

DOCUMENT TYPE:

DOCUMENT TITLE:

**GENERAL INFORMATION FOR ERECTION (G.I.E)  
PAINTING WORK**

Z	Aug.2016	MMTE	MMTE	Mohammadzadeh	GISD	-	As Built
5	Feb. 2014	Hajizadeh	Parvani	Kiomarsi	GISD	-	As Built
4	Oct. 2011	MMTE	Kalantarian	Kiomarsi	GISD	-	Issue For Construction
3	Sep. 2011	MMTE	Kalantarian	Kiomarsi	GISD	-	Issue For Construction
2	Aug. 2011	MMTE	Kalantarian	Kiomarsi	GISD	-	Issue For Approval
1	Jun. 2011	MMTE	Kalantarian	Kiomarsi	GISD	-	Issue For Information
REV.	DATE	PRE.	CHK.	APP.	Client	Description	Purpose of Issue
		CONTRACTOR					

PROJECT TITLE :

**GOHAR GISD MEGA MODULE PROJECT**

Client :





contractor:

MINES & METALS TECHNOLOGICAL  
ENGINEERING CO.



Client 'S Project	Project Code	Main Contractor	Area Code	Plant Group	Equipment Code	Document Type	Eng. Discipline	Serial No.	
GISD	7-1	119	1002	7	AA	05	P	002	
	NAME		DATE		MMTE No.			SHEET	REV.
PREPARED	MTME		Aug.2016		GGMMPG00P1300			Z	64
CHECKED	MMTE		Aug.2016						
APPROVED	Mohammadzadeh		Aug.2016		Contract No. : 90/1942				

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## Application

### Scope

This installation manual specifies the general requirements for painting work and paint repair work for building facilities, and equipments on the site of Gol e Gohar mega module plant except for special coating such as baking finish, metal spraying and plating and temporary rust proofing work.

### Applicable Standards



NISIC : National Iranian Standard Incorporation (Painting Part)  
 SIS : Svensk Standard SIS 05 59001967  
 SSPC : Steel Structure Painting Council  
 BS : British Standard  
 (BS EN ISO 8501-1:2001 \* BS 7079-A1:1989)

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## Work Range

The painting should be done on the outer surface of the following items:\*

- |     |                  |                                                                                                          |
|-----|------------------|----------------------------------------------------------------------------------------------------------|
| (1) | Towers           | outer steel plate parts                                                                                  |
| (2) | Tanks            | Floating roof type tanks, and conical<br>Roof types (fixed roof) tanks                                   |
| (3) | Heat exchangers  | flanges and frames                                                                                       |
| (4) | Heating furnaces | upright, Cylindrical, box type, stacks<br>and its periphery, and ducts<br>(Cylindrical, square)          |
| (5) | Pipings          | Bare pipings, embedded pipings,<br>coating, elbows, tees, valves, and flanges                            |
| (6) | Frame works      | frame supports, Stair landing,<br>elevating ladders, pipe racks, building iron frames,<br>belt conveyors |
| (7) | Electrical       | meter stands, switch boxes and instrument panels                                                         |
| (8) | Machineries      | pumps, motors and compressors                                                                            |



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## Painting Work Procedure

General procedures for painting work should be as follows:

**Table 1: Painting Work Procedure**

Step	Item		Remarks
1	Work plan from start to completion		Specification check, collection on work site Consideration given to weather conditions Communication and arrangement with other works Operation safety
2	Selection of paints		Compliance with painting specifications Observe handling method for each type
3	Preparations of machines, tools and consumables		Examination of sub materials
4	Temporary setting		Scaffolding, curing, material stockyard Water, power and air for construction
5	Surface preparation		Witness inspection after surface preparation
6	Paint mixing		Material inspection is included
7	Painting	Undercoat	Intermediate inspection for each layer (see each paint manual)
		Middle coat	
		Topcoat	
8	Various signs and display		
9	Inspection on completion		
10	Clearance after completion of work		

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## Work Plan

It is necessary to take into account the relationship with various works such as piping, welding, air supply, instrumentation and heat insulation, weather conditions and a substantial work plan which meets the painting requirements should be set up in advance. In planning the work, special attention should be given to the followings:

- **Checking specifications**

Work should be done in accordance with specifications and provisions of the relevant documents.



1. Surface preparation, undercoat, middle coat and topcoat, also coating film thickness sequence and finishing paint specifications should be in accordance with painting specification.
2. Applicable Painting Spec. for each line of piping should be as per given table in item No. 8.

- **Consideration given to weather conditions during execution**

Weather conditions significantly affect coating films and their status, and cause a substantial difference in workmanship and durability; therefore, general precautions in painting specification should be followed, and at the same time, special attention should be given to the following.

- (1) Outdoor painting work should not be done at the lowest temperature below 5°C in the daytime, 85% RH, and also during snowfall and frost.
  - (2) Avoid exterior painting work in rainy seasons.
  - (3) If condensation is found on the coated surface.
- Communication and arrangement with other works with the regard to the effect of other works on painting, care should be taken to prevent any trouble by ensuring close connection with such works.



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## Operation Safety

### Observing Safety and Health Control Procedure

- Painting work uses a lot of fire-hazard articles such as organic solvent and paint, and a greater part of them contain toxic components, so that due attention should be given to prevent fire and poisoning of workers. Particular care should be also given to scaffoldings.
- In the plant, there are many structures tens of meters high such as towers, tanks, heating furnaces, overhead pipings and frameworks, and also many dangerous works are involved; therefore, with due consideration given to working efficiency as well, it is essential to set up a work plan ensuring safety.
- The contractor should draft a safety and health control plan, based on the client's safety and health control procedure and to be submitted.

### Fire and Explosion Prevention

- The paint and solvent storage place should be provided with fire extinguishers. The storage place should be made of inflammable materials, and the lighting with special arrangement.
- Only the required amount of solvent should be taken out in small quantities whenever needed.
- Fire, smoking, exposed heating element or anything that may cause firing should not be used in painting area.
- Welding work or bare fire handling work should not be done in adjacent areas during painting or after painting.

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- When cleaning or painting the tank and piping which contain inflammable gas or vapor, no shock or impact should be applied thereto. Impact sparks may cause explosion or fire.
- In the paint storage place, no combustibles should be put such as waste paper, wooden chips and waste.

## Gas and Vapor Poisoning Prevention

In the painting work, numerous organic solvents and other toxic gas generating articles are used; however, these handling methods should be well understood, facilities and personnel arrangements should be considered and poisoning prevention and corrective measures against poisoning should be established, executed and controlled.



## General Precautions for Safety (See NISIC, STD. Section 2, para.8)

- When doing work in an elevated place, a life-rope should be used and special care should be given to operation safety.
- Prior to work, painter's working clothes, guard (mask, life-rope) and tools (including a ladder and stepladder) should be carefully checked to ensure that they are all right.
- To prevent paint from dropping, a proper sheet and tent should be used as needed.
- When scaffolding is required for painting work, a steel one with a buckle should be used.
- When the existing scaffolding is used, it should be checked prior to work start and supplemented as needed before use.

## Machines, Tools and Consumables

The required quantity of the following machines, tools and consumables used for painting work should be pre-arranged.

## Machines and tools

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The machines and tools used for painting work should be as specified in the table below:

**Table 2: Machine/ Tool Table**

Description	Remarks
Compressor	Dry type
Sand blast	Incl. air hose, sand hose and a set of guards
Electric sander	150mm, 100mm
Airless spray	
stirrer	

### Measuring tool



- Electromagnetic film thickness gauge
  - Pinhole detector
  - Pull up test
  - Roughness check
  - Thermometer (dry and wet)
  - Wet film thickness checker
  - Reference roughness plate
- Adhesion test

### Consumables

Main consumables used for painting work should be in accordance with the table below.

**Table 3: Consumables**

Description	Remarks
Silica sand	For sand blast
Nozzle	For sand blast
Sander stone	SIS St-3
Wire brush	SIS St-2
Scraper	SIS St-2
Brush	Tube, angle brush, bamboo brush, others
Sand paper	#40, #60, #100

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Description	Remarks
Waste cloth	
others	Mask, glass

### Storage (See NISIC, STD. Section 2, Para.2)



All paints and thinner shall be stored under covered shelter for protection from direct sunlight, rain and extremely high or low outdoor temperature. Smoking or open flames shall not be permitted within the storage areas while providing suitable fire-preventing materials.

### Selection of Paints

The quantity and type of paints should be selected in accordance with painting specification. Some paints require wet-on-wet coating, and others do not; a proper paint should be selected with care to avoid any mistake. (See the attached 2)



### Color and Spec. Numbers (See NISIC STD., Section 2, Para. 9)

The color should be as per RAL 840 HR code table.



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**Table 4: Color Table**



NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
MECHANICAL AND EQUIPMENT			
Direct Reduction Furnace Shell	No. 4	7001	Silver Grey
Water Return Tank Outside	No. 1	6021	Light Grey Green
Water Return Tank Inside	No. 1	6021	Light Grey Green
Reformer Box	No. 5	7001	Silver Grey
Reformed Gas Cooler Shell	No. 2	6021	Light Grey Green
Process Gas Comp. First Stage	No. 2	6021	Light Grey Green
Process Gas Comp. First Stage Discharge Silencer	No.2	6021	Light Grey Green
Process Gas Comp. Second Stage	No. 2	6021	Light Grey Green
Process Gas Comp. Second Stage Discharge Silencer	No. 2	6021	Light Grey Green
Process Gas Mixer	No. 5	1021	Rape Yellow
Process Gas Mist Eliminator	No. 2	6021	Light Grey Green
Cooling Gas Scrubber Shell	No. 2	6021	Light Grey Green
Cooling Gas Compressor	No. 2	6021	Light Grey Green
Cooling Gas Compressor Discharge Silencer	No. 2	6021	Light Grey Green
Personnel Lift For Shaft Furnace Lift Tower	No. 2	6021	Light Grey Green
	See M.S.*	See M.S.*	
Main Air Blower	No. 2	6021	Light Grey Green
Recuperator Shell	No. 5	9006	White aluminum
Fuel Gas Mixer	No. 5	1021	Rape Yellow
Main Burner A	No. 5	9006	White aluminum
Main Burner B	No. 5	9006	White aluminum
Auxiliary Air Blower	No. 2	6021	Light Grey Green
Auxiliary Burner	No. 5	9006	White aluminum
Dilution Air Blower	No. 2	6021	Light Grey Green
Ejector Stack	No. 4	7001	Silver Grey

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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
Ejector Stack Fan	No. 2	6021	Light Grey Green
Seal Gas Cooler: Shell	No. 2	6021	Light Grey Green
Seal Gas Compressor Inlet Silencer	No. 2	6021	Light Grey Green
Seal Gas Compressor	No. 2	6021	Light Grey Green
Seal Gas After Cooler	No. 2	6021	Light Grey Green
Seal Gas Refrigerant Dryer	No. 1	See M.S.*	
Purge Gas Compressor	No. 2	6021	Light Grey Green
Purge Gas Dryer	No. 1	6021	Light Grey Green
Furnace Upper Slide Gate	No. 1	6021	Light Grey Green
Bottom Seal Mist Eliminator	No. 2	6021	Light Grey Green
Furnace Lower Slide Gate	No. 1	6021	Light Grey Green
Top Gas Scrubber Shell	No. 2	6021	Light Grey Green
Purge Gas Tank Outside	No. 2	6021	Light Grey Green
Purge Gas Tank Inside	No. 1	6021	Light Grey Green
Cooling Gas Mist Eliminator	No. 2	6021	Light Grey Green
Pumps	No. 2	5005	Signal blue
Classifier	No. 2	6021	Light Grey Green
Classifier tank	No. 1	6021	Light Grey Green
Electric Hoists	See M.S.*	1003	Signal yellow
Furnace Charge Hopper	No. 2	7001	Silver Grey
Upper Burden Feeder Assembly	No. 1	7001	Light Grey Green
Middle Burden Feeder Assembly	No. 1	7001	Light Grey Green
Lower Burden Feeder Assembly	No. 1	7001	Light Grey Green
Furnace Discharge Gate	No. 1	7001	Silver Grey
Cooling. Heating Ventilation (Electrical Rooms)	No. 1	5015	Sky blue
Hydrant	No. 1	3000	Flame red



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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
Hydraulic Cabin	No. 1	6021	Light Grey Green
Inert Gas Generator Compressor	No. 2	6021	Light Grey Green
Inert Gas Generator Fan	No. 2	6021	Light Grey Green
Inert Gas Generator Demister	No. 2	6021	Light Grey Green
Inert Gas Generator Cooler	No. 2	6021	Light Grey Green
External Top Gas Fuel Mist Eliminator	No.2	6021	Light Grey Green
External Process Gas To Bustle Mist Eliminator	No.2	6021	Light Grey Green
Natural Gas Filtration Station	No.2	1021	Rape Yellow
Fuel Tank	No.2	8001	Brown
Machinery Cooling Water Basin Outside	No.2	6021	Light Grey Green
Machinery Cooling Water Basin Inside	No. 1	6021	Light Grey Green
Furnace Area Piping Open Trough	No. 1	6011	Reseda Green
Clarifier(Contact With Water)	No.1	6021	Light Grey Green
Clarifier(Not In Contact With Water)	No. 2	6021	Light Grey Green
Reformer Tube Accessories	No.5	7001	Silver Grey
Slurry Funnel Tank	No. 2	6011	Reseda Green
Air Riser	No.5	7001	Silver Grey
Seal Gas Compressor Inlet Filter	No. 2	6021	Light Grey Green
Product Cooler	No.6	7001	Silver Grey
Ejector Stack inlet Spool Piece	No. 4	7001	Silver Grey
Vent Water Seal Tank	No. 1	6021	Light Grey Green
Top Gas Fuel Mist Eliminator	No. 2	6021	Light Grey Green
Seal Gas Inlet Filter	No. 2	6021	Light Grey Green
Bottom Seal Gas Bubbler	No. 2	6021	Light Grey Green
Bottom Seal Leg(upper &lower sections)	No. 6	7001	Silver Grey
Lower Seal Gas Inlet Cone	No. 6	7001	Silver Grey



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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
HDRI Seal Leg Upper Slide Gate	No. 6	7001	Silver Grey
PDC Feed Leg Shut Off Valve	No. 6	7001	Silver Grey
Clarifier Rake	No. 1	6021	Light Grey Green
Clarifier Inlet Transition piece	No. 1	6021	Light Grey Green
Product Cooler Middle Burden Feeder	No. 1	6021	Light Grey Green
Product Cooler Lower Burden Feeder	No. 1	6021	Light Grey Green
PDC (Product Discharge Chamber ) casing	No. 6	7001	Silver Grey
PDC Tramp Material Discharge Slide Gate	No. 6	7001	Silver Grey
Tramp Chute Transition	No. 6	7001	Silver Grey
MATERIAL HANDLING			
Skirt Board	No.2	6021	Light Grey Green
Drive Frame	No.2	6021	Light Grey Green
Belt Scale	No.2	6021	Light Grey Green
Cover	No.2	7001	Silver Grey
Tail Frame	No.2	6021	Light Grey Green
Take Up System	No.2	6021	Light Grey Green
Discharge Chute	No.2	7001	Silver Grey
Frame	No.2	6021	Light Grey Green
Hand Rails	No.2	1003	Signal yellow
Screen Steel Structure	No.2	6021	Light Grey Green
Oxide Coating Storage Bin	No. 2	7001	Silver Grey





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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
DUST COLLECTION			
Scrubber	No. 1	6021	Light Grey Green
Storage Bin	No. 2	6021	Light Grey Green
Stack	No. 2	7001	Silver Grey
Air Fan	No. 2	6021	Light Grey Green
Slurry Sump	No. 1	6021	Light Grey Green
Pump	No. 2	5005	Signal blue
Rotary Valve	No. 2	7001	Silver Grey
Duct And Hood	No. 2	7001	Silver Grey
STEEL STRUCTURES AND SUPPORTS			
Reformer Steel Structure	No. 2	7001	Light Grey Green
Furnace Area Structure	No. 2	6021	Light Grey Green
Blower Area Structure	No. 2	6021	Light Grey Green
Stack Area Structure	No. 2	6021	Light Grey Green
WTP Pipe Bridge	No. 2	6021	Light Grey Green
Blower Area Pipe Bridge	No.2	6021	Light Grey Green
Stack Pipe Bridge	No.2	6021	Light Grey Green
Furnace Pipe Bridge	No.2	6021	Light Grey Green
Building Steel Structure (Including Pump House, Work House, Maintenance Shop. . .)	No.1	6021	Light Grey Green
Duct Support	No. 1	See (Note 5)	
Walking desks (except material handling)	No.1	9005	Black
Handrails and toe boards (except material handling)	No.1	9005	Black
Rail posts , stanchions and jambs	No.1	1003	Signal yellow
Overhead Lifting Equipment	No.1	1003	Signal yellow
Outer Surface of Sandwich Panels used in Maintenance Shop	No.2	3020	Traffic red

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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
Inner Surface of Sandwich Panels used in Maintenance Shop	No.1	9001	Cream
CRANE AND HOISTS			
Crane	No.2	1003	Single Yellow
Hoist	No.2	1003	Single Yellow
PIPING AND DUCTS			
Industrial and service water	No.2	6021 2004	Light Grey Green With pure orange band
Drinking water	No.7	6021 5012	Light Grey Green With Light Blue band
Water for fire-fighting	No.2	6021 3001	Light Grey Green With Signal Red Bands
Chilled water	No.2	6021 9010	Light Grey Green With white band
Make up water	No.2	6021	Light Grey Green
Process Water Supply	No.2	6011	Reseda Green
Process Water Return	No.2	6011	Reseda Green
Machinery Cooling Water Supply	No.2	6011	Reseda Green
Demineralised & R.O water	No.2	6021 1000	Light Grey Green Green beige
Blow down water	No.2	6021	Light Grey Green
Machinery Cooling Water Return	No.2	6011	Reseda Green
Hot and superheated water – condense water feed water to boiler	No.2	7001	Silver Grey

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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
Lubricating oil	No.2	8001	Brown
Fuel oil	No.2	8001 1021	Brown With Rape Yellow Band
Air(included main, auxiliary, compressed and instrument air)	No.2	5012	Light Blue
Combustible gas	No.2	1021	Rape Yellow
Inert gas (nitrogen)	No.2	1021 3002	Rape Yellow With Carmine Red
Light slurry	No. 2	6021	Light Grey Green
Heavy slurry	No.2	9005	Black
Fuel gas piping	No.2	1021	Rape Yellow
Cooling Gas Duct	No.2	1021	Rape Yellow
Natural Gas	No.2	1021	Rape Yellow
Process Fuel Gas	No.2	1021	Rape Yellow
Process Gas	No.2	1021	Rape Yellow
Reformed Gas Cold	No.2	1021	Rape Yellow
Feed Gas	No.2	1021	Rape Yellow
Seal gas high temperature	No.5	7001	Silver Grey
Top gas Duct	No.5	7001	Silver Grey
Flue gas duct and system	No.5	7001	Silver Grey
Refractory lined pipe/duct	No.2	7001	Silver Grey
Seal & Purge gas	No.2	7032	Pebble Grey
Impulse Purge gas	No.2	7032	Pebble Grey
Main Combustion Air(hot)	No.2	7001	Silver Grey
Auxiliary air	No.2	5015	Sky blue

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NAME	PAINTING SPEC.	RAL NO.	PAINTING COLOR
Feed Gas high temperature	Since the material is stainless steel, painting shall not be applied		
Seal Gas Condensate Drain	Since the material is stainless steel, painting shall not be applied		
Vent	The same color as the main line shall be applied.		
Piping included in Package Equipment	The same color as the main equipment shall be applied		
Ventilation ducts	No. 1	5015	Sky blue
Reformer Piping	No. 2	1021	Rape Yellow
Cooling Gas Scrubber Duct (Hot)	No. 5	7001	Silver Grey
Cooling Gas Scrubber Duct (Cold)	No. 1	1021	Rape Yellow
Reformer flue gas	No. 5	7001	Silver Grey
Combustion air duct	No. 5	7001	Silver Grey
Seal gas duct	No. 5	7001	Silver Grey
Feed gas duct(cold)	No. 2	1021	Rape Yellow
Reformed gas duct	No. 5	7001	Silver Grey
Transition Zone N.G Injection Nozzles	No. 6	7001	Silver Grey
Reformed Gas Mixer	No. 5	7001	Silver Grey
Feed Gas Mixer	No. 2	1021	Rape Yellow
Hose Connection for Water	No. 2	6021	Light Grey Green
Hose Connection for Seal Gas	No. 2	7032	Paddle Grey
<b>HIGH TEMPERATURE PIPES</b>			
Hot natural gas to process(400 °C)	No.4	1021	Rape Yellow
Combustion air discharge from first stage bundle (285 °C)	No.4	7001	Silver Grey



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NAME		PAINTING SPEC.	RAL NO.	PAINTING COLOR
Feed gas to pre heater(150°C)		No.5	1021	Rape Yellow
Seal gas compressor discharge to after cooler(200°C)		No.5	7001	Silver Grey
Inert gas compressor discharge (IGG)(120°C)		No.5	1021	Rape Yellow
UNINSULATED PIPE				
Un insulated (Up to 100)		No.2	Above mentioned RAL No.'s	
Un insulated (100-250)		No.5	7001,9006	Silver Grey, White aluminium
Un insulated (250-450)		No.4	9006	White aluminium
ELECTRICAL				
Power panels:	inner	No.1	7001	Silver Grey
	outer	No. 2		
Control panels: Local Control Boxes	inner	No.1	7032	Pebble Grey
	outer	No. 2		
DC/AC motors, generators, gear motors		Supplier standard's		
Transformers		Supplier standard's		
Pull boxes		No.1	7001	Silver Grey
Control desks		No.1	7032	Pebble Grey
Current taps and outlets: Externally		No.1	1004	Golden Yellow
Current taps and outlets: Internally		No.1	2004	Pure Orange

\*M.S.: MANUFACTURERS STANDARD

#### NOTES:

- 1- Stainless steel pipes such as feed gas high temperature line are not painted.
- 2- Above ground carbon and ferritic alloy steel pipe work, including nipples, fittings, flanges, line blinds, weld end specialty inline components such as strainers, etc. were not galvanized.

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- 3- For insulated pipes and temperatures up to 399°C, zinc ethyl silicate primer (P-05) with 75-80µm thickness is only applied. For temperatures above 399°C, the silicone aluminum paint (P-24) with 30µm thickness is applied.
- 4- Seal legs are not painted except for the inner side of reformed gas cooler seal leg (36") that is painted with RAL No. 6021 and spec no. 5.
- 5- Duct supports are painted with RAL No. 7001 for refractory ducts and the other ducts are painted same as steel structures.

## Execution Procedure

### Surface Preparation

Surface preparation is indispensable for painting on the iron parts. If it is not satisfactory even when the optimum paint is used, the effect of paint applied thereon cannot be accepted.



The surface on which paints are applied should be checked visually according to the surface preparation standard.

The surface should be subjected to witness inspection by the client's representative as a rule.

Weather conditions for surface preparation will be same as painting conditions.

For surface preparation refer to Swedish Standard (Sand Blasting) SA 2 1/2.

- Prior to surface preparation, grease, oil, and marking traces on the coated surface should be removed carefully, using volatile solvent.
- Significantly rusty parts should be trimmed by chipping.
- Rust on the shaped steel corner and other complicated parts should be removed with utmost care.
- Heat scale on the weld zone of piping's, pedestals and tanks should be completely removed, using disk sander, wire brush, etc.
- The prepared surfaces should be cleaned using dry air or clean brush.
- The prepared surface should be coated immediately after inspection.
- Piping's of bare pipe 200A or less should be pickled by specified pickling procedure.

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## Surface Preparation Standard

(See NISIC, STD. Section 2, Para.1.4.3.2, 1.4.3.3)

3. Thorough scraping and wire-brushing (SIS-ST-2 or equivalent)
4. Very thorough scraping and wire brushing (SIS-ST-3 or equivalent)
5. Pickling (SSPC-SP-8 or equivalent)
6. Light blast cleaning (SIS-SA-1 or equivalent)
7. Thorough blast cleaning (SIS-SA-2 or equivalent)
8. Very thorough (SIS-SA-2 1/2 or equivalent)
9. Blast cleaning to pure metal (SIS-SA-3 or equivalent)

For the sandblasted surface we can use ISO 8501-4 standard. Based on this standard in the first step by the aesthetic appearance and judgment of the paint we can decide regarding the quality of the performed paint in the second step by roughness and profile tests the quality of paint will specify. The profile test will be done by profile gage meter.

- **Damaged prime coated surfaces**



Prime coated surfaces, if damaged during the site fabrications, erection or handling, shall be cleaned mechanically or manually removing all damaged coating, rust or like.

- **Water cleaning**

- (1) If applicable, foreign matter such as dust, soil, etc. shall be removed with water, using rags, brushes, etc.
- (2) Any salt on shop-primed surfaces caused due to sea water or sea wind during ocean transportation or on surfaces before finish coating at the site shall be removed and cleaned with water, etc. before finish coating, 150 mg/m<sup>2</sup> is measured by salt test. For the salt test, the method of detection of chloride ions with detection tube shall be used. The salt test shall be performed by the contractor using his measuring devices. The test report shall be submitted to the client's inspector for his approval.

- **Site welding**

After site welding and before painting, all surfaces including welding zone shall be touched up deep to the substance and at least 40% area difference and cleaned to be free from spatter,

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mill scale, rust, dirt, oil or any other matter, using white spirit or whatever cleaning liquid necessary.

- Concrete, concrete block, mortar or wood

Concrete, concrete blocks, mortar or wood to be painted shall be free from all traces of dirt, oil, grease or whatever may be harmful or the painting.

### Paint Mixing (See NISIC, STD. Section 2, Para.3)



- (1) Before opening the can, the paint should be checked if it complies with the specification.
- (2) Material inspection should be conducted on real paint, and when the contractor opens the can for the first time, the client's inspector should witness it as a rule. Client will inspect the batch.
- (3) Paint-can should be opened just before using as a rule: the paint-can once opened, should be securely closed for storage, and better finished early.
- (4) The paint in opened can should be stirred sufficiently until it becomes uniform. Up to 20 liters of paint should be stirred manually, and over 20 liters use a machine. No stirring is allowed with compressed air.
- (5) When thinner is necessary, unspecified thinner should not be used. Also, the amount should not be exceeded.
- (6) For color, it is necessary to use paints mixed to the specified color at the production plant.

### Painting (See NISIC, STD. Section 2, Para.4)

- Painting should be done carefully, and coating film thickness should be ensured as specified in the specification. One layer thickness should not be increased over the specified value, to reduce the number of paint coats.
- Upon completion of undercoat and topcoat, film thickness should be measured with film thickness gauge. WFT (Wet Film Thickness) and DFT (Dry Film Thickness) shall be measured during application of paint. (for film thickness, see painting specification)
- Dry film thickness measuring procedure:

- (1) Checking equipment :



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- Micro tester
- Electromagnetic film thickness gauge

(2) Checking procedure:

For paint coat accepted in dry-state test, thickness of specified number of coat should be measured in specified places separately. For measuring, the electromagnetic film thickness gauge should be used where applicable. When it is, however, difficult to measure in specific measurement conditions or installation conditions, a micro tester may be used. In any case, the same measuring instrument should be used in the whole process as a rule. (zero point adjusting plate used for electromagnetic film thickness gauge should be 10 mm Min. in thickness and have 10S Max. surface roughness.)

(3) Checking process and period

The paint coat should be measured when the coating film is in dry-hard state after completion of the undercoating and the final coating.



(4) Judgment method

It should be judge whether the measured film thickness is same to specified film thickness.  
It should conform to SSPC-PA 2 paint Application Specification.

(5) Criterion

The average specified film thickness should be obtained.



- Wet-on-wet coating should be performed after checking that more than the specified time has elapsed and coating film is sufficiently dry.(for the wet-on-wet coating time required, see painting specification.)
- Color tone should be changed for every layer of undercoat, middle coat and top coat.
- After surface preparation, visually check for skip and uneven coating upon completion of painting on each layer.
- When the paint coating is damaged or separated, executed painting again according to the specification after surface preparation (ST-3).

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- After finish painting, the following should be checked visually.
  - a) uneven painting, skip, sag and wrinkles are not allowed;
  - b) There should be no remarkable difference from the specified color locally,
  - c) There should be no noticeable stains.
- Defects caused by sudden changes in weather, conditions and other unavoidable conditions should be repaired and re-painted quickly.
- Due consideration should be given to pipings, equipments, structures and parts supplied after completion of topcoat, so that, they are not contaminated in painting work. If they are stained, repair painting should be done according to painting specification for each stained item. Repair painting should start with the surface preparation process.
- Underground piping coating. As specified in piping Spec.
- Various signs and displays should be painted as specified in piping specifications.
- For painting work, the records should be submitted according to the format approved by the client.

## Painting Inspection

- (1) Appearance inspection and film thickness inspection should be witnessed by the client's inspector for every surface preparation and completed paint coating at each layer. Sampling inspection should be applied as a rule. Sampling and testing will be done according to standard guide for painting inspectors (ASTM D3276).
- (2) Interim inspection
- (3) Painting frequency inspection, dilution rate for each layer, paint application amount and painting coat amount should be witness inspected by the client inspector.
- (4) Inspection of completion  
Appearance inspection, finish color and quantity inspection should be witnessed by the client inspector.



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- (5) For final paint checking and before releasing the equipment, adhesion tape test will be performed on paint dry film according to ASTM D3359. This test method is used to establish whether the adhesion of a coating to a substance is at a generally adequate level.
- (6) The standards acceptance method for inspection of electrostatic painted surface is as follows:
- Type of the paint (it shall be from polyester or venil painting group).
  - Painting thickness measurement (it it will be done by Elcometer ,the paint thickness shall be 60 micron at least).
  - If by the aesthetic appearance and judgment of the paint we see any non homogeneity in the paint surface, the adhesion test shall be performance.

## Painting not allowed

In the following cases, no painting work should be done as a rule.

- |                                      |                |
|--------------------------------------|----------------|
| (1) Humidity:                        | 85% or higher  |
| (2) Rainy weather                    |                |
| (3) Temperature:                     | below 5°C      |
| (4) Strong wind and severe sand dust |                |
| (5) Painted surface temperature:     | 50°C or higher |

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## Clearance after completion of painting

- While waiting until the paint at each layer becomes dry, special cares should be taken to prevent contaminations and deposits on the painted surface.
- When scaffolding is arranged for painting work, it should be withdrawn after completion of intended work, and when the existing scaffolding is used, the work completion should be informed, and at the same time used paints, solvent, tools, waste, cloth and other consumables should be cleaned up and rearranged.



For wooden pieces and waste cloth stained with paint, the disposal method should be fixed before painting work, and they should be disposed of in the specified manner.

## General Precautions for Painting Work

- Painting work should be done smoothly by a skilled worker under the instructions of responsible superintendent. The skilled worker shall be qualified through the standard test.
- For repair painting on work site, pertinent equipment, piping and instrument specifications should be checked before the specified painting work is done.
- The temporary work range (material stockyard, workshop, operator's rest room, etc.), scaffolding work range (material assembly work, withdrawal work, etc.)
- Construction water, power, lighting supply conditions and remaining material disposal should be in accordance with construction order specification. The construction period and place should also conform thereto.
- The parts to be installed on the foundation, such as under pedestal which cannot be painted after assembly, remove rust and coat with anti-corrosive paint before installation.
- The partson piping support which cannot be painted after piping should be painted in advance.

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- When painting on work site, surrounding equipment and objects which do not require painting on site should be protected to that they are not stained.
- When re-painting the items as such as meter stand, switch box and instrument panel on work site for some reason, be sure to remove the painted surface, using water paper and apply phthalic acid resin enamel or lacquer enamel.
- For repair paint, however, be sure to examine the painting specification carefully before doing painting work.
- Machineries (pumps, motors, compressors, etc.) are mostly carried in as painted, however, when painting them just only for color adjustment, do painting work in the same manner as with the meter stand, etc.
- For clothes contaminated with paint and waste cloth stained with paint, the method of disposing them outside the danger zone should be settled in advance.
- Special precaution are to be taken for the items which are mentioned in individual equipment specification sheets, this is for surface and materials which shall not be painted or shielded to prevent damage during surface preparation and painting.
- Machined surface (such as flange face, threaded surfaces and other machined mating faces), nameplates, valve stems, control linkage, bearing, etc. shall be wiped, masked and/or cover before surface preparation and coating to protect them from cleaning and coating operations.
- Galvanized and aluminum surfaces shall not be required to be painted except for touch up painting. A suitable system of painting shall be designed for touch up and maintenance of paint of aluminum and galvanized surfaces.

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## Attachment 1



### Adequacy of wet-on-wet coating

When painting interval is short:

Type of Undercoated paint \ Type of Topcoat paint	Oil type	Oil synthetic Type	Alkyd type	Vinyl type	Chlorinated rubber	Epoxy type	Epoxy modified type	Zinc, inorganic	Epoxy acryl	Poly urethane type
Oily type	o	o	o	x	x	x	x	x	x	x
Oily synthetic type	o	o	o	x	x	x	x	x	x	x
Alkyd type	o	o	o	x	x	x	x	x	x	x
Vinyl chloride type			Δ	o	o	x	x	x	x	x
Chlorinated rubber			Δ	x	o	x	x	x	x	x
Epoxy type			Δ	o	o	o	o	x	o	o
Epoxy modified type		o	o	x	o	o	o	x	o	o
Zinc inorganic	x	x	x	o	o	o	o	o	o	o
Acryl epoxy acryl				o	o	o	o	x	o	o
Polyurethane type				o	o	o	o	x	o	o

Note:

1. When applying wet-on-wet coating on modified epoxy resin, be sure to rough the film surface on modified epoxy resin (for over 5 days). When undercoat is a tar type topcoat breeds.
2. When applying wet-on-wet coating on thick inorganic zinc paint, mist coat is required.

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When painting interval is long:

Type of Undercoated paint \ Type of Topcoat pain	Oil type	Oil synthetic Type	Alkyd type	Vinyl type	Chlorinated rubber	Epoxy type	Epoxy modified type	Zinc, inorganic	Epoxy acryl	Poly urethane type
Oily type	O	O	O		O			X		
Oily synthetic type	O	O	O		O			X		
Alkyd type	O	O	O		O			X		
Vinyl chloride type			Δ	O	O	X	X	X	X	X
Chlorinated rubber	X	X	X	X	O	X	X	X	X	X
Epoxy type	X	X	X	O	O	O	O	X	O	O
Epoxy modified type		O	O	X	O	O	O	X	O	O
Zinc inorganic	X	X	X	X	O	O	O	O	O	O
Acryl epoxy acryl	X	X	X	O	O	O	O	X	O	O
Polyurethane type	X	X	X	O	O	O	O	X	O	O



- Note:
1. When applying wet-on-wet coating on modified epoxy resin, be sure to rough the film surface on modified epoxy resin (for over 5 days). When undercoat is a tar type, topcoat breeds.
  2. When applying wet-on-wet coating on thick inorganic zinc paint, mist coat is required.
  3. Wet-on-wet coating may differ from the table above, depending on paint quality.

Evaluation:

O: wet-on-wet coating acceptable

Δ: wet-on-wet coating acceptable, depending on conditions

X: wet-on-wet coating not acceptable

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## Attachment 2

### Painting spec. No. 1

Process		Paint name & treatment	No. of coat	Painting method	Dry film thickness per coat
At shop	Surface preparation	Blast cleaning (SIS SA 2 1/2)			
	1 ST Coat	(P-04) Epoxy Polyamide Zinc Rich	1	AL	50 microns
	2 ND Coat	(P-14) High Build Epoxy Intermediate	1	AL	100 microns
	3 RD & 4 TH Coat	(P-20) Epoxy Polyamide Finish Coat	2	AL	40 microns

**General note:** All Painting specs shall be applied at shop. Touch up only will be done at site.

**Special note:** It permits a heat resistance up to 100°C.



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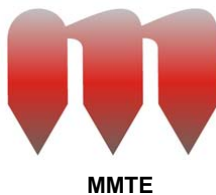
## Painting Spec. No. 2

Process		Paint name & treatment	No. of coat	Painting method	Dry film thickness per coat
At shop	Surface preparation	Blast cleaning (SIS SA 2 1/2)			
	1 ST Coat	(P-04) Epoxy Polyamide Zinc Rich	1	AL	80 microns
	2 ND Coat	(P-14) High Build Epoxy Polyamide Intermediate	1	AL	120 microns
	3 RD Coat	(P-23) Polyurethane Aliphatic Finish Coat	1	AL	50 microns

**Remark:** In case of using shop-primed steel, SD zinc primer ZE No. 1000 shall be applied as shop primer.

**General note:** All Painting specs shall be applied at shop. Touch up only will be done at site.

**Special note:** It permits a heat resistance up to 100°C.

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#### Painting spec. No. 4

Process		Paint Name& treatment	No. of coat	Painting method	Dry film thickness per coat
At shop	Surface preparation	Blast Cleaning (SIS SA 3)			
	1 ST coat	(P-05) Inorganic Zinc Ethyl Silicate	1	AL	75 Microns
	2 ND coat	(P-24) Aluminum Silicon Pure	1	AL	25 microns
	3 RD coat	(P-24) Aluminum Silicon Pure	1	AL	25 microns

**Remark:** \* In case of using shop-primed steel, SD Zinc primer ZE No.1000 shall be applied as shop primer.

- This painting specification shall be applied at the temperature up to 450°C

**General note:** All Painting specs shall be applied at shop. Touch up only will be done at site.



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## Painting Spec. No. 5

Process		Paint name & treatment	No. of coat	Painting method	Dry film thickness per coat
At shop	Surface preparation	Blast cleaning (SIS SA 2 1/2)			
	1 ST Coat	(P-05) Inorganic Zinc Ethyl Silicate	1	AL	75 microns
	2 ND Coat	(P-13) Modified Silicon Acrylic	1	AL	25 microns
	3 RD Coat	(P-13) Modified Silicon Acrylic	1	AL	25 microns

**General note:** All Painting specs shall be applied at shop. Touch up only will be done at site.

**Special note:** It permits a heat resistance up to 250°C.

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#### Painting spec. No. 6

Process		Paint name & treatment	No. of coat	Painting method	Dry film thickness per coat
At shop	Surface preparation	Blast cleaning (SIS SA 2 1/2)			
	1 ST Coat	(P-05) Zinc Ethyl Silicate	1	AL	75 microns
	2 ND & 3 RD Coat	(P-26) Aluminum polyurethane top coat	2	AL	60 microns

**General note:** All Painting specs shall be applied at shop. Touch up only will be done at site.

#### Special notes:

- This spec can be used for painting of big equipments and accessories parts that there is no suitable condition from humidity and curing (temperature) view point.
- It permits a heat resistance continuous up to 120 °C, non continuous up to 140.

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## Painting spec. No. 7

Process		Paint name & treatment	No. of coat	Painting method	Dry film thickness per coat
At shop	Surface preparation	Blast cleaning (SIS SA 3 )			
	1 ST Coat	(P-09W) Epoxy Polyamide Zinc Phosphate	1	AL	70 microns
	2 ND & 3 RD Coat	(P-25) High Build Epoxy Intermediate	2	AL	250 microns
	3 RD Coat	(P-27) Epoxy Finish Coat	1	AL	100 microns

**General note:** All Painting specs shall be applied at shop. Touch up only will be done at site.

**Special note:** 1- this spec shall be used only for potable water.

2- The color of epoxy top coat is white.

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### **Attachment 3**

#### **Technical Data Sheet of Paints**

#### **(P-04)**

#### **EPOXY POLYAMID ZINC RICH**

#### **PAINTING PRODUCTS CHARACTERISTICS:**

Type:	Three – components
Color:	ZINC GRAY
Pigment:	ZINC DUST
Percentage:	85% by weight
Chemical composition:	Consisting of zinc-dust Exclusively (2-6 microns) zinc- metal Titer not less than 97% by weight.
Hardener:	POLYAMID, (adduct hardener) among solvents only the Chlorinated and benzene must be avoided.
Operating temperature:	continuous up to 100°C, non continuous up to 120°C

#### **SURFACE PREPARATION:**

Rust grade A-B-C-D steel surfaces: Blast cleaning minimum SA2 1/2



APPLICATION: Brush , Spray , Airless

#### **DRYING TIME:**

For touch at 250°C:	2 hours
Minimum interval for recoating:	24 hours
Dried coat looks:	opaque
Minimum Thickness of Dried Film:	60 Microns

#### **RESISTANCE CHARACTERISTICS:**

Salt – spray chamber test (according to ASTM B – 117)  
800 - Hours exposure  
Humid static chamber test (according to ASTM D –2247)  
800 - Hours exposure

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**(P-05)**

## INORGANIC ZINC ETHYL SILICATE

Type	Solvent base self-curing inorganic zinc paint based on silicate with zinc/ powder		
Characteristics	1) Excellent rust preventive property 2) Excellent resistance to water and sea water 3) Excellent resistance to organic solvents 4) Excellent heat resistance and less scorch by heat treatment 5) Excellent resistance to mechanical abrasion 6) Good applicability by standard airless spray Equipment		
Color	ZINC- Gray		
Application method	Airless spray to brush		
Thinner	CLEANER SOLVENT		
Packaging	2 packs (liquid/powder)		
Drying time	5°C	20°C	30°C
Set to touch	1 hour	20 Mins.	20 Mins.
Semi dry hard	6 hours	3 hours	1 hour
Operating temperature:	up to 400°C		

### Remark:

Practical coverage is given as 170% for spraying and 130% for brush application of theoretical coverage to obtain the recommended film thickness as average and changes depending on application method, application technique, shape and surface condition of substrate, weather condition, wastage, etc.



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**(P-09)**

## **EPOXY PRIMER**

Type	Two component zinc phosphate epoxy polyamide primer
Characteristics	1) Excellent resistance to cathodic protection 2) Tough, hard and highly abrasion resistance 3) High resistance to crude and heavy oils, aliphatic hydrocarbon solvent and many Chemicals 4) Excellent water and salt water resistance
Color	Light gray
Application method	Airless spray or brush
Thinner resin	Compatible thinner with epoxy
Thinning ratio	10% by weight
Packaging	2 packs
Over coating interval	24 hours at 20°C (16-24hr)
Operating temperature:	continuous up to 100°C, non continuous up to 120°C



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**(P-09W)**

## **EPOXY PRIMER (EP104P)**

### **Product Data**

### **Typical Uses**

As an anticorrosive primer, it can be used for protection of structural steel, machinery, pipes & tanks exteriors in oil refineries, power plants, paper mills, chemical process & water treatment plants.

Also, with a suitable top coat, it can be used as an excellent primer in industrial & corrosive environments.

\*It can be used as a hygienic primer in pipes & tanks interior in drinking water systems with suitable topcoats because of FDA confirmation due to consuming resins. (Namely EPW104P)



- Easily applied airless or conventional spray
- Forms durable coating system with a wide range of top coats
- Excellent adhesion to blasted steel

### **Safety Precautions**

Since this product is flammable, keep it away from heat & flame.



Use safety gloves & mask & apply in well ventilated places.

Store it in dry, cool & ventilated warehouses.

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## Physical Data

Finish.....	Flat
Color.....	Gray
Substrate.....	Clean Blasted steel
Components.....	2
Solid Weight.....	72 ± 2%
Volume Solids.....	54 ± 2%
DFT.....	Min. 50μ
WFT.....	90μ
TSR.....	10.8 m2/lit/50μ
Drying times (at 25° c)	
Surface dry.....	Max. 2hours
Dry to handle.....	Min. 12 hours
Dry to top coat.....	Min. 16 hours
Full cure.....	7 Days
Mixing Ratio (by w)	
Base.....	5.5 parts
Cure.....	1 part
Pot life (at 25° c) .....	8 hours
Specific Gravity.....	1.4 ±0.05 kg/lit
Viscosity (at 25° c) .....	65-85 kU (mixed product)
Thinner.....	S406
Hardener .....	HEP01152
Packing	
Base.....	4.4 kg (gal), 17.6 kg (tin)
Cure.....	0.8 kg (quart), 3.2 kg (gal)
Shelf life.....	18 month
Operating temperature	Continuous up to 100°C Non continuous up to 120°C

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## Application Instruction

### Environmental Conditions

Air temp.....10-50°c

Surface temp.....10-50°c

Surface temperature must be at least 3°c above dew point.

### Surface Preparation

Blast in accordance with the Swedish standard Sa 2½ or Steel Structures Painting Council SP-10 to achieve desired profile.

Apply EP104P as soon as possible to prevent any contamination.

**Note:** If it is used as a hygienic primer in the interior drinking water tanks painting system, the surface must be blasted in accordance with the Swedish standard Sa 3 or Steel Structures Painting Council SP-5.

### Equipment Conditions

Line nuzzle head pressure



4-6 bars for conventional spraying

120- 180 bars for airless spraying

Nuzzle tip

0.8- 1.2 mm for conventional spraying

0.015- 0.019 inch for air less spraying

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### Application procedure



- 1.Flush equipment with recommended cleaner.
- 2.Stir base to an even consistency with a power mixer.
- 3.Add cure to base & continue Stirring up to uniformity. Induction time before use is 10 min.

**Note:** since the pot life is limited & shortened by high temperatures, do not mix more material than will be used.

- 4.For conventional spray thin only as needed for workability.
- 5.Stir during application to maintain uniformity of material.
- 6.Apply 90μ of the wet film thickness to reach 50μ dry film thickness.

**Note:** If used in confined areas, use adequate circulated fresh air continuously during application & drying. Use fresh air mask to prevent hazards of fire explosions & health risks.



Temperature & humidity of ventilation air must be in a way that moisture condensation cannot be formed on the surface.

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**MODIFIEDD SILICON ACRILIC RESIN**

**PAINTING PRODUCTS CHARACTERISTICS:**

Type:	One – component
Color:	Silver gray RAL 7001
Pigment percentage:	30 % by weight
Vehicle percentage:	70% by weight
Chemical composition:	Acrylic resin, silicon modified. Among solvents chlorinated and benzene Must be avoided.
Hardener:	--
Specific weight:	1.00
Viscosity at 250°C:	120" – 140" Ford cup 4
Solid content at 105 <sup>0</sup> C on the	
Product ready for application:	not less than 60% by weight
Surface Preparation:	--
Application:	Brush, Spray
Operating Temperature	UP TO 250°C

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**(P-14)**

## **EPOXY POLYAMID INTERMEDIATE**

Type	high build epoxy polyamide semi matt
Characteristics	1) High build and heavy duty coating 2) Excellent resistance to cathodic protection 3) Tough, hard and highly abrasion resistance 4) High resistance to crude and heavy oils, aliphatic hydrocarbon solvent and many chemicals 5) Excellent water and salt water resistance
Color	Light grey RAL7035
Application method	Airless spray or brush
Thinning ratio	0-10% by weight
Packaging	2 Packs
Operating temperature:	continuous up to 100°C, non continuous up to 120°C

### **Remark:**

Practical coverage is given as 170% for spraying of theoretical coverage to obtain the recommended film thickness as average and changes depending on application method, application technique, shape and surface condition of substrate, weather condition, wastage, etc.

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## EPOXY FINISH COAT

Type

Epoxy polyamide SEMI GLOSS

Characteristics

- 1) Excellent resistance to cathodic protection
- 2) Tough, hard and highly abrasion resistance
- 3) High resistance to crude and heavy oils,  
Aliphatic hydrocarbon solvent and many  
Chemicals
- 4) Excellent water and salt water resistance

Application method

Airless spray or brush

Thinner

Epomarine thinner No.20

Thinning ratio

0-10% by weight

Packaging

2 Packs

Mixing ratio

Base/hardener=85/15 by weight

Pot life

5°C	20°C	30°C
12 hours	8 hours	4 hours

Standard film thickness

Wet

204 microns/ coat

Dry

80 microns/ coat

Coverage

Theoretical                      0.211 Kg/m<sup>2</sup>/80 microns

Practical

0.36    Kg/m<sup>2</sup>/80 microns for spray

Drying time

5-10°C    20°C    30°C

Set to touch

3 hours	2 hours	1 hour
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Semi dry hard

48 hours	16 hours	12 hours
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Over coating interval

over 24 hours at 20°C

Specific gravity

1.22 (Mixture)

Flash point



8°C

Ignition point

450°C

Operating temperature:



continuous up to 100°C, non continuous up to 120°C

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**Remark:**

Practical coverage is given as 170% for spraying of theoretical coverage to obtain the recommended film thickness as average and changes depending on application method, application technique, shape and surface condition of substrate, weather condition, wastage, etc.



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## **POLYURETHANE FINISH COAT**

### Painting Products Characteristics:

Type:	Two components
Color:	upon request
Pigment percentage:	30% by weight
Chemical composition:	
- Green color:	chromium oxide and titanium dioxide (min. 50%), Zinc chromate, magnesium silicate (max. 5%) and tinting pigments.
- White color:	Titanium dioxide (min. 70%), Aluminium and Magnesium silicates.
- Orange color:	Titanium dioxide , cadmium sulphide + cadmium selenide (100:12) or permanent orange G (dichlorobenziedine+pheny1-methy1–tyrazolone),magnesium silicate and tinting pigments.
- Yellow color:	Titanium dioxide and tetroxide chromate and tinting pigments .
- Blue color:	Titanium dioxide and aluminum and magnesium Silicate and tinting pigments
- Pigments and extenders shall not be water soluble.	
	Carbonates must be avoided.



Hardener: Isocyanides – type

Specific weight: 1– 1.2

Surface Preparation: --

Application: Brush, Spray, Airless

Thickness Of Dried Film: 40-50 Microns

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Operating temperature: continuous up to 100°C, non continuous up to 120°C



Resistance Characteristics:

Salt – spray chamber test (According to ASTM B – 117)

300 – Hours exposure

Humid static chamber test (According to ASTM D – 2247)

300 – Hours exposure

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## HEAT RESISTANT SILICON RESIN

Type	A heat resistant paint based on Silicone resin and Aluminum powder		
Characteristics	1) Excellent heat resistance 2) Good weather resistance 3) Good applicability		
Color	Silver GRAY RAL 7001		
Application method	Airless spray or brush		
Thinner	Thinner for silicon resin		
Thinning ratio	0-5% by weight		
Packaging	Ready to use		
Standard film thickness			
Wet	80 microns/ coat		
Dry	20 microns/ coat		
Coverage			
Theoretical	0.084 Kg/m <sup>2</sup> /20 microns		
Practical	0.14 Kg/m <sup>2</sup> /20 microns for spray 0.11 Kg/m <sup>2</sup> /20 microns for brush		
Drying time	5°C	20°C	30°C
Set to touch	8 hrs	5 hours.	3 hours.
Ignition point	500°C		
Operating temperature:	up to 450°C		

### Remark:

- 1- Practical coverage is given as 170% for spraying and 130% for brush application of theoretical coverage to obtain the recommended film thickness as average and changes

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depending on application method, application technique, shape and surface condition of substrate, weather condition, wastage, etc.

2- Standard dry film thickness for all color except sewer color is 30 micron.

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## HIGH BUILD EPOXY INTERMEDIATE COAT (EPF3119HI)

### Product Data

#### Typical Uses

As a high build polyamide cured epoxy intermediate, it can be used for protection of structural steel, machinery, pipes & tanks exteriors, paper mills, oil refineries, power plants, chemical process & waste treatment plants, for both immersion & non- immersion services.

With the suitable top coat, it is also resistant to splash or spillage of water, solvents, chemical & petroleum products.



- Durable coating system with a wide range of top coats
- Easily applied airless or conventional spray.
- Up to 150μ DFT in only one coat
- Suitable for the interior surfaces of the storage tanks

### Safety Precautions

Since this product is flammable, keep it away from heat & flame.

Use safety gloves & mask & apply in well ventilated places.



Store it in dry, cool & ventilated warehouses.

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## Physical Data

Finish.....	Semi gloss
Color.....	Light gray
Substrate.....	Primed steel
Components.....	2
Solid Weight.....	72 ± 2%
Volume Solids.....	62 ± 2%
DFT.....	100μ/coat
WFT.....	160μ
TSR.....	6.2 m <sup>2</sup> /lit/100μ
Drying times (at 25° c)	
Surface dry.....	Max. 2hours
Dry to top coat .....	Min. 24 hours
Full cure .....	7 Days
Mixing Ratio (by w)	
Base.....	6 parts
Cure.....	1 part
Pot life (at 25° c) .....	8 hours
Specific Gravity.....	1.35 ±0.05 kg/lit
Viscosity (at 25° c) .....	85-100 KU (mixed product)
Thinner.....	S406
Hardener.....	HEP01182
Packing	
Base.....	4.2 kg (gal), 16.8 kg (tin)
Cure.....	0.7 kg (quart), 2.8 kg (gal)
Shelf life.....	18 month
Operating temperature	Continuous up to 100°C
	Non continuous to 120°C

**Note: this product also can be supplied in other colors.**

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## Application Instruction

### Environmental Conditions

Air temp..... 10-50°C

Surface temp.....10-60°C

Surface temperature must be at least 3°C above dew point.

### Surface Preparation

Be sure that the primed surface is clean, dry & free of oil, grease & other contaminations before applying EPF3119HI.

### Equipment Conditions

Line nuzzle head pressure

4-6 bars for conventional spraying

120- 180 bars for airless spraying

Nuzzle tip

0.8- 1.2 mm for conventional spraying

0.017- 0.021 inch for airless spraying



### Application procedure

- 1.Flush equipment with recommended cleaner.
- 2.Stir base to an even consistency with a power mixer.
- 3.Add cure to base & continue Stirring up to uniformity. Induction time before use is 10 min.

**Note:** since the pot life is limited & shortened by high temperatures, do not mix more material than will be used.



- 4.For conventional spray thin only as needed for workability.
- 5.Stir during application to maintain uniformity of material.
- 6.Apply 160μ of the wet film thickness to reach 100μ dry film thickness.

**Note:** If used in confined areas, use adequate circulated fresh air continuously during application & drying. Use fresh air mask to prevent hazards of fire explosions & health risks.

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Temperature & humidity of ventilation air must be in a way that moisture condensation cannot be formed on the surface.



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## **ALUMINUM POLYURETHANE TOP COAT (PU207)**

### **Product Data**

#### **Typical Uses**

As an aliphatic polyurethane finish coat, it has an excellent resistance to ultra violet exposure as well as chemical, industrial & marine environments. PU207 forms an impact & abrasion resistant coating with excellent color & gloss retention. So, it can be used in chemical plants, pulp & paper mills, petroleum industries, offshore platforms, marine equipments & other equipments.



- Good coating system with a wide range of epoxy primers or intermediate coats
- Easily applied airless or conventional spray.
- Hard, tough, flexible & abrasion resistant

### **Safety Precautions**

Since this product is flammable, keep it away from heat & flame.



Use safety gloves & mask & apply in well ventilated places.

Store it in dry, cool & ventilated warehouses.

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## Physical Data

Finish.....	Semi gloss
Color.....	Metallic light gray
Substrate.....	Primed steel
Components.....	2
Solid Weight	44 ± 2%
Volume Solids	43 ± 2%
DFT.....	50μ/coat
WFT.....	116μ
TSR.....	8.6 m <sup>2</sup> /lit/50μ
Drying times (at 25° c)	
Surface dry.....	Max. 2hours
Thorough dry.....	24 hours
Full cure.....	7 Days
Mixing Ratio (by w)	
Base.....	4 parts
Cure.....	1 part
Pot life (at 25° c).....	8 hours
Specific Gravity.....	1 ± 0.05 kg/lit
Viscosity (at 25° c).....	40-60 sec (mixed product)
Thinner.....	S4676
Hardener.....	IA375
Packing	
Base.....	3.2 kg (gal), 12.8 kg (tin)
Cure.....	0.8 kg (quart), 3.2 kg (gal)
Shelf life.....	6 month
Operating temperature	Continuous up to 120°C Non continuous up to 140°C

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## Application Instruction

### Environmental Conditions

Air temp.....10-50°C

Surface temp..... 10-50°C

Surface temperature must be at least 3°C above dew point.

### Surface Preparation

Be sure that the primed surface is clean, dry & free of oil, grease & other contaminations before applying PU207.

### Equipment Conditions

Line nuzzle head pressure

4-6 bars for conventional spraying

120- 160 bars for airless spraying

Nuzzle tip

0.8- 1.2 mm for conventional spraying

0.015- 0.017 inch for airless spraying



### Application procedure

- 1.Flush equipment with recommended cleaner.
- 2.Stir base to an even consistency with a power mixer.
- 3.Add cure to base & continue Stirring up to uniformity. Induction time before use is 10 min.
- 4.



**Note:** since the pot life is limited & shortened by high temperatures, do not mix more material than will be used.

- 5.For conventional spray thin only as needed for workability.
- 6.Stir during application to maintain uniformity of material.
- 7.Apply 116μ of the wet film thickness to reach 50μ dry film thickness.

**Note:** If used in confined areas, use adequate circulated fresh air continuously during application & drying. Use fresh mask to prevent hazards of fire explosions & health risks.

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Temperature & humidity of ventilation air must be in a way that moisture condensation cannot be formed on the surface.

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## **EPOXY TOP COAT (E8050)**

### **Product data**

#### **Typical Uses**

As a polyamide cured epoxy top coat, it can be used for protection of tank exteriors, structural steel & piping in chemical plants, petroleum industries, pulp paper mills & other structures exposed to severe weathering.

\* It can be used as a hygienic top coat in pipes & tanks interiors in drinking water systems due to FDA confirmations for the consuming resin. (Namely EPW8050)



- Easily applied airless or conventional spray.
- Durable coating system

### **Safety Precautions**

Since this product is flammable, keep it away from heat & flame.

Use safety gloves & mask & apply in well ventilated places.



Store it in dry, cool & ventilated warehouses.

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## Physical Data

Finish.....	Gloss
Color.....	white
Substrate.....	Primed steel
Components.....	2
Solid Weight.....	70 ± 2%
Volume Solids.....	50 ± 2%
DFT.....	50μ/coat
WFT.....	100μ
TSR.....	10 m <sup>2</sup> /lit/50μ
Drying times (at 25° c)	
Surface dry.....	Max. 2hours
Thorough dry.....	16 hours
Full cure.....	7 Days
Mixing Ratio (by w)	
Base.....	4 parts
Cure.....	1 part
Pot life (at 25° c).....	8 hours
Specific Gravity.....	1.25± 0.05 kg/lit
Viscosity (at 25° c).....	45-70 sec (mixed product)
Thinner.....	S406
Hardener.....	HEP01152
Packing	
Base.....	3.2 kg (gal), 12.8 kg (tin)
Cure.....	0.8 kg (quart), 3.2 kg (gal)
Shelf life.....	18 month
Operating temperature	Continuous up to 100°C
	Non continuous up 120°C

**Note:** This product also can be supplied in other colors.

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## Application Instruction

### Environmental Conditions

Air temp..... 10-50°C

Surface temp.....10-60°C

Surface temperature must be at least 3°C above dew point.

### Surface Preparation

Be sure that the primed surface is clean, dry & free of oil, grease & other contaminations before applying EP8050.

### Equipment Conditions

Line nuzzle head pressure

4-6 bars for conventional spraying

120- 180 bars for airless spraying

Nuzzle tip

0.8- 1.2 mm for conventional spraying

0.015- 0.019 inch for airless spraying

### Application procedure

1.Flush equipment with recommended cleaner.

2.Stir base to an even consistency with a power mixer.

3.Add cure to base & continue Stirring up to uniformity. Induction time before use is 10 min.



**Note:** since the pot life is limited & shortened by high temperatures, do not mix more material than will be used.

4.For conventional spray thin only as needed for workability.

5.Stir during application to maintain uniformity of material.

6.Apply 100μ of the wet film thickness to reach 50μ dry film thickness.

**Note:** If used in confined areas, use adequate circulated fresh air continuously during application & drying. Use fresh mask to prevent hazards of fire explosions & health risks.

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Temperature & humidity of ventilation air must be in a way that moisture condensation cannot be formed on the surface.