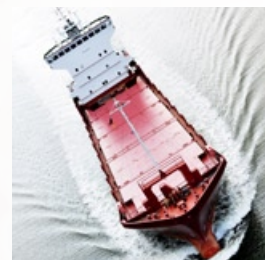
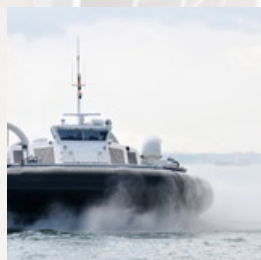


Elastomeric spray coatings and repair materials to protect against erosion, corrosion, cavitation and wear

MetaLine® Serie 700 Cartridge Spray Coating

... the new dimension in coating technology after 50 years of brush applied epoxy-ceramic





MetaLine® Series 700

Rubber-like, sprayable wear protection to solve erosion, corrosion and cavitation problems directly on-board

For more than 50 years, MetaLine has been concerned with synthetic coating materials to recover and protect surfaces in danger of wear and tear.

MetaLine Series 700 is a material concept combining the efficiency and performance of vulcanized rubber coatings with the simple processing of epoxy-ceramics with extreme lifetime improvements! In connection with the novel cartridge spray processing, this presents a **milestone** in the protection of metal structures!

Natural rubber is a proven wear and corrosion protection material. However, with **seams** that can fail, restricted reparability and its equipment intensive need for field vulcanization. Rapid in-situ lining is generally not possible. When repairs need to be carried out, quite often epoxy-ceramic products are used due to the ease of application. However, replacing rubber by plastic filling compounds is a questionable approach and not generally to be recommended . . .

MetaLine Series 700 is an elastomeric material system that offers a different solution. This new product combines rubber quality features with a novel cartridge spray process. Using this technique, it is possible to apply **sprayable elastomer wear protection coatings** - directly on site - professionally, **rapidly** and **seamlessly**. The product is based on a special PUR-Elastomer technology that does not require vulcanization.

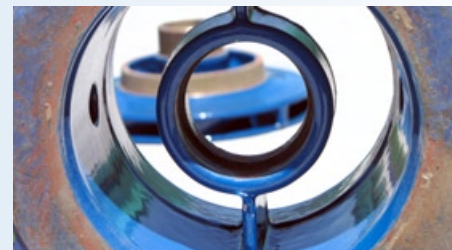
By means of the MetaLine cartridge spray gun, the coating is mixed and sprayed automatically. This results in hydro-dynamically resilient protective coatings developing an **erosion and cavitation resistance** so far not yet achieved. The stability is exceeded by up to **50 times (*)** in comparison with epoxy-ceramics!

MetaLine Series 700 is extremely convincing owing to its simple spray application process and the extraordinary **surface smoothness** and resultant improvement in **flow efficiency**. Efficiency increases of up to 3.5 % has been proven.

The process is suitable for the complete protection of metal components as well as for the repair of existing rubber linings.



The daily repair routine with conventional epoxy ceramic products applied by an old-fashioned process which no designer wants to see anymore . . .



This is how it should be instead - MetaLine surfaces are smoother than any steel casting and also approximately 500 % more wear-resistant than conventional steel () . . .*

**) Proven by independent research laboratories and OEM tests, including pump manufacturers KSB (Technik kompakt, 12/2004) and ANDRITZ*



Material-Details

MetaLine Series 700



The Product

MetaLine Series 700 is a **solvent-free** two-component elastomer. Application is carried out by spraying, injection or casting. Polymerization begins after 1 minute so that even on vertical surfaces layer thicknesses between 1 and 20 mm can be realized without the material sag. Processing can be realized under almost **any climatic** conditions (including high humidity) directly on board.

MetaLine Series 700 adheres to almost any substrate, including steel, brass, aluminum, bronze, concrete, rubber and most plastics. It is not necessary to heat the components to be coated. After approximately 5 minutes, the coating is dry to touch and commissioning can be carried out after 24 hours (at 20 °C). Temperature resistance is between **-50 °C and +120 °C**, depending on the relevant application.

MetaLine Series 700 cures without any tension and develops in addition to its chemical adhesion a mechanical **memory effect**. This pulls the coating permanently against the substrate thus counteracting any separation tendency as it is the case with conventional rubber tiles. In addition, MetaLine Series 700 can be recoated and repaired!

There are 3 different degrees of hardness available:

- **MetaLine 760** (60 Shore A) serves to repair damaged soft rubber linings or overhaul conveyor belts
- **MetaLine 785** (85 Shore A) is the first choice for the protection of components subjected to wear, erosion or cavitation
- **MetaLine 795** (95 Shore A) develops non-stick properties owing to the low coefficient of static friction and prevents bridging, e.g. in hoppers

MetaLine Series 700 coatings are particularly user friendly having been assessed by the US authorities as drug and **food-safe** according to FDA standards.

The strength of MetaLine Series 700 lies in its erosion and cavitation resistance which is **comparable** with high-alloy steels and **armors**. With a density of 1.05 g/cm³ it is the most **lightweight** duroplastic wear protection concept available and potential energy savings when applied to impellers and rotors, are considerable.



Application Process

The novel MetaLine cartridge spray process is based on **low-pressure spraying** in connection with pneumatically controlled material conveying.

By means of the MetaLine **cartridge spray gun** the two-component coating is automatically and precisely mixed with no possibility of 'off-ratio' problems than can be associated with conventional two-component products.

Similar to a 'DIY' spray can, only the required amount of material is removed. There is no mixed waste, and opened cartridges can be used again at a later point in time.

Mixing is undertaken via an in-line plastic disposable mixer acting in conjunction with an atomizer nozzle. The spray gun does not come into contact with the coating material so that the **tool does not have to be cleaned** after finishing the work.

Spraying is similar to wet-paint processing, although no solvents are used here. Merely compressed air with 5 bar pressure and a volume amounting approximately to 300 liters is necessary.

The MetaLine cartridge gun has been designed for rough working atmospheres and is maintenance free. Investment cost is below 1.000,- EUR!



Abrasion / erosion-resistant

Permanently elastic

Cavitation-resistant

Shock-absorbing

Glide enhancing or slip-resistant

Corrosion-resistant



MetaLine[®] Series 700 Spray Elastomers

	MetaLine 760	MetaLine 785	MetaLine 795
Hardness sprayed /cast on (A.S.T.M. D2240-68)	60 / 65 Shore A	82 / 85 Shore A	95 / 98 Shore A
Density (DIN 53 479)	1.10 g/cm ³	1.05 g/cm ³	1.05 g/cm ³
Tensile strength (A.S.T.M. D412-68)	20 N/mm ²	20 N/mm ²	24 N/mm ²
Tensile Modulus at 100 % elongation (A.S.T.M. D412-68)	6 N/mm ²	7 N/mm ²	13 N/mm ²
Tear resistance (DIN 53 515)	68 N/mm	55 N/mm	68 N/mm
Elongation at break (A.S.T.M. D412-68)	650 %	380 %	275 %
Bashore resilience (DIN 53 512)	63 %	45 %	27 %
Coefficient of thermal conductivity (DIN 52 612)	0.2 W/K·m	0.2 W/K·m	0.2 W/K·m
Dielectric surface resistivity (DIN 53 482)	7 x 10 ¹⁰ Ohm	7 x 10 ¹⁰ Ohm	7 x 10 ¹⁰ Ohm
Dielectric breakdown voltage (DIN 53 841)	> 5 Kv/mm	> 5 Kv/mm	> 5 Kv/mm
Temperature resistance (dry / wet)	+100 °C / +60 °C	+120 °C / +60 °C	+120 °C / +60 °C
Abrasion according to Taber (A.S.T.M. D1-044-73 - Rad H-22, dry, 1 kg, 1.000 U)	n.d.	8.2 mg	10.5 mg
Abrasion (DIN 53 516)	80 mm ³	70 mm ³	n.d.
Coefficient of static friction (DIN EN ISO 8295)	$\mu(0) = \text{approx. } 0.7$	$\mu(0) = \text{approx. } 0.6$	$\mu(0) = \text{approx. } 0.2$
Solids contents (DIN EN ISO 3251)	100 %	100 %	100 %
Processing time (at 50 °C)	7 minutes	1 minutes	1 minute
Solidification (at 20 °C - dependent on stress)	> 1.5 days	> 1 day	> 1 day
Coverage (theoretically per mm film thickness)	1.20 kg/m ²	1.20 kg/m ²	1.20 kg/m ²



Fields of Application

MetaLine Series 700



MetaLine Series 700 is used, amongst others, on board of the following container ships, bulk carriers, car ferries or fishing factory vessels:

Vessel Cormone
Vessel Togo
Vessel St. Anna
Vessel Berge Danuta
Vessel Toronto
Vessel E.R. Denver
Vessel E.R. Savannah
Vessel E.R. Dallas
Vessel E.R. Beijing
Vessel Konstanz
Vessel E.R. Amsterdam
Vessel E.R. Berlin
Vessel E.R. Kobe
Vessel E.R. Santiago
Vessel E.R. Felixstowe
Vessel Independent Accord
Vessel Logos Hope
Vessel Antonio Nores
Vessel Hermigon
Vessel Anapurna
Vessel Maya Rickmers
Vessel Vicki Rickmers
Vessel Cathrine Rickmers
Vessel Pacific Resolution
Vessel Sabine Rickmers
Vessel Tsingtao Express
Vessel E.R. Canada
Vessel E.R. India
Vessel E.R. Los Angeles

Beyond mentioning the ship names, it is not possible for us to publish more details about the work carried out since we have precise agreements with the shipping companies and ships' owners not to do so for advertising purposes. We appreciate your understanding.

MetaLine® Series 700 - wear protection system for the repair of damaged rubber linings or elastomeric in-situ coating of metal structures

- cooling water pumps
- seawater pipes
- ballast water treatment systems
- bulwarks
- anchor lockers
- hatch seals
- ship propellers
- buoys
- fenders
- buoyancy pipes
- seawater filters
- thrusters
- kort nozzles
- valves
- fire fighting water systems
- propulsion drives
- aluminum hulls
- dredging pumps
- rudder blades
- steven supports
- stabilizers
- underwater antennas
- cold storage cells
- fish processing areas
- strainers
- fins
- valves and fittings
- jetski & water sports gear



Wear protection

Corrosion protection

Shock absorption

Cavitation protection

Antifouling performance

Noise deadening



Corrosion Protection

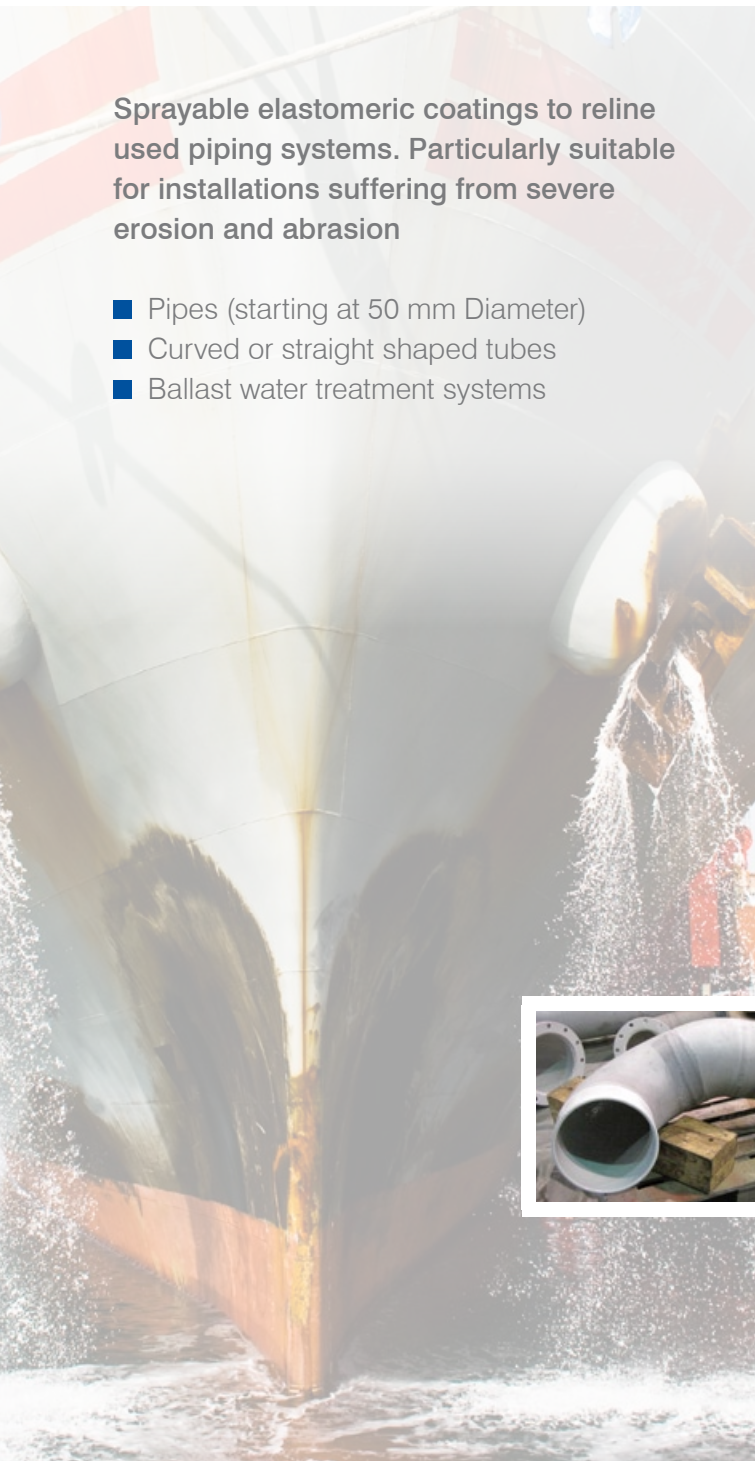
MetaLine Series 700



Seawater Pipes

Sprayable elastomeric coatings to reline used piping systems. Particularly suitable for installations suffering from severe erosion and abrasion

- Pipes (starting at 50 mm Diameter)
- Curved or straight shaped tubes
- Ballast water treatment systems



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- 1 Scared surface being smoothed out by MetaLine 785
- 2 Seawater pipes during in-situ coating
- 3 Proven spray solutions for curved / contorted pipes
- 4 Internal pipe coating including flange areas
- 5 Inside coating with seamless flange "rubber" lining

Erosion Protection

MetaLine Series 700



Pumps Valves

Sprayable elastomeric coatings to re-furbish worn parts or for the preventive maintenance of new equipment. Extremely resistant to erosion, cavitation and corrosion

- Open impellers
- Closed impellers
- Pump casings



- 1 Seamless impeller lining for maximum erosion protection
- 2 Elastomeric wear protection for pump casings
- 3 No matter what dimension - MetaLine has no restrictions in size
- 4 Saltwater corrosion protection with long-term warranty
- 5 Tried and tested for any sizes of hydraulic conveying systems

Surface Protection

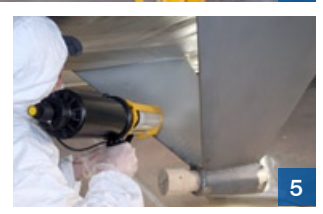
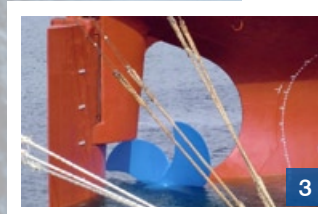
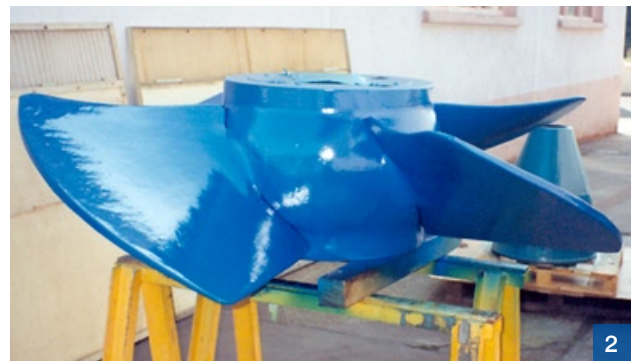
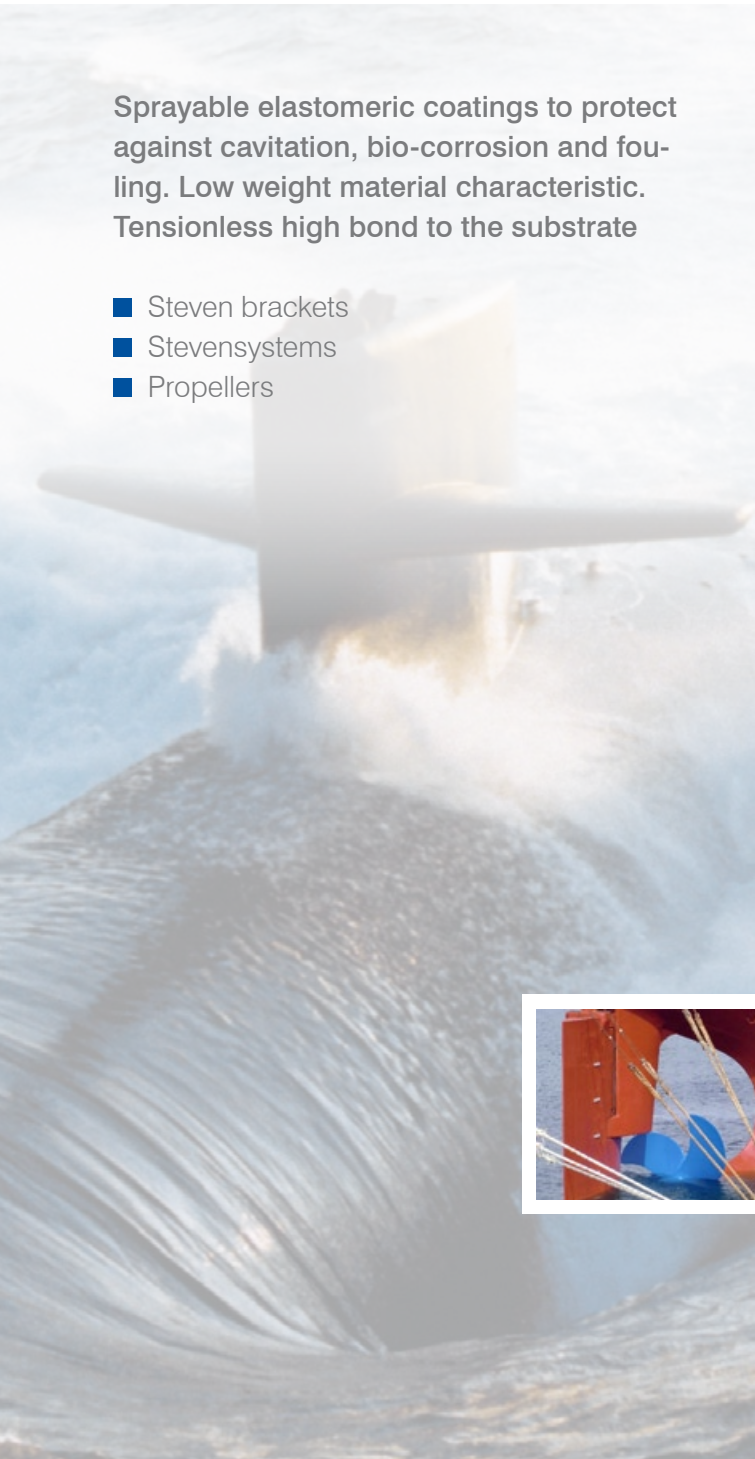
MetaLine Series 700



Propeller Steven

Sprayable elastomeric coatings to protect against cavitation, bio-corrosion and fouling. Low weight material characteristic. Tensionless high bond to the substrate

- Steven brackets
- Stevensystems
- Propellers



- 1 *MetaLine in-situ coating – by professionals for professionals*
- 2 *Ship's propeller during in-situ coating*
- 3 *This might be the future of maritime propulsion technology*
- 4 *Rubberlike coated aluminum sports boat propellers*
- 5 *Coated steven bracket on a coast patrol boat*

Wear Protection

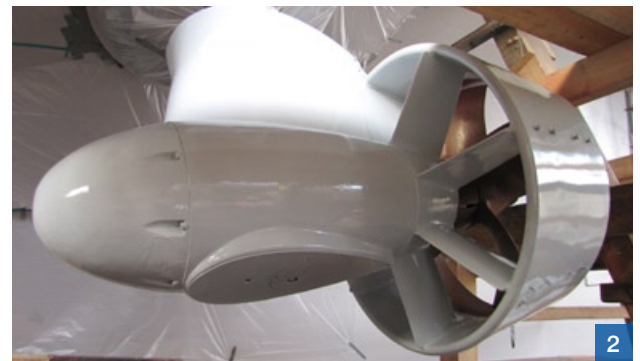
MetaLine Series 700



Propulsion Drives

Sprayable elastomeric coatings to protect against impact and high fluid flow forces. These rubberlike linings create a completely seamless and extremely smooth surface characteristic which provides increased efficiency

- Jet propulsion systems
- Kort nozzles
- Thrusters



- 1 *MetaLine's elastomeric technology – no chance for impact*
- 2 *Smooth surfaces to fight against cavitation and turbulences*
- 3 *MetaLine coatings – designed for immersion purposes*
- 4 *Fluid-flow, performance & cost optimization with MetaLine*
- 5 *State of the art seamless elastomeric spraylinings*

Life-time Extension

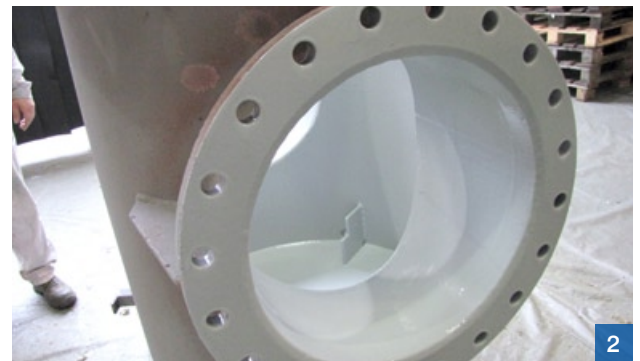
MetaLine Series 700



Filter Strainers

Sprayable elastomeric coatings for the repair or complete re-lining of maritime filter equipment. Seamless and borderless homogenous rubberlike character

- Strainers
- Ballast water treatment reactors
- Desalination equipment



- 1 Coated strainers before assembly in the port of Lisbon
- 2 Seamless spray elastomeric lining of a used strainer
- 3 Resistant due to an integrated borderline anti-corrosion primer
- 4 Seawater filter with liquid rubber lining in the dry dock
- 5 Coated ballast water treatment reactor

Cavitation Protection

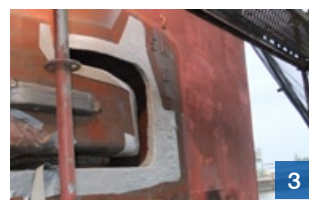
MetaLine Series 700



Rudder Systems

Trowelable or sprayable elastomeric repair compounds to resurface worn metallic structures. Applicable in every desired thickness. Highly elastic and extremely resistant against cavitation

- Rudder horns
- Rudders
- Stabilizer fins



- 1 *MetaLine in-situ coating at this rudder horn*
- 2 *Rudder with a final top coat after MetaLine 785 partial coating*
- 3 *Problem solutions of the latest coating generation*
- 4 *Reconstruction of the missing structure and preventive protection*
- 5 *Seamless and tensionless elastomeric lining*

Abrasion Protection

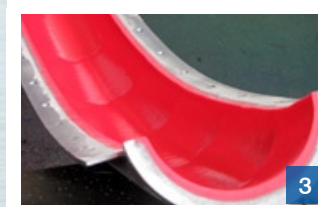
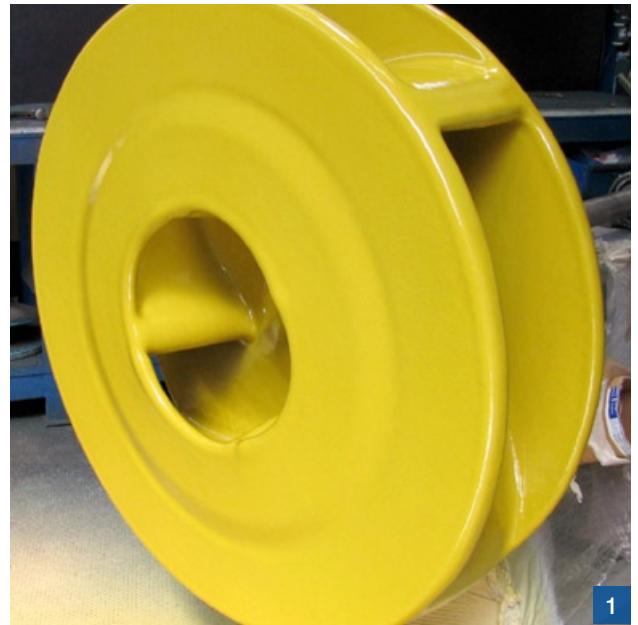
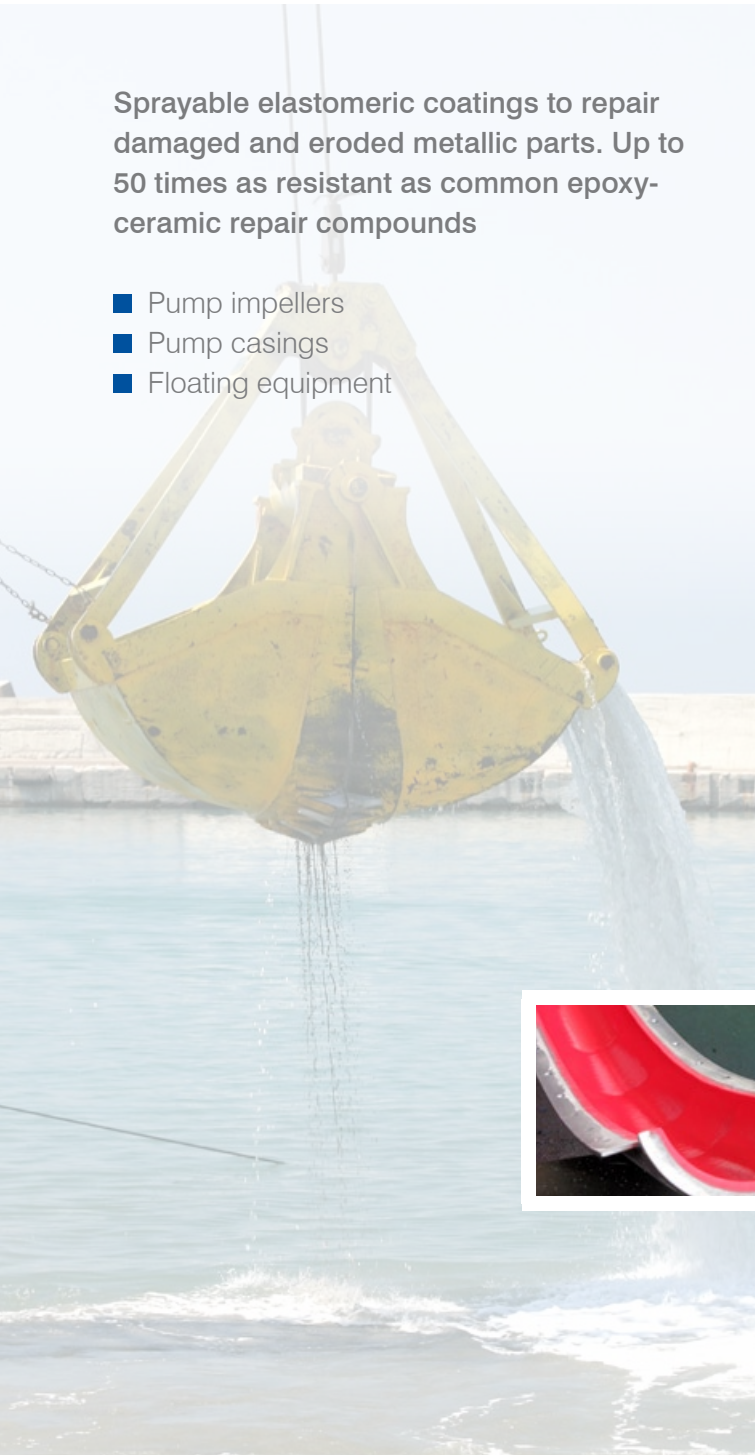
MetaLine Series 700



Land Reclamation

Sprayable elastomeric coatings to repair damaged and eroded metallic parts. Up to 50 times as resistant as common epoxy-ceramic repair compounds

- Pump impellers
- Pump casings
- Floating equipment



- 1 25 mm thick MetaLine 785 coating of a dredging impeller
- 2 Installation of a re-coated dredging pump casing
- 3 Elastomeric lining, inside a longitudinal splitted elbow pipe
- 4 Repaired rubber floating pipe from gravel extraction
- 5 Even flow-optimized pump geometries

Spares Recycling

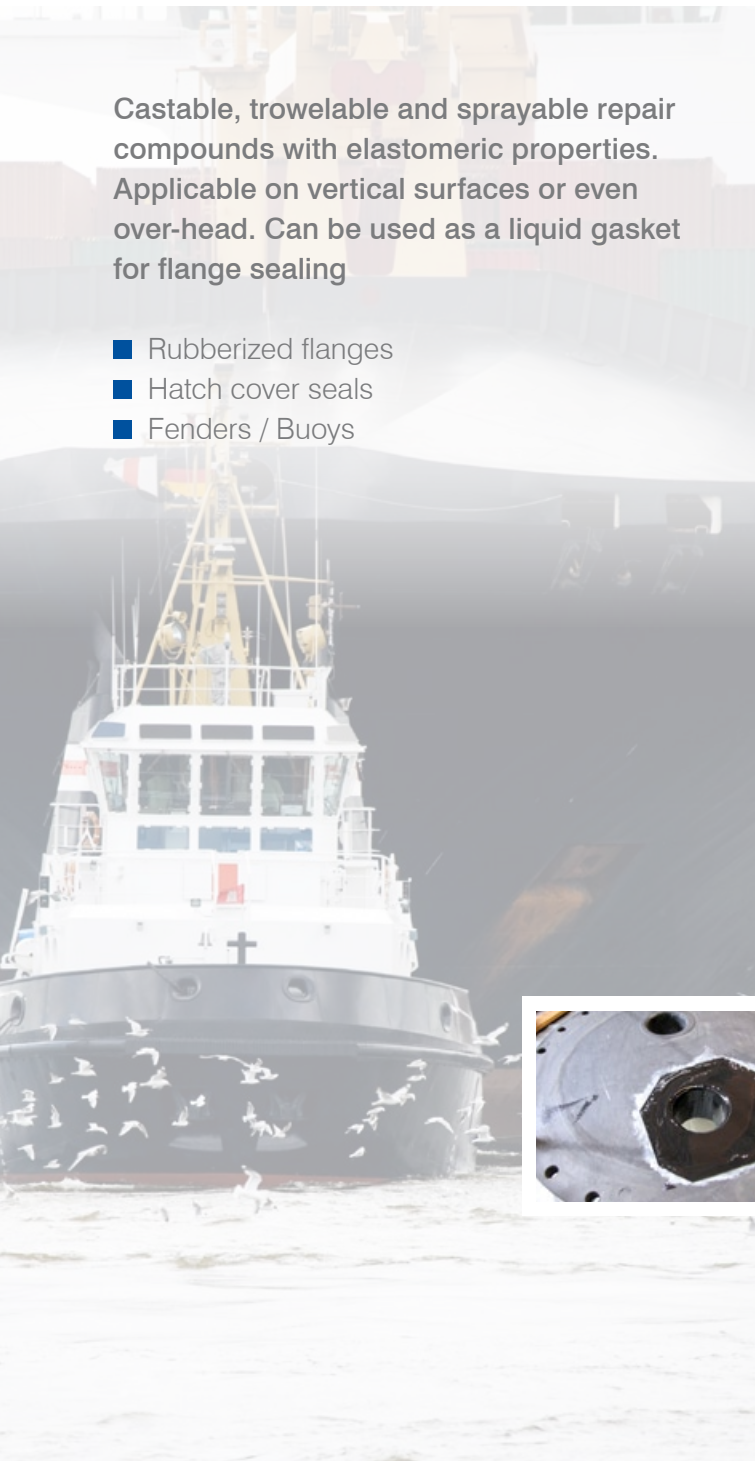
MetaLine Series 700



Rubber Repairs

Castable, trowelable and sprayable repair compounds with elastomeric properties. Applicable on vertical surfaces or even over-head. Can be used as a liquid gasket for flange sealing

- Rubberized flanges
- Hatch cover seals
- Fenders / Buoys



- 1 Hot-vulcanized rubber flange during in-situ repair
- 2 Partially repaired natural soft rubber lining
- 3 With MetaLine 785 reworked lid / inlet of a strainer
- 4 Broken rubber impeller during overhaul
- 5 Liquid sealing of a seawater treatment unit

Non-Stick Characteristics

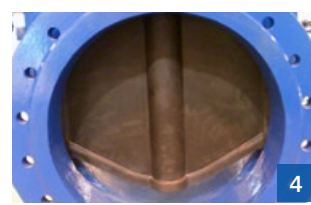
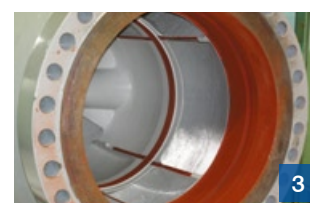
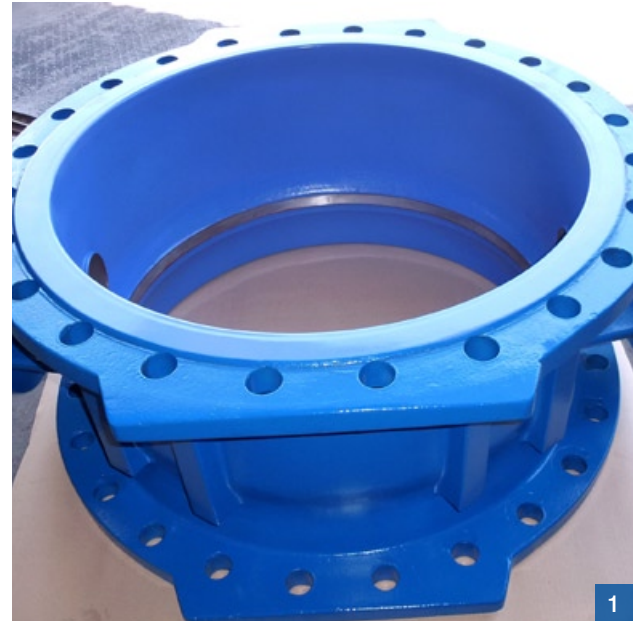
MetaLine Series 700



Valves Fittings

Sprayable elastomeric coatings to protect the interior and exterior against saltwater corrosion. Resists chemical exposure within a pH range between 3 to 11. Non-Stick surfaces are available

- Butterfly valves
- Stop valves
- Throttle valves



- 1 Large valve after elastomerization with MetaLine 785
- 2 Fire fighting systems during protective coating
- 3 MetaLine 785 elastomeric lined ball valve
- 4 Slurry stop valve after the MetaLine overhaul
- 5 Saltwater valve fully encapsulated with MetaLine 795

Impact Protection

MetaLine Series 700



On-Deck Applications

Sprayable, decorative elastomeric coatings to improve the slip protection on board. Seamless and smooth film finish improves the cleanability as well as improving hygiene for food processing and storage

- Fridge areas
- Food processing areas
- Safety equipment



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- 1 Impact-resistant on-deck corrosion protection
- 2 Fish processing areas and cold storage cells laid out seamlessly
- 3 Coated safety equipment - ready to use at any time
- 4 Bulwarks, anchor lockers, hatches with soundproof spray rubber coating
- 5 Decorative sliding protection on steps, bathing ladders, gangways ...

Saltwater Protection

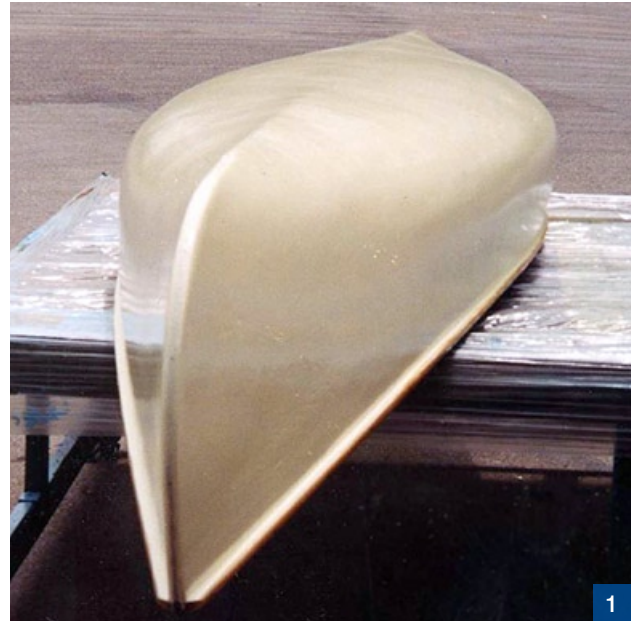
MetaLine Series 700



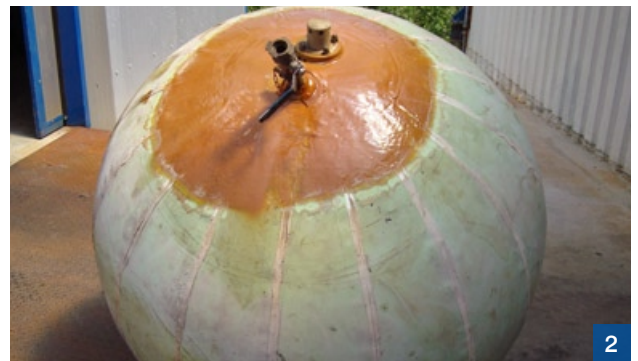
Water sports equipment

Brushable, trowelable or sprayable elastomeric products in order to repair or protect sensitive synthetic naval surfaces. Coatings with a lower coefficient of friction are available in order to ease the transport of sports equipment

- Jet Skis
- Bathing ladders / Gangways
- Rental equipment



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- 1 Repair / new coating of PE foamed rental equipment
- 2 Repair and redesign of fenders / buoys
- 3 Aluminium floating equipment nicely coated with liquid rubber
- 4 Glide-enhancing coating as slip protection on water jets
- 5 Impact-resistant sealing & scratch protection beneath the water line

Processing & Cost

MetaLine Series 700



A process from professionals for professionals

The use of highly functional coatings requires competent **surface preparation**. MetaLine Series 700 can be applied under almost any climatic conditions, even under high humidity or increased temperatures. The surfaces to be coated need to be dry, clean, free of grease and desalinated as well as **having a surface profile**.

For producing the appropriate surface profile over small areas or areas difficult to access, the handy **MetaLine blasting gun SP 1** is recommended. Areas up to approximately 1.5 m² can be treated professionally with a minimum of time. Corundum with a particle size of approximately 2 mm is to be used as abrasive.



MetaLine SP1 grit blasting gun. Small, quick and cost effective – that is how to prepare surfaces!

Successfully coating in 3 easy steps!

- 1 First of all, metal substrates are coated with MetaLine 924 offering borderline penetration protection. This **electro-chemically active corrosion protection** prevents borderline penetration on coating edges and protects partially damaged areas against rusting.
- 2 After drying, MetaLine 900 Universal Primer is applied with a single coat on solid surfaces or MetaLine 910 on elastomer surfaces.
- 3 Finally, MetaLine 700 protective coating with the required film thickness is applied!

And what about the material cost?

... in contrast to epoxy-ceramic, the cost is surprisingly **low**! When comparing prices (1 liter of MetaLine Series 700 corresponds to a volume of approximately 2.5 kg epoxy-ceramic), the MetaLine technology is very convincing owing to **cost savings of up to 60 %**. With smaller coating areas, the MetaLine material cost amount to roughly 80 EUR/m² for a 1 mm thick coating of Series 700.

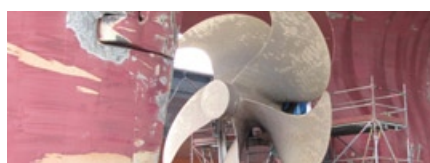


For first-time users, we recommend the **MetaLine Starterkit 10**. This is a fully equipped kit including cartridge gun, cleaning agent, primer, spare nozzles, processing instructions and also 10 kg of coating material (see illustration to the left):

Only 1,995 EUR ex stock Germany (net price)

The shelf life of the components amounts up to 2 years so that the system can also be used as a mere repair variant – if the need arises. With MetaLine, you can make sure that damaged parts are no longer useless . . .

Version (09/12). Prices are subject to change.





- Protect
- Repair
- Save

For more than 50 years

MetaLine has its headquarters near Stuttgart (Southern Germany), and through our sales partners, we are represented in more than **70 countries**.

When handling our coating materials, we attach great importance on expert **instruction** and customer liaison. To realise this objective, we offer expert **training that lasts from one to several days** at our premises or if more convenient, on-site. Our experienced trainers are at your disposal!

Trainings can be held in German, English, French, Spanish and Italian. Also, we are able to offer discussions about concrete problems and product demonstrations by means of **online video conferences**.

Do not hesitate to contact us!

MetaLine[®]
protect ■ repair ■ save
proven coating systems since 1960

You will find MetaLine products in most industrial areas such as automation technology, mining industry and mining technology, pulp & paper, petro-chemical, power plant technology, foodstuff processing, concrete production, municipal technology, pharmaceuticals, chemical industry, recycling technology, plastics processing, electrical engineering, glass processing, conveyor technology, fertilizer production, ceramic industry, surface technology, occupational safety, automotive manufacture, metal foundries, packaging technology, aeronautical engineering, textile machinery construction . . .

Version K700MA-1-GB – Subject to technical modifications! The information and application examples in this brochure are given to the best of our knowledge and belief. However, also regarding protective rights of third parties, they are not binding and do not release the user from testing the products and processes for the intended purpose regarding their suitability and material compatibility. We do not guarantee any application results. Copyright by MetaLine Surface Protection GmbH, DE-71157 Hildrizhausen (1960 - 2012). MetaLine is a registered trademark belonging to our company.

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