सब पत्र - व्यवहार महाप्रबंधक के नाम करें किसी अधिकारी के नाम पर नहीं /All correspondence should be addressed to the General Manager and not to any officer by name.

भारत सरकार, रक्षा मंत्रालय
भारतीय आयुध निर्माणियाँ
राइफल फैक्टरी ईशापुर
ईच्छापुर-नवाबगंज,
उत्तर 24 परगना
प. बंगाल – 743144
GOVERNMENT OF INDIA
MINISTRY OF DEFENCE
INDIAN ORDNANCE FACTORIES
RIFLE FACTORY ISHAPORE
ICHAPUR-NAWABGANJ
NORTH 24 PARGANAS
WEST BENGAL-743144.

150 YEARS OF CELEBRATING THE MAHATMA

NOTICE INVITING EXPRESSION OF INTEREST

NIEOI No.6725/4/EOI/01/2018-19 Date:01.11.2018

The General Manager, Rifle Factory Ishapore. On behalf of the President of India, invites EXPRESSION OF INTEREST for submission of technical offers with detailed technical specification to provide high quality chrome plating on Barrel bore from reputed, well experienced firms/companies for:

Automatic Chromium Plating Plant with ETP

ABOUT RIFLE FACTORY ISHAPORE:

Rifle Factory Ishapore is manufacturing various Small Arms for Indian Forces and is one of the chain of 41 Ordnance Factories under Ordnance Factories Board, Ministry of Defence. The Factory is located in Ishapore, 24 Parganas (N) District, State of West Bengal. The Factory is a ISO 9001:2015, ISO 14001:2015, IS 18001-2007, ISO 50001-2011 & NABL Standard (ISO/IEC 17025:2005) Unit.

PROPOSAL:

The proposed plant is required to be supplied, installed & commissioning for high quality chrome plating on Barrel bore as required at Rifle Factory Ishapore.

SCOPE:

The work includes comprehensive proposal for supply, Installation & Commissioning of Automatic Chromium Plating Plant with ETP with required accessories confirming to latest Global Practices on Trunkey basis. Requirement of power & water supply may clearly be specified in the proposal to maintain ISO 14001 Norms.

ELIGIBILITY CRITERIA FOR SUBMISSION OF PROPOSALS:

1) The firm should be Original Equipment Manufacturer with experience of design, fabrication, erection & commissioning of Automatic Chromium Plating Plant with ETP
2) The firm must have executed at least one similar plant during last 05 years.

This is not a tender advertisement. This invitation of Expression of Interest is without any commitment at this stage.

After scrutiny of all the proposals received, Rifle Factory Ishapore will firm up the final specification of the plant and thereafter tender notice will be issued.

Last date for receiving the Expression of Interest is 15.12.2018.

Any further data required can be obtained from the following address:
Website: rfi.nic.in [Home → Vendor Desk]
The Works Manager/Engineering Office
Phone No. 033-2593-7133 FAX No. 033-2593-7200
Email: enggofficerfi.ofb@gov.in

Cl. No.	TECHNICAL SPECIFICATION OF CHROMIUM PLATING PLANT WITH ETP FOR BARREL BORE	
1.0	**Objective :**	
1.1	The objective of this Specification is to guide the vendor in submitting a quotation which will fulfil all the technical / commercial requirements of the Purchaser.	
1.2	This Specification will also act as conditions of supply for all such technical / other aspects about which the vendor remains silent in his quotation.	
2.0	**Intended Purpose of the Machines :**	
2.1	01 No.Automatic Chromium plating Plant with Effluent Treatment Plant and essential, standard accessories & spares.To provide high quality plating on Barrel Bores.	
2.2	**Components Nomenclature & Drg. No.**	**Operation Required**
2.2.1	RIFLE 5.56m EXCALIBUR MK.1 BARREL RIFLE(COLD FORGED) & Drg no. RFI/SK.7478/1	Hard Chromium Plating on Barrel Bore (25 µm to 50 µm)
2.2.2	7.62 barrel bore of assault rifle GHAATAK & Drg no.AR/02/2-RFI.	Hard Chromium Plating on Barrel Bore (25 µm to 50 µm)
2.2.3	12 Bore pump action barrel bore & Drg no. PAG-0008A	Chromium Plating on Barrel Bore (10 µm to 15 µm)
2.2.4	LONG SIGHT RADIUS .30-06" SPORTING RIFLE &Drg.No. TSP-	Chromium Plating on Barrel Bore (10 µm to 15 µm)
2.2.5	7.62x51mm SNIPER RIFLE & Drg.SNP-001/1	Chromium Plating on Barrel Bore (3 µm to 5 µm)
3.0	**Scope of Contract :**	
3.1	Design, manufacture & supply of the equipment as specified.	
3.2	The equipment should complete in all respect like all fittings,fixtures and standard accessories which are required for complete and safe operation with smooth maintenance (even if not specified in this specification) and desired / specified level of performance without any extra payment.The firm shall be responsible for working of the same at site.	
3.3	To ensure completeness of supply, vendor should include in the scope of supply, all auxiliary items like pipings, interconnecting cables, initial filling of chemicals of full tank capacity with such other items which are necessary for satisfactory running of plant, if not included in this specification.	
3.4	Necessary access ladder and maintenance platform as suitable for this kind of plating system to be provided/fabricated.	
3.5	Quality and strength of material used in manufacturing the machine should be as per applicable code of practice and regulation. Vendor must confirm this aspect in the offer.	
4.0	**Technical specification of Chromium Plating Plant for Barrel Bore.**	
4.1	**TANK LAYOUT FOR CHROMIUM PLATING:**	
4.1.1	**HOT WATER RINSE - 2 Nos.**	i) Internal Dimension - (LxBxH) 1400 mm x 1000 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Heater-3 nos. of 3KW Stainless steel Heaters-1200 mm long. iv) Digital Temperature indicating Controller with sensor. v) 40 mm thick Glass wool insulator all around. vi) Cast iron Vee Block- 4 pair . vii)Drain outlet with Stainless Steel type- AISI-304 valves size-50 mm. viii) Water inlet with AISI-304 Stainless Steel control and non-return valve,size-50 mm. ix) Overflow chamber with outlet. x) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel non-return & control valve size-20 mm.
4.1.2	**WATER RINSE(SWILL)**	i) Internal Dimension - (LxBxH) 1200 mm x 700 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Water inlet and outlet with AISI-304 Stainless Steel valve, size-20mm. iv) Cast iron Vee Block- 2 pair . v) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & Non-return valve, size-20mm.

		vi) AISI-304 Stainless Stee Drain valve,-Size 50 mm.
4.1.3	**CHROME STRIPPING:**	i) Internal Dimension - (LxBxH) 1200 mm x 700 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Lip exhaust duct- 3mm PVC ,coated with 2mm FRP. iv) Drain valve-Size 50 mm, Material Polypropylene. v) Vee Block, Copper Alloy-2 pair. vi) PVC Air agitation Coil -Size 20mm dia. ,2mm thick with PP non-return valve and control valve. vii) Stainless Steel,type AISI-304, Water inlet and outlet valves-Size 25mm. viii) One suitable rectifier on 12V x 300 amp. is to be properly connected.
4.1.4	**ANODIC CLEANING**	i) Internal Dimension - (LxBxH) 1400 mm x 1100 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Heater-3 nos. of 3KW Stainless steel Heater 1200 mm long. iv) Digital Temperature indicating Controller with sensors. v) 40 mm thick Glass wool insulation all around. vi) Copper Alloy Vee Block, -4 pair. vii) Lip exhaust duct of 3mm PVC, coated with 2mm Fiber-glass with re-enforcement. viii) AISI-304 Stainless Steel Drain valve, Size-50mm. ix) Water inlet with AISI-304 Stainless Steel valve, size- 20mm. x) Outlet Scum Chamber. xi) Rectifier- 300 amp x 12V- 1 no.Rectifier duly connected with Vee Blocks.
4.1.5	**CASCADE RINSE**	i) Internal Dimension - (LxBxH) 2400 mm x 2100 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced . iii) Water inlet and outlet with AISI-304 Stainless Steel valve, size-20mm. iv) Overflow chamber: Partition with outlet. v) Cast iron Vee Block- 4 pair . vi) Overflow cum Scum partition with outlet. vii) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel non-return & control valve size-20mm. viii) Drain valve of PP-Size 50 mm.
4.1.6	**WATER RINSE(SWILL)**	i) Internal Dimension - (LxBxH) 1200 mm x 700 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Water inlet and outlet with AISI-304 Stainless Steel valve, size-20mm. iv) Cast iron Vee Block- 2 pair . v) Overflow cum Scum Portion with outlet. v) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & Non-return valves, size-20mm. vi) AISI-304 Stainless Stee Drain valve,-Size 50 mm. vii) Drain valve of PP-Size 50 mm.
4.1.7	**CHROME NUTRALISATION**	i) Internal Dimension - (LxBxH) 1200 mm x 1000 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Water inlet and outlet with AISI-304 Stainless Steel valve, size-20mm. iv) Cast iron Vee Block- 4 pair . v) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & Non-return valve, size-20mm vi)Drain valve of PP-Size 50 mm.
4.1.8	**NUTRALISATION**	i) Internal Dimension - (LxBxH) 1200 mm x 1000 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Water inlet and outlet with AISI-304 Stainless Steel valve, size-20mm. iv) Cast iron Vee Block- 4 pair . v) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & Non-return valve, size-20mm. vi) Drain valve of PP-Size 50 mm.
4.1.9	**DRAG OUT**	i) Internal Dimension - (LxBxH) 1200 mm x 1000 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Water inlet and outlet with AISI-304 Stainless Steel valve, size-20mm. iv) Cast iron Vee Block- 4 pair . v)AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & Non-return valve, size-20mm.

		vi) Drain valve of PP-Size 50 mm.
4.1.10	**ETCHING**	i) Internal Dimension - (LxBxH) 1400 mm x 1000 mm x 1200 mm with 150 mm flange. ii) Material-5 mm Mild Steel suitably re-enforcement and lined internally with 3mm PVDF. iii) Heater-4 nos. of 3KW Titanium immersion heater,length-1200mm, Effective Heating Zone-750mm. iv) Digital Temperature indicating Controller with sensors. v) 50 mm thick Glass wool thermal insulation all around. vi)Copper Alloy V-Block -4 pair. vii) Lip exhaust duct of 3mm PVC,coated with 2mm FRP. viii) PVC Air agitation Coil with PVC control and non-return valves, Size 20mm. ix) Rectifier- 500 amp - 2Nos.. Rectifier duly connected to the Vee Blocks.
4.1.11	**CHROME PLATING TANKS- 3 Nos.**	i) Each Tank Internal Dimension- (LxBxH) 2800 x 1400 mm x 1200mm with 150 mm flange. ii) Material-5 mm Mild Steel suitably re-enforcement and lined internally with 3mm PVDF, 50mm thick Glass wool thermal insulation all around. iii) Heater-5 nos. of 3KW Titanium immersion Heaters, length 1200 mm long, Effective Heating Zone - 750 mm. iv) Digital Temperature indicating Controller with sensor. v) PVDF Cooling coil with solenoid valve. vi) Lip exhaust duct of 3mm PVC, coated with 2mm FRP on 2 sides. vii) Copper Alloy Vee Blocks-10 pair (8 pairs for plating & 2 pair for re-generation as dummy station) on each tank. viii) PVC Air agitation Coil with PVC control and non-return valves, Size 20mm dia. ix) 12V x 250 amp. Rectifier for re-generation as dummy station(one in each tank)- 3 Nos. x) 12 Nos. of 12V x 500 amp Rectifiers(2 nos. in each station. Total 4nos. In each tank.) xi) 100 Lts/min. capacity Teflon body self priming for pumping hot chrome solution with inlet and outlet flexible PVC tube - 6 sets of inlet and outlet pipe of length 10 meter.
4.2	**TANK LAYOUT FOR ELECTRO POLISHING :**	
4.2.1	**ANODIC CLEANING**	i) Internal Dimension - (LxBxH) 1400 mm x800 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Heater-3 nos. of 3KW Stainless steel Heater length 1200 mm. iv) Digital Temperature indicating Controller with sensor. v) 40 mm thick Glass wool insulator all around. vi) V-Block, Copper Alloy-2 pair. vii) Lip exhaust duct- 3mm PVC, coated with 2mm Fiber-glass with re-enforcement. viii) AISI-304 Stainless Steel Drain valve, Size-50mm ix) Water inlet with AISI-304 Stainless Steel valve, size- 20mm. x) Outlet Scum Chamber. xi) Rectifier- 300 amp x 12V- 1 no.Rectifier duly connected with Vee Blocks.
4.2.2	**WATER RINSE(SWILL)**	i) Internal Dimension - (LxBxH) 1200 mm x 1500 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Water inlet and outlet valves. iv) Cast iron Vee Block- 2 pair . v) Overflow cum Scum partition with outlet. vi) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & non-return valve size-20mm. vii) Drain valve of PP-Size 50 mm.
4.2.3	**HOT RINSE - 02 Nos.**	i) Internal Dimension - (LxBxH) 1400 mm x 700 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Heater-3 nos. of 3KW Stainless steel Heaters-1200 mm long. iv) Digital Temperature indicating Controller with sensor. v)40 mm thick Glass wool insulation all around. vi) Cast iron Vee Block- 2 pair .

		vii) Drain outlet with Stainless Steel valve size-50 mm. viii) Water inlet with AISI-304 Stainless Steel control and non-return valve, size-20mm . ix) Overflow chamber with outlet. x) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel non-return & control valve size-20mm.
4.2.4	**ELECTRO POLISH**	i) Internal Dimension - (LxBxH) 1400 mm x 800 mm x 1200 mm with 150 mm flange. ii) Material-5mm thick Stainless Steel, type AISI-316L. iii)Heater- 3 nos. of 3 KW Fused Silica Heater, Size-1200 mm long (750 mm working length). iv) Digital Temperature indicating Controller with sensors covered with glass tube. v) 50 mm thick Glass wool thermal insulation all around. vi) AISI-304 Stainless Steel Air agitation coil with AISI-304 Stainless Steel control & non-return valve size-20mm. .vii) Copper Alloy Vee Blocks,-2 pair viii) Lip exhaust duct of 3mm PVC coated with 2mm FRP. ix) 12 Volt / 300 Amp. Rectifier suitably connected with Vee blocks.
4.2.5	**CHROME PASSIVATION**	i) Internal Dimension - (LxBxH) 1400 mm x 700 mm x 1200 mm with 150 mm flange. ii) Material-4mm Stainless Steel type AISI-304, suitably re-enforced. iii) Heater-3 nos. of 4KW Stainless steel Heater,Size- 1200 mm long (750mm working length). iv) Digital Temperature indicating Controller with sensor. v) 40 mm thick Glass wool insulator all around. vi) Cast iron Vee Block- 2 pair . vii)AISI-304 Stainless Steel Drain valve, size- 50 mm. viii) Water inlet and outlet with AISI-304 Stainless Steel valve, size- 20 mm.
5.0	**HARD CHROMIUM PLATING PROCESS SEQUENCE**	
5.1	**ELECTRO POLISH PROCESS SEQUENCE:**	
5.1.1	**LOADING**	
5.1.2	**UN-LOADING**	
5.1.3	**ANODIC CLEANING**	
5.1.4	**RINSE**	
5.1.5	**ELECTRO POLISH**	
5.1.6	**HOT RINSE**	
5.1.7	**CHROME PASSIVATION**	
5.1.8	**HOT RINSE**	
5.2	**CHROMIUM PLATING PROCESS SEQUENCE**	
5.2.1	**LOADING**	
5.2.2	**UN-LOADING**	
5.2.3	**RINSE**	
5.2.4	**CHROME STRIPPING**	
5.2.5	**ANODIC CLEANING**	
5.2.6	**CASCADE RINSE**	
5.2.7	**NEUTRALISATION**	
5.2.8	**DRAG OUT**	
5.2.9	**ETCHING**	
5.2.10	**CHROMIUM PLATING**	
5.2.11	**CHROME NEUTRALISATION**	
5.2.12	**RINSING**	
5.2.13	**HOT RINSE**	
6.0	**ADDITIONAL EQUIPMENTS:**	
6.1	**AIR AGITATION UNITS:**	Two nos. of regenerating Air Agitation Units, having Oil free delivery capacity 160 c.f.m at TURBO BLOWER type.
6.2	**CENTRIFUGAL EXHAUST FAN FOR**	Impeller Casting- Mild steel, internal coating with FRP and externally painted with epoxy.

	CHROME FUME	Shaft &Impeller - Stainless Steel Type - AISI -316, Dynamically balanced. Capacity -7500 c.m.f. - 1 Nos.
6.3	**CENTRIFUGAL EXHAUST FAN For CHROME STRIPING, ELECTRO CLEANING AND ELECTRO POLISH**	Impeller Casting- Mild steel, internal coating with FRP and externally painted with epoxy. Shaft &Impeller - Stainless Steel Type - AISI -316, Dynamically balanced. Capacity -3000 c.m.f. - 1 Nos.
6..4	**FUME TREATMENT DEVICE - 1 NO.**	Type -Twin Tower Capacity - 7500 c.f.m Extraction system having construction of poly glass, re-enforced with FRP or 10mm polypropylene having following features: i)Column of pall rings ii)Mist eliminator iii)Spray pipes iv)Water wash tanks v)Level controller vi)Spray pump
7.0	**MATERIAL HANDLING SYSTEM :**	
7.1	**TRANSPORT STRUCTURE**	Skid mounted transport structure to be fabricated from steel rolled section. The transport structure shall comprise of :- i)Column and cross beams of sections. ii)Gantry Girders. iii)Suspenders and bracings. iv)Cable track for cable trolleys. v)Guide angles for transport wagon and for trolleys. vii)And Reinforcement of angles and channels. The complete transport structure will be painted with epoxy.
7.2	**TRANSPORT WAGAN - 2Nos.**	i)The heavy duty transport wagon fabricated from rolled steel section, covered with steel and painted with epoxy. ii)The wagon will be provided with: iii)For Transvers movement : Geared motor with brake. iv)For Hoisting: Geared motor with brake. v)Proximity Switches. vi)Electric pendent with control push buttons. vii)Vulcolan wheels. viii)Safety Interlock.
7.3	**TANK SUPPORT BEAM:**	I-Section running along the length of the plant for supporting of tanks.
7.4	**CATINARY CABLE:**	12-core catinary cable along with cable trolleys and tracks for transport wagon.
7.5	**FREQUENCY INVERTOR:**	Frequency invertor for soft start and soft stop of traverse movement of the transport wagon to facilitate jerk free movement.
7.6	**RECTIFIERS**	Only copper bar shall be used. ALL coils used in rectifiers are to be copper only.
7.7	**FLIGHT BARS:**	Flight bars shall be fabricated from Copper flats and provided with lift arms and copper contact blocks.
7.8	**JIG & FIXTURE**	Total number of Jig/ Fixture shall be as under: For 5.56Barrel - 100 complete sets for chrome plating including all shunts and connectors and holders. 80 completes sets for electro plating including all shunts & connectors and holders. The firm has to supply also the following:
7.9	**HEATER**	a) S.S Heater - 3 KW - 50 Nos. - 1200 mm b) Fused Silica Heater - 3 KW - 50 Nos. - 1200 mm c) Titanium Heater - 3KW - 40 Nos. -1200 mm
7.1	**LOAD - UNLOAD SATND : - 2 NOS.**	
8.0	**EFFLUENT TREATMENT PLANT;-**	
		Centrifugal polypropylene pumps with mechanical seal - 5 Nos.

8.1	**PUMPS:**	Metering pumps for dozing of neutraliziing chemicals from storage tank to nutralizer - 4 Nos. Positive displacement pump.- 1 No.
8.2	**REACTORS:**	
8.2.1	**CHROME REDDUCER: (Continious)**	Tank designed to handle 1000 Lt/Hrs of chrome waste. Rectangular tank fabricated from 5 mm thick MS internally lined 3mm thick PVC. The Reducer will be provided with: i)pH meter with controller ii) rH meter with controller iii) Stirrer with mounting frame. iv) Mixing Hopper v) Inter line for Sodium Bisulphite. vi) Inter line for acid. vii) Drain outlet with valves. viii) Lid
8.2.2	**Acid / Alkali NEUTRALIZER:**	Tank shall be designed to handle approx. 2000 Lts/ Hr. of Acid/Alkali Waste. Tank fabricated from 5mm thick mild steel and internally lined with 3mm thick rubber. The Neutralizer shall be provided with: i) pH meter with controller. ii)rH meter with controller. ii)Stirrer with mounting frame. ii) Mixing Hopper. iv) Inter line for Sodium Bisulphite. v) Inter line for acid. vi) Drain outlet with valves. vii) Lid.
8.2.3	**CLARIFIER:**	Lamella type clarifier fabricated from 5mm thick mild steel , internally coated with polyurethane paint & externally coated with epoxy paint designed to continuously handie maximum of 2 sq. m per hour of treated waste for separation of suspended solids. The Clarifier will be provided with: a) Inlet Weir b) Overflow Weir c) Collection cone for sludge. d) Corrugated baffles of molded fiber glass. e) Drain outlet with gate-valves- 2 Nos.
8.2.4	**FILTER PRESS:**	Recess filter press made from molded polypropylene plate of approximate size 600 mm x 600 mm. Complete with inlet socket. filter cloth & discharge tray. Filter press shall be provided manual closer.
8.2.5	**NEUTRALIZING CHEMICAL STORAGE TANK:**	Cylindrical storage tanks of approximate volume 500 liters; one for, i)Sodium Bisulphate - with stirrer ii)Sodium hydroxide - with stirrer iii)Flocculating acid - with stirrer iv)Hydrochloric Acid - without stirrer Tank shall be provided with: i) rain outlet with valve. ii) Lid and feed hopper iii) Water inlet with valve.
8.2.6	**LEVEL CONTROLLER**	Level controller for underground collection tanks.
8.2.7	**CENTRALIZER CONTROL PANEL:**	Cabinet fabricated from 2mm thick mild steel sheet duly powder to house the entire switch fuse units such as starters for motor, pH meter, indicating controllers, ON/OFF switch indicating lamps etc. for the equipments covered under scope of supply.

9.0	**SERVICES:**	
9.1	**PIPE LINE**:	Separate pipe lines for air, water waste, waste water, rinse, waste concentrates connecting ETP and covering whole plant will be proper colour coding.
9.2	**POWER CABLING:**	The complete power cabling with copper core from control panel various equipments.
9.3	**EXHAUST DUCTING:**	Exhaust Ducting shall be fabricated from 3mm thick PVC, externally reinforced with 2mm thick FRP. The ducting shall generally be welded excepting wherever necessary flange point shall be provided. The ducting shall be laid in the main plant connecting lip exhaust to central exhaust duct, central exhaust to scrubber and chimney from fan to atmosphere.(Max.11 M from floor level).
9.4	**PLANT RE-GENARATION:**	One point in each chrome plating tank shall be provided with proper rectifiers for solution-regeneration.
9.5	**CENTRALIZED CONTROL PANAL:**	Cabinet fabricated from 2mm thick mind steel duly powder coated to house the entire switch fuse units such as startes, controls for automation switch gears, voltmeters, ammeters, raise flower switches for Rectifiers, contactors, all temperature indicating controls, ON/OFF switch indicating lamps, etc. for the equipments covered under scope of supply.
9.6	**STRESS RELIEVING FURNACE**	One Heavy duty air circulating stress relieving furnace of 25 KW capacity shall be provided with working dimension of 1m x 1m x 1.5m D with swing aside door, having working range of 300°C.
9.7	**AUTOMATION (PENSTECH KS-100)**	Microprocesser based controller design to control the movement of the transport wagan as per the set Programme.The Microprocessor shall be designed to perform random selection load depending upon the process requirement and the availability (i.e. as you like it facility).
10	**SAFETY MEASURE**	The plant and its accessories shall be equipped with safety devices for the protection of the operator and of the equipment. Covers , guards and other safety device shall be provided wherever necessary to protect the operator and the plant parts, in all respects.
11	**QUALITY OF MATERIAL:**	The equipment shall be manufactured and constructed in the best and most workmen like manner and with the materials of the best or of the approved qualities, for their respective uses. All the material used in the manufacture of the plant / accessories offered, shall be of the best quality and conform to the relevant Indian / International standards. The design and workmanship shall be of the highest quality so as to ensure satisfactory operation of the equipment(s) in the tropics under humid and dusty conditions. The entire equipment shall be in accordance with best modern practices, currently being followed worldwide.
12	**COMPLETENESS OF PLANT/EQUIPMENT:**	The plant shall be complete in all respect with all mountings, fittings, fixtures and standard are normally supplied even through not specifically detailed accessories which in the supply order. The contractor shall not be eligible for any payment in respect of such mountings, fittings, fixtures and accessories which are needed for safe operation of the equipment as required by the applicable code of country of manufacture and India, though they may not have been included in the contract.
13	**MACHINE COATING & PAINTING**	The plant and other equipment shall be cleaned and protected against corrosion & the chemicals. Where ever required, specific protective coating shall be given and other than that, the general painting shall be of APPLE GREEN COLOUR. Prior approval of General Manager, Rifle Factory, Ishapore will have to be obtained if the contractor intends to supply the machine painted in any colour.