

# Corrosion Protection Systems

## PROTEGOL<sup>®</sup> high performance coatings





## Leaders in quality and service

TIB Chemicals originates from the merger of Goldschmidt TIB Germany and Goldschmidt Quimica de México. As manufacturer of specialised Basic Chemicals, innovative Inorganic Specialty Chemicals and Coating Systems, the company supplies to a worldwide market.

The largest production facilities of TIB Chemicals are located in Mannheim (Germany) as well as San Luis Potosi (Mexico). The sales and marketing organisation operates globally, with representations on all continents.

Employing approximately 350 qualified personnel, the TIB Chemicals manufacturing history dates back over 130 years of tradition and know-how. With a yearly production of more than 400.000 tons of chemicals, TIB Chemicals generates revenues of over € 120 million.

The yearly growth of TIB Chemicals' accrual rate is above the average for the industry. High-quality products, custom-made solutions and a flexible distribution and logistics service for our entire customer base are the basis of our success. Customer requirements are met with prompt and individual attention. We thereby focus on our main target, to increase and to enhance the business success of our clients.

Subdivided into three business units, the company operates Basic Chemicals, Inorganic Specialty Chemicals and Coating Systems. Combined they form a strong unit with a solid financial base and with the logistic and organisational structure of a large international enterprise.

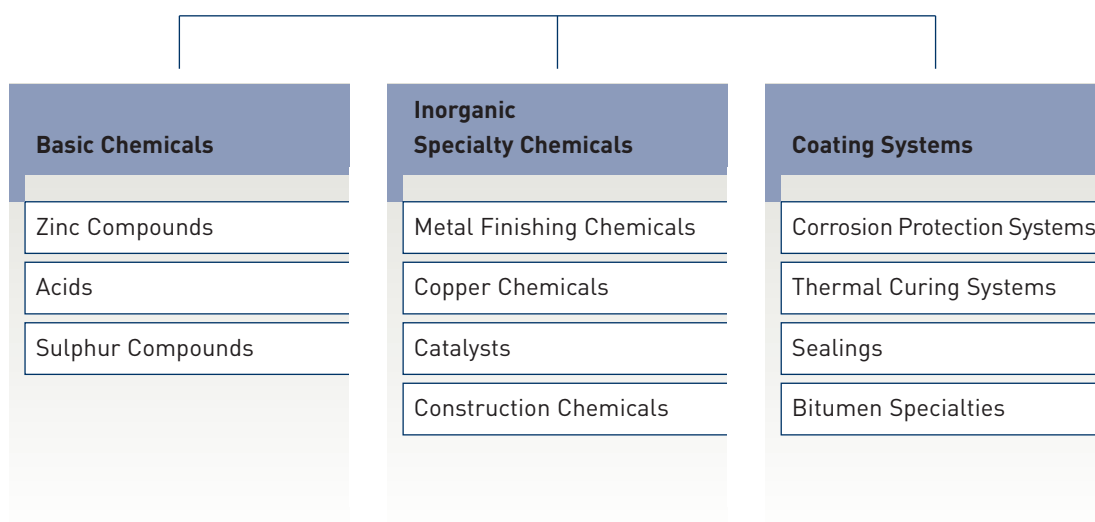


*TIB Chemicals successfully passed certification for the standards according to ISO 9001:2000.*





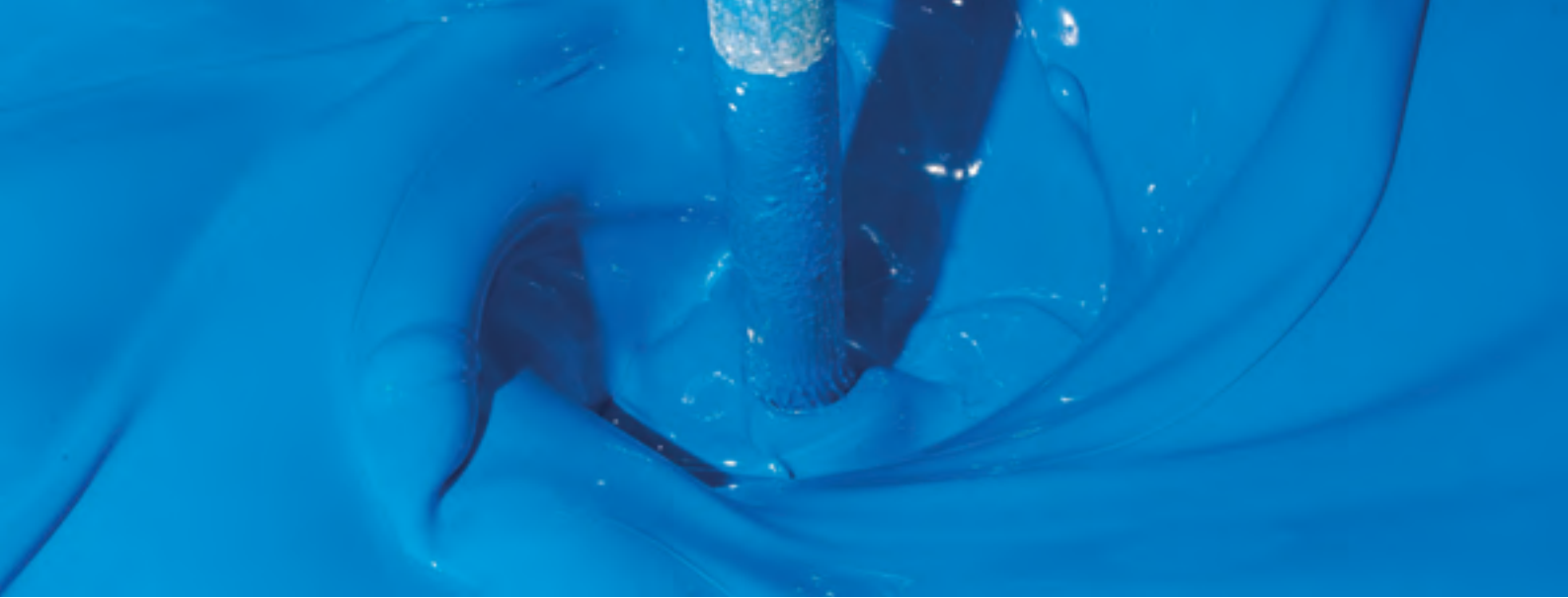
## TIB CHEMICALS



### TIB Chemicals produces and distributes through three business units

- ❑ **Basic Chemicals**, such as acids or sulphuric and zinc compounds for chemicals companies, the metal industries, hot-dip galvanising industry, for the electroplating industry, the textile and plastic industry, and water purification of for producers of food and beverages
- ❑ **Inorganic Specialty Chemicals** based on elements tin, zinc, copper and bismuth. These special compounds are used as galvano chemicals for the electronic and metal industries, copper compounds for the automotive and chemical industry, catalysts for the varnish and paint industry and also, chromate reduction for the construction chemistry
- ❑ **Coating Systems** based on plural component liquid polyurethane and epoxy systems have been developed as the anticorrosion protection for the pipeline industry, valves, fittings and vessels. Also the sewage outfall, water treatment and power plants. Hot dip coatings for electroplating plants/tool industry, and stoving varnishes for interior drum linings. Sealing compounds for gas and heating systems. Additionally modification and oxidation of bitumina together with production of specialities of bituminous based systems for the surfaces on traffic paths, and aprons

The following pages introduces, **PROTEGOL®** one of the major product groups within the Corrosion Protection Division.



## PROTEGOL® protective coating systems against corrosion

In the oil & gas energy industry, the valve making industry or, manufacturers of pipes. More and more customers within the industry are acknowledging the high quality of PROTEGOL® coating systems, have been developed as the most reliable protection against corrosion, based on approved liquid polyurethane's, and epoxies. We are one of the leading manufacturers of high technology coating systems for decades, and a recognised reliable supplier.

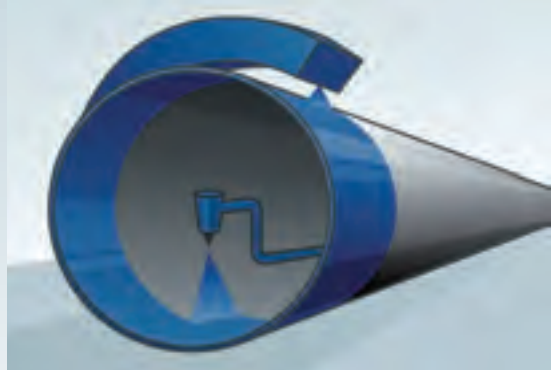
TIB Chemicals, manufactures over 50 high-quality multi-component PROTEGOL® products for pipes, valves and fittings, which are applied with the airless spraying procedures. The systems offer an effective protection against corrosion, fast curing and easy to apply. PROTEGOL® coating systems based on polyurethane or epoxy, are suitable protection for both, new coating in industrial manufacturing, and refurbishment in the field.

Over 50 years, of continued development has produced, high performance innovative coating systems, of the highest quality and standard. Therefore we are continuously aware of our customer needs. PROTEGOL® coating systems fulfill the specific applications and requirements and meet all recognised international standards. We supply suitable systems to our customers and develop new, custom-made solutions.

Co-operating closely with our customers, through a network of qualified sales and marketing personnel throughout the world. We advise our business partners locally, which products are suitable and provide full support, and training in the application of our innovative application systems, both for internal and external coating.

### Online application external coating/internal lining

Online application for external coating of pipes against corrosion and soil-stress. Flow coat systems for internal lining for reduced friction of gas transmission pipelines, and internal coating as a corrosion protection for the supply of potable water pipelines, applied by airless hot-spray method by using guns or rotating wheels.





Since June 2006, the BTC – Baku-Tbilisi-Ceyhan Pipeline has been transporting crude oil from the Caspian Sea to the Mediterranean Sea – in the Turkish section, the length of the pipeline is 1070 km long, the field joints were coated with PROTEGOL®UT Coating 32-10 by using automatic sprayings

## Developed for harsh and severe conditions

- ❑ PROTEGOL® polyurethane and epoxy based coating systems give long life protection against corrosion attack even under severe soil stress conditions
- ❑ PROTEGOL® has excellent bonding to steel and cast iron substrates. Providing extremely high abrasion and chemical resistance. Our coating systems are especially approved for the protection of oil, and gas pipelines. Within our range of protective coatings portfolio, including systems specifically developed for use in contact with potable water
- ❑ PROTEGOL® polyurethane coatings have extremely high impact resistance and excellent mechanical properties, a distinct advantage in the transportation of coated pipes, valves and fittings
- ❑ PROTEGOL® is formulated to withstand temperature variations, because, pipelines and industrial plants have often to meet extreme temperature requirements. Therefore, our coating products have been developed, to operate at temperature ranges from, minus 30 °C up to 120 °C



External protection of pipelines for all terrains, even for extreme temperature requirements



Online application for internal lining of 56" pipes with PROTEGOL®EP Coating 130 HT, in a coating thickness of 600 µm



PROTEGOL® coating system have been approved for both, onshore and offshore



## Application in the field – simple and efficient

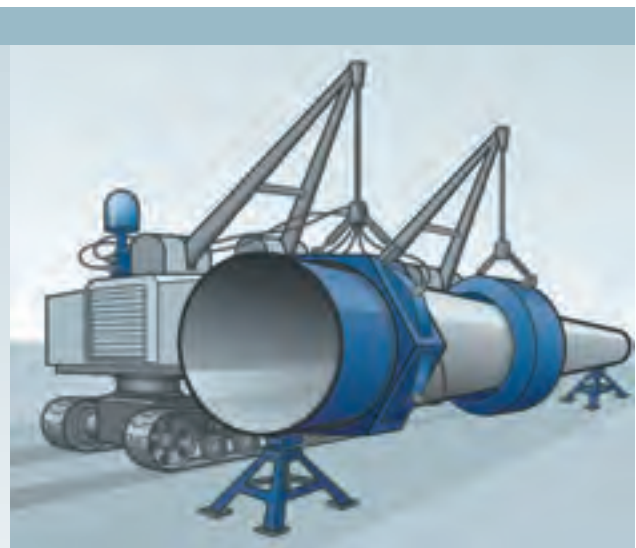
PROTEGOL® is not only durably effective, but can also be economically applied and has fast curing properties, even at ambient temperature  $> +10\text{ °C}$  without pre- or post heating. This makes PROTEGOL® the ideal coating solution against corrosion.

**PROTEGOL® can be applied with a 2-component airless hot-spray procedure, which gives many advantages in the field:**

- ❑ One single pass application achieving thin film thicknesses of  $> 500\text{ }\mu\text{m}$  or thicknesses of  $> 1500\text{ }\mu\text{m}$  can be applied
- ❑ Field joints or, complicated shapes can be effectively, and perfectly coated additionally rehabilitated economically through controlled material consumption, at the same time maintaining a constant quality
- ❑ Achieving a homogeneous coating with the 2-component airless procedure, with excellent adhesion to the steel surface.
- ❑ Our solvent-free corrosion protective coating systems on polyurethane-base have fast-curing properties. Within a short period, tests such as measurement of film thickness and holiday detection can be carried out

### Method using an automatic spray-ring

The efficient application of PROTEGOL® polyurethane based coatings, by airless hot-spray method, using uniform and pinhole-free coating, together with controlled material consumption in a single pass coating operation.

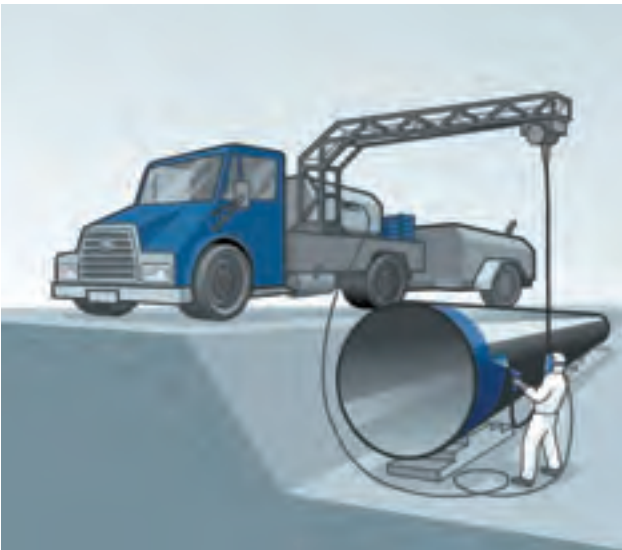




Pipeline rehabilitation applying PROTEGOL®UR Coating 32-55 over the ditch at a location in Czeljabsinsk region, Southeast Ural, using automatic spray unit with three oscillating guns as the method of application (Courtesy of Incal Pipeline Inc.)

## Flexibility – Methods of application

In joint co-operation with TIB Chemicals as the coating manufacturer, the first automatic spray-ring for application of PROTEGOL® systems on pipelines in the field was, designed and developed by the equipment manufacturer. This method of application, using a mobile airless hot-spray unit mounted on a truck, has proved to be a most efficient method of application for short distance, and bellhole rehabilitation.



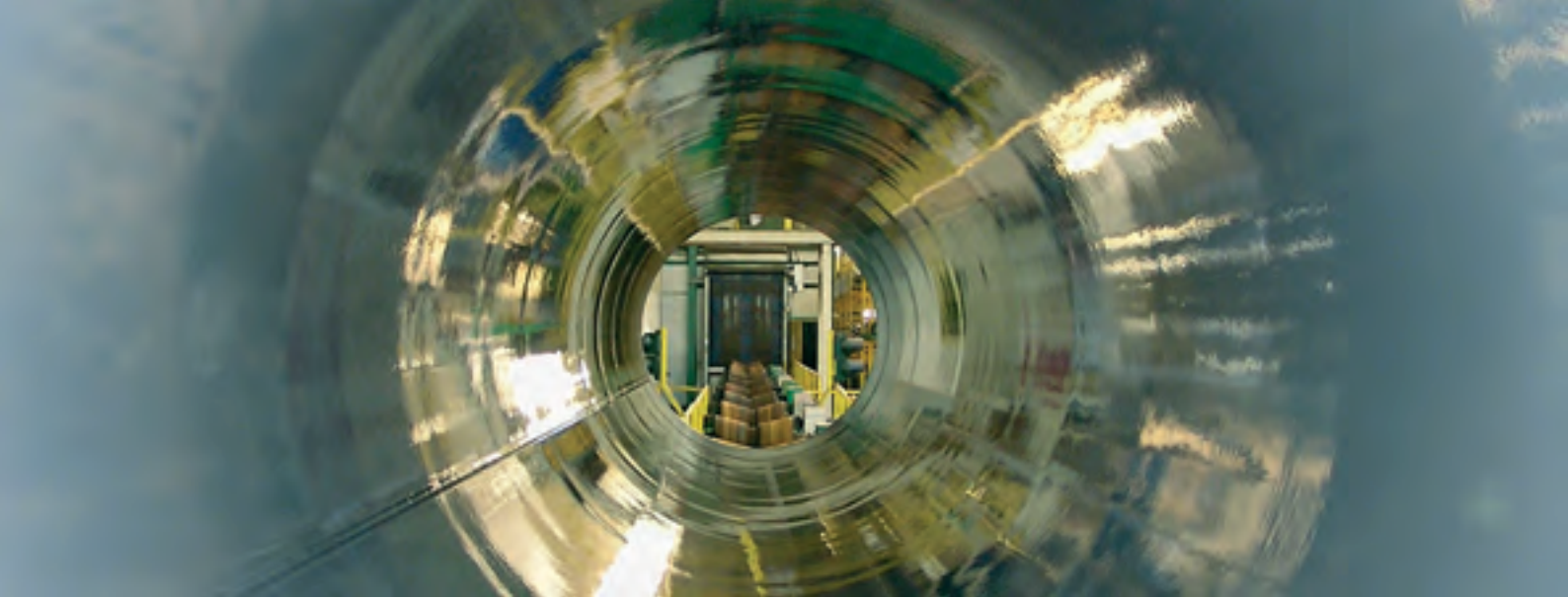
### Mobile airless hot-spray equipment

The rehabilitation of pipelines in the field, or coating of new steel construction, e.g. distribution units or compressor stations, carried out with the mobile airless equipment offers the advantage of an easy coating operation.



### PROTEGOL® repair materials for hand application

The coating of girth weld joints, carried out using suitable recommended materials for hand application, formulated with an extended potlife and pre-working of sharp corners, edges at the valves, additionally repairing mechanical damage caused during transportation.



## New coating in the pipe mill innovative and cost effective

PROTEGOL® coatings achieve rational in short time a homogenous and perfect internal and external coating against corrosion attack.

The application with the 2-component airless hot-spray equipment has been approved throughout the pipeline industry. In a single pass a pore free coating is achieved, with excellent adhesion onto cast iron and steel, with fast reaction time and excellent protection against corrosion.



### **Increased efficiency is guaranteed by**

- ⚡ Short time installation
- ⚡ Ease of application, single product requiring no primer
- ⚡ Fast curing and reaction time
- ⚡ Custom made coating systems



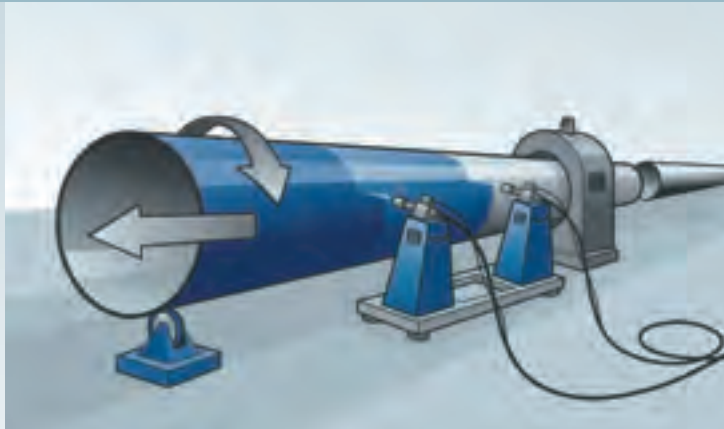
*Online coating facility for coating of pipes with different pipe diameter: Blasting unit/buffer zone/pipe coating section*

## Methods of application in the factory

In joint co-operation with TIB Chemicals, specific online-processes for the external and internal coating was produced as a simple and efficient application, were developed by the equipment manufacturers. For versatile requirements, such as variation in coating thicknesses, and variations of pipe diameters, this online procedure is approved. Factory application method, utilising fixed spraying guns, especially for the external coating of pipes of the same or similar size. Our system produces high efficiency, during application on pipes of different diameters, using a mobile spraying gun.

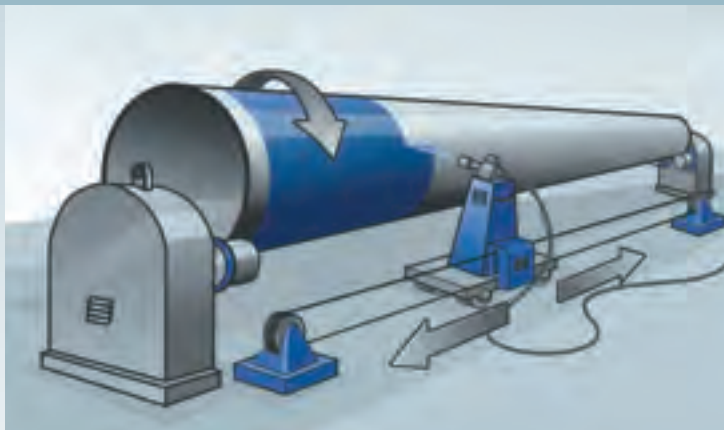
### Schematic diagram showing the online application with fixed nozzles

Rotating pipe passes fixed spray guns for the application to the required thickness in one pass, following preheating of the pipe up to 90 °C . Induction heaters complete the pre-heating process. The applied coating will be cooled down by a water quencher system, to accelerate the curing down to one minute.



### Schematic drawing showing the online application using rollers

Movement of the rollers rotates the pipes. During the coating process the guns are passing the rotating pipe. The advantage of this system, is the capability to coat pipes of various diameter and application in several passes to achieve the required specified coating thickness. Preheating of the pipe is not required.





## Corrosion protection for steel structures – reliable and safe

Each year corrosion of steel structures causes billions of dollars damages worldwide. TIB Chemicals offers proven solutions for protection of steel structures in sewage treatment plants, power plants and oil production facilities proved to be reliable, and providing long term durable corrosion protection. We have gained experience in the development, production and application of two component epoxy and polyurethane based coating systems in the sector of heavy-duty corrosion protection.

PROTEGOL® coatings manufactured, and distributed by TIB Chemicals are chemically and mechanically highly reliable, and meet all the demanding requirements of international quality standards.

### Proven efficiency within many industrial areas

- ❑ Conventional and nuclear power plants
- ❑ Sewage water treatment plants
- ❑ Condensators and cooling water pipelines
- ❑ Tanks and vessels

### Various uses and specialised range of applications

- ❑ Internal coating of cooling water pipelines
- ❑ Pipelines at high service temperatures
- ❑ Product supply lines
- ❑ Storage tanks (e.g. LPG-bullets tanks)
- ❑ Tube sheets of heat exchangers
- ❑ Water chambers
- ❑ Neutralisation and boric water tanks
- ❑ Applicable also during simultaneous operation of cathodic corrosion protection installations



*Fittings:  
External coating of water traps*



*Pipeline components:  
External protection of elbows*



*Tanks:  
External coating of tanks for installation in a chemical plant*



*Power plant components:  
External coating of distribution units*



*Gas Valves:  
External coating of 56" ball valve – PROTEGOL®UR Coating 32-55  
in a film thickness > 2 mm*



*Abrasion resistant internal lining  
for a pump drive assembly using  
PROTEGOL®UR 32-55*



*Great Man-Made-River Project, Libya:  
Water supply distribution unit protected  
with PROTEGOL®UR 32-55*



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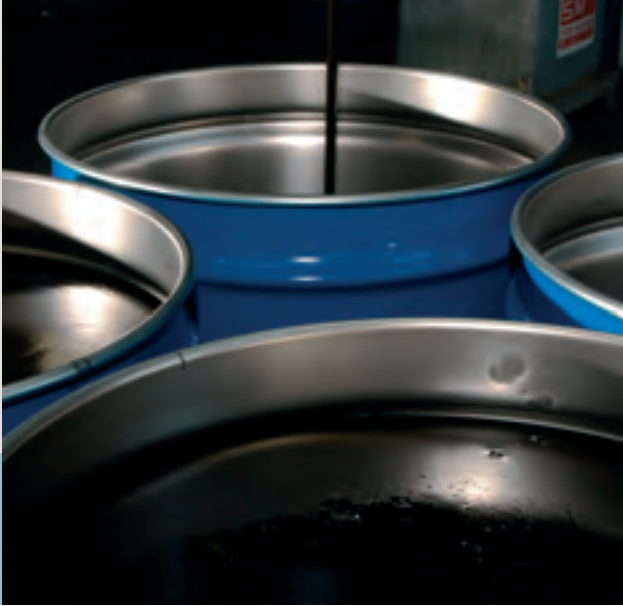
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Filling process of PROTEGOL® component into 200 liter drums. Other filling variations include, 30 liter (non-returnable) pails or, 1,000 liter returnable and non-returnable bulk containers

PROTEGOL® polyurethane systems	Polyurethane	Epoxy	Pipes, fittings, valves	Vessels, tanks	HDD pipes, field joint coating	Potable water approval, Germany	Potable water approval, Spain	Potable water approval, France	Potable water approval, Austria	Potable water approval, Switzerland	DIN EN 10290	DIN EN 10289	1-component application	2-component application	Internal lining	External coating	Manual application	Bacteriological approval W 270	Anti-static	Water-borne epoxy	ISO 15 741 : 12/2001	API RP 5L2	Transco CM2, March 2003
	PU 32-10	■		■	■	■						■			■		■						
PU 32-27	■		■	■					■					■	■	■							
PU 32-35 RRG	■		■	■										■		■							
PU 32-45	■		■	■	■	■	■	■			■			■	■	■		■					
PU 32-55	■		■	■	■						■			■	■	■		■					
PU 32-55 TD	■		■	■	■						■		■		■	■	■						
PU 32-10 L	■		■	■	■											■	■						
PU 32-55/45 L	■		■	■	■										■	■	■						
PU 32-60	■		■		■						■			■		■							
PU Offshore weld coating	■		■		■									■		■							

PROTEGOL® epoxy systems	Polyurethane	Epoxy	Pipes, fittings, valves	Vessels, tanks	HDD pipes, field joint coating	Potable water approval, Germany	Potable water approval, Spain	Potable water approval, France	Potable water approval, Austria	Potable water approval, Switzerland	DIN EN 10290	DIN EN 10289	1-component application	2-component application	Internal lining	External coating	Manual application	Bacteriological approval W 270	Anti-static	Water-borne epoxy	ISO 15 741 : 12/2001	API RP 5L2	Transco CM2, March 2003
EP 32-89		■	■	■									■		■	■	■						
EP 32-89 L		■	■	■	■											■	■						
EP 32-99		■	■	■		■		■					■	■	■			■					
EP 32-97		■	■	■		■	■			■				■	■			■					
EP 130 HT		■	■	■							■			■	■	■							
EP 131 HT		■	■	■							■			■	■								
EP TB 55		■	■	■									■	■	■								
EP TB 55 AS		■	■	■									■	■	■				■				
EP-Flowcoat 06 LT													■	■	■					■	■	■	■
EP-Primer		■																					

