

NORTH CHENNAI - II

GIS Tender : 3168IND

**420 KV & 245 KV
Gas Insulated Switchgear (GIS)**

Section 6:

**Erection, Work Force,
Means & General Tools**

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ANNEX 1

1. ANNEX 1 - ESTIMATED WORKFORCE FOR INSTALLATION & HV TEST OF GIS

1.1 Extent of Service

GIS MANUFACTURER Scope of Services includes the supervision of the erection as well as performance of on site High Voltage Tests of GIS equipment included in its supply only, in a competent manner and in accordance with the specifications of the Contract.

The following chapters describe the responsibilities of each participant at site. They also define the requirements in terms of workforce and qualification to make sure that the equipment can be installed according to the manufacturer standards and estimated timeschedule.

1.2 Responsibilities of GIS MANUFACTURER Supervision & Commissioning Engineer

The responsibilities of the GIS MANUFACTURER Supervision and Commissioning Engineer are as follows:

- He ensures that the conditions necessary for the start of the erection work are met. If not he specifies the measures that must be taken by the CUSTOMER and/or the Erection company before erection can be authorised,
- He ensures that during the whole duration of the work, the cleanliness conditions are maintained. If not he submits a written request for suspension of the works CUSTOMER and/or the Erection company specifying the corrective actions required. Authorisation to resume work shall only be given once the required cleanliness conditions have been restored.,
- He checks the qualification and suitability of the erection persons for the good performance of the erection and commissioning work
- He supervises the erection of the GIS equipment by giving proper instructions to the erection team,
- He supervises the commissioning and on site testing of the GIS equipment,
- He ensures that the GIS equipment is erected , commissioned and tested in accordance with adequate care and in accordance with GIS MANUFACTURER procedures,
- He ensures that the specific tools and equipment as listed in corresponding paragraph are available for use on site
- He prepares, submit and update as the case may be, the erection and commissioning schedule,
- He prepares and submits reports to CUSTOMER on progression of the work and any problem that is encountered.
- He assists on site progress meeting as may be required by CUSTOMER.

1.3 Responsibilities of the CUSTOMER

The CUSTOMER's responsibilities shall be as follows:

To obtain from local authorities all necessary permits and approvals for the work to progress

To provide a suitably qualified erection team as specified in corresponding paragraph.

To provide general tools and on site facilities as per corresponding paragraph

ensure of the permanent cleanliness of the GIS area

ensure that the erection team placed at the disposal of GIS MANUFACTURER Representative is following its instructions and advices.

- To take all necessary measures to ensure and maintain the safety of GIS MANUFACTURER Representative during all its stay in the country where the GIS equipment is to be installed as well provide the GIS MANUFACTURER representative with a safe working environment
- Ensure that GIS MANUFACTURER representative is properly covered by the EAR insurance program in place.
- To render all reasonable assistance to GIS MANUFACTURER Representative in its relations with local authorities if any
- Give access to its medical facilities in case GIS MANUFACTURER representative requires medical attention

1.4 Waiver of Responsibility

GIS MANUFACTURER shall not be held responsible nor considered in default in case GIS MANUFACTURER Representative is prevented from performing its obligations or is delayed in performing its obligations in case CUSTOMER can not meet and maintain any of its responsibilities as defined in paragraph 3 as well as in any other cases that are beyond the reasonable control of the GIS MANUFACTURER Representative.

1.5 General tools and on site facilities to be available

1.5.1 General Tools

GIS MANUFACTURER specifies the General Tools that must be available and operational on site prior to and during the whole duration of the works. Detailed requirements shall be specified 3 months prior to start of Supervision Service. Typical list of general tools required is presented in Annex 2.

1.5.2 On site facilities

One fully equipped climate-controlled office shall be made available free of charge at site for GIS MANUFACTURER representative. This office shall also be equipped with international telephone and fax equipment for international communication. Photocopier shall also be accessible at no cost for reasonable use.

Sanitary equipment and lockable cloakroom shall be made available for GIS MANUFACTURER representative

1.6 Estimated Schedule

The estimated minimum duration of the service is given in the following table. This duration does not include the commissioning period of the whole substation nor the site opening and closing periods. This duration has been estimated based on availability and qualification of erection team as per following paragraph.

420KV GIS Erection Team – Availability and Qualification

Responsibility	Ressources	Team 1		Team 2	
		Nb of people	Duration on site (Estimated Working Days)	Nb of people	Duration on site (Estimated Working Days)
GIS MANUFACTURER	AREVA Supervisor	1	201	1	123
Civil work					
CUSTOMER	Land surveyor	1	9	-	-
CUSTOMER	surveyor	2	9	-	-
Unpacking and handling					
CUSTOMER	Helper	4	138	-	-
GIS erection and testing					
CUSTOMER	Team leader for HV equipment	1	194	1	92
CUSTOMER	Electromechanical fitter	8	194	4	92
CUSTOMER	Helper	2	194	2	92
CUSTOMER	Technician for gas treatment	1	195	-	-
CUSTOMER	Team leader for LV cabling	1	166	-	-
CUSTOMER	Wireman	6	166	-	-
CUSTOMER	Helpers for wiring	1	166	-	-
CUSTOMER	Test technician	1	126	-	-

245 KV GIS Erection Team – Availability and Qualification

Responsibility	Ressources	Team 1	
		Nb of people	Duration on site (Estimated Working Days)
GIS MANUFACTURER	AREVA Supervisor	1	57
Civil work			
CUSTOMER	Land surveyor	1	2
CUSTOMER	surveyor	2	2
Unpacking and handling			
CUSTOMER	Helper	4	35
GIS erection and testing			
CUSTOMER	Team leader for HV equipment	1	50
CUSTOMER	Electromechanical fitter	4	50
CUSTOMER	Helper	4	50
CUSTOMER	Technician for gas treatment	1	50
CUSTOMER	Team leader for LV cabling	1	40
CUSTOMER	Wireman	3	40
CUSTOMER	Helpers for wiring	1	40
CUSTOMER	LV Test technician	1	30

Notes:

- In case of HV cable connections or direct transformer connections, it is assumed that the cables and the transformers will be installed during erection of SF6 equipment. If not, extra costs for additional work or time spending have to be applied and calculated on a daily basis. TBEM
- In case of HV cable connections to the GIS, time duration and testing equipment to perform the tests of these cables from the GIS side are not part of GIS MANUFACTURER scope of work. They can be quoted separately. TBEM
- It is assumed that the complete GIS will be installed in one stage and that only one HV dielectric test will be performed at the end of the installation. TBEM

1.7 Erection team – Availability and Qualification

The erection team is placed under the technical authority of GIS MANUFACTURER supervisor and under the hierarchical authority of CUSTOMER/ Erection company site manager. Detailed requirements regarding qualification of erection team shall be given at contract stage.

As a resume:

- **Team Leader for HV equipment (foreman)** should be able to manage the team, read all drawings, identify equipment and tools, supervise gas treatment equipment operation, supervise heavy pieces handling by crane or otherwise. He should also be able to understand the inspection instructions, interlocking functions as well as all LV HV safety instructions. He should be able to carry out the tasks assigned to the fitters and be qualified to check the equipment prior to the erection, check the civil work with Theodolite, erect the equipment, handle gas treatment operations such as measurement of vacuum, pressure, humidity, correction according to temperature
- **Electromechanical fitters** should be able to carry out the installation work and the inspections during the erection under the supervision of the HV team leader/foreman. They should be able to read drawings. They would be responsible for unpacking, identifying equipment, organise the storage, erect supporting frames according to drawings, prepare and install the GIS equipment according to drawings and instructions.
- **Team leader for LV cabling** should manage wiremen and be able to carry out all activities assigned to them (cabling work and inspection, reading of electrical drawings and other electrical documentation) check connections and detect possible faults.
- **Wiremen** should be suitably qualified to read electrical drawings and be able to do proper cabling of CTs, VTs, pressure switches, driving mechanism ... according to drawings and instructions.
- **Test technician** should carry out all testing prior to energisation of the equipment. He should have extensive technical knowledge to carry out all testing and commissioning work, record test values. As examples, he would be responsible for testing the operating time of circuit-breaker, test driving-rods mechanism for disconnectors and earthing switches, test CTs and VTs for ratios, polarity, insulation a.s.o and test local control panel including interlocking functions

Team leaders and test technician should be correctly fluent in English language in order to assure proper understanding of GIS MANUFACTURER supervisor's instruction. It is recommended that fitters, wiremen and helpers also have some basic knowledge of English language.

ANNEX 2

2. ANNEX 2 - TYPICAL GENERAL TOOL LIST REQUIRED FOR ERECTION OF GIS

1- PRELIMINARIES TO ERECTION		Nb.	Rep.	2- GENERAL ASSEMBLY		Nb.	Rep.
1.1 INSTALLATION				GREASE PISTOL		4	N°34
TEMPORARY SUPPLY TYPE A (380V / 100A)	1	N°6		MECHANIC'S TOOL BOX	1	N°35 à 39	
TEMPORARY SUPPLY TYPE B (380V / 40A)	1	N°7		LIGHT MECHANIC'S TOOL BOX	3	N°40 à 44	
INDUSTRIAL HOOVER	1	N°8		MANUAL ALUMINIUM PLATE BENDER	1	N°45	
ELECTRICAL EXTENSION 230V 15m	6	N°9		DRILLING MACHINE (Drills 13mm MAX.)	1	N°48	
FAX - PHONE with INTERNET connection	1	N°10		4 to 13mm dia. DRILLS (FOR DRILLING MACHINE)	1	N°49	
SHELF FOR TOOLS STORAGE	1	N°11		DRILLING MACHINE WITH COLUMN	1	N°50	
COLLAPSIBLE WORKBENCH 1200x550	2	N°12		THERMAL STRIPPER	1	N°51	
REVOLVING VICE (open 180mm x 125mm)	2	N°13		SANDER 230V 2100W	1	N°53	
FLOODLIGHT 1000W (1)	2	N°14		INDUSTRIAL PORTABLE HOOVER	2	N°55	
PLASTIC SHEET (1)	2	N°15		SET OF 10 BAGS FOR HOOVER	2	N°56	
PRY BAR	2	N°16		GREASE BRUSH	10	N°57	
MOBILE TABLE 1000x700	3	N°17		NYLON LINE 20m Long	1	N°58	
OFFICE, CLOAKROOMS, SANITARY, STORE ...	1	N°18		3- HANDLING		Nb.	
WELDING EQUIPMENT (1)	1	N°19		5T HYDRAULIC JACK WITH TOE (1)	4	N°60	
SHELTER FOR OUTSIDE WORKING AREA (1)	1	N°20		CABLE TIRFOR UNLIMITED RUN (3,2 à 5T) (1)	2	N°61	
1.2 SAFETY & MARKING				2T SHACKLE	4	N°62	
ABC POWDER FIRE EXTINGUISHER 6kg	2	N°21		1T TUBULAR SLING 2 m unfold length	2	N°63	
FIRST AID KIT - for 8 persons	1	N°22		3T TUBULAR SLING 2 m unfold length	2		
1.3 CIVIL WORK				3T TUBULAR SLING 4 m unfold length	2		
SPIRIT LEVEL 300 mm	2	N°23		3T TUBULAR SLING 6 m unfold length	2		
INDUSTRIAL CONCRETE DRILLING MACHINE	1	N°24		6T TUBULAR SLING 4 m unfold length	4		
25mm dia. CONCRETE DRILL (2)		N°25		6T TUBULAR SLING 10 m unfold length	4		
28mm dia. CONCRETE DRILL (2)				1T CHAIN PULLEY BLOCK	2	N°64	
18mm dia. CONCRETE DRILL (2)				1T LUG ALL	2	N°66	
14mm dia. CONCRETE DRILL (2)				M12 EYELET SCREW	6	N°67	
12mm dia. CONCRETE DRILL (2)				SLING 1.5 m LONG	2	N°68	
16mm dia. CONCRETE DRILL (2)				2T LIFT TRUCK, L=1150 / w=520	1	N°69	
20mm dia. CONCRETE DRILL (2)				FORKLIFT	1	N°70	
24mm dia. CONCRETE DRILL (2)				30T CRANE(1)	2	N°71	
CHEMICAL STUD INSTALLATION TOOL (M20) (2)		N°26		IN CHARGE MOVABLE GANTRY (1)	1	N°81	
CHEMICAL STUD INSTALLATION TOOL (M24) (2)				4- GAS TREATMENT			
THEODOLITE	1	N°27		BOTTLE OF NITROGENE U 50Kg 50ppm maxi (1)	4	N°73	
ALIGNMENT ROD 2,5 m Long	2	N°28		5- LOW VOLTAGE TEST			
1.4 HEIGHT WORKING				250VDC SUPPLY WITH VARIABLE RANGE	1	N°76	
INDIVIDUAL EQUIPMENT FOR WORKING AT ELEVATION	2	N°30		MULTIMETER	2	N°75	
STEPLADDER (7 steps)	4	N°31		VARIABLE AC/DC SUPPLY	1	N°77	
EXTENDIBLE LADDER 5 m	2	N°32		6- LOW VOLTAGE TOOLS			
EXTENDIBLE LADDER 7 m (1)	2			ELECTRICIAN'S TOOL BOX	2	N°78	
SCALFOLDING FLOOR LEVEL 3 m	2	N°33		CABLE CUTTER	2	N°79	
SCALFOLDING FLOOR LEVEL 5 m (1)	2			SET OF CRIMPING PLIERS (3)	1		
SCALFOLDING FLOOR LEVEL 7 m (1)	2			SET OF TOOLS FOR OPTICAL FIBER (3)	1		
MOBILE PLATFORM (1)	1	N°72		7- HIGH VOLTAGE TESTS			
TELESCOPIC PLATFORM FOR OUTSIDE WORK(1)	1	N°80		380V/150A SUPPLY FOR HV TEST	1		

(1) If necessary at site

(2) Type and quantity will be defined in accordance with GIS manufacturer civil-work guide

(3) Detail of these tools will be given by GIS manufacturer

2. ANNEX 2 - ATTACHED DOCUMENTS

FD 206.056.1E	11/08	Typical general tool list required for erection of GIS - Preliminaries to erection
FD 206.056.2E	11/08	Typical general tool list required for erection of GIS - General assembly
FD 206.056.3E	11/08	Typical general tool list required for erection of GIS - Handling - Gas treatment
FD 206.056.4E	11/08	Typical general tool list required for erection of GIS - Low voltage test - Low voltage tools

ANNEX 3

3. ANNEX 3 - PRELIMINARY PACKING LIST FOR 420KV & 245KV GIS EQUIPMENT

The estimated packing list for 400KV & 245KV GIS is enclosed.

ANNEX 4

4. ANNEX 4 - ERECTION CONDITIONS AND ATTACHMENTS

List of attachments

FAQ 011 EF	07/04	Conditions required to open and use a site for the erection of a GIS in a building
FAQ 011 EF Annex	07/04	State of site before beginning GIS erection according to FAQ 011

ANNEX-3

Tender No : 4583198 DTD 20.10.2008

Project ; 400/220 kV North Chennai GIS

Vendor : TNEB

Details of Packages - 400 kV			
Sl.No.	Description	Unit 1	Unit 2
1	No. of Packages	275 Nos. approx.	345 Nos. approx.
2	Size (m ³)	2207	2350
3	Weight	275 MT approx.	378 MT approx.
4	Container Cargo or loose	Container Cargo and Loose	
5	No. of Containers / Trucks		
	40' Open top :	8 Nos.	10 Nos.
	40' Closed :	56 Nos.	68 Nos.
	Full truck :	11 Nos.	13 Nos.

Details of Packages - 220 kV		
Sl.No.	Description	Quantity/Wt.
1	No. of Packages	125 Nos. approx
2	Size (m3)	411
3	Weight	80 MT approx.
4	Container Cargo or loose	Container Cargo and Loose
5	No. of Containers / Trucks	
	40' Closed :	12 Nos.
	Full truck :	3 Nos.

Note: The above is required for arranging Road Transport port to site.

Bidder's Name : AREVA T&D

Designation: Managing Director

Company seal:

Areva T & D India Limited
 Gas Insulated Substation
 1911 G.S.T. Road,
 Panavaram,
 Chennai-600 043.

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TYPICAL GENERAL TOOL LIST REQUIRED FOR ERECTION OF THE GIS

1. PRELIMINARIES TO ERECTION

1.1. INSTALLATION

Ref.	Description	page
N° 6	- Temporary supply type A (380V / 100A)	2
N° 7	- Temporary supply type B (380V / 40 A)	3
N° 8	- Industriel vacuum cleaner	4
N° 9	- Electrical extension 230 V 15 m long	4
N° 10	- Fax – Phone	5
N° 11	- Shelf for tool storage	5
N° 12	- Collapsible workbench 1200 x 550	6
N° 13	- Revolving vise (opening 180 mm x 125 mm)	6
N° 14	- Floodlight 1000 W	6
N° 15	- Plastic sheet	7
N° 16	- Nail drawer	7
N° 17	- Mobile table 1000 x 700	7
N° 18	- Office, cloakrooms, sanitary, store ...	8
N° 19	- Welding equipment	8
N° 20	- Shelter for outside working area	9

1.2. SAFETY & MARKING

Ref.	Description	page
N°21	- ABC powder fire extinguisher (6 kg)	10
N°22	- First-aid kit for 8 persons	10

1.3. CIVIL WORK

Ref.	Description	page
N°23	- Spirit level 300 mm long	11
N°24	- Industrial concrete drilling machine	11
N°25	- Concrete drills for concrete drilling machine	12
N°26	- Chemical stud installation tool (M20 / M24)	12
N°27	- Théodolite (DT5A) SOKKIA	13
N°28	- Alignment rod 2.5m long	13

1.4. HEIGHT WORKING

Ref.	Description	page
N°30	- Individual equipment for working at elevation	14
N°31	- Stepladder (7 steps)	14
N°32	- Extensible ladder 5 m and 7 m high	14
N°33	- Scaffolding floor level 3m, 5m or 7m high	14
N°72	- Mobile platform	14
N°80	- Telescopic platform for outside work	14

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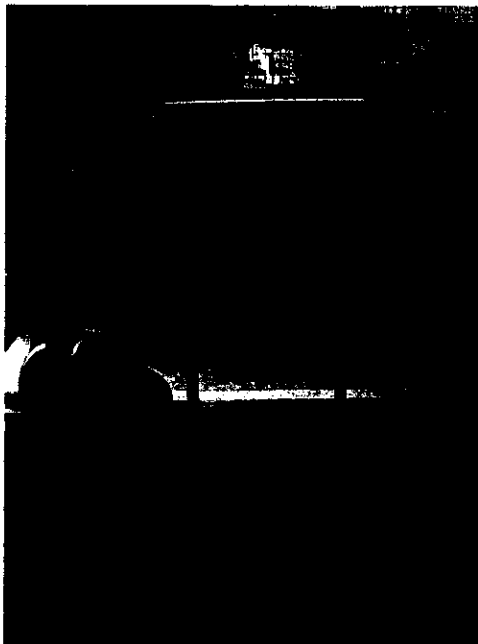
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PRELIMINARIES TO ERECTION

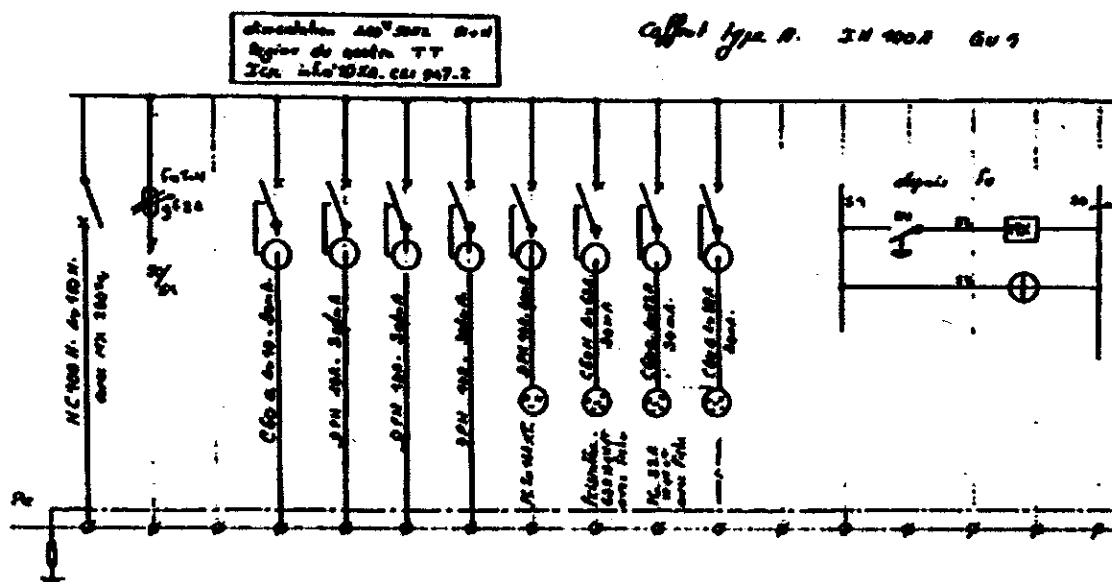
1.1. INSTALLATION

N°6 - Temporary supply type A (380 V / 100 A)



- 1 - plastic cubicle with legs IP 559 (800 x 600 x 300)
- 1 - circuit breaker 4 x 100 A equipped with MX220 coil
- 1 - urgency stop push button
- 1 - feeder 4 x 10A - 30mA (sanitary)
- 3 - feeders 1 ph + N 10A - 30mA (bungalow)
- 1 - circuit breaker 1 ph + N 10A 30mA
- 2 - circuit breakers 4 x 32A 30mA
- 1 - circuit breaker 4 x 63A 30mA

- 1 - socket 2 x 16A + T (domestic connection)
- 2 - socket 3 ph + N + T 32A with plastic plug
- 1 - socket 3 ph + N + T 63A with locking and rubber plug
- 5 - plastic stuffing box with nut
- 1 - 3m long cable H07VK 16sq.m



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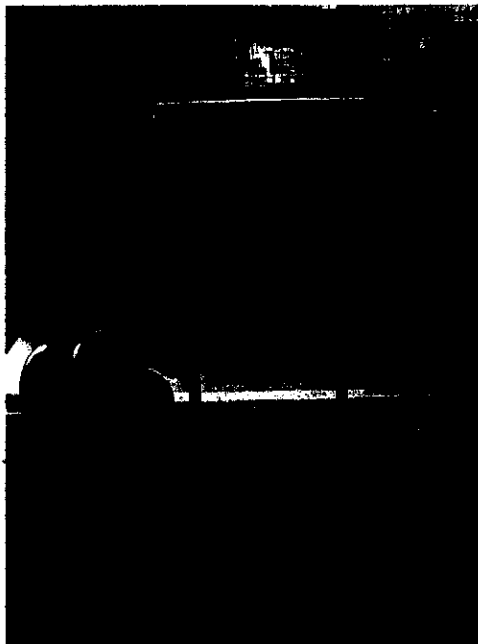
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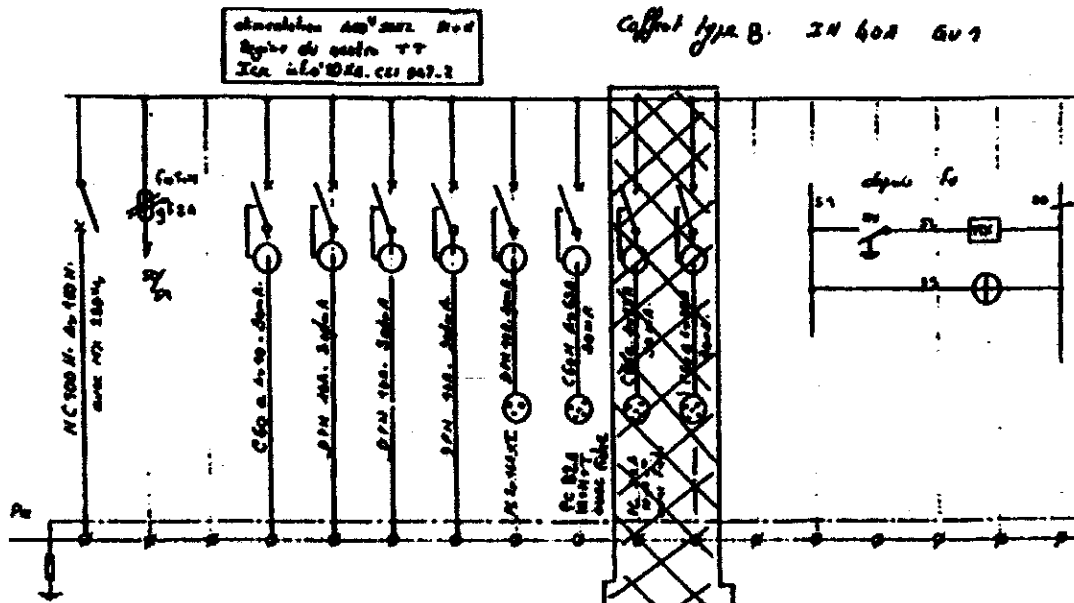
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N°7 - Temporary supply type B (380 V / 40 A)



- 1 - plastic cubicle offret with legs IP559 (700 x 500 x 250)
- 1 - circuit breaker 4 x 40A equiped with MX220 coil
- 1 - urgency stop push button
- 1 - feeder 4 x10A - 30mA (sanitary)
- 3 - feeders 1ph + N 10A - 30mA (bungalow)
- 1 - circuit breaker 1ph + N 10A - 30mA
- 1 - circuit breakers 4 x 32A 30mA
- 1 - socket 2 x 16A + T (domestic connection)
- 2 - sockets 3 ph + N + T 32A with plastic plug
- 5 - plastic stuffing box with nut
- 1 - 3m long cable H07KV 16sq.m



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N°8 - Industriel equipped vacuum cleaner 230VAC - 15A onto trolley

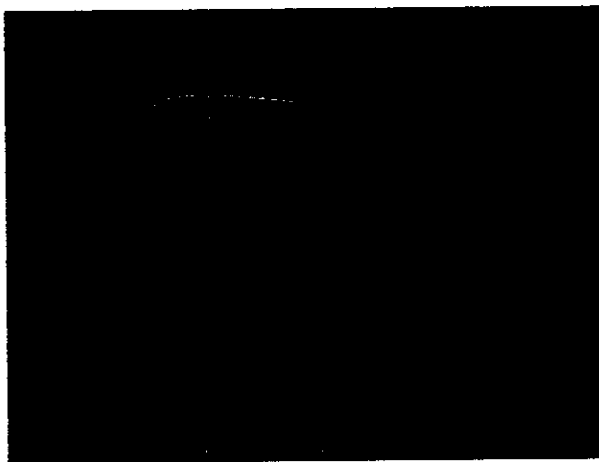


- Power : 2 KW
- Supply : 230V
- Depression : 2.10 m
- Air flow : 5.5 m³ / min
- Tank volume : 57l

It must be equipped with :

- 1 - vinyl tube dia.38 - 3 m long
- 1 - connector for tube
- 1 - straight tube with connector for dia.Ø38 tube
- 1 - brush

N°9 - Electrical extension cable 230V / 16 A - 20 m long



It is composed of:

- Dia.290 mm roll
- IP 44 protection level
- 2P + 1T socket
- Cable: H07RNF3G 2.5 sq.mm 20 m long

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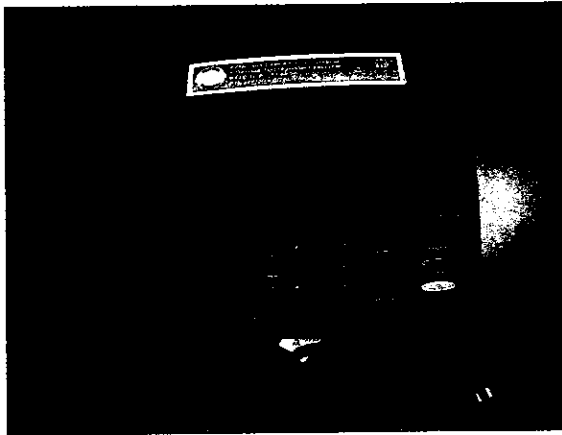
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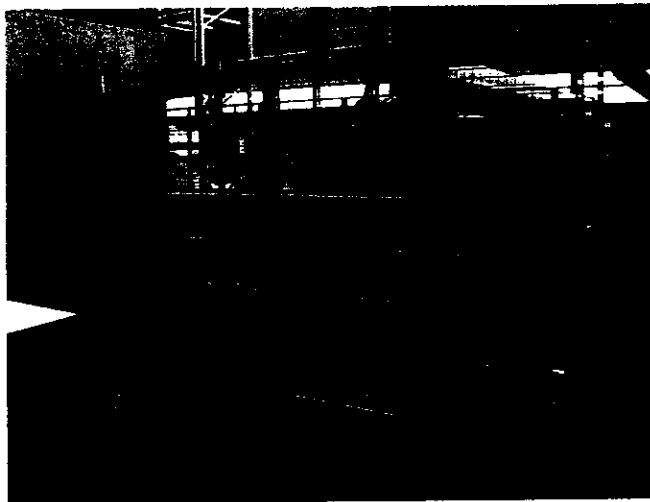


N°10 - FAX - Phone with INTERNET access



Fax / Phone with using guide, paper and ink.

N°11 - Shelf for storage



Set of shelf including the following :

- 1 basic element
(2 ladders, 5 shelves and accessories)
- 1 additional element
(1 ladder, 5 shelves and accessories)
- width : 500 mm
- length : 1000 mm
- high : 1950 mm
- use for half-heavy load

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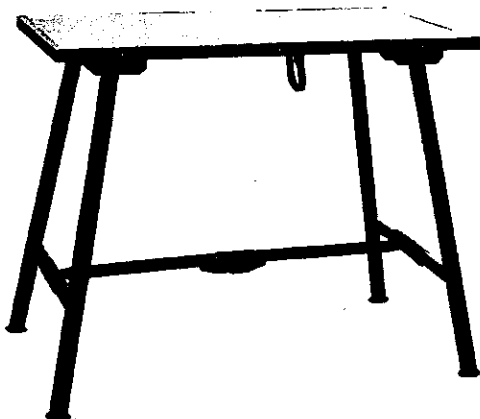
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N°12 - folder workbench



1 folder workbench for fitter :

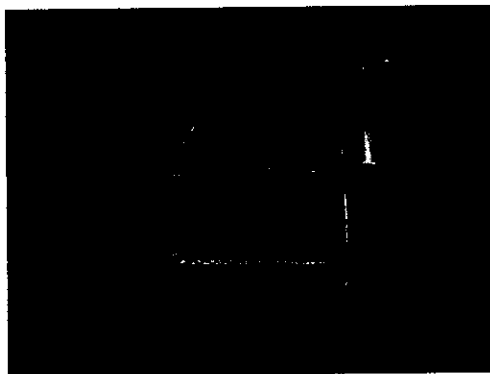
Thickness : 50 mm
Dimensions : 1200 x 550 mm
High of work : 830 mm

N°13 - Revolving vise



Opening : 180 mm
Width : 125 mm
Weight : 14.5 kg

N°14 - Floodlight 1000W / 230VAC



Portable floodlight IP 557 protection level with :

- protection bars
- support made of tube
- delivered with bulb
- 1 cable 5 m long

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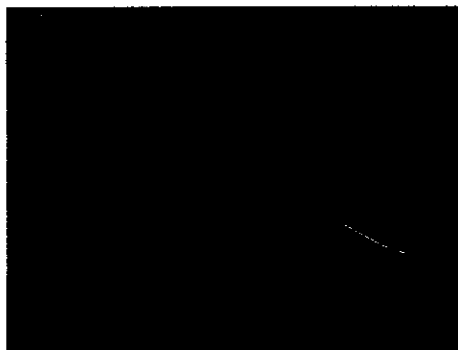
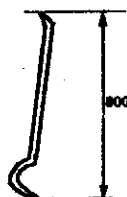
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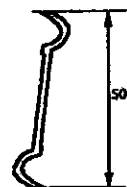
**N°15 - Sheet made of polyethylene**

Dimensions: 5.5 x 9 m

N°16 - Nail drawer**Characteristics:**

SECTION 20 mm
 MASSE: 2,2 KG

REFERENCE: 259 M 322



SECTION 12 mm
 MASSE: 0,6 KG

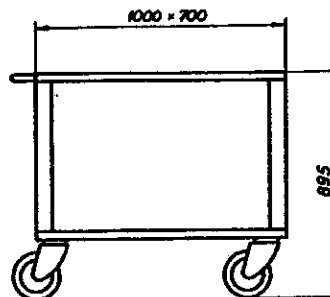
REFERENCE: 259 M 300

Quantity : 1

Quantity : 1

N°17 - Mobile table

Dimensions : 1000 x 700 mm
 Maximal load : 500 kg
 Weight : 58 kg



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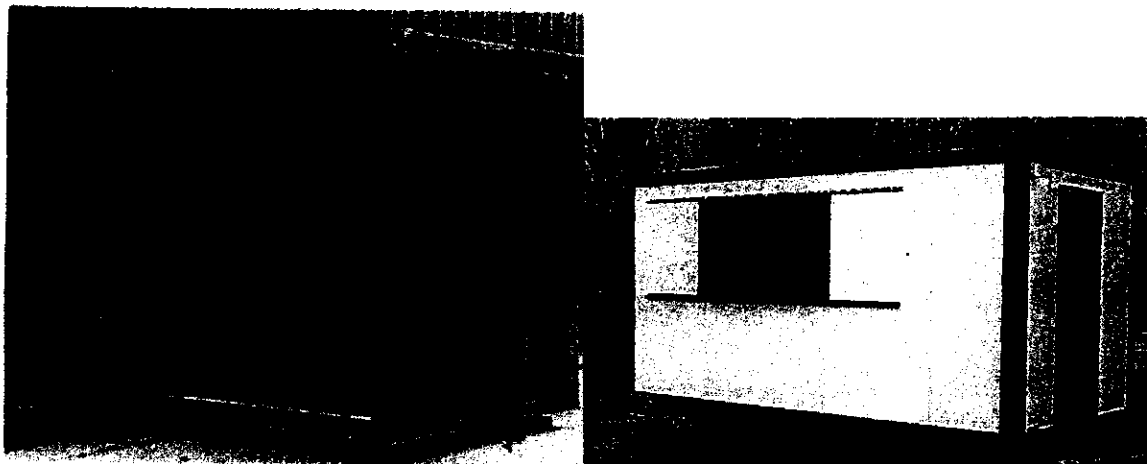
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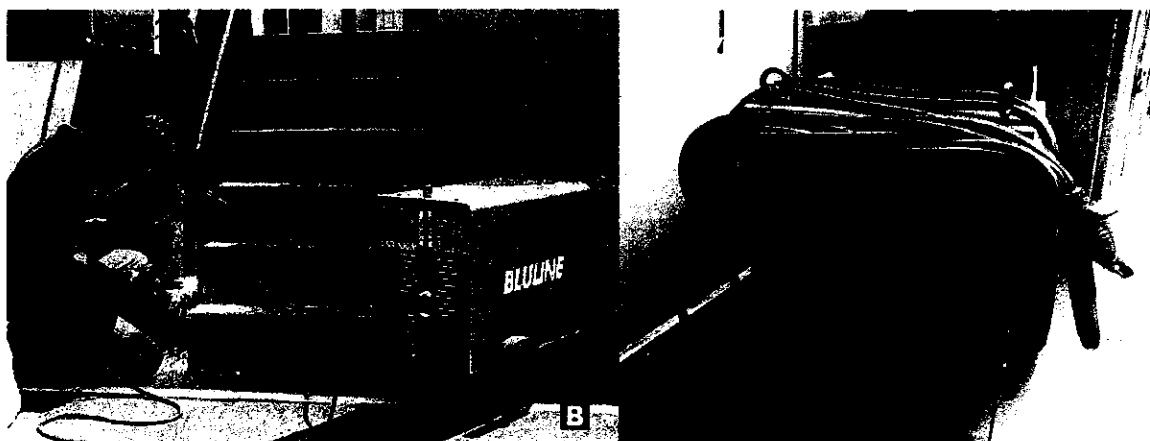
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N°18 - Office, cloakrooms, sanitary, store ...



N°19 - Welding equipment



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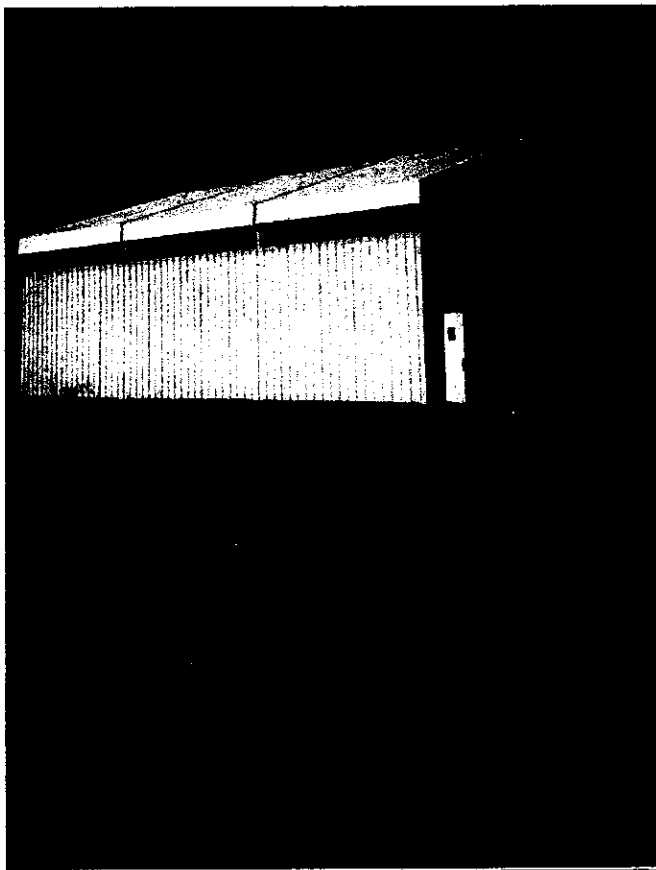
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N°20 - Shelter for outside working area



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**1.2. SAFETY AND MARKING**

N°21 - ABC powder fire extinguisher 6kg



Extinguisher ABC powder for every kind of fire
Extinguishing medium : 6 kg of powder P11-24 or GIP 40 or
CENTRIMAX ABC 40 or FAVORIT 111 euronorm
Propulsive gas : 110 g of CO₂

Storage: - 20°C up to 65°C

N°22 - First aid kit for 8 persons



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**1.3. CIVIL WORK****N°23 - Spirit level 300 mm**

✓
Accuracy : 0,05 mm par m
2 perpendicular bubbles
Rectified sole
V grooves
Length : 300 mm

N°24 - Industrial concrete drilling machine**Technical characteristics:**

✓
Voltage : 230 V - 50/60 Hz
Power : 1700 W
Nominal current : 8A
1st speed : 1200 rpm
2nd speed : 2400 rpm
3rd speed : 3900 rpm
Drilling capability : dia.8 up to dia.42
Weight : 6.2 kg

Equipment :

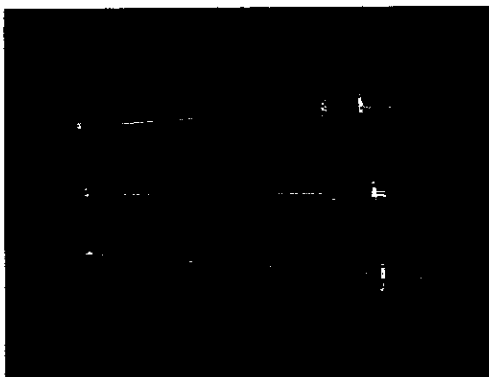
- Water collector
- Suction sole with high speed valve for depressurization and vacuum-meter.
- Indication of the drilling position.
- Vacuum pump
- Handling box
- 1 maintenance kit including one(1) sole gasket
- 1 pressure water tank 10L capability
- 1 replacement flexible pipe

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**N°25 - Concrete drills with diamonds for concrete drilling machine**

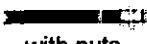


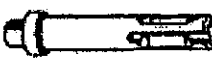





Several diameters:

Dia. 12 mm
Dia. 14 mm
Dia. 16 mm
Dia. 18 mm
Dia. 20 mm
Dia. 24 mm
Dia. 25 mm
Dia. 28 mm

N°26 - Installation tool for M20 and M24

chemical stud

**INSTALLATION TOOL KIT**

Rod dia.	Hex. socket	Increase socket	Tool No 525	Adapter 342/525
M 8	M 8: 151130			
M 10	M 10: 151140	151170	151010	115490
M 12	M 12: 151150			
M 16	M 16: 151160			
 with nuts				
Rod dia.	Hex. socket	Installation tool 525 max	Adapter 3545/375/525 max	
M 20	M 20: 151180	151500	112020	
M 24	M 24: 151190			
M 30	M 30: 151200			
 with nuts				

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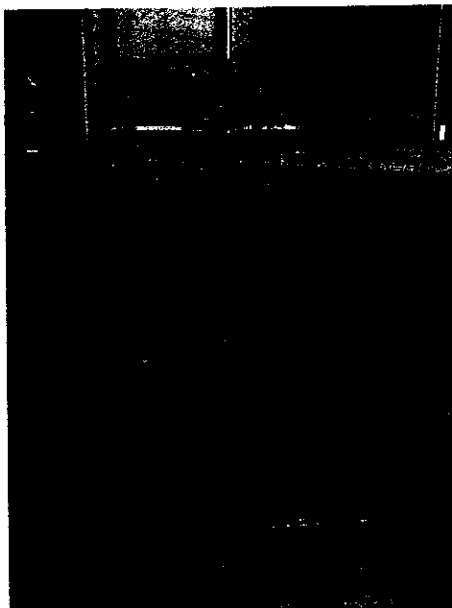
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✓
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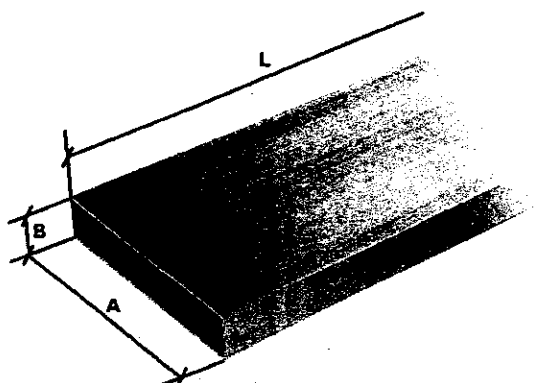
N°27 - Théodolite SOKKIA (DT5A)



Device must be supply with:

- 1 screen
- 2 tripods
- Inspection report
- Using guide
- Technical description (caracteristics, specifications)

N°28 - Alignment rod for masonry



1 wall / 2 cells AxB: 100x18 mm
Length: 2.5 m

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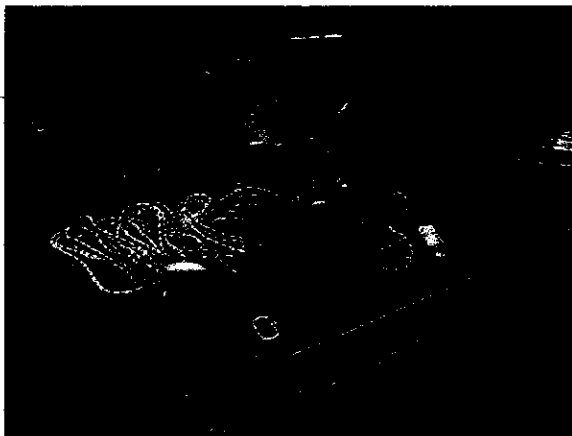
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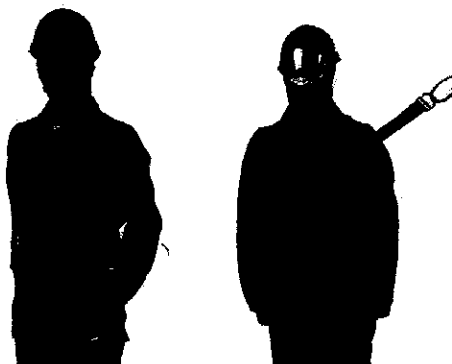


1.3. HEIGHT WORKING

N°30 - Individual equipment for working at elevation



- 1 complete fall arrest chest harness NAVAHO®
- 1 strap with 2m shock absorber
- 2 screw locking carabiners
- 1 automatic locking carabiner
- 4 straps 240
- 1 maintaining strap reglex 3000
- 1 handling bag
- 1 helmet with chin-chain



N°31 - Stepladder made of aluminium - seven(7) steps



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N°32 - Extensible ladder 5 and 7 m high



N°33 - Rolling adjustable scaffolding



Height of work: 3 m / 5 m / 7 m
Adjusting every 2 m

The scaffolding must be delivered with agreement certificate, using guide and maintenance guide.

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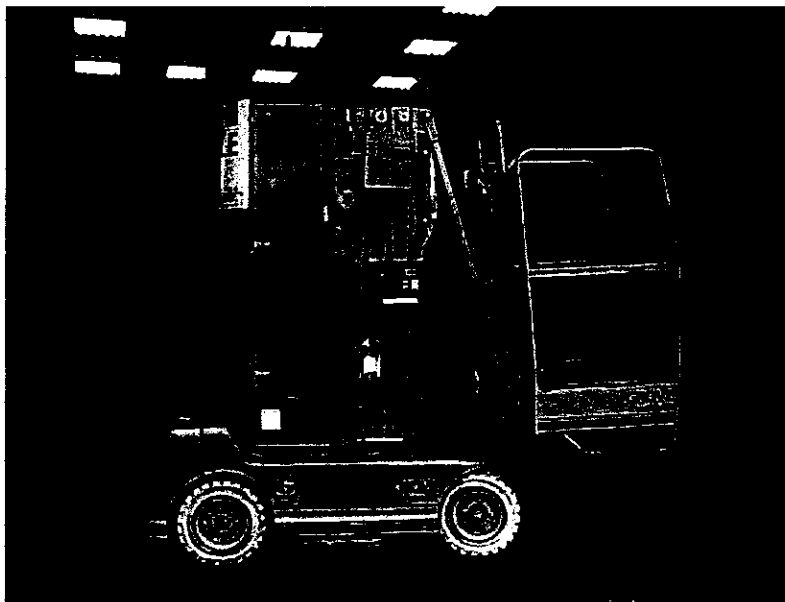
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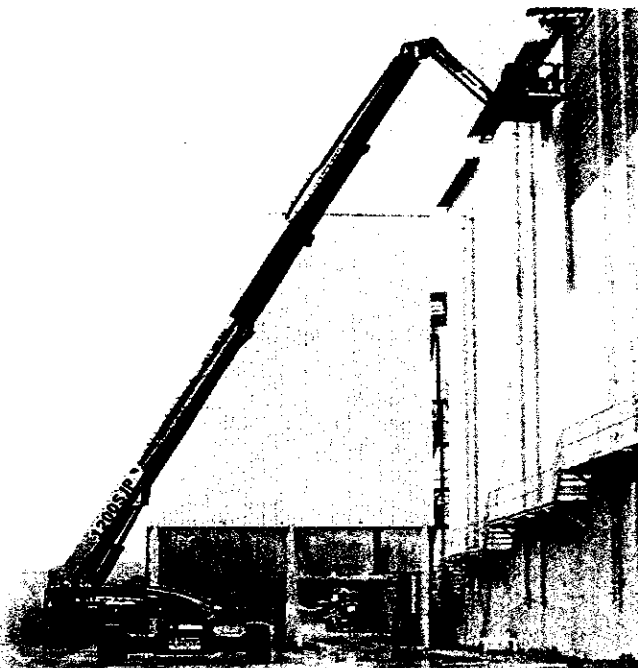
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N°72 - Mobile platform



N°80 - Telescopic platform for outside working



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TYPICAL GENERAL TOOL LIST REQUIRED FOR ERECTION OF THE GIS

2. GENERAL ASSEMBLY

Ref.	Designation	page
N° 34	- Grease pistol	2
N° 35-39	- Mechanic's tool box	2-3
N° 40-44	- Light mechanic's tool box	7
N° 45	- Manual aluminium plate bender	9
N° 48	- Electric drill	9
N° 49	- Drills from dia.4 to dia.13 mm	10
N° 50	- Drill press	10
N° 51	- Hot air gun	11
N° 53	- Angle sander 230VAC - 2100W	11
N° 55	- Industrial portable Hoover	12
N° 56	- Set of 10 dust bags for Hoover	12
N° 57	- Grease brush	12
N° 58	- Nylon line 20m long	12

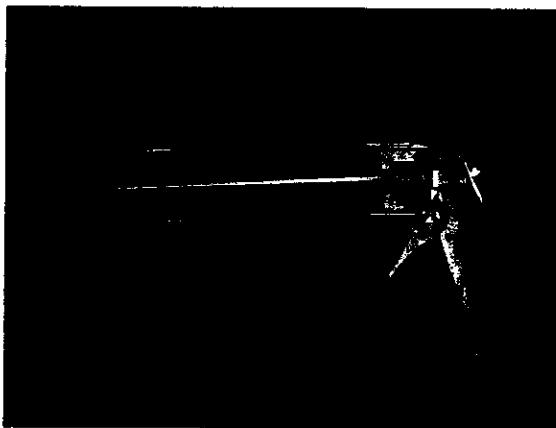
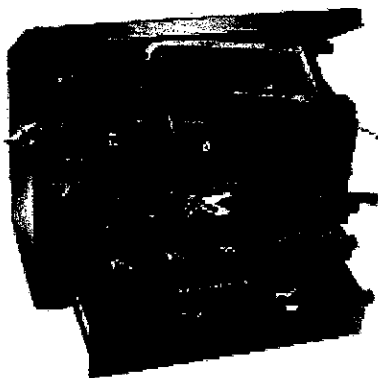
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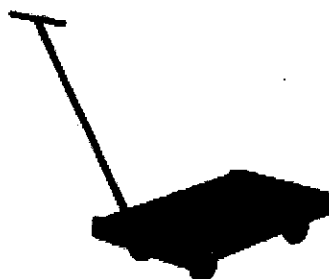
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**2. GENERAL ASSEMBLY****N° 34 – Grease manual pistol****N° 35 – Mechanic's tool box**

Tool box



Carrying trolley for tool box

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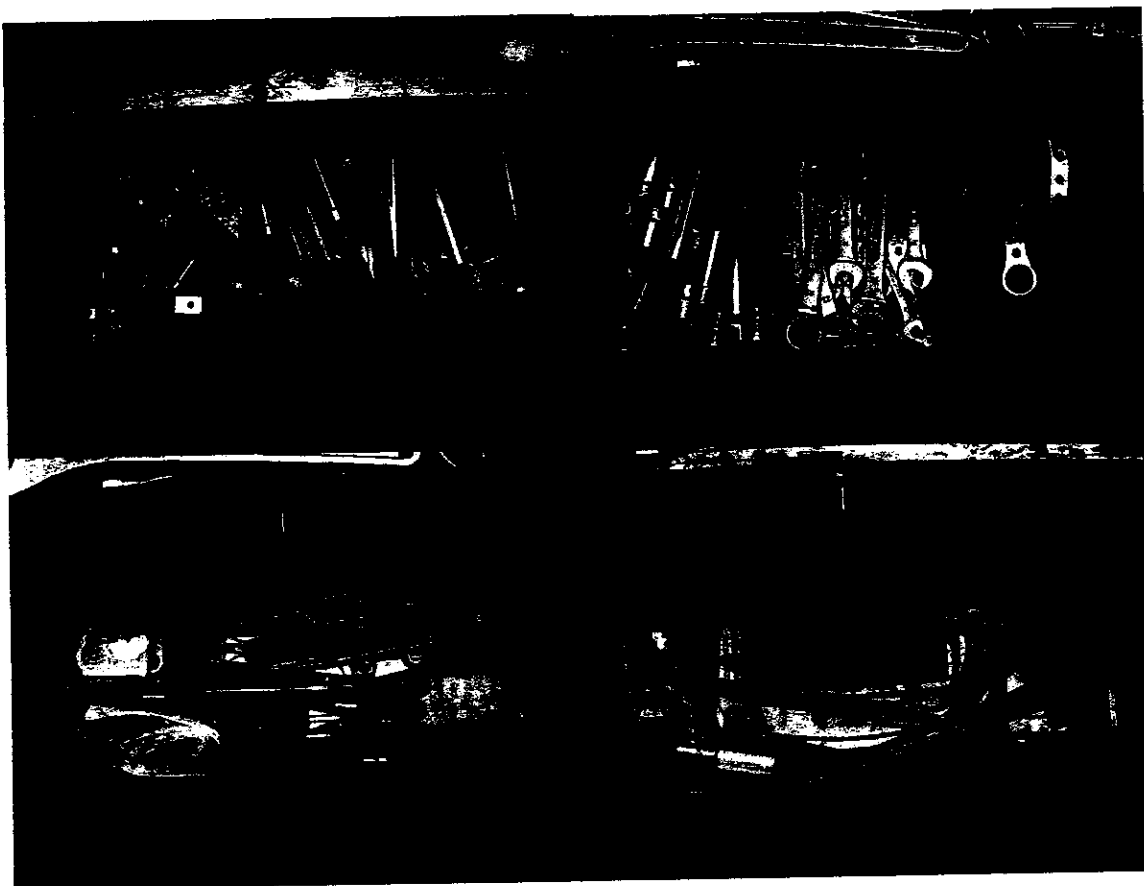
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N° 36-39 – Contents of the tool box



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**Contents**

Désignation	Qté		Désignation	Qté	
Metric combination wrench of 4	1		Open end wrench 4x5	1	
Metric combination wrench of 5	1		Open end wrench 6x7	1	
Metric combination wrench of 7	1		Open end wrench 8x9	1	
Metric combination wrench of 8	1		Open end wrench 10x11	1	
Metric combination wrench of 10	1		Open end wrench 12x13	1	
Metric combination wrench of 13	1		Open end wrench 14x15	1	
Metric combination wrench of 14	1		Open end wrench 16x17	1	
Metric combination wrench of 16	1		Open end wrench 18x19	1	
Metric combination wrench of 17	1		Open end wrench 20x22	1	
Metric combination wrench of 18	1		Open end wrench 24x27	1	
Metric combination wrench of 19	2		Open end wrench 30x32	1	
Metric combination wrench of 22	1		Open end wrench 36x41	1	
Metric combination wrench of 24	2		Fractional flare-nut wrench of 17x19	1	
Metric combination wrench of 27	1		Fractional flare-nut wrench of 22x24	1	
Metric combination wrench of 30	1				
Metric combination wrench of 32	1				
Metric combination wrench of 36	1				
Ratchet wrench 1/2" series	1		Hex. socket of 10 - 1/2" series	1	
			Hex. socket of 13 - 1/2" series	1	
			Hex. socket of 14 - 1/2" series	1	
			Hex. socket of 16 - 1/2" series	1	
Universel joint	1		Hex. socket of 17 - 1/2" series	1	
Extension 1/2" series 52.5mm long	1		Hex. socket of 18 - 1/2" series	1	
Extension 1/2" series 75mm long	1		Hex. socket of 19 - 1/2" series	1	
Extension 1/2" series 125mm long	1		Hex. socket of 22 - 1/2" series	1	
Extension 1/2" series 250mm long	1		Hex. socket of 24 - 1/2" series	1	
Extension 3/4" series 200mm long	1		Hex. socket of 27 - 1/2" series	1	
Adjustable wrench of 13 max opening	1		Hex. socket of 30 - 1/2" series	1	
Adjustable wrench of 46 max opening	1		Hex. socket of 42 - 3/4" series	1	
Polygonal ratchet ring wrench of 12x13	1		Long hex. socket of 19 - 1/2" series	1	
Polygonal ratchet ring wrench of 16x18	1		Long hex. socket of 24 - 1/2" series	1	
Polygonal ratchet ring wrench of 17x19	1		Bit holder of 1/2" - 5/16"	4	
Polygonal ratchet ring wrench of 22x24	1		Bit holder of 1/2" - 1/2"	3	
Screwdriver of 2.5x75 for split head	1		Hex. screw bit of 6	1	
Screwdriver of 4x75 for split head	1		Hex. screw bit of 7	1	
Screwdriver of 5.5x125 for split head	1		Hex. screw bit of 8	1	
Screwdriver of 6.5x150 for split head	1		Hex. screw bit of 10	1	
Screwdriver of 8x200 for split head	2		Hex. screw bit of 12	1	
Screwdriver of 4x40 for split head	1		Hex. screw bit of 14	1	
Screwdriver of 5.5x40 for split head	1		Long series hex. screw bit of 6	1	
Screwdriver of 5.5x40 for cross head	1		Long series hex. screw bit of 8	1	
Angled screwdriver of 5.5 for split head	1		Long series hex. screw bit of 10	1	
3/4" to 1/2" reducer	1		Ratchet set 1/4" radio series	1	

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Désignation	Qté		Désignation	Qté	
Set of angled hex. key wrenches Spherical head of : 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 8 - 10	1		Angled hex. key wrench of 5	2	
Outside circlip pliers	1		Angled hex. key wrench of 6	1	
			Angled hex. key wrench of 8	1	
Inside circlip pliers	1		Angled hex. key wrench of 12	1	
			Angled hex. key wrench of 14	1	
Set of 12 nail and drift punch	1		Angled hex. key wrench of 17	1	
			Straight T-handle hex. key wrench T4	1	
Diagonal cutter pliers	1		Straight T-handle hex. key wrench T5	1	
			Straight T-handle hex. key wrench T6	1	
End cutting pliers	1		Straight T-handle hex. key wrench T8	1	
			Straight T-handle hex. key wrench T10	1	
Precision diagonal cutting pliers	1		Hacksaw	1	
Flat nose pliers	1		Steel blade for hacksaw	3	
General pliers	1		Set of 5 mechanic's files STG series	1	
Round nose pliers	1		Riveting hammer 30mm width	1	
Multi-grip pliers	1		Riveting hammer 40mm width	1	
Locking pliers	2		Dead blow hammer dia. 50mm	1	
Metric feeler gauge	1		Center punch of dia. 4mm	1	
Metric ISO screw pitch gauge	1		Gauge 1/50mm accuracy	1	
Whitworth screw pitch gauge	1		Steel scriber	1	
Decametre 20m long with steel tape 13mm width	1		Flexible ruler 300mm long	1	
Measuring tape 3 m long	1		250mm size mechanic's divider	1	
Chalk line	1		Square	1	
Blue powder for chalk line	1		Spirit level 400mm long 0,5mm/m acc.	1	
Flexible fine magnetic retriever	1		Plummet	1	
Flat chisel 24mm width	1		Strap wrench 125mm capability	1	
Cape chisel 10mm	1		Replacement strap	1	
Cable sheet stripper 6-20 mm capability	1		Adjustable pin wrench with set of pins	1	
Set of replacement blades	1		Angle beak hexagonal crowbar 400mm long	2	
Triangular scrapper	1		Cutter with divisible blade	1	
			Set of 10 blades for cutter	1	

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


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Désignation	Qté		Désignation	Qté		
Set of 3 hand taps of M4x0.7 ISO	1		Set of drills	1		
Set of 3 hand taps of M5x0.8 ISO	1					
Set of 3 hand taps of M6x100 ISO	1					
Set of 3 hand taps of M8x125 ISO	1		Tap wrench of M5 up to M12	1		
Set of 3 hand taps of M10x150 ISO	1		Tap wrench of M5 up to M20	1		
Set of 3 hand taps of M12x175 ISO	1		Die handle of 1"	1		
Hand round thread die of M8 ISO	1	Die handle of 1-1/2"	1			
Hand round thread die of M10 ISO	1		Nut splitter	1		
Hand round thread die of M12 ISO	1					
Hand round thread die of M16 ISO	1		Set of needle files 1 round -1 half round -1 square 1 flat -1 triangular	1		
Thread restoring tool	1					
Bolt fastener of 12	1		Card brush	2		
Bolt fastener of 16	1					
Bolt extractor of 3-6 mm	1		Goggles	1		
Bolt extractor of 6-8 mm	1					
Bolt extractor of 8-11 mm	1			Fluorescent portable lamp	1	
Bolt extractor of 14-18 mm	1					
Flexible revolving mirror	1		Clamp 200 mm capability	2		
Clamp 200 mm capability	2					

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N° 40 - Caisse à outils de mécanicien "allégée"



N° 41-44 - Composition de la caisse "allégée"

Désignation	Qté		Désignation	Qté	
Metric combination wrench of 4	1		Polygonal ratchet ring wrench of 12x13	1	
Metric combination wrench of 5	1		Polygonal ratchet ring wrench of 16x18	1	
Metric combination wrench of 7	1		Polygonal ratchet ring wrench of 17x19	1	
Metric combination wrench of 8	1		Polygonal ratchet ring wrench of 22x24	1	
Metric combination wrench of 10	1		Fractional flare-nut wrench of 17x19	1	
Metric combination wrench of 13	1		Fractional flare-nut wrench of 22x24	1	
Metric combination wrench of 14	1		Ratchet wrench 1/2" series	1	
Metric combination wrench of 16	1		Hex. socket of 10 - 1/2" series	1	
Metric combination wrench of 17	1		Hex. socket of 13 - 1/2" series	1	
Metric combination wrench of 18	1		Hex. socket of 14 - 1/2" series	1	
Metric combination wrench of 19	2		Hex. socket of 16 - 1/2" series	1	
Metric combination wrench of 22	1		Hex. socket of 17 - 1/2" series	1	
Metric combination wrench of 24	2		Hex. socket of 18 - 1/2" series	1	
Metric combination wrench of 27	1		Hex. socket of 19 - 1/2" series	1	
Metric combination wrench of 30	1		Hex. socket of 22 - 1/2" series	1	
Metric combination wrench of 32	1		Hex. socket of 24 - 1/2" series	1	
Metric combination wrench of 36	1		Bit holder of 1/2" - 5/16"	2	
Long socket of 19 - 1/2" series	1		Bit holder of 1/2" - 1/2"	2	
Long socket of 24 - 1/2" series	1		Hex. screw bit of 6	1	
Universel joint	1		Hex. screw bit of 7	1	
Extension 1/2" series 125mm long	1		Hex. screw bit of 8	1	
Extension 1/2" series 250mm long	1		Hex. screw bit of 10	1	
			Hex. screw bit of 12	1	
Ratchet set 1/4" radio series	1		Long series hex. screw bit of 6	1	
			Long series hex. screw bit of 8	1	
			Long series hex. screw bit of 10	1	

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



















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Désignation	Qté		Désignation	Qté		
Screwdriver of 4x75 for spilt head	1		Set of angled hex. key wrenches Spherical head of : 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 8 - 10	1		
Screwdriver of 5.5x125 for spilt head	1					
Screwdriver of 8x200 for spilt head	2					
Screwdriver of 4x40 for spilt head	1					
Screwdriver of 5.5x40 for spilt head	1					
Diagonal cutting pliers	1		Angled hex. key wrench of 5	2		
End cutting pliers	1		Angled hex. key wrench of 6	1		
			Angled hex. key wrench of 8	1		
			Angled hex. key wrench of 12	1		
			Angled hex. key wrench of 14	1		
Flat nose pliers	1		Riveting hammer 30mm width	1		
General pliers	1		Riveting hammer 40mm width	1		
Multi-grip pliers	1		Dead blow hammer dia. 50mm	1		
Locking pliers	1		Adjustable wrench of 55 max opening	1		
Hacksaw	1		Set of 5 mechanic's files STG series	1		
Steel blade for hacksaw	1					
Steel scribe	1					
Center punch of dia. 4mm	1					
Flexible ruler 300mm long	1		Plummet	1		
Metric feeler gauge	1		Measuring tape 3 m long	1		
Metric ISO screw pitch gauge	1		Angle beak hexagonal crowbar 400mm long	2		
Flat chisel 24mm width	1		Thread restoring tool	1		
Cape chisel 10mm	1		Nut splitter	1		
Triangular scrapper	1		Clamp 200 mm capability	2		
Cutter with divisible blade	1					
Set of 10 blades for cutter	1					

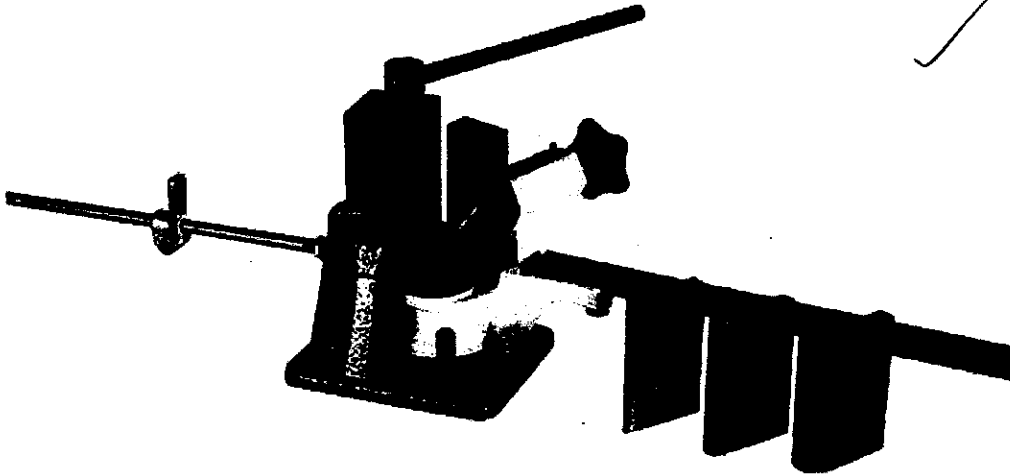
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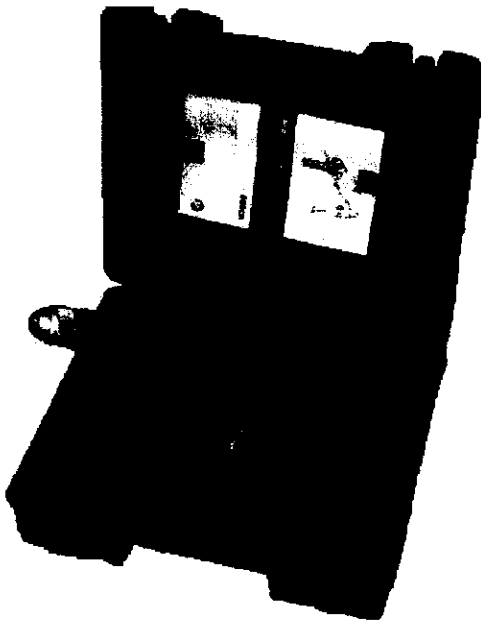
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**N° 45 - Manual aluminium plate bender****Set including :**

- 1 manual bending machine 120x12 mm capability / 0°-120° graduated angle
- 1 pedestal (machine to be fitted onto the support)
- 1 bending die for 25mm radius

N° 48 - Electric drill with carrying box

- Power : 700W
- Supply : 230V – 50Hz
- Drill chuck : 13mm capability
- 2 speeds : 0-1000 - 3000 rpm
- Weight : 2,2 kg
- Drilling capability :

concrete : 18/13 mm
wood : 40/25 mm
steel : 13/8 mm

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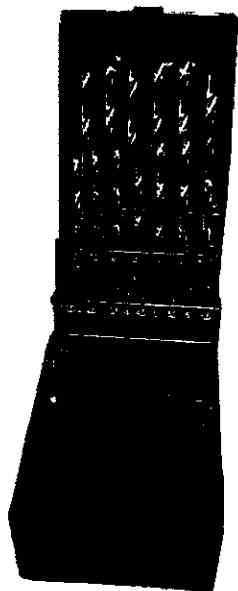
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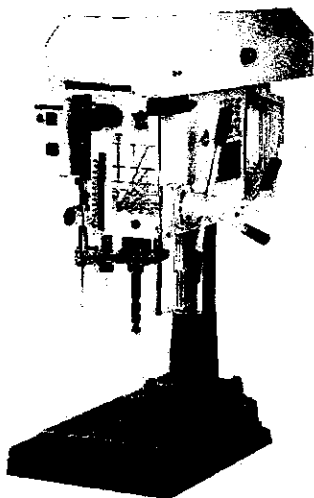
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N° 49 - Set of HSS drill for electric drill



Drill range : dia.4 -dia.5 -dia.6 -dia.7 -dia.8 -dia.9
dia.10 -dia.11 -dia.12 -dia.13

N° 50 - Drill press



Machine equiped with :

- column + 200 mm
- rectangular table and base with retention groove
- CM2 joining
- self-locking drill 1 to 13 mm range
- precision vise
- set of tool protection

Technical characteristics :

- drilling capability through steel metal 15 mm
- spindle dimension CM2 / MT2 / MK2
- number of speeds : 8
- motor power : 0.55 kW 0.75 CV
- speed range : 330 à 6000 tour / min
- weight : 83 Kg
- spindle travelling : 100 mm
- distance btween spindle and column : 210 mm
- column diameter : 80 mm

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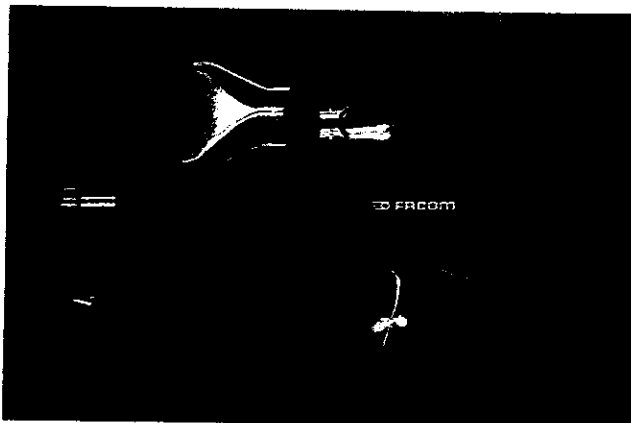
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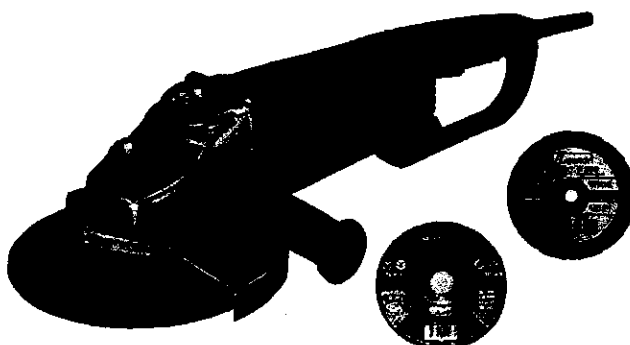
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N° 51 - Hot air gun for stripping

- Electronic heat regulator from 60 up to 600 °C
- Power : 2000 W
- Supply : 230 V / 50 Hz
- Air flow : 300 l / min and 500 l / min
- Delivered with two(2) tips

N° 53 – Angler sander 2100W**1 angle sander :**

- dia: 230 mm
- 6500 rpm
- 230VAC – 50Hz
- 2100 W
- 4.2 Kg

Accessories delivered :

- 1 protection cap
- 1 nut
- 1 pin wrench
- 1 additional handle
- 1 blocking nut
- 1 cutting disk dia.230 mm for steel
- 1 trimming disk dia.230 mm

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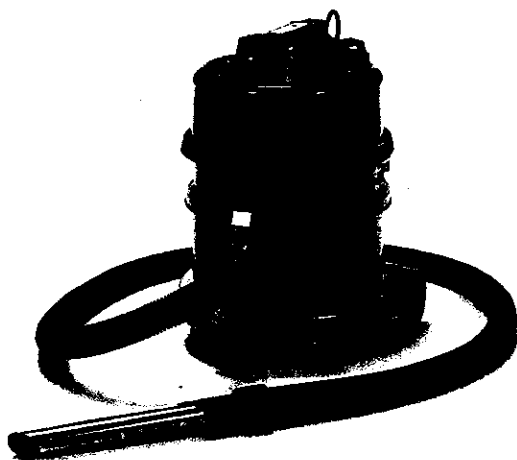
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N° 55 - Portable industrial Hoover



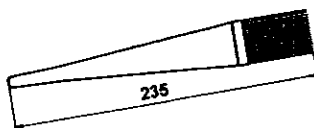
Hoover equipped with :

- 1 flexible pipe dia. 32 / 4 m long
- 2 joins
- 1 nozzle

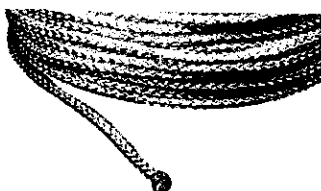
N° 56 - Set of 10 dust bags for industrial hoover



N° 57 - Grease brush



N° 58 - Nylon line



Twisted polyamide dia.6mm / 20m long

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TYPICAL GENERAL TOOL LIST REQUIRED FOR ERECTION OF THE GIS

3. HANDLING

Ref.	Designation	page
N°60	- 5T hydraulic jack with toe	2
N°61	- Pulling hoist "Tirfor" unlimited run (from 3,2T up to 5T)	2
N°62	- 2T Shackle	2
N°63	- Tubular slings	3
N°64	- 1T Chain block	3
N°66	- 1T Lug-all	4
N°67	- M12 eyelet screw	4
N°68	- Sling 1,5m long	4
N°69	- 2T lift truck	5
N°70	- Forklift	5
N°71	- 30T crane	6
N°81	- In charge movable gantry	6

4. GAS TREATMENT

Ref.	Designation	page
N°73	- Bottle of nitrogene U 50kg	7

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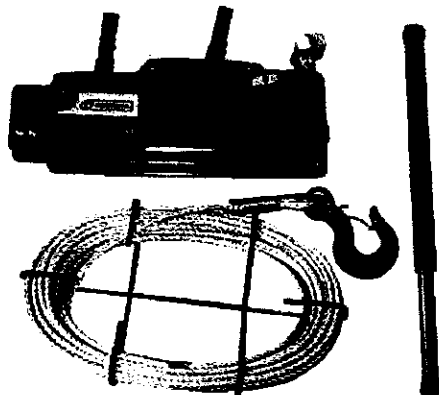
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**3. HANDLING****N° 60 - Hydraulic jack with toe 5T capacity**

Lifting load by head or by toe : 5 tons

N° 61 - Pulling hoist "Tirfor" unlimited run (from 3,2T up to 5T)

Delivered with 20 m long of specific cable for "Tirfor"

N° 62 - 2T shackle

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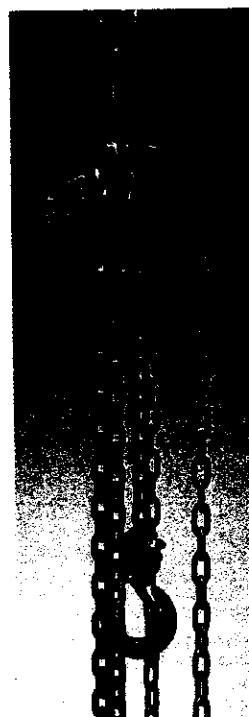
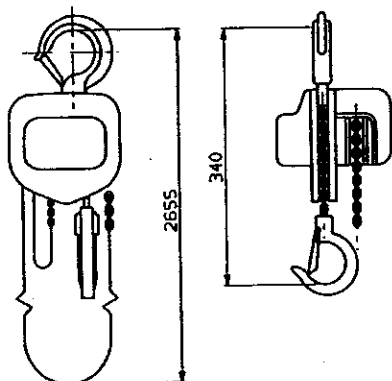
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N° 63 - Tubular slings

- Unfold length : 2 m, max load : 1 ton
- Unfold length : 2 m, max load : 3 tons
- Unfold length : 4 m, max load : 3 tons
- Unfold length : 6 m, max load : 3 tons
- Unfold length : 4 m, max load : 6 tons
- Unfold length : 10 m, max load : 6 tons

**N° 64 - Chain block****Characteristics :**

- Load : 1000 kg
- Rotating hook
- Automatic brake
- Length of chain : about 2,5 m



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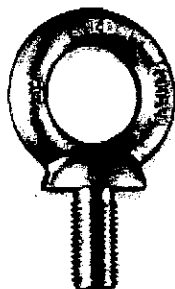
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N° 66- Cable hoist "Lug-all" 1 Ton capability



N° 67- Eyelet screw M12 threaded



N° 68- Sling 1,5 m



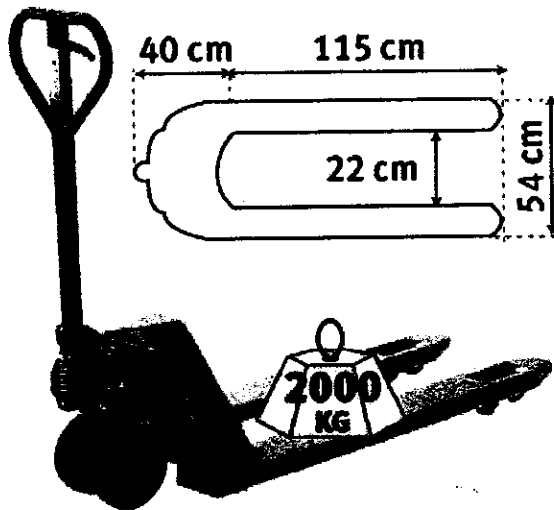
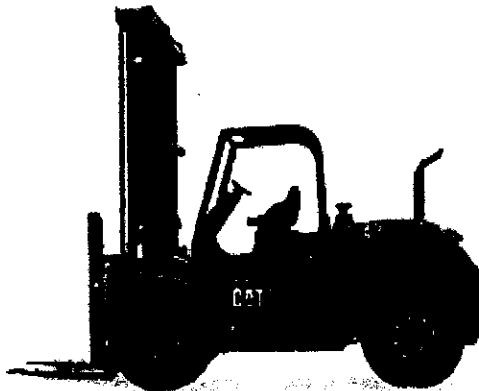
Flat sling 1 ton load capability, folded loops

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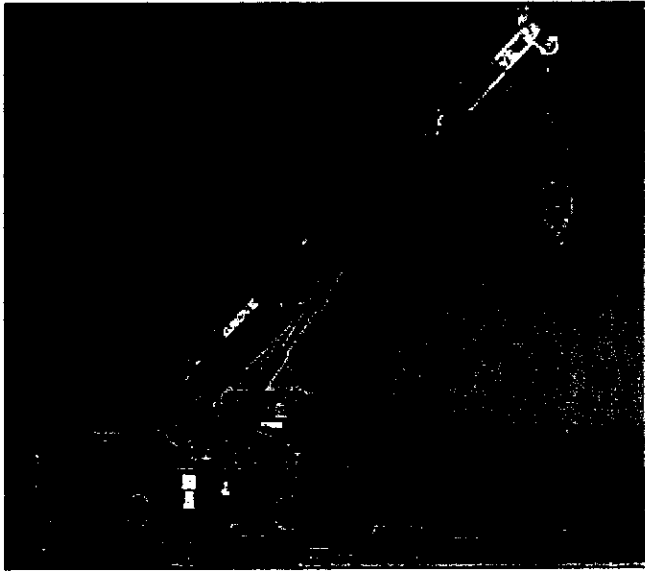
**N° 69- Lift truck 2000 kg load****N° 70- Forklift**

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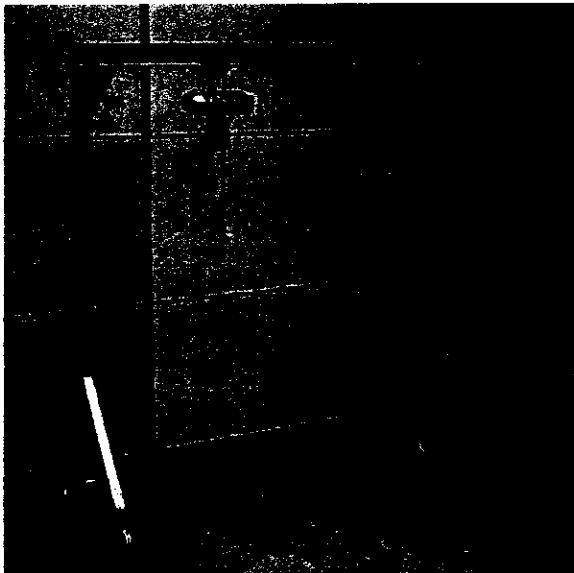
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**N° 71 - 30 tons self-moving telescopic crane**

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N° 81 - In charge movable gantry**Description :**

Lifting capacity : 1500 kg minimum
Range : 5 m
Underneath free high : 3 m
Delivered with hoist

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**4. GAS TREATMENT**

N° 73- Bottle of nitrogène U 50kg



Impurity: 50 ppm maxi



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TYPICAL GENERAL TOOL LIST REQUIRED FOR ERECTION OF THE GIS

5. LOW VOLTAGE TEST

Ref.	Designation	page
N° 75	- Multimeter ✓	2
N° 76	- 250Vdc supply with variable range ✓	3
N° 77	- Variable AC/DC supply	3

6. LOW VOLTAGE TOOLS

Ref.	Designation	page
N° 78	- Electrician's tool box	4
N° 79	- Cable cutter	5

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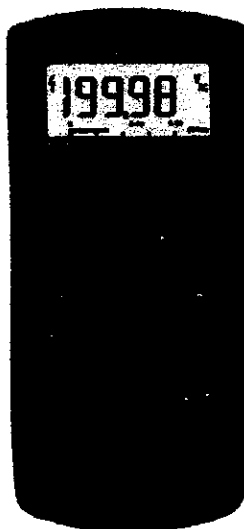
1, rue Paul Doumer – BP 601 – 73106 Aix-les-Bains Cedex – France
 Téléphone : +33 (0)4 79 88 79 80 – Fax : +33 (0)4 79 88 79 39

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5- LOW VOLTAGE TEST

N°75 - Multimeter



General characteristics	
DC voltage	Voltage : 1 000 V maximum Accuracy : $\pm (0.05 \% + 1)$ Resolution level : 10 μ V
AC voltage	Voltage : 1000 V maximum Accuracy : $\pm (0.7 \% + 2)$ TRMS AC frequency band : 20 kHz Resolution level : 10 μ V
DC current	Current : 10 A maximum (20 A during 30 seconds maximum) Accuracy : $\pm (0.2 \% + 2)$ Resolution level : 0.01 μ A
AC current	Current : 10 A maximum (20 A during 30 seconds maximum) Précision d'intensité : $\pm (1.0 \% + 2)$ Résolution maximum : 0.01 μ A TRMS
Resistance	Resistance : 50 M Ω maximum Accuracy : $\pm (0.2 \% + 1)$ Resolution level : 0.01 Ω
Capacity	Capacity : 9 999 μ F maximum Accuracy : $\pm (1 \% + 2)$ Resolution level : 0.01 nF
Frequency	Frequency : > 200 kHz maximum Accuracy : $\pm (0.005 \% + 1)$ Resolution level : 0.01 Hz
Temperature	Range : - 200.0 $^{\circ}$ C to 1 090 $^{\circ}$ C (without densor)
Temperature sensor 80 BK	Range : - 40.0 $^{\circ}$ C à 260 $^{\circ}$ C Accuracy : 2.2 $^{\circ}$ C or 2%
Conductance	Conductance : 60.00 nS maximum Accuracy : $\pm (1.0\% + 10)$ Resolution level : 0.001 nS
Measuring limitation for dangerous areas	Voltage : 65 V Current : 5 A

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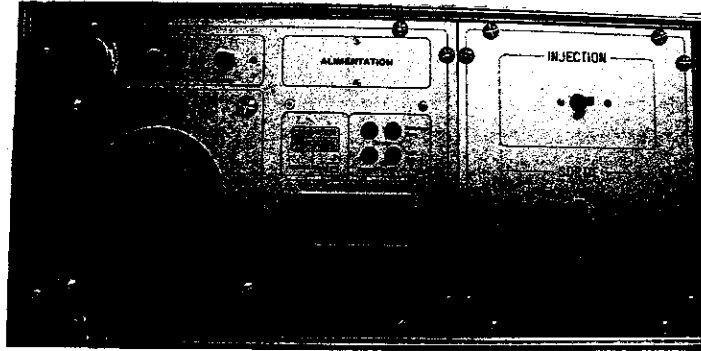
1, rue Paul Doumer - BP 601 - 73106 Aix-les-Bains Cedex - France
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N° 76 - 250V continuous current supply with variable range



Generality :

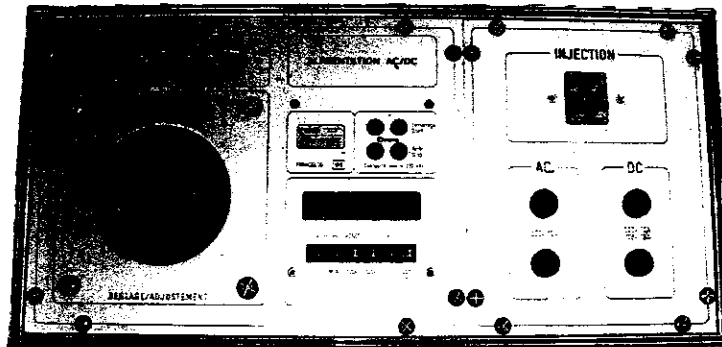
250V DC (10A) voltage produce ability

Supply :

- 230 VAC $\pm 10\%$ - 50/60 Hz + ground
- Connection through Socapex socket type
- MCB protection
- Using guide + inspection report

N° 77 - Variable AC/DC supply

TBTS



Generality :

250 VAC (10A) voltage produce ability
or 220 VDC (10A) adjustable range voltage produce ability

Supply:

- 230 VAC $\pm 10\%$ - 50 / 60 Hz + ground
- Connection through Socapex socket type
- MCB protection
- Using guide + inspection report

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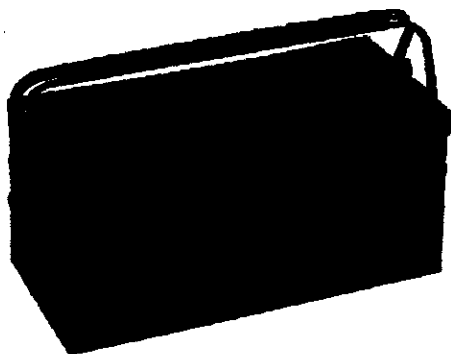
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6- LOW VOLTAGE TOOLS

N° 78 – Electrician's tool box



Contents

Désignation	Qté		Désignation	Qté	
Electrician screwdriver of 2x125	1		Open end wrench 4x5	2	
Electrician screwdriver of 2,5x75	1		Open end wrench 6x7	2	
Electrician screwdriver of 3,5x75	1		Open end wrench 8x9	1	
Electrician screwdriver of 4x100	1		Open end wrench 10x11	2	
Electrician screwdriver of 5,5x150	1		Open end wrench 12x13	2	
Electrician screwdriver of 6,5x200	1		Open end wrench 14x15	1	
Electrician screwdriver of 8x200	1		Open end wrench 16x17	1	
Screwdriver of 5,5x40 for cross head	1		Open end wrench 18x19	1	
Hacksaw	1		Open end wrench 22x24	1	
Steel blade for hacksaw	1		Adjustable wrench of 13 max opening	1	
Riveting hammer 30mm width	1		Cable sheet stripper 6-20mm capability	1	
			Set of replacement blades	1	
Round nose pliers	1		Connector pliers	1	
Long flat nose pliers	1		Automatic wire stripper	1	
Bent nose pliers	1		Cable tie installation tool	1	
Diagonal cutting pliers	1		Standard sleeve pliers		
Precision diagonal cutting pliers	1		Ref S.E.S. process HELAVIA KG	1	
General pliers	1		Ref S.E.S. process HELAVIA KK	1	
Multi-grip pliers	1		230 VAC – 200W soldering iron	1	
			230 VAC – 50W soldering iron	1	
			Electrician's knife	1	
Ratchet set 1/4" radio series	1		Digital display multimeter	1	

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**N°79 - Ratchet cable cutter – Copper / Aluminium****Cutting capability :**

- Cable dia.45 mm max
- Copper cable section : 300 sq.mm
- Aluminium cable section : 600 sq.mm
- Copper sectorial cable section : 240 sq.mm
- 4 x 70 sq.mm copper cable
- Aluminium sectorial cable section : 4x12 sq.mm
- Phone cable dia.45 mm
- Almelec 54,6 sq.mm

Delivered with one(1) set of replacement jaws (1 fix + 1 mobile)



Not able to cut steel material

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ANNEX 4

4. ANNEX 4 - ERECTION CONDITIONS AND ATTACHMENTS

List of attachments

FAQ 011 EF	07/04	Conditions required to open and use a site for the erection of a GIS in a building
FAQ 011 EF Annex	07/04	State of site before beginning GIS erection according to FAQ 011

ASSURANCE QUALITE**T&D**

GAS INSULATED SUBSTATIONS

Etablissement d'Aix-les-Bains

**H****OBJET : CONDITIONS REQUIRED TO OPEN AND USE A SITE FOR THE ERECTION OF A GIS *****CONDITIONS REQUISES POUR L'OUVERTURE ET LA REALISATION D'UN CHANTIER DE MONTAGE D'UN POSTE A ISOLATION GAZEUSE *****DIFFUSION :**- Pour information (nominative) : MM. GUENYOT - LOPEZ DE ARIAS - COLLAUDIN - J. BOIS - BUES - WISNIEWSKI - HENRIOT- Pour action (fonctionnelle suivant FG 59001) : **M.Processus** - Affaires - TEX - TEX Chantier - SAV

ANNULE ET REMPLACE FAQ 017

The conditions required are as follows:

- CIVIL WORKS COMPLETED
- STORAGE AREA CORRECTLY PREPARED
- SATISFACTORY CLEANLINESS
- GIS BUILDING EQUIPPED (when the equipment is indoor)
- SITE FACILITIES AVAILABLE FOR OUTDOOR ERECTION
- ERECTION MEANS AVAILABLE ON SITE

H*Les conditions requises sont les suivantes :*

- GENIE CIVIL TERMINE
- ZONE DE STOCKAGE CORRECTEMENT AMENAGEE
- PROPRETE SATISFAISANTE
- BATIMENT EQUIPE (dans le cas de poste intérieur)
- SITE POUR LE MONTAGE EXTERIEUR EQUIPE
- MOYENS DE MONTAGE DISPONIBLES SUR PLACE

H**H***** : In this instruction the wording "GIS" stands for all gas insulated equipment such as GIS, GIB, Module,...***** : Dans cette instruction le terme "Poste à isolation gazeuse" représente tout type d'équipement à isolation gazeuse tels que poste, liaison, module, ...**

Repère

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							Appr. F. BORDENAVE	N° FAQ 011

1 - CIVIL WORKS COMPLETED

H

The completed civil works are checked by a GIS factory representative before any erection work is begun on the GIS.

- Reference documents:

- Civil works guide drawing of the contract.
- Specification F401404 - hole anchoring - or specification F401407 - across anchoring (in the case of GIS installed on Halfen rails).

No civil works or other activities producing dust are allowed during GIS erection, in the building for indoor GIS, or in an area near the working zone for the outdoor GIS.

GENIE-CIVIL TERMINE

Le génie civil terminé fait l'objet d'une vérification par le représentant constructeur avant tous travaux de montage du poste.

- Documents de référence :

- Plan guide de génie civil de l'affaire.
- Spécification F401403 - ancrages borgnes - ou spécification F401406 - ancrages traversants (dans le cas de poste monté sur fers Halfen).

Aucune activité de génie civil ou autre activité génératrice de poussière n'est admise durant le montage du poste, dans le bâtiment en cas de poste intérieur, ou dans la zone proche des travaux pour les parties extérieures.

2 - STORAGE AREA CORRECTLY PREPARED

Equipment waiting to be erected and that may be stored outdoors should be stored in consolidated areas that are protected from flooding and impacts and are accessible to lifting and handling equipment under any weather conditions.

ZONE DE STOCKAGE CORRECTEMENT AMENAGEE

Le matériel en attente de montage et pouvant être stocké à l'extérieur doit être stocké sur des aires stabilisées, non inondables, à l'abri des chocs et accessibles par tout temps aux engins de levage et de manutention.

H

3 - CLEANLINESS OF THE GIS ERECTION AREAS

The installation of GIS must be performed with protection from all types of pollution, so as to avoid the penetration of particles harmful to the dielectric withstand of the equipment. Openings in the building, if any, must be closed.

Temporary protections against dust, rain, ..., must be provided, if required, for the outdoor erection works.

Repère

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ASSURANCE QUALITE

T&D

GAS INSULATED SUBSTATIONS

Etablissement d'Aix-les-Bains



H

PROPRETE DES ZONES DE MONTAGE DU POSTE A ISOLATION GAZEUSE

L'installation d'un poste à isolation gazeuse doit être effectuée à l'abri de toute sorte de pollution, afin d'éviter la pénétration de particules nuisibles à la tenue diélectrique du matériel.

Les ouvertures du bâtiment doivent être obturées.

Des protections provisoires contre la poussière, la pluie, ... , doivent être fournies, si nécessaire, pour les opérations de montage à l'extérieur.

H

4 - BUILDING EQUIPPED (when the equipment is indoor)

The building where the GIS is to be installed must be equipped with the necessary means for assembly and tests:

- lighting installed
- handling equipment operational — TBE M.
- doors, windows installed
- necessary power supplies available.

H

BATIMENT EQUIPE (dans le cas de poste intérieur)

Le local d'installation du poste doit être équipé des moyens nécessaires au montage et essais :

- éclairage réalisé
- moyens de manutention opérationnels
- portes, fenêtres posées
- alimentations électriques BT requises disponibles.

H

5 - SITE FACILITIES AVAILABLE FOR OUTDOOR ERECTION

The area where GIS is to be installed must be equipped with the necessary means for assembly and tests:

- access road for crane and forklift available, — TBE M
- pre-assembly workshop, if required, available,
- necessary power supplies available,
- temporary protections, if required, available.
- diversion planned, when erection works have to be done over a road.

SITE POUR LE MONTAGE EXTERIEUR EQUIPE

Le site d'installation du poste doit être équipé des moyens nécessaires au montage et essais :

- route d'accès pour grue et chariot élévateur,
- local de pré-assemblage disponible (si nécessaire),
- alimentations électriques BT requises disponibles,
- protections provisoires, si nécessaires, disponibles,
- déviation prévue, lorsque des travaux de montage sont à faire au-dessus d'une route.

6 - ERECTION MEANS AVAILABLE ON SITE

All tools and other equipment required for erection must be available on site.

MOYENS DE MONTAGE DISPONIBLES SUR PLACE

Les outillages et autres équipements nécessaires au montage doivent être sur place.

Repère

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ASSURANCE QUALITE

T&D

GAS INSULATED SUBSTATIONS

Etablissement d'Aix-les-Bains



The GIS factory representative must ensure that the above conditions have been met before starting the erection on site.

H

A report of the actual conditions is established jointly with the GIS factory representative, the Client's representative, and the representative of the Company in charge of erection. Their observations are recorded in the document "State of site before beginning GIS assembly" attached in the Appendix.

The GIS factory representative gives the authorisation to begin work if the required conditions have been met.

If not, he specifies the measures that must be taken by the Client or the Company in charge of erection before erection can be authorised. The Client or the Contractor specifies the time required to perform these corrective actions.

During the work, the cleanliness conditions required must be maintained. The GIS factory representative may suspend the work if these conditions are unsatisfactory. If such is the case, the GIS factory representative submits a written request for the suspension of work to the Client and the Contractor, specifying the corrective actions required. The authorisation to resume work will only be given once the required cleanliness conditions have been restored.

The report on the opening conditions at the site is signed by the GIS factory representative, the Client's representative, and the representative of the Contractor in charge of erection works.

- 1 copy is handed over to the representative of the Client and the one of the erection Contractor.
- 1 copy is included in the dossier of results of the at-site inspection and tests.
- 1 copy is transmitted to AREVA T&D, Gas Insulated Substations, by their representative.

H

Le représentant constructeur s'assure préalablement à l'ouverture du chantier que les conditions ci-dessus sont remplies.

Le constat des conditions réelles est effectué conjointement entre le représentant constructeur, le représentant du Client et celui de l'Entreprise responsable du montage. Il est consigné dans le document "Etat des lieux avant ouverture du chantier de montage du poste " en annexe.

H

Le représentant constructeur autorise le démarrage des travaux si les conditions requises sont remplies.

Dans le cas contraire il précise les mesures à prendre par le Client ou l'Entreprise de montage avant que ne soit autorisé le début de montage. Le Client ou l'Entrepreneur précise le délai de corrections.

Durant les travaux les conditions de propreté requises doivent être impérativement maintenues. Le représentant constructeur peut interrompre les travaux de montage si ces conditions n'étaient pas satisfaisantes. Dans ce cas une demande de suspension des travaux serait alors faite par écrit par le représentant constructeur, adressée au Client et à l'Entrepreneur en précisant la nature des corrections à apporter. L'autorisation de reprise des travaux ne serait donnée qu'après restauration des conditions de propreté nécessaires.

Le constat des conditions d'ouverture du chantier est signé par le représentant constructeur, celui du Client et celui de l'Entreprise de montage.

- 1 copie est remise au représentant du Client et à celui de l'Entreprise de montage.
- 1 copie est incluse au dossier des résultats de contrôle et d'essais sur site.
- 1 copie est transmise à AREVA T&D Aix-les-Bains par son représentant.


H

Annexe : "Etat des lieux avant ouverture du chantier de montage du poste ".

Appendix: "State of site before beginning GIS erection"

Repère

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	SITE INSPECTION RECORD RAPPORT DE CONTRÔLE SUR SITE	Client: #REF! Customer: #REF!
	STATE OF SITE BEFORE BEGINNING GIS ERECTION ACCORDING TO FAQ 011 ETAT DES LIEUX AVANT OUVERTURE DU CHANTIER DE MONTAGE SUIVANT FAQ 011	Poste: #REF! Substation: #REF! BHT N° : #REF!

Layout drawing:
Plan d'implantation

Erection Contractor:
Installateur

Civil works guide drawing:
Plan guide génie-civil

Mr.

GIS factory representing
représentant constructeur

Mr.

representing the Client
représentant le Client

Mr.

representing the erection Contractor
représentant l'Installateur

constatent la situation suivante :

report the following conditions:

CHECKS PERFORMED/VERIFICATIONS EFFECTUEES

REMARKS/REMARQUES

1 - CIVIL WORKS
GENIE-CIVIL

1.1 - Reference pins at correct position
Présence et position des pions de référence

☐

1.2 - Carry out a flatness survey of the
GIS slab and outdoor foundations
Faire un relevé de la planéité de la dalle et des
massifs en béton

☐

1.3 - Location and dimensions of openings for:
Position et dimensions des ouvertures pour

- Passage of the GIB
Passage des liaisons blindées

☐

- Passage of high voltage cables
Passage des câbles HT

☐

- Passage of low voltage cables
Passage des câbles BT

☐


1.4 - Location of civil works expansion joints
Position des joints de dilatation du génie civil

☐


1.5 - Location and dimensions of cable trenches for
L.V cables, HV cables and HV SF6 busducts.
Position et dimensions des caniveaux pour câbles BT,
câbles HT et liaisons SF6 HT.

☐

FAQ 011/H Annexe

	RAPPORT DE CONTRÔLE SUR SITE - POSTE SITE INSPECTION RECORD	Client: #REF! Customer: #REF!
	CONTRÔLE DU GENIE CIVIL INSPECTION OF CIVIL ENGINEERING WORK	Poste: #REF! Substation: #REF! BHT N° : #REF!

CHECKS PERFORMED/VERIFICATIONS EFFECTUEES	REMARKS/REMARQUES
1.6 - Location of connecting points to earthing grid <input type="checkbox"/> <i>Position des points de raccordement au réseau général de terre</i>	
1.7- Installation of anchor rods, if Halfen rails not installed (if applicable) <input type="checkbox"/> <i>Implantation des tiges d'ancrage si rails Halfen non installés (si applicable)</i>	
1.8 - Location and level of Halfen rails (if applicable) <input type="checkbox"/> <i>Position et niveau des rails Halfen (si applicable)</i>	
1.9 - Prestressed anchoring rods for circuit-breakers (if applicable) <ul style="list-style-type: none"> - Proper seating of the distribution plates <input type="checkbox"/> - Locking (weld point) of the nuts of the Halfen rails <input type="checkbox"/> - Tightening torque <input type="checkbox"/> <i>Tiges d'ancrage précontraintes pour disjoncteurs (si applicable)</i> <ul style="list-style-type: none"> - Surface d'appui des plaques de réparation - Pointage des écrous de platine support rail Halfen - Couple de serrage 	
1.10 Location, dimensions and level of foundations for transformers, overhead bushings, surge arresters and switchgear supports. <input type="checkbox"/> <i>Position, dimensions et niveaux des massifs pour transformateurs, traversées aériennes, parafoudres et liaisons blindées.</i>	

	RAPPORT DE CONTRÔLE SUR SITE - POSTE SITE INSPECTION RECORD	Client: #REF! Customer:
	CONTRÔLE DU GENIE CIVIL INSPECTION OF CIVIL ENGINEERING WORK	Poste: #REF! Substation: BHT N° : #REF!

CHECKS PERFORMED/VERIFICATIONS EFFECTUEES	REMARKS/REMARQUES
2- STORAGE AREA ZONE DE STOCKAGE	
2.1 - Consolidated areas, protected from flooding and impacts and accessible to lifting and handling equipments under any weather conditions <input type="checkbox"/> <i>Zones stabilisées, non inondables, à l'abri des chocs et accessibles aux engins de levage et manutention par tout temps</i>	
2.2 - Site security <input type="checkbox"/> <i>Gardiennage</i>	
3- CLEANLINESS PROPRETE	
3.1 - Erection areas cleared by contractors <input type="checkbox"/> <i>Zone de montage rendue libre par les entreprises</i>	
3.2 - Anti-dust treatment on floors <input type="checkbox"/> <i>Traitement anti-poussière des sols</i>	
3.3 - Thorough cleaning and dusting of floors, foundations, walls, partitions, Halfen rails and travelling crane <input type="checkbox"/> <i>Nettoyage et dépoussiérage complet des sols, massifs, murs, cloisons, rails Halfen et pont roulant</i>	
4 - GIS ROOM EQUIPMENT AMENAGEMENT DU LOCAL	
4.1 - Lighting installed <input type="checkbox"/> <i>Eclairage réalisé</i>	
4.2 - Handling equipment operational <input type="checkbox"/> <i>Moyens de manutention opérationnels</i>	
4.3 - Doors, windows installed <input type="checkbox"/> <i>Portes, fenêtres posées</i>	
4.4 - Necessary power supplies available <input type="checkbox"/> <i>Alimentations électriques BT requises disponibles</i>	
5- CHECK OF THE SITE FACILITIES VERIFICATION DE L'EQUIPEMENT DU SITE	
5.1 - Necessary power supplies available <input type="checkbox"/> <i>Alimentations électriques BT requises disponibles</i>	
5.2 - Access road for crane and forklift available. <input type="checkbox"/> <i>Route d'accès pour grue et chariot élévateur disponible.</i>	
5.3 - Preassembly workshop available. <input type="checkbox"/> <i>Local de préassemblage disponible.</i>	



RAPPORT DE CONTRÔLE SUR SITE - POSTE
SITE INSPECTION RECORD

CONTRÔLE DU GENIE CIVIL
INSPECTION OF CIVIL ENGINEERING WORK

Client: #REF!
 Customer:

Poste: #REF!
 Substation:

BHT N° : #REF!

CHECKS PERFORMED/VERIFICATIONS EFFECTUEES

REMARKS/REMARQUES

6- ERECTION MEANS
MOYENS DE MONTAGE

6.1 - Means on site according to the list ☐
recommended by GIS manufacturer
Moyens de chantier recommandés par le fabricant

6-2 - General erection tools according to the list ☐
recommended by GIS manufacturer
Outillages généraux de montage recommandés par le fabricant

6-3 - Specific erection tools according to ☐
GIS manufacturer's list
Outillages spécifiques de montage selon liste du fabricant



RAPPORT DE CONTRÔLE SUR SITE - POSTE
SITE INSPECTION RECORD

Client: #REF!
Customer:

CONTRÔLE DU GENIE CIVIL
INSPECTION OF CIVIL ENGINEERING WORK

Poste: #REF!
Substation:
BHT N° : #REF!

The GIS factory representative
Le représentant Constructeur

- **authorises the starting of the erection**
autorise l'ouverture du chantier

☐

- **authorises the starting of the erection with the following reservations:**
item numbers of above check-list:

☐

others:

autorise l'ouverture du chantier avec les réserves suivantes :
numéro des points de la check-list ci-dessus :

autres :

- **does not authorise the starting of the erection as long as the conditions mentioned on the following page are not met:**
n'autorise pas l'ouverture du chantier tant que les conditions mentionnées dans le document page suivante ne sont pas remplies

☐

Signature of GIS factory representative:
Signature du représentant Constructeur


date:

Signature of CLIENT representative:
Signature du représentant du CLIENT

date:

Signature of Contractor representative:
Signature du représentant de l'Installateur

date:

	RAPPORT DE CONTRÔLE SUR SITE - POSTE SITE INSPECTION RECORD	Client: #REF! Customer: #REF!
	CONTRÔLE DU GENIE CIVIL INSPECTION OF CIVIL ENGINEERING WORK	Poste: #REF! Substation: #REF! BHT N° : #REF!

SUSPENSION OF GIS ERECTION WORKS

SUSPENSION DE TRAVAUX DE MONTAGE DU POSTE

Request of suspension of following erection works:
Demande de suspension des travaux de montage suivants

as long as the following conditions are not met:
tant que les conditions ci-après ne sont pas remplies

Date: **Visa of GIS factory Representative:**
Visa du Représentant Constructeur

Corrective actions taken and anticipated completion dates:
Actions correctives entreprises et dates prévisionnelles d'achèvement

Date: **Visa of Erection Contractor or client Representative:**
Visa du Représentant de l'Entreprise ou du Client

Authorisation of resumption of following erection works:
Autorisation de reprise des travaux suivants

Date: **Visa of GIS factory Representative:**
Visa du Représentant Constructeur