Visual, Shade & DFT	Random	Tech Spec/ Approved Datasheet/ Approved Drawing	IR	√	2	2	--	# Seaworthy packing for export orders	
4.2		Packing #	Major	Visual	100%		Packing List	√	2	2	1		

Notes:-

- This MQP should be read along with specification ((Latest revisions to be considered as per PO), approved drawings & approved datasheet.
- Specification/drawing/datasheet shall prevail over quality plan for contradiction if any.
- Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

Abbreviations:-

MTC	–	Material Test certificate	COC	–	Certificate of Compliance	DFT	–	Dry Film Thickness
TC	–	Test Certificate	NDE	–	Non Destructive Examination	IR	–	Inspection Report
DFT	–	Dry Film Thickness	IBR	–	Indian Boiler Regulations	IS	–	Indian Standards

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

ESP-001- 2A Rev.00	 	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION RAMACHANDRAPURAM: HYDERABAD - 502 032	Std. / Doc. Number	
			Annexure-8	
			Rev. No.	00

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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19

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			Annexure-9	
			Rev. No.	00

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Annexure-9

Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19

MASTER DOCUMENT LIST - Foam Pump: Motor & Diesel Engine driven																								
	Vendor Name:				PROJECT:											Supplier Doc- No:								
	Vendor Contact Person:				BHEL PO No.		PO date:			PO Dly. Date:						Rev- No.								
	Vendor contact No.				Supplier's Job No.											Date:								
	SYSTEM/PACKAGE:	Hydrant Pump				TODAY-DATE	19-Jul-19			Submission status to BHEL														
Sl.No	DRG/DOC. NAME	DRG/ DOC NO.	NO. OF SHTS.	CAT	CRITICAL FOR MFG?	REQD.FOR CUSTOMER SUBMISSION?	Plan date of submission	Count of DUE as on Dt.	STATUS	Rev-0			Rev-1			Rev-2			Rev-3			Rev-4		
			NO.	(A / I)	(Y/N)	(Y/N)	dd-mmm-yyyy		" /PV/PB /PC/AA	SD	AD	APP.CAT	SD	AD	APP.CAT	SD	AD	APP.CAT	SD	AD	APP.CAT	SD	AD	APP.CAT
1.0 Mechanical																								
A	MECHANICAL																							
1	Pump Data Sheet -Engine & Motor Driven	Later		A	Y	Y	Within 2 weeks after PO placement																	
2	Pump Performance curve-Motor Driven	Later		I	Y	Y	Within 2 weeks after PO placement																	
3	Pump Performance curve-Engine Driven	Later		I	Y	Y	Within 2 weeks after PO placement																	
4	Pump & Motor assembly GA drawing	Later		A	Y	Y	Within 2 weeks after PO placement																	
5	Pump & Engine assembly GA drawing	Later		A	Y	Y	Within 2 weeks after PO placement																	
6	Pump Cross Sectional Drawing-Motor Driven	Later		I	Y	N	Within 2 weeks after PO placement																	
7	Pump Cross Sectional Drawing-Engine Driven	Later		I	Y	N	Within 2 weeks after PO placement																	
8	Motor Data Sheet	Later		A	Y	Y	Within 2 weeks after PO placement																	
9	Motor GA drawing	Later		A	Y	Y	Within 2 weeks after PO placement																	
10	Motor TB drawing	Later		I	Y	N	Within 2 weeks after PO placement																	
11	Motor Curves	Later		I	Y	Y	Within 2 weeks after PO placement																	
12	T-S Curve	Later		I	N	N	Within 2 weeks after PO placement																	
13	Diesel engine GA Drawing	Later		A	Y	N	Within 2 weeks after PO placement																	
14	Diesel engine Data Sheet	Later		A	Y	Y	Within 2 weeks after PO placement																	
15	Controller GA Drawing & Wiring Diagram	Later		A	Y	Y	Within 2 weeks after PO placement																	
16	Diesel Engine Wiring Diagram	Later		I	Y	N	Within 2 weeks after PO placement																	
17	Battery Charger Data Sheet	Later		A	Y	Y	Within 2 weeks after PO placement																	
18	Battery Data Sheet	Later		A	Y	Y	Within 2 weeks after PO placement																	
19	Battery capacity calculation sheet	Later		I	Y	N	Within 2 weeks after PO placement																	
20	Fuel tank Drawing	Later		A	Y	N	Within 2 weeks after PO placement																	
21	Fuel tank calculation sheet	Later		I	Y	N	Within 2 weeks after PO placement																	
22	P&ID/Schematic of Diesel Engine	Later		I	N	N	Within 2 weeks after PO placement																	
23	Coupling GA Drawing for Motor Driven Pump	Later		I	Y	N	Within 2 weeks after PO placement																	
24	Coupling GA Drawing for Engine Driven Pump	Later		I	Y	N	Within 2 weeks after PO placement																	
25	Mechanical Seal GA Drawing and details: Motor driven Pump	Later		I	Y	N	Within 2 weeks after PO placement																	
26	Mechanical Seal GA Drawing and details: Engine driven Pump	Later		I	Y	N	Within 2 weeks after PO placement																	
B	INSTRUMENTAION																							
1	Data Sheet of Level transmitter	Later		I	N	N	Within 4 weeks after PO placement																	
2	Datasheet of Motor Bearing & Winding RTDs	Later		I	N	N	Within 4 weeks after PO placement																	
3	Datasheet of Motor Bearing TGs	Later		I	N	N	Within 4 weeks after PO placement																	
5	Data Sheet of Junction Box	Later		I	N	N	Within 4 weeks after PO placement																	
6	GAD of Junction Box	Later		I	N	N	Within 4 weeks after PO placement																	

MASTER DOCUMENT LIST - Foam Pump: Motor & Diesel Engine driven																								
	Vendor Name:				PROJECT:											Supplier Doc- No:								
	Vendor Contact Person:				BHEL PO No.		PO date:			PO Dly. Date:						Rev- No.								
	Vendor contact No.				Supplier's Job No.											Date:								
	SYSTEM/PACKAGE:	Hydrant Pump				TODAY-DATE	19-Jul-19			Submission status to BHEL														
Sl.No	DRG/DOC. NAME	DRG/DOC NO.	NO. OF SHTS.	CAT	CRITICAL FOR MFG?	REQD.FOR CUSTOMER SUBMISSION?	Plan date of submission	Count of DUE as on Dt.	STATUS	Rev-0			Rev-1			Rev-2			Rev-3			Rev-4		
			NO.	(A / I)	(Y/N)	(Y/N)	dd-mmm-yyyy		" * /PV/PB /PC/AA	SD	AD	APP.CAT	SD	AD	APP.CAT	SD	AD	APP.CAT	SD	AD	APP.CAT	SD	AD	APP.CAT
C	MISCELLANEOUS																							
1	Performance Test Procedure: Motor driven & Engine Driven	Later		A	Y	N	Within 8 weeks after PO placement																	
2	NPSH test procedure	Later		I	N	N	Within 8 weeks after PO placement																	
3	Vibration test procedure & Temperature rise test procedure	Later		I	N	N	Within 8 weeks after PO placement																	
5	Hydro Test Procedure	Later		I	N	N	Within 8 weeks after PO placement																	
6	NDE Test Procedure	Later		I	N	N	Within 8 weeks after PO placement																	
8	Painting proccedure	Later		A	N	N	Within 10 weeks after PO placement																	
9	Packing List	Later		I	N	N	Before Despatach																	
10	BILL OF MATERIAL	Later		A	N	N	Within 10 weeks after PO placement																	
11	BILLING BREAKUP	Later		A	N	N	Before Despatach																	
12	QUALITY ASSURANCE PLAN	Later		A	N	Y	Within 4 weeks after PO placement																	
13	SUB VENDOR LIST	Later		I	N	N	Within 4 weeks after PO placement																	
14	COMMISSIONING SPARES LIST	Later		A	N	N	Within 4 weeks after PO placement																	
15	Mandatory Spares List	Later		A	N	N	Within 4 weeks after PO placement																	
16	LUBE OIL SCHEDULE	Later		I	N	N	Within 8 weeks after PO placement																	
20	O& M Manuals(Soft Copies)	Later		A	N	N	After Approval of all engineering drawings/documents																	
21	O& M Manuals(Hard Copies)** ** hard copy shall be furnished after getting concurrence on soft copy.	Later		I	N	N	After Approval of all engineering drawings/documents																	
							TOTAL	0		*APP.CAT														
	A-Approval Category	PV-Commented and pending with vendor					TOTAL "PV"		0	A1-'Approved								Approved By:						
	I-Information Category	PB- Pending with BHEL					TOTAL "PB"		0	A2-'Mfg. Clearance given subject incorporation of comments							Sign :							
		PC- Pending with Customer					TOTAL "PC"		0	A3-Commented,Revision & resubmission required.														
		AA- Approved					TOTAL "AA"		0	A4- Retained for info.							Date :							
		OD-Overdue					TOTAL "OD"		0															
		" " - Not yet Due.							5															

Vendor documentation status									
Total No of Docs	Due as on Date	Submitted by vendor as on Dt.	Approved by BHEL as on Dt.	Commented by BHEL as on Dt.	Pending with BHEL/CUSTOMER as on date	%age of Dos Approved	%age of critical Dos Approved	Is Mfg. Clearance given?	Status/ Remarks
(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	(Nos)	% age	% age	(Y/N)./(If Y) put Dt.	
0	0	0	0	0	0	#DIV/0!	0.00%	Y	

ESP-001- 2A Rev.00	 	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION RAMACHANDRAPURAM: HYDERABAD - 502 032	Std. / Doc. Number	
			Annexure-10	
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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19

ANNEXURE-10: DEVIATION FORMAT

Sl. No.	Section / Part/Subsection	Page No.	Clause No.	Bid Specification Requirement	Bidder's Deviation

Notes:

1. Bidder to furnish duly filled format along with SEAL & SIGN along with their offer.
2. All the pre-bid queries (if any) shall be raised before submission of the offer as per pre-bid query format (Annexure- 10).
3. Deviations, which are impractical, and the same were raised during pre-bid stage as per pre-bid query format (Annexure-10), but still purchaser's reply/clarifications could not be met shall only be raised in this format.
4. If there are no deviations, bidders shall indicate as "No deviation" and submit the same along with their offer.
5. Deviations indicated elsewhere in bidders offer except raised through this format shall not be considered and reviewed during technical evaluation of their offer.

SIGNATURE : _____
NAME : _____
DESIGNATION : _____
COMPANY : _____
DATE : _____

COMPANY SEAL

ANNEXURE-11: PRE-BID QUERIES FORMAT

Sl. No.	Section / Part/Subsection	Page No.	Clause No.	Bid Specification	Bidder's Query	Purchaser's Reply

Note: During Preparation of Pre-Bid Queries, Complete Tender Specification (along with all Annexures) shall also be referred.

ESP-001- 2A Rev.00	 	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION RAMACHANDRAPURAM: HYDERABAD - 502 032	Std. / Doc. Number	
			Annexure-11	
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Annexure-11

Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19

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			Rev. No.	00

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Annexure-12

Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	Siva Prasad Babu	18.07.19



SHIPPING AND PACKAGING INSTRUCTIONS
FOR
2 x 660 MW MAITREE SUPER THERMAL POWER
PROJECT, BANGLADESH
OF
BANGLADESH-INDIA FRIENDSHIP COMPANY (PVT.) LTD
(BIFPCL)

Document Revision-0

Approved by	Checked by	Prepared By
Jasvindra Pal Singh/AGM	Akhilesh Kumar/DGM	Sandeep Singh/Dy. Manager
<i>Jasvindra Pal Singh</i> 11/09/17	<i>Akhilesh</i> 11/09/17	<i>Singh</i> 11/09/17

Bharat Heavy Electricals Limited
Maitree Export Project Group
International Operation Division
Integrated Office Complex, Lodhi Road
New Delhi -110003



Ref: IO/MEPG/S&P/01
Date: 12th September 2017

2x660 MW Maitree STPP, Bangladesh: Shipping and Packaging Instructions Rev-0

Following dispatch instructions for effecting supplies under the above contract are being issued for compliance by all the units/region involved in this project.

Sr. No.	Item No.	Details	Action By
A	1	<u>Purchaser's Name and Address:</u> Bangladesh-India Friendship Power Company (Pvt.) Limited (BIFPCL), Level-17, Borak Unique Height, 117, Kazi Nazrul Islam Avenue, Eskaton Garden, Dhaka-1217, Bangladesh Attention: Mr. Ujjwal Bhattacharya Managing Director, BIFPCL Tel : +8823941805 E-mail : cto@bifpcl.com ; md@bifpcl.com	For information
B	1	<u>Delivery Terms:</u> Site Incharge, 2x660 MW Maitree Super Thermal Power Project, PO-Kalekharber, Union-Rajnagar, Upajila-Rampal, Dist: Bagerhat-9343, Bangladesh Contact No.: +8801678582823	Units to ensure proper marking on the boxes so as to Identify the final destination clearly.
C	1	<u>Seller's Name and Address:</u> Bharat Heavy Electricals Limited International Operations Division Lodhi Road, Integrated Office Complex New Delhi –110003, INDIA Through Various Units/Divisions	For information
D	1	<u>Payment Terms for Equipment, Material & Plant Supply:</u> Advance - 15% of the Contract price. Sight Payment - 65 % of total CIF Value of equipment, materials and plant on submission of shipping documents Delivery Payment - 10% of total CIF cost of supply of equipment, materials and plant against receipt cum damage report. PAC - 5% on receipt of Provisional Acceptance Certificate. FAC - 5% on the receipt of Final Acceptance Certificate	All Units

Sr. No.	Item No.	Details	Action By
E	1	<u>Shipping Marks:</u> Each package or shipping unit shall be clearly marked or stenciled on at least two sides as follows: “BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (Pvt.) LIMITED, 2X660 MW MAITREE SUPER THERMAL POWER PROJECT, BANGLADESH” EPC Contractor - Bharat Heavy Electricals Limited, India In addition, each package or shipping unit shall have the symbol painted in red on at least two sides of the package, covering one fourth of the area of the side.	All Units
F	1	<u>Consignee:</u> BOARD BILL/S OF LADING MADE OUT TO THE ORDER OF /OR AIRWAY BILL CONSIGNED TO AND/OR CONSIGNED NOTE FOR TRANSPORT BY TRUCK CONSIGNED TO Managing Director, Bangladesh-India Friendship Power Company (Pvt.) Limited, Level-17, Borak Unique Height, 117, Kazi Nazrul Islam Avenue, Eskaton Garden, Dhaka-1217, Bangladesh Contact No.: +8823941805 ** Any change as per LC shall be taken care of.	All Units
G	1	<u>Notifying Party :</u> DGM(C&M) Bangladesh-India Friendship Power Company (Pvt.) Limited, Level-17, Borak Unique Height, 117, Kazi Nazrul Islam Avenue, Eskaton Garden, Dhaka-1217, Bangladesh Contact No.: +8801678582831 E-Mail:epcmainplant@bifpcl.com ** Any change as per LC shall be taken care of.	All Units
H		Packing Instructions & Inspection Prior to Dispatch by Supplying Units/Sub-Vendors:	
H	1	Packing (tare) shall be part of the Equipment cost and shall not be subject to return. The packing should ensure integrity and cohesiveness of each delivery batch of Equipment during transportation. In case of Equipment assemblies and unit's delivery in the packing of glass, plastics or paper the specification of packing with the material and weight characteristics are to be indicated. Hazardous goods must be packed as per international standards/practice.	All Units/Suppliers
H	2	<u>Special instructions as per BICPCL :</u>	

Sr. No.	Item No.	Details	Action By
H	2.1	All equipment and materials and other Plant shall be suitably coated wrapped, or covered and boxed or crated for export shipment and to prevent damage during handling and storage at the Site. Cardboard containers shall be enclosed in a solid wooden container.	All Units/Suppliers
H	2.2	Equipment and process materials shall be packed and semi-knocked down, to the extent possible, to facilitate handling and storage and to protect bearings and other machine surfaces from oxidation. Each container, box, crate or bundle shall be reinforced with steel strapping In such a manner that breaking of one strap will not cause complete failure of the packaging. The packing shall be of best standard to withstand rough handling and to provide suitable protection from tropical weather while In transit and while awaiting erection at the Site.	All Units/Suppliers
H	2.3	Equipment and materials in wooden cases or crates shall be properly cushioned to withstand the abuse of handling, transportation and storage. Packing shall include preservatives suitable to tropical conditions. All machine surfaces and bearings shall be coated with oxidation preventative compounds. All parts subject to damage when in contact with water shall be coated with suitable grease and wrapped in heavy asphalt or tar impregnated paper.	All Units/Suppliers
H	2.4	Crates and packing material used for shipping will become the property of Employer, but the Contractor will be allowed to use the same for the Work as needed, but the remaining material shall be turned over to Employer upon completion of the Project. Provided however, shippers container used for transportation of material shall be returned to the Contractor.	All Units/Suppliers
H	2.5	Each part of the equipment which is to be shipped as a separate piece or smaller parts packed within the same case shall be legibly marked to show the unit of which it is part, and match marked to show its relative position in the unit, to facilitate assembly in the field. Unit marks and match marks shall be made with steel stamps and with paint.	All Units/Suppliers
H	2.6	Each case shall contain a packing list showing the detailed contents of the package. When any technical documents are supplied together with the shipment of materials no single package shall contain more than one set of such documents. Shipping papers shall clearly indicate in which packages the technical documents are contained.	All Units/Suppliers
H	2.7	The case number shall be written in the form of a fraction, the numerator of which is the serial number of the case and the denominator the total number of case in which a complete unit of equipment is packed .	All Units/Suppliers

Sr. No.	Item No.	Details	Action By
H	2.8	Wherever necessary besides usual Inscriptions the cases shall bear special indication such as "Top", "Do not turn over", "Care", "Keep dry", etc., as well as indication of the centre of gravity (with red vertical lines) and places for attaching slings (with chain marks). For all fragile equipment , unit should take special care to pack and label with additional markings such as “ FRAGILE-HANDLE WITH CARE” , “ LIFTING POINTS” , “ THIS WAY UP” , “ DO NOT STACK” etc. to protect them from damage in transit.	All Units/Suppliers
H	2.9	Cases which cannot be marked as above shall have metal tags with the necessary markings on them. The metal tags shall be securely attached to the packages with strong steel binding wire. Each piece, skid, case or package shipped separately shall be labelled or tagged properly.	All Units/Suppliers
H	3	Each package should have the following inscriptions and signs stenciled with an indelible ink legibly and clearly: Destination: Package number: BHEL/MTR/BD/XXX/YYY/ZZZZZ where XXX stands for Unit abbreviation e.g. HWR , HYD ,EDN, PEM, RPT, PCRI, TBG, PC, JHS,TRY, EPD, ISG etc. and YYY stands for Vendor abbreviation. Following series of ZZZZZ should be used by different Units- HWR (10000), PCRI (17000), RDP(18000), HYD(20000), TBG(25000), PEM (30000), TRY(40000), PC(50000), HPVP(57000), PSER(60000), ISG(70000), BPL(80000), RPT(85000), EPD (90000), JHS(92000), EDN(95000). if first package is dispatched from HWR and vendor named as ABC then package should be numbered as : BHEL/MTR/BD/HWR/ABC/10001 Gross and Net weight: Dimensions: Lifting places: Handling marks and the following delivery marking: CONTRACT No. BIFPCL/EPC-MAIN PLANT/2016/01 PURCHASER: BIFPCL, Bangladesh	All Units/Suppliers
H	4	Completeness of Contents of each packing case:	
H	4.1	Concerned CQA/Unit QC/Third Party Inspection Agency shall verify the completeness of contents of each package w.r.t packing list both in terms of quality and quantity before authorising dispatch of the consignment.	All Units/Suppliers
H	4.2	Packing commensurate with international standards and accepted norms will be ensured by CQA/ Unit QC/Third Party Inspection Agency. Packing has to be sea-worthy and secure. As far as possible, the packing has to be rectangular in shape for optimum space utilization in the ship and economize on shipping costs. Projections on packages are prohibited.	CQA/All Units

Sr. No.	Item No.	Details	Action By
H	4.3	The packing list has to be checked and certified by the Inspection agency with due signatures. All packages shall be enclosed in suitable GI sheets on all sides.	CQA/All Units
H	4.4	No loose items / Gunny bag packing are allowed for shipment. Proper pallets and crates are to be used for packing of Oil drums and Structures.	CQA/All Units
H	5	<u>Routing of Packing Lists:</u> Packing list is an extremely important document, which forms a part of export documentation in connection with the processing of customs formalities. Packing List has to be generated by units/Unit vendors and sent to MEPG and ROD Chennai/Kolkata (both at the same time), two weeks in advance, for processing and obtaining shipping bills' clearances and avoiding any delay at Kolkata/Haldia/Chennai port.	All Units/ suppliers
H	6.1	<u>Advance intimation to ROD- Chennai/Kolkata & MEPG, New Delhi:</u> All supplying units/vendors will give at least 15 days advance intimation to ROD-Chennai/Kolkata & MEPG, New Delhi along with package details before actual dispatches to arrange for storage/shipping arrangements by ROD Chennai/Kolkata/Haldia. Information must be sent to consolidate the details and arrange for shipments in time.	All Units
H	6.2	<u>Telephonic Intimation to ROD Chennai/Kolkata of Movement of Vehicles:</u> Vehicle drivers to be instructed by the units to contact ROD regarding movement of vehicles on daily basis for heavy lifts. Especially 2 days before arrival at Kolkata/Haldia/Chennai so that suitable directives can be given to the driver of the vehicle for further transportation of the goods to either docks or godown.	All Units/suppliers
H	7	<u>Bond or Letter of Undertaking:</u> All units to ensure Corporate indirect taxation guidelines vide letter ref no. AA:Fin:Ind Tax:GST-17 date 10.07.2017 for compliance and CBEC Notification no. 16/2017-Central Tax Dated 07.07.2017 and CBEC Circular No. 4/4/2017-GST Dated 07.07.2017 (Circular/Notifications are enclosed). <u>Sealing of Container:</u> All units to ensure CBEC Circular 26/2017 and Corporate indirect taxation guidelines ref. no. AA:Fin:Ind Tax:GST-14 dated 05.07.2017 in this regard may please be followed(Circular/Notifications are enclosed). <u>Other Procedures w.r.t Export:</u> Various guidelines issued time to time from Corporate indirect taxation regarding export may please be referred and to be followed.	All Units/ suppliers

Sr. No.	Item No.	Details	Action By
H	8	<u>Provision of Inspection Windows on Packages:</u> Unit/Vendors should provide inspection window of size 6" x 4" (glass perplex) for customs examination for all packages (above 1.5 x 1.5 x 1.5 cu m) involving panels of any kind. Care would be taken to ensure that all packages are properly sealed to avoid ingress of moisture, rodents etc. Packing slip folders shall be attached in each box.	All Units/ Suppliers
H	9	<u>Transportation Drawings for Heavy Weight/ODC consignment: For any package/item weighing above 20000 kgs and/or size greater than 12 X 2.5 X 2.5 m :</u> Detailed engineering documents (at least 4 sets) for all items of the above category shall be furnished by respective units to issue shipment enquiries in a proper manner. This would include Turbines ,Transformers, Generators etc. The drawing has to include center of gravity of the item clearly (Units to identify such items and notify MEPG as soon as the engineering documents are released).	All units
H	10	<u>Lifting Beams:</u> All heavy lifts for which safe handling is essential at the port of dispatch shall be accompanied by lifting beam on non-returnable basis	All Units
I	1	<u>Marking for Safe Handling:</u> To ensure safe handling, packing case shall be marked to show the following: • Upright position. • Sling position and Centre of Gravity position. • Storage category. • Fragile components (to be marked properly with a clear warning for safe handling).	All Units/suppliers
J	1	<u>Marine Insurance Policy:</u> Insurance Policy for 110 percent value of the contract covering all risks including war and SRCC from Port of shipment in India/Third country direct dispatches, to site shall be taken by PSER, Kolkata and it shall indicate BIFPCL as co-insured.	PSER/Corporate Insurance
K	Shipping Documentation including those covered by customs requirements:		
K	1	GST Invoice as per approved BBU. Following details to be mentioned in GST Invoice for Export – 1. Forex Bank Account no. for all type of Shipping Bill. 2. Authorized Dealer Code no. with Name of Bank for all type of Shipping Bill. 3. Duty Drawback Account no. with IFS code of Bank for Drawback Shipping Bill. As invoice will be used for export custom clearance details like HS code; CIF value, Freight value, Insurance value, FOB value in FC ; Shipper name ;Manufacturer name; Shipping bill type;	All Units/suppliers

Sr. No.	Item No.	Details	Action By
		POL; POD; DBK serial no ; Advance authorization no ; EPCG License no as applicable should appear on invoice.	
K	2	• Packing List • LR Copy • Fumigation certificate for wooden boxes • MSDS for DGR cargo • CE certificate for DEEC shipping bill cases with original import license • Warranty Certificate • Manufacturer 's Factory Test Certificate/Inspection Waiver Certificate • Quality and Quantity Certificate • Certificate of Origin • MDCC	All Units /Sub-vendors of units
K	3	• Type of Shipping Bills. • All Units have to send their DEEC & EPCG licence details to ROD Kolkata or ROD Chennai as per cargo despatches.	All Units/Region
K	4	Chartered Engineer's Certificate, applicable to be arranged by Units. Care should be taken to ensure that usage of the materials shown in C.E. certificate out of DEPB goods is not disproportionate.	All Units/ROD
K	5	Catalogues/literature/write-up in case of customs endorsement for discharging exports obligation in case of DEEC imports to be made available to ROD before arrival of goods in the city of port of dispatch.	All Units
K	6	Commercial Documents for Customs Clearance at Destination i.e. Bangladesh	MEPG/Dhaka Office
L	1	<u>Full Set of Clean Multimodal Transport Document:</u> Complete set of shipping B/L showing freight prepaid as per the rates of regular shipping lines. In case of Air Freight consignment, one original of AWB is required together with three copies of the same. In case of road transport, one original LR is required with 3 copies of the same.	ROD/ MEPG
M	1	<u>Certified Inspection Certificate Approved by Customer:</u> The certificate signed by BIFPCL inspector (if equipment tested in presence of BIFPCL representative) is to be provided to MEPG . In case the Certificate is signed by BHEL/Third Party Inspection Agency, it is to be provided by Units/ suppliers to MEPG and MEPG will get it approved from BIFPCL.	All Units/ Suppliers
N	Shipping Carrier Specification and related Requirements:		
N	1	Certificate of Freight having been pre-paid as per the regular shipping lines is required on MTDs/BLs.	ROD/ MEPG
N	2	Subject cargo would be generally shipped under the deck. Specific confirmation/clearance of MEPG is needed for shipment on deck except wherever shipment is through Barges.	ROD/ MEPG

Sr. No.	Item No.	Details	Action By
N	3	Vessel age to be restricted as per insurance policy in force. Buyer's Reference (Contract No. BIFPCL/EPC-MAIN PLANT/2016/01 Dated 12.07.2016) is required on BLs.	ROD/ MEPG
N	4	For Third Country Supplies , concerned units will ensure all the above certificates in addition to Certificate of Origin.	All Units/ Suppliers
O	Guidelines for Dispatches from Units/Indian Vendors:		
O	1	<u>All materials to be dispatched under intimation to:</u> 1. For Shipments through Chennai Consignment shall be sent to the following address - Mr Harshal Trivedi, Engineer/Docks Bharat Heavy Electricals Ltd Near Marshalling Yard, Chennai Port trust Chennai 600 001 Ph No 044 25362247/25360446 -Mob 08680850932 E-mail trivedi@bhel.in The couriers /correspondence shall be sent to the following address - Shri S S RAJAN AGM/MS, Bharat Heavy Electricals Ltd Regional Operations Division, EVR Building 6th floor No 690(Old No 474) Anna Salai, Nandanam Chennai 600 035 Mob – 09840997089 E-mail ssrajan@bhel.in 2. For Shipments through Kolkata/Haldia Consignment shall be sent to the following address - (Storage yard to be finalized by ROD Kolkata/freight forwarder and address shall be intimated soon) The couriers /correspondence shall be sent to the following address - Mr. Abhijit Chowdhury , Sr. Engineer Bharat Heavy Electricals Ltd , Regional Operations Division DJ 9/1 SECTOR II , Saltlake , Karunamoyee West Bengal 700091 Mob – 9830441607 E-mail abhijit@bhel.in	All Units/Rod
O	2	<u>Clearing Agents:</u> All materials to be dispatched to Chennai/Kolkata/Haldia on door delivery basis, freight prepaid to the address of the clearing agents(to be specified by ROD, from time to time)	All Units/Rod

Sr. No.	Item No.	Details	Action By
O	3	<u>Customs formalities Period:</u> Packages arriving at the port shall have a minimum time of 3 working days for customs examination and other related formalities in respect of the cargo under shipment. The goods received after arrival of the ship may not be loaded if either sufficient time does not exist or space available in the ship is booked by the carrier for other exporters due to lack of availability of the goods at the port in time for shipment from BHEL. In case, where the committed cargo to the carrier based upon information received from all the units does not reach in time of scheduled shipment at the port of dispatch, MEPG would be within its right to decide the priority of loading as per the project schedule requirements given the condition that adequate space in the ship is not available to accommodate the cargo.	For information
P	1	• <u>Shipping Procedures and ROD Responsibilities:</u> Consolidation of Packages and Storage in Warehouse: ROD Chennai/Kolkata either themselves or through their CHA would ensure following: • Proper storage of goods at an elevated level if store is in open to avoid damages to the consignment during rainy season (All the packages to be covered with a proper tarpaulin in open storage). • All Electrical and C&I items to be stored indoors. • Consolidation of the goods as per summary packing lists. • Check marks and numbers on packages. Carry out the corrections, if necessary. • Label the packages linking to the proposed shipping carrier to ensure that package does not get left out.	ROD

Note:

1. Units/Regions are also requested to refer shipping and packaging instructions provided with Internal Orders and GCC Clause no 65 at contract book no. 6 for compliance.
2. Units/Regions are advised to take necessary actions for compliance of GST related issues and refer information available at GST portal of Corporate Finance.

BHARAT HEAVY ELECTRICALS LIMITED
Corporate Finance
BHEL House, Siri Fort, new Delhi-110049

From:	Suraj Prakash GM (Fin) Corporate Office	To :	All Heads of Units
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Ref No.: AA: Fin: Ind.Tax: GST-17

Dated 10.07.17

Subject: Export procedure under GST

This is in continuation to our GST Circulars No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,14,15,16, dated 3rd, 5th, 8th, 9th, 17th, 19th, 21st, 23rd, 27th, 30th June 2017 & 5th & 7th July 2017 respectively regarding transitory credit, job work, invoicing, GST Credit, ISD registrations, IGST on imports, exports without payment of IGST and other provisions as per GST law.

As per GST law provisions, goods or services can be exported under bond or Letter of Undertaking without payment of integrated tax. CBEC vide notification no. 16/2017 dated 07th July 2017 and Circular No.4/4/2017-GST dated 07th July 2017 have notified certain conditions and issued certain clarifications regarding modalities w.r.t. export of goods or services under bond or Letter of Undertaking without payment of IGST, which are as follows:

1. Guidelines for furnishing Letter of Undertaking (LUT)

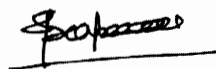
1.1. **Eligibility for issuance of LUT:** As per the notification, following registered person shall be eligible for submission of Letter of Undertaking in place of a bond: -

- (a) a status holder as per the Foreign Trade Policy 2015-2020; or
- (b) who has received the due foreign inward remittances amounting to a minimum of 10% of the export turnover, which should not be less than one crore rupees, in the preceding financial year,

and he has not been prosecuted for any offence under the Central Goods and Services Tax Act, 2017 or under any of the existing laws in case where the amount of tax evaded exceeds two hundred and fifty lakh rupees.

1.2. **Validity of LUT:** It has been clarified that LUT shall be **valid for twelve months**. In case, BHEL exporting Unit fails to comply with the conditions of the LUT, BHEL may be asked to furnish a bond. Further, Govt. has clarified that exports may be allowed under existing LUTs/Bonds till 31st July 2017. LUTs/bond in the revised format is required to be submitted latest by 31st July, 2017.

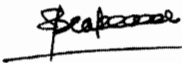
Page 1 of 2



- 1.3. **Authority to accept LUT:** It has been clarified that LUT shall be accepted by the Jurisdictional Deputy /Assistant Commissioner having jurisdiction over the principal place of business of the exporting BHEL Unit. However, till the time administrative mechanism for assigning taxpayer to Centre/State authority is implemented, the LUT can be furnished by BHEL Units either before Central Tax Authority or State Tax Authority. Further, it has been provided that, on the directions/ instructions of Commissioner of State tax, the LUT can be furnished before Central Tax Officer till the time jurisdiction is assigned.
2. Further, vide the enclosed CBEC circular (No.4/4/2017-GST dated 07th July 2017), certain clarifications have been issued by CBEC regarding furnishing of bond, amount of bond, bank guarantee to be furnished along with bond etc. and sealing of containers, which may be referred to.

The above instructions shall apply to exports on or after 1st July, 2017.

The matter may be given wide circulation so that all concerned departments can take necessary action to ensure compliances


(Suraj Prakash)

Copy to:
Heads of MM/Heads of Commercial/ Heads of Finance
ED (COM)
GM(I) (Corp. Accounts)/ED (Fin)
D(F)/D(E R&D)/D(IS&P)/D(HR)/D(Power)—for kind information please
CMD Secretariat: for kind information of CMD please

Page 2 of 2

Circular No. 4/4/2017-GST

**F. No. 349/82/2017-GST
Government of India
Ministry of Finance
Department of Revenue
Central Board of Excise and Customs
(GST Policy Wing)**

New Delhi, the 7th July, 2017

To,

**The Principal Chief Commissioners / Chief Commissioners / Principal Commissioners/
Commissioners of Central Tax (All)**

Madam/Sir,

**Subject: Issues related to Bond/Letter of Undertaking for exports without payment
of integrated tax – Reg.**

Various communications have been received from the field formations and exporters that difficulties are being faced in complying with the procedure prescribed for making exports of goods and services without payment of integrated tax with respect to furnishing of bonds/Letter of Undertaking. Therefore, in exercise of powers conferred under section 168 (1) of the Central Goods and Services Tax Act, 2017, for the purpose of uniformity in the implementation of the Act, these issues are being clarified hereunder.

2. As per rule 96A of the Central Goods and Services Tax Rules, 2017 (The CGST Rules), any registered person exporting goods or services without payment of integrated tax is required to furnish a bond or a Letter of Undertaking (LUT) in FORM GST RFD-11.
3. Attention is invited to notification No. 16/2017-Central Tax dated 01-07-2017 vide which the category of exporters who are eligible to export under LUT has been specified along with the conditions and safeguards. All exporters, not covered by the said notification, would submit bond. The procedure for submission and acceptance of bond has already been prescribed vide circular No. 2/2/2017-GST dated 4th July, 2017. The bond shall be furnished on non-judicial stamp paper of the value as applicable in the State in which bond is being furnished.

4. A clarification has been sought as to whether bond to be furnished for exports is a running bond (with debit / credit facility) or a one-time bond (separate bond for each consignment / export). It is observed consignment wise bond would be a significant compliance burden on the exporters. It is directed that the exporters shall furnish a running bond, in case he is required to furnish a bond, in FORM GST RFD -11. The bond would cover the amount of tax involved in the export based on estimated tax liability as assessed by the exporter himself. The exporter shall ensure that the outstanding tax liability on exports is within the bond amount. In case the bond amount is insufficient to cover the tax liability in yet to be completed exports, the exporter shall furnish a fresh bond to cover such liability.

5. FORM RFD -11 under rule 96A of the CGST Rules requires furnishing a bank guarantee with bond. Field formations have requested for clarity on the amount of bank guarantee as a security for the bond. In this regard it is directed that the jurisdictional Commissioner may decide about the amount of bank guarantee depending upon the track record of the exporter. If Commissioner is satisfied with the track record of an exporter then furnishing of bond without bank guarantee would suffice. In any case the bank guarantee should normally not exceed 15% of the bond amount.

6. As regards LUT, it is clarified that it shall be valid for twelve months. If the exporter fails to comply with the conditions of the LUT he may be asked to furnish a bond. Exports may be allowed under existing LUTs/Bonds till 31st July 2017. Exporters shall submit the LUTs/bond in the revised format latest by 31st July, 2017.

7. It is further stated that the Bond/LUT shall be accepted by the jurisdictional Deputy/Assistant Commissioner having jurisdiction over the principal place of business of the exporter. The exporter is at liberty to furnish the bond/LUT before Central Tax Authority or State Tax Authority till the administrative mechanism for assigning of taxpayer to respective authority is implemented. However, if in a State, the Commissioner of State Tax so directs, by general instruction, to exporter, the Bond/LUT in all cases be accepted by Central tax officer till such time the said administrative mechanism is implemented. Central Tax officers are directed to take every step to facilitate the exporters.

8. Attention is further invited to circular No. 26/2017 – Customs dated 1st July 2017, vide which it has been clarified that the existing practice of sealing the container with a bottle seal

under Central Excise supervision or otherwise would continue till 01st September, 2017. Such sealing shall be done under the supervision of the officer having physical jurisdiction over the place of business where the sealing is being done. A copy of the sealing report would be forwarded to the Deputy/Assistant Commissioner having jurisdiction over the principal place of business.

9. These instructions shall apply to exports on or after 1st July, 2017. It is requested that suitable trade notices may be issued to publicize the contents of this circular. Difficulty, if any, in the implementation of the above instructions may please be brought to the notice of the Board. Hindi version would follow.

-sd-
(Upender Gupta)
Commissioner (GST)

**[TO BE PUBLISHED IN THE GAZETTE OF INDIA, EXTRAORDINARY, PART II,
SECTION 3, SUBSECTION (i)]**

**Government of India
Ministry of Finance
Department of Revenue
Central Board of Excise and Customs**

Notification No. 16/2017 – Central Tax

New Delhi, the 7th July, 2017

G.S.R... ()E.- In exercise of the powers conferred by sub-rule (5) of rule 96A of the Central Goods and Services Tax Rules, 2017, the Central Board of Excise and Customs hereby specifies the conditions and safeguards for the registered person who intends to supply goods or services for export without payment of integrated tax, for furnishing a Letter of Undertaking in place of a Bond.

i. The following registered person shall be eligible for submission of Letter of Undertaking in place of a bond:-

- (a) a status holder as specified in paragraph 5 of the Foreign Trade Policy 2015-2020; or
- (b) who has received the due foreign inward remittances amounting to a minimum of 10% of the export turnover, which should not be less than one crore rupees, in the preceding financial year,

and he has not been prosecuted for any offence under the Central Goods and Services Tax Act, 2017 (12 of 2017) or under any of the existing laws in case where the amount of tax evaded exceeds two hundred and fifty lakh rupees.

ii. The Letter of Undertaking shall be furnished in duplicate for a financial year in the annexure to FORM GST RFD – 11 referred to in sub-rule (1) of rule 96A of the Central Goods and Services Tax Rules, 2017 and it shall be executed by the working partner, the Managing Director or the Company Secretary or the proprietor or by a person duly authorised by such working partner or Board of Directors of such company or proprietor on the letter head of the registered person.

[F. No. 349/74/2017 – GST]

(Dr. Sreeparvathy S. L.)
Under Secretary to the Government of India

BHARAT HEAVY ELECTRICALS LIMITED
Corporate Finance
BHEL House, Siri Fort, new Delhi-110049

From:	Suraj Prakash GM (Fin) Corporate Office	To :	All Heads of Units
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Ref No: AA: Fin:Ind.Tax:GST-14
Dated 05.07.17

Subject: Export without payment of IGST and sealing of containers - regarding

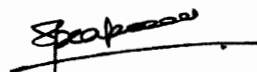
This is in continuation to our GST Circulars No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 & 13 dated 3rd, 5th, 8th, 9th, 17th, 19th, 21st, 23rd, 27th 30th Jun & 5th July 2017 respectively regarding transitory credit, job work, invoicing, GST Credit, ISD registrations, IGST on imports and other provisions as per GST law.

As per GST law provisions, goods or services can be exported under bond or Letter of Undertaking without payment of integrated tax or with payment of IGST and refund of such IGST paid can be claimed.

CBEC vide notification no. 15/2017 dated 01st July 2017 (as clarified vide Circular dated 04th July 2017) has inserted a new rule 96A in CGST Rules prescribing conditions and other modalities w.r.t. export of goods or services under bond or Letter of Undertaking (LUT) without payment of IGST, gist of key points whereof is as follows:

1. Conditions, modalities & other requirements for Exports

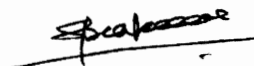
- 1.1. As per the Rules, a bond or a Letter of Undertaking in FORM GST RFD-11, is required to be submitted by BHEL **prior to export**, to the Jurisdictional Deputy/Assistant Commissioner. Though such Bond/LUT is required to be furnished electronically on the GSTN portal, however facility for furnishing the same manually till the module for furnishing of FORM RFD-11 is available on the common portal has been provided.
- 1.2. In case goods are not exported by BHEL within the prescribed period of 3 months from the date of issue of invoice for export of goods or payment in convertible foreign exchange is not realized within prescribed period of one year from the date of issue of invoice for export of service, BHEL would be required to pay IGST along with the interest as follows:



- (a) within a period of 15 days after the expiry of 3 months from the date of issue of the invoice for export of goods.
 - (b) Within a period of 15 days after the expiry of period of 1 year period from the date of issue of the invoice (or such further period as may be allowed by the Commissioner) for export of services.
- 1.3 It may be noted that for export of goods, invoice for export is required to be issued by concerned BHEL Unit/Region on or before dispatch of goods and hence time limit of 3 months for export shall be reckoned from that date.
- 1.4 Further it is provided that in case the goods are **not exported** within the time limit of 3 months from the date of invoice and the **amount of IGST and interest thereon is not paid as** specified above in Para 1.2 above, **the export as allowed** under bond or LUT **shall be withdrawn forthwith** and the said amount shall be recovered from BHEL u/s 79 of CGST law. **It is further provided that the export shall be restored ONLY when such amount is paid.**
- 1.5 Above provisions apply mutatis mutandis in respect of zero rated supply of goods/services to SEZ units/developer without payment of IGST.
- 1.6 CBEC would specify the conditions and safeguards under which LUT may be furnished in place of a bond.

Key Actions required

1. In view of above, to avoid any financial implications on BHEL, it is imperative for all concerned Units including IO and RODs to ensure that whenever goods or services are exported under bond or Letter of Undertaking, the prescribed timelines as mentioned above for export of goods or realization of foreign currency in case of export of services, are strictly complied with. Failure to meet these timelines will entail cash outgo towards IGST and interest thereon.
2. Further, all concerned Units including IO and RODs to ensure that all export related operational procedures and formalities including transportation upto port of export, documentation, arranging ship liner are completed timely and promptly to enable export of goods within the prescribed time lines. This would necessitate proper coordination among concerned Units/ROD/IO.
3. It may be seen that as per provisions of GST law, the export as allowed under bond or Letter of Undertaking shall be withdrawn forthwith in case IGST with interest thereon is not paid within time indicated above. Although no specific clarity on this aspect has been provided, however there is possibility that future export of BHEL under such bond



or Letter of Undertaking may be restricted or BHEL may be asked to pay IGST for each export thus entailing blockage of IGST till refund.

4. Moreover, said amendment does not specifically provide for refund of IGST in such cases where IGST is paid due to non-adherence to timelines indicated above and goods are subsequently exported or payment towards services realized after expiry of timelines indicated above and thus may result in permanent loss of IGST to BHEL. Hence all concerned Units/ROD/IO to ensure that prescribed timeline for export of goods are strictly complied with so as to avoid any financial implications on BHEL.

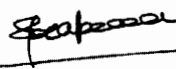
2. Procedure for Sealing of Containers

Vide circular No. 26/2017-Customs issued by CBEC (Copy enclosed), the revised procedure for Sealing of containers has been prescribed which shall be effective from 01.09.2017.

As per the procedure, the exporter shall self-seal the container with a tamper proof electronic-seal of standard specification. Units are advised to refer to the said circular for detailed guidelines and modalities in this regard for necessary compliance.

The above are some of key provisions of amendments/provisions in this regard. Units are requested to go thru detailed circulars/amendments and ensure compliance in toto.

The matter may be given wide circulation so that all concerned departments can take necessary action to ensure compliance in this regard.


(Suraj Prakash)

Copy to:

1. Heads of MM/Heads of Commercial/ Heads of Finance
2. ED (COM)
3. GM(I) (Corp. Accounts)/ED (Fin)
4. D(F)/D(E R&D)/D(IS&P)/D(HR)/D(Power): - for kind information please
5. CMD Secretariat : for kind information of CMD please

Circular No. 26/2017-Customs

F. No. 450/08/2015-Cus.IV
Government of India
Ministry of Finance
Department of Revenue
(Central Board of Excise and Customs)

New Delhi dated the 1st July, 2017

To

All Principal Chief Commissioner/Chief Commissioner of Customs & Central Excise
All Principal Commissioner/Commissioner of Customs & Central Excise
All Principal Chief Commissioner/Chief Commissioner of Customs/Customs (Preventive)
All Principal Commissioner/Commissioner of Customs / Customs (Preventive)

Sir/ Madam,

Subject: Export procedure and sealing of containerized cargo-regarding.

Goods and Service Tax has become operational from 01-07-2017. In the GST regime, the governing provisions related to exports are contained in section 16 of the Integrated Goods and Service Tax Act, 2017 (IGST Act). Supplies of goods and services for exports have been categorized as 'Zero Rated Supply' implying that goods could be exported under bond or Letter of Undertaking without payment of integrated tax followed by claim of refund of unutilized input tax credit or on payment of integrated tax with provision for refund of the tax paid.

2. With the onset of GST, extant procedures relating to export of goods viz. claim of rebate/refund, stuffing of containers at the factory, warehouse or any other place from where the goods are intended to be exported etc. would require review of the existing procedures. In this regard, attention is drawn to notification No's 42/2001-CE (N.T.) to 45/2001-CE (N.T.) both dated 26.6.2001 detailing the procedure to be followed for the export of goods on payment of terminal excise duty and 19/2004-CE (N.T.) and 20/2004-CE (N.T.), both dated 06.09.04, without payment thereof.

A. Procedure of Export

3. Any person making zero rated supply (i.e. any exporter) shall be eligible to claim refund under either of the following options, namely: –

(a) he may supply goods or services or both under bond or Letter of Undertaking, subject to such conditions, safeguards and procedure as may be prescribed, without payment of integrated tax and claim refund of unutilized input tax credit; or

(b) he may supply goods or services or both, subject to such conditions, safeguards and procedure as may be prescribed, on payment of integrated tax and claim refund of such tax paid on goods or services or both supplied, in accordance with the provisions of section 54 (Refunds) of the Central Goods and Services Tax Act or the rules made there under (i.e. the Central Goods and Service Tax Rules, 2017).

4. For the option (a) above, procedure to file refund has been outlined in the Central Goods and Service Tax Rules, 2017. The exporter claiming refund of unutilized input tax credit will file an application electronically through the Common Portal, either directly or through a Facilitation Centre notified by the GST Commissioner. The application shall be accompanied by documents as prescribed in the said rules. Application for refund shall be filed only after the export manifest or an export report, as the case may be, is delivered under section 41 of the Customs Act, 1962 in respect of such goods. The formats for furnishing bond or LUT for export of goods have been separately notified under CGST Rules, 2017. The said formats are attached herewith for easy reference.

5. For the option (b), broadly the procedure is that a registered person shall not be required to file any application for refund of *integrated goods and services tax* paid on supply of goods for exports. The shipping bill, having inter-alia GST invoice details, filed by an exporter shall be deemed to be an application for refund of integrated tax paid on the goods exported out of India and such application shall be deemed to have been filed only when the person in charge of the conveyance carrying the export goods duly files an export manifest or an export report covering the number and the date of shipping bills or bills of export and the applicant has furnished a valid return in FORM GSTR-3. The details of the relevant export invoices contained in FORM GSTR-1 shall be transmitted electronically by the common portal to the Customs system and the said system shall in turn electronically transmit back to the common portal a confirmation that the goods covered by the said invoices have been exported out of India. Upon receipt of information regarding furnishing of valid return in FORM GSTR-3 from the common portal, the Customs system shall process the claim for refund and an amount equal to the integrated tax paid in respect of each shipping bill or bill of export shall be electronically credited to the bank account of the applicant mentioned in his registration particulars. Government has allowed a grace period to the registrants to file returns under the new GST Law. Therefore, this refund procedure shall as a consequence come into operation only when the registrants file the above mentioned returns. Further, the exporters are free to avail option (a) or option (b). The refund shall be governed by the provisions of the section 16 of the IGST Act.

6. In order to ensure smooth transition from the earlier export procedure to the procedure being laid down for export of goods under the GST regime, the existing Shipping Bill formats (both manual/ electronic) have been modified to make them compliant with the IGST law. New formats of the Shipping Bill have been made applicable already. ARE-1 procedure which was being followed is dispensed with except in respect of commodities to which provisions of Central Excise Act would continue to be applicable.

B. Sealing of Containers

7. Board has in the past issued various circulars both on the Excise and Customs side on the issue of sealing of containers. A gist of these Circulars and the subject matter dealt in them is given in the annexure to this circular. At present, there are three categories of containers which arrive at the port/ICD:

- a. Containers stuffed at factory premises or warehouse under self-sealing procedure.
- b. Containers stuffed / sealed at factory premises or warehouse under supervision of central excise officer.
- c. Containers stuffed and sealed at Container Freight Stations/ Inland Container Depot.

8. For the sake of uniformity and ease of doing business, Board has decided to simplify the procedure relating to factory stuffing hitherto carried out under the supervision of the Central Excise officers. It is the endeavor of the Board to create a trust based environment where compliance in accordance with the extant laws is ensured by strengthening Risk Management System and Intelligence setup of the department. Accordingly, Board has decided to lay down a simplified procedure for stuffing and sealing of export goods in containers.

9. It has been decided to do away with the sealing of containers with export goods by CBEC officials. Instead, self-sealing procedure shall be followed subject to the following:

- i. The exporter shall be under an obligation to inform the details of the premises whether a factory or warehouse or any other place where container stuffing is to be carried out, to the jurisdictional customs officer.
- ii. The exporter should be registered under the GST and should be filing GSTR1 and GSTR2. Where exporter is not a GST registrant, he shall bring the export goods to a Container Freight Station/Inland Container Depot for stuffing and sealing of container. However, in certain situations, an exporter may follow the self-sealing procedure even if he is not required to be

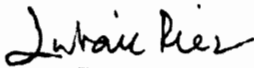
registered under GST Laws. Such an exception is available to the Status Holders recognized by DGFT under a valid status holder certificate issued in this regard.

- iii. Any exporter desirous of availing this procedure shall inform the jurisdictional Custom Officer of the rank of Superintendent or Appraiser of Customs, at least 15 days before the first planned movement of a consignment from his/her factory/ premises, about the intention to follow self- sealing procedure to export goods from the factory premises or warehouse. The jurisdictional Superintendent or an Appraiser or an Inspector of Customs shall visit the premises from where the export goods will be stuffed & sealed for export. The jurisdictional Superintendent or Inspector of Customs shall inspect the premises with regard to viability of stuffing of container in the premises and submit a report to the jurisdictional Deputy Commissioner of Customs or as the case may be the Assistant Commissioner of Customs within 48 hours. The jurisdictional Deputy Commissioner of Customs or as the case may be the Assistant Commissioner of Customs shall forward the proposal, in this regard to the Principal Commissioner/Commissioner of Customs who would grant permission for self-sealing at the approved premises. Once the permission is granted, the exporter shall furnish only intimation to the jurisdictional Superintendent or Customs each time self-sealing is carried out at approved premises. The intimation, in this regard shall clearly mention the place and address of the approved premises, description of export goods and whether or not any incentive is being claimed.
- iv. Where the visit report of the Superintendent or an Appraiser or an Inspector of Customs regarding viability of the stuffing at the factory/ premises is not favorable, the exporter shall bring the goods to the Container Freight Station /Inland Container Depot/Port for sealing purposes.
- v. Self-Sealing permission once given by a Principal Commissioner/Commissioner of Customs shall be valid for export at all the customs stations. The customs formation granting the self-sealing permission shall circulate the permission along with GSTIN of the exporter to all Custom Houses/Station concerned.
- vi. Transport document for movement of self-sealed container by an exporter from factory or warehouse shall be same as the transport document prescribed under the GST Laws. In the case of an exporter who is not a GST registrant, way bill or transport challan or lorry receipt shall be the transport document.
- vii. The exporter shall seal the container with the tamper proof electronic-seal of standard specification. The electronic seal should have a unique number which should be declared in the Shipping Bill. Before sealing the container, the exporter shall feed the data such as name of the exporter, IEC code, GSTIN number, description of the goods, tax invoice number,

name of the authorized signatory (for affixing the e-seal) and Shipping Bill number in the electronic seal. Thereafter, container shall be sealed with the same electronic seal before leaving the premises.

- viii. The exporter intending to clear export goods on self-clearance (without employing a Customs Broker) shall file the Shipping Bill under digital signature.
 - ix. All consignments in self-sealed containers shall be subject to risk based criteria and intelligence, if any, for examination / inspection at the port of export. At the port/ICD as the case may be, the customs officer would verify the integrity of the electronic seals to check for tampering if any enroute. The Risk Management System (RMS) is being suitably revamped to improvise the interdiction/ examination norms. However, random or intelligence based selection of such containers for examination/scanning would continue.
10. Board has decided that the above revised procedure regarding sealing of containers shall be effective from 01.09.2017. A future date has been prescribed since the returns under GST have been permitted to be filed by 10.09.17 and also with the purpose to give enough time to the stakeholders to adapt to the new procedures. Therefore, as a measure of facilitation, the existing practice of sealing the container with a bottle seal under Central Excise supervision or otherwise would continue. The extant circulars shall stand modified on 01.09.2017 to the extent the earlier procedure is contrary to the revised instructions given in this circular.
11. Suitable public Notices may be issued in this regard. Difficulty faced, if any, may be brought to the notice of the Board.
12. Hindi version will follow.

Yours faithfully,


(Zubair Riaz)
Director (Customs)

Annexure

Sr. No	Reference Number	Date	Subject
1	952/1 3/2011 -CX.	08-09-11	Stuffing of export containers - Procedure
2	892/1 2/2009-CX	23-07-09	Exports - Self-sealing/certification facility extended for export of non-excisable agricultural products
3	860/1 8/20,07-CX	22-11-07	Exports under Free Shipping Bills - Mandatory self-sealing of containers
4	741/57/2003-CX.	02-09-03	Exports to Nepal and Bhutan - Self-sealing and self-certification facility not applicable
5	736/52/2003-CX.	11-08-03	Exports - Self-certification and self-sealing facility extended to all categories of Manufacturer-Exporters-Extension of facility of self-sealing to all categories of manufacturer exporters.
6	481/47/99-CX	23-08-99	Containers Sealing of packages/Containers procedure Relaxed-modifies 426/59/98-CX in so far as furnishing tentative date and time of export plan by manufacturer exporter is concerned.
7	445/11/99-CX	17-03-99	Exports Special facility of self-certification and self-sealing to large manufacturer Exporter Further instructions. Para 7 (duty of customs officers at the place of export) of 426/59/98-CX is deleted in view of Circular 6/2002-Cus. [90/98-cus. was rescinded vide 31/2002-cus].
8	426/59/98-CX	12-10-98	Introduction of facility of self-sealing to manufacturers who have paid Central Excise duty exceeding Rs. 10 crores in the preceding financial year in cash or by debit in current account or manufacturer-exporters who have been accorded the status of Super Star Trading House, Star Trading House, Trading House or Export House under the provisions of the Export - Import Policy announced by the Government from time to time.
9	6/2002-Cus	23.1.2002	Export- procedure, as also norms for examination of self-sealed containers at the port of export.
10	83/99-Cus	14-12-99	Export Simplification in procedure for movement of export goods on the basis of. Self-certification and reduced percentage of physical examination-Dispensing off with routine examination at gateway ports.

FORM GST RFD-11

Furnishing of bond or Letter of Undertaking for export of goods or services

1. GSTIN				
2. Name				
3. Indicate the type of document furnished		Bond: ☐ Letter of Undertaking ☐		
4. Details of bond furnished				
Sr. No.	Reference no. of the bank guarantee	Date	Amount	Name of bank and branch
1	2	3	4	5

Note – Hard copy of the bank guarantee and bond shall be furnished to the jurisdictional officer.

5. Declaration -

- (i) The above-mentioned bank guarantee is submitted to secure the integrated tax payable on export of goods or services.
- (ii) I undertake to renew the bank guarantee well before its expiry. In case I/We fail to do so the department will be at liberty to get the payment from the bank against the bank guarantee.
- (iii) The department will be at liberty to invoke the bank guarantee provided by us to cover the amount of integrated tax payable in respect of export of goods or services.

Signature of Authorized Signatory

Name

Designation / Status -----

Date -----

Bond for export of goods or services without payment of integrated tax
(See rule 96)

I/We.....of.....,hereinafter called "obligor(s)", am/are held and firmly bound to the President of India (hereinafter called "the President") in the sum of.....rupees to be paid to the President for which payment will and truly to be made.

I/We jointly and severally bind myself/ourselves and my/our respective heirs/ executors/ administrators/ legal representatives/successors and assigns by these presents; Dated this.....day of.....;

WHEREAS the above bounden obligor has been permitted from time to time to supply goods or services for export out of India without payment of integrated tax;
and whereas the obligor desires to export goods or services in accordance with the provisions of clause (a) of sub-section (3) of section 16;

AND WHEREAS the Commissioner has required the obligor to furnish bank guarantee for an amount of..... rupees endorsed in favour of the President and whereas the obligor has furnished such guarantee by depositing with the Commissioner the bank guarantee as afore mentioned;

The condition of this bond is that the obligor and his representative observe all the provisions of the Act in respect of export of goods or services, and rules made thereunder;

AND if the relevant and specific goods or services are duly exported;

AND if all dues of Integrated tax and all other lawful charges, are duly paid to the Government along with interest, if any, within fifteen days of the date of demand thereof being made in writing by the said officer, this obligation shall be void;

OTHERWISE and on breach or failure in the performance of any part of this condition, the same shall be in full force and virtue:

AND the President shall, at his option, be competent to make good all the loss and damages, from the amount of bank guarantee or by endorsing his rights under the above-written bond or both;

I/We further declare that this bond is given under the orders of the Government for the performance of an act in which the public are interested;

IN THE WITNESS THEREOF these presents have been signed the day hereinbefore written by the obligor(s).

Signature(s) of obligor(s).

Date :

Place :

Witnesses

(1) Name and Address

Occupation

(2) Name and Address

Occupation

Accepted by me this.....day of (month).....
(year)

.....of
(Designation)
for and on behalf of the President of India.".

Letter of Undertaking for export of goods or services without payment of integrated tax

(See rule 96)

To

The President of India (hereinafter called the "President"), acting through the proper officer

I/We of..... (address of the registered person)
having Goods & Services Tax Identification Number
No....., hereinafter called "the undertaker(s) including
my/our respective heirs, executors/ administrators, legal representatives/successors and assigns
by these presents, hereby jointly and severally undertake on this day of
..... to the President

(a) to export the goods or services supplied without payment of integrated tax within time
specified in sub-rule (9) of rule 96 ;

(b) to observe all the provisions of the Goods and Services Tax Act and rules made thereunder,
in respect of export of goods or services;

(c) pay the integrated tax, thereon in the event of failure to export the goods or services, along
with an amount equal to eighteen percent interest per annum on the amount of tax not paid, from
the date of invoice till the date of payment.

I/We declare that this undertaking is given under the orders of the proper officer for the
performance of enacts in which the public are interested.

IN THE WITNESS THEREOF these presents have been signed the day hereinbefore written
by the undertaker(s)

Signature(s) of undertaker(s).

Date :

Place :

Witnesses

(1) Name and Address

Occupation

(2) Name and Address

Occupation

Date

Place

Accepted by me this.....day of (month).....
(year)

.....of
..... (Designation)
for and on behalf of the President of India

Circular No. 2/2/2017-GST

**F. No. 349/82/2017-GST
Government of India
Ministry of Finance
Department of Revenue
Central Board of Excise and Customs
GST Policy Wing**

New Delhi, Dated the 4th July, 2017

To,

The Principal Chief Commissioners/Chief Commissioners/Principal Commissioners/
Commissioners of Central Tax (All)

Madam/Sir,

Subject: Issues related to furnishing of Bond/ Letter of Undertaking for Exports–Reg.

Various communications have been received from the field formations and exporters on the issue of difficulties being faced while supplying the goods or services for export without payment of integrated tax and filing the FORM GST RFD -11 on the common portal (www.gst.gov.in), because of which exports are being held up.

2. Whereas, as per rule 96A of the Central Goods and Services Tax Rules, 2017, any registered person availing the option to supply goods or services for export without payment of integrated tax shall furnish, prior to export, a bond or a Letter of Undertaking. This bond or Letter of Undertaking is required to be furnished in FORM GST RFD-11 on the common portal. Further, Circular No. 26/2017- Customs dated 1st July, 2017 has clarified that the procedure as prescribed under rule 96A of the said rules requires to be followed for the export of goods from 1st July, 2017.

3. Another issue being raised by various stakeholders is that the Bond/Letter of Undertaking is required to be given through the proper officer which is to be furnished to the jurisdictional Commissioner as per sub-rule (1) of rule 96A of the said rules. Taking cognizance of the fact that a large number of such Bonds/Letter of Undertakings would be required to be filed by the registered exporters who would be located at a distance from the office of the jurisdictional Commissioner, it is understood that the furnishing of such bonds/undertakings before the jurisdictional Commissioner may cause hardship to the exporters.

4. Thus, in exercise of the powers conferred by sub-section (3) of section 5 of the CGST Act, 2017, it is hereby stated that the acceptance of the Bond/Letter of Undertaking required to be furnished by the exporter under rule 96A of the said rules shall be done by the jurisdictional Deputy/Assistant Commissioner.

5. Further, in exercise of the powers conferred by section 168 of the said Act, for the purpose of uniformity in the implementation of the said Act, the Bond/Letter of Undertaking required to be furnished under rule 96A of the said rules may be furnished manually to the jurisdictional Deputy/Assistant Commissioner in the format specified in FORM RFD-11 till the module for furnishing of FORM RFD-11 is available on the common portal. The exporters may download the FORM GST RFD-11 from the website of the Central Board of Excise and Customs (www.cbec.gov.in) and furnish the duly filled form to the jurisdictional Deputy/Assistant Commissioner.

6. The above specified provisions shall be applicable to all applications which have been filed on or after 1st July, 2017. It is requested that suitable trade notices may be issued to publicize the contents of this circular.

7. Difficulty, if any, in the implementation of the above instructions may please be brought to the notice of the Board. Hindi version would follow.

Sd/-
(Upender Gupta)
Commissioner (GST)

PAINTING SPECIFICATION FOR FIRE PROTECTION & DETECTION SYSTEM										REV 01
Coating System (refer Contract Book No.3 Clause B0.6.5)										
System No.	Surface location	Item Description/ PGMA details	Temp in Celsius	Surface Preparation	Coating systems	No. of coats	Generic type	Dry film thickness (DFT) per coat micro m	Total DFT (Micro m)	REMARKS
1	Structural steel works, piping INDOOR	Structural steel works and Piping for Hydrant system , Spray system and Foam system (INDOOR)	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80	A) PIPING:(Surface preparation, Primer and finish coats at site) FINAL SHADE : SIGNAL RED / RAL : 3001
					Finish	1	Epoxy High Solid	80	80	B) STRUCTURAL STEEL:(Surface preparation, Primer and finish coats at site) Final shade:WINDOW GREY / RAL 7040
									160	
2	Structural steel works, piping OUTDOOR	Structural steel works and Piping for Hydrant system , Spray system and Foam system (OUTDOOR)	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80	A) PIPING:(Surface preparation, Primer and finish coats at site) FINAL SHADE : SIGNAL RED / RAL : 3001
					Intermediate	1-2	Epoxy High Solid	160	160	B) STRUCTURAL STEEL:((Surface preparation, Primer and finish coats at site) Final shade:WINDOW GREY / RAL 7040
					Finish	1	2-Comp Polyurethane	50	50	
									290	
3	Paints for external surfaces protection of Deluge valve,Hydrant Valve, Water Monitor alarm valve , foam monitor, Foam proportioning equipments and foam maker etc. to be installed indoor and outdoor.	1. Hydrant System 2. Water Spray System 3. Foam System 4. Sprinkler system	upto 120	SA 2.5	Primer	1	Zinc-Epoxy**	35	35	**Painting details for these items are indicative only as these are OEM Specific Items. Accordingly, OEM may adopt their standard Painting procedure maintaining the total DFT as 125 Microns and Final Shade as mentioned below. FINAL SHADE : SIGNAL RED / RAL : 3001
					Finish	3	Aliphatic Polyurethane**	30	90	
									125	
4	Pump, motors, other equipments INDOOR	1. Hydrant System 2. Water Spray System 3. Foam System	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80	FINAL SHADE : SIGNAL RED / RAL : 3001
					Finish	2	Epoxy High Solid	50	100	
									180	
5	Fire water Tanks and Hydro-Pneumatic Tank	1. Hydrant System 2. Water Spray System	upto 120	SA 2.5	Primer	1	Zinc-Epoxy	80	80	FINAL SHADE : SIGNAL RED / RAL : 3001
					Finish	1	Epoxy High Solid	80	80	
									160	
6	Galvanized Surfaces	1. WATER SPRAY SYSTEM (for Galvanized Pipes)	upto 120	Mechanical cleaning from contaminants and zinc salts by means of washing or steam jetting or sweep-blasting with fine stand	Primer	2	Etch Primer: micaceous iron oxide (MIO)	6	12	A) PIPING(Galvanizing is at shop, and finish coat will be at site) FINAL SHADE : SIGNAL RED / RAL : 3001
					Finish	2	Epoxy High Solid	60	120	
									132	
7	Fire detection and Alarm System panels	Fire detection and Alarm System	Shall be as per OEM Standrard							
8	PLC Panels	PLC for Fire water pumps operation	Shall be as per OEM Standrard							FINAL SHADE : LIGHT GREY / RAL : 7035
9	Inert gas cylinders, Gas release panel, Inhibit/Release push button and Inert gas components for Inert gas systems	Inert Gas Extinguishing System	Shall be as per OEM Standrard							
* Additional 1 x Finish Coat 2-Comp. Polyurethane, 50 micro m, when exposed to UV or weathering conditions and color retention is required										

Deviation Sought, if any										
System No.	Surface location	Item Description/ PGMA details	Temp in Celsius	Surface Preperation	Coating systems	No. of coats	Generic type	Dry film thickness (DFT) per coat micro m	Total DFT (Micro m)	Justification/ Reasoning
D-1										
D-2										
D-3										
D-4										
D-5										
D-6										
D-7										
D-8										
D-9										