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# Polyurethane Coating Against Corrosion

Our company can apply Polyurethane and Polyurethane-based coatings for underground steel pipelines and equipments to protect against corrosion.

In general it is known as the most long-lasting in the world for purpose of protection of underground and undersea steel equipments against corrosion for a long time period (50-60 years).

## QUALITY CONTROL TESTS

- Dry Film Thickness (DFT)
- Microtest Thickness Measuring
- Holiday Test (15 Kv Voltage)
- Pull-off Adhension Test
- Hardness Test
- DIN-30671 Standards

## Internal And External Coating

Epoxy coating application with dual component hot airless machine (for internal lining in compliance with potable water pipelines)

### Quality Control Tests After Pu Coating

- Impact Resistance Test
- Tensile and Fracture Testing
- Pull-off Adhension Test

## Application Areas

- Coating of buried crude oil, natural gas, water pipelines and piping components.
- Field joints of pipelines.
- Coating repairs od underground steel pipe welding regions.
- External coating of underground fuel-oil tanks.
- Underground steel equipments.(valves, check valves etc.)
- External coating of ships.
- Coating of undersea piles and scaffolding.
- Coating of clean-up system coating of underground scada containers and underground steel storage tanks equipments.
- Coating of water turbines, pumps, penstock pipes.
- Rehabilitation of equipments that are exposed to corrosion.
- Other steel equipments that are exposed to high corrosion.

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## Coating Quality Standards

Coating application process is carried out in accordance with DIN-30671, BS EN 10290 and AWWA C222-99 standards.

## Properties of Polyurethane (PU) Coating

- It is a dual component solvent-free polyurethane or polyurethane based coating material.
- Desired Dry Film thickness (DFT) (600µ-3000µ).
- High friction and impact resistance (> 25 inch pound).
- Excellent adhesion property (> 75-100 Kg f/cm²).
- Durable to fresh and salty water.
- Quick dry (Application temp. is 60-70°C, pot life is 40 sec.).
- High coating thickness possible per operation (500-3000 mµ).
- Because of solvent-free it is environmentally friendly.
- Black, grey, blue, green, beige and brown color alternatives.

In this system, our dual component feeding hot airless equipment can serve fixed or mobile. Before coating, surfaces are blasted in a quality of SA 2½ and then it is applied by spraying method in a pressure of 400-500 bar with hot airless equipment. Coating applications are in accordance with BS EN 10290 and AWWA C222-99 standards.

## Elastomeric PU Coating Against Corrosion and Impact

The Elastomeric polyurethane coating is a long lasting polyurethane application that provides protection against corrosion, abrasion , impact and chemical effects for a long time period (40-50 Years).

Elastomeric polyurethane coating is applied in 3 different types according to the purpose of usage;

Type 1:In the Industrial sectors, coating of metal structures against corrosion, abrasion and impact.

Type 2: In the construction sector, coating of concrete, wall, ceramic and wood materials for sealing, insulation and resistance.

Type 3:In military buildings and vehicles, coating against mine, bomb and ballistic impact for protection like cabinets, containers and fuel-oil tanks.

Elastomeric polyurethane is a hot airless spray coating / lining system includes two-component polyurethane hybrid coating material that applied with premium equipments for intended thickness. This system for coating applications is especially designed for surface protection of materials against abrasion, corrosion, attrition and impact.

It is suitable for steel and concrete structures and structural joints that will be subjected to dynamic stresses. Curing time is 30 seconds. It does not flat joints and grouts as it takes the shape of the surface. It provides sealing, insulation and dilatation feature and also flexible at low temperature, offers superior resistance and flexibility to the thermal shock(-40_+200).

In addition to all extremely high characteristic features of elastomeric polyurethane coating system, is also environmentally friendly because they do not contain solvents and thus do not release volatile organic contents (VOC's) into the atmosphere.

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# Elastomeric Polyurethane Coating Properties

- It includes all features of water-proofing, anti-corrosion and last coat of paint
- Excellent protection against external environmental effects, and durability
- Excellent chemical resistance to the wide range of common chemicals
- High Flexibility, stretching and bending does not damage the material
- High impact and abrasion resistance
- Perfect adhesion to applied surface
- It has an excellent thermal shock resistance (-40ºC -+200 ºC)
- It does not flat joints and grouts as it takes the shape of the surface
- It is very resistant to abrasion
- Application temperature range is very wide (0º C-45 º C)
- It can be applied when air humidity is 100%
- It is long-lasting (approximately 40-50 years)
- It is applied very fast
- Curing time (pot life) is 30 seconds
- Surface is seamless and compact
- Environmental friendly, Solvent-free (ecological)
- Cost efficient

# Application Areas

Elastomeric Polyurethane Coating application fields are very wide due to extremely high characteristic features. It is applied in many areas such as construction and aviation sector.

Application Surfaces:Concrete, metal, steel, aluminium, wood, glass, ceramic, geo-textile, and other construction materials.

- Vagon, Truck, Pick-up, Rock Dumper internal coating against impact
- Industrial floors that require high level resistance and endurance
- Protection of steel tanks inner and outer surfaces against corrosion
- External and internal coating of pipelines
- Petrochemical refineries
- Coating of treatment tanks and filter tanks
- Internal coating of corrosive chemical tanks
- Internal coating of tanks (Truck mixer, Salt Tank etc.)
- Coating of metal surfaces exposed acid, base and salt
- Coating of military buildings and vehicles, against mine, bomb and ballistic impact
- Bomb impact resistant cabinets
- Coating of piers, oil-gas drilling platforms exposed to sea water
- Blasting cabinet internal coating
- Coating of mud and chemical pumps
- Bridges, tunnels, subways
- Decorative pools and swimming pools
- Terraces and roofs
- Ship Industry
- Using as a sealing/joint material at the large diameter flanges
- Internal coating of concrete pipes
- Sealing of grout and expansion joints and dilatation areas
- Sub base foundation concrete and walls insulation against humidity
- Thermal shock (-40 _ +200) resistant flooring coatings
- Coating of concrete water tanks and rusted tanks for insulation and sealing
- Coating of stairs, ladder steps
- Mining and mineral industry equipments
- Because of Hygienic property and resistance

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## Technical And Chemical Properties

| | |
|---|---|
| **Color** | Grey, Yellow and various types |
| **Storage Temperature** | + 10°C / +30°C |
| **Density** | 1,1 ± 0,01 g/cm³ |
| **Ratio of Components** | 1,0 1,0 (by volume) |
| **Viscosity of the Mixture Prit=80°C** | 100 MPa-s |
| **Hardness (Shore A)** | 90 (ASTMD 2240, DIN 53505) 1 |
| **Breakout force (Tensile)** | 7,5 MPA (ASTM D 412, DIN 53 504) |
| **Tear Strength** | 15,5 Mpa (ASTM D 412, DIN 53 504) |
| **Stretch During Break(Elongation)** | ≥110 (ASTM D 412 , DIN 53504) |
| **Adhesion on the Sand Blasted Metal, Without Primer** | 12,0 Mpa (ISO 4624, DIN EN 24624) |
| **Max Temp. of Liquid Inside** | + 150°C |
| **Solid Material** | %100 |
| **Curing Time** | ≈ 30 Sec. |
| **Drying Time (Temp=+20°C)** | 2 Minutes (* Fully drying after 24 hours) |
| **Fully Drying and Mechanical Strength** | After 24 hours |
| **Impact Resistance** | na -15°C, 15 J na 20 °C, 27 J na 40 °C, 28 J |

## Chemical Resistance (170 Hours Test Results)

| | |
|---|---|
| **10% Sodium Chloride / NaCl** | Resistant |
| **10% Sulfuric Acid / H2SO4** | Resistant |
| **10% Hydrochloric Acid / HCl** | Resistant |
| **20% Ammonium / NH4+** | Resistant |
| **%50 Sodium Hydroxide / NaOH** | Resistant |
| **20% Potassium Hydroxide / KOH** | Resistant |
| **Cathodic Delamination** | Resistant ( Condition: in NaCl , at 80°C for 1000 Hours ) |
| **Resistance of Exposure to High Temperatures in a Short Time (t=230°C, 1 min.)** | No Changing |
| **Continuous Liquid Temp. Max.** | + 150°C |
| **Water Resistance** | Resistance-Water Proof |

## Coating Application Conditions

| | |
|---|---|
| **Temperatures of Components (During the Application)** | +75 - +80°C |
| **Before Coating Surface Preparation** | SA 2 ½ Blasting or Primer Application |
| **Nozzle Pressure During the Application** | 170 - 200 Bar (Min 170 Bar, Max 240 Bar) |
| **Shelf Life** | 6 Months |
| **Consumption for 1 mm Thickness** | 1,57 Kg/m² |
| **Life Expectancy in Case of Normal Using** | 40-50 Years |

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# Repair and Field Joint Coating

The field joint is the area where two pipe joints meet and are welded together. The bare part of the pipeline and joints surrounding the weld area, is extremely susceptible to corrosion and it must be protected agains corrosion by Polyurethane Coating. Field joint coatings vary in both the complexity of application technique and the sensitivity to environmental conditions.

## Properties Polyurethane Coating

Long-Term Anti-Corrosion Coating System. Excellent fortification and bonding to the steel Pipeline substrate and joint parts. Tough outer surface resists damage and protects during piping activities.

### Before and After Application Tests

- Pull-off Adhension Test
- Hardness Test
- Holiday Test (15 Kv Voltage)
- Dust Test
- Salt Test
- Dry Film Thickness (DFT)
- Humidity Ratio Measurement

## Field Coating Application

- Determining weather and environmental conditions (surface and ambient temperature and humidity)
- After welding and before blasting inspection of Pipeline joint and Cleaning. (Weld Splatter, grinding, Sharp edges)
- Surface preparation and blasting application

# Surface Preparation

Our company applies blasting in a quality of SA 2½ surface profile and 50µm-100µm surface roughness in accordance with coating and painting data sheets.

### Test and Quality Control Process after Blasting:

- Salt Test ( Max 20mg/m² )
- Holiday Test (15 Kv Voltage)
- Dust Test ( Class 2 )
- Surface Roughness
- Surface Profile ( SA 2½ )
- Ambient Temperature
- Surface Temperature
- Dew Point
- Humidity Ratio

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