Global Surface Protection

MetaLine® .com

surface protection

Ceramic Repair Compounds

Power Generation, Pulp & Paper, Marine & Offshore, Mining, HVAC, Hydro-Engineering, Oil & Gas

MetaLine® Series XL

Trowel- / brushable ceramic repair compounds for the reconstruction of worn surfaces

Equipment life is just too short without protection!

MADE IN GERMANY

60 YEARS OF EXPERIENCE

Product description Series XL

Ceramic Repair Compounds

MetaLine Series XL stands for a **series of three modern synthetic repair products** designed to solve maintenance problems such as leakage, breakage, erosion, corrosion, cavitation or wear. Well proven as a leading technology to refurbish impacted metallic structures. Reduces break-down times and minimizes costs. Perfectly suitable for:

- professional repair work
- reconstruction of worn areas
- high-load bondings
- chemical resistant linings
- wear protective coatings

The concept

Suitable for field and direct „in-situ“ use. No cost-intensive application specialists are required. USDA approved for incidental food contact.

cold bonding without tension

fast cure characteristics

machinable to high accuracy

heat resistant to 200°C / 400°F

corrosion resistant

non-conductive / non-magnetic

withstands chemical attack

bonds ferrous to non-ferrous

almost infinite shelf-life

Material composition

Two component, cold-curing, paste-like or liquid ceramic repair compounds. Based on a combination of solvent-free Novolac-Polymers synthesized with ceramic and non-metallic fillers. Small range of different material types avoids large inventory. Formulated with the MetaLine experience of **over 60 years** industrial engineering & coating installation.

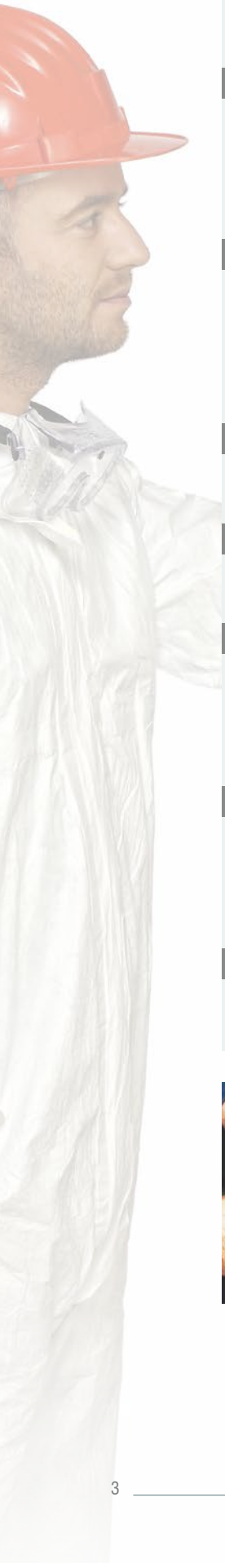
Application

Applied by trowel or brush in every desired thickness. Cures within 24 hours after mixing. No shrinkage. Sticks to most types of surfaces such as iron, (stainless) steel, aluminum, zinc, brass, enamel and many plastics.

Wear resistance

Superior non-corroding, wear-resistant compounds with outstanding mechanical properties against aging, erosion, corrosion, cavitation or impingement. Resists linear and lower dynamic impact in dry and turbulent fluid-flow installations. Provides extraordinary chemical resistance against acids, caustics, salts, oils or gases. Electrically non-conductive.

How to select the correct repair product



MetaLine SXL

Description

Trowelable, **ceramic-grade** for the rebuilding of worn areas or the repair of damaged equipment

Typical applications

- worn key-ways
- scored machine beds
- cracked engine bodies
- oversized bearing houses

Typical work size

Partial repairs

Working life at 20 °C (68 °F)

20 minutes

Cure time at 20 °C (68 °F)

Machinable	2 h
Full mechanical load	24 h
Full chemical load	48 h

Film thickness

Minimum:	0.1 mm | 4 mils
Maximum:	unlimited
Recommended:	> 1 mm | 40 mils

Machinable by

grinding / milling / lathe

MetaLine KXL

Description

Brushable, semi self-leveling **ceramic-grade** for the lining of surfaces impacted by liquids & increasing its efficiency

Typical applications

- eroded pump casings
- cavitated valves
- corroded heat exchangers
- worn hydraulic rams

Typical work size

Full linings

Working life at 20 °C (68 °F)

30 minutes

Cure time at 20 °C (68 °F)

Machinable	6 h
Full mechanical load	24 h
Full chemical load	72 h

Film thickness

Minimum:	0.1 mm | 4 mils
Maximum:	unlimited
Recommended:	1 mm | 40 mils

Machinable by

grinding / milling / lathe

MetaLine CXL

Description

Trowelable, **carbide-grade** for the protection of dry/wet surfaces extremely impacted by colliding solids

Typical applications

- centrifuges / decanters
- turbo separators
- pulverizing mills / pulpers
- pipe elbows

Typical work size

Partial linings

Working life at 20 °C (68 °F)

25 minutes

Cure time at 20 °C (68 °F)

Machinable	3 h
Full mechanical load	24 h
Full chemical load	48 h

Film thickness

Minimum:	3.0 mm|120 mils
Maximum:	unlimited
Recommended:	>5 mm|200 mils

Machinable by

grinding only

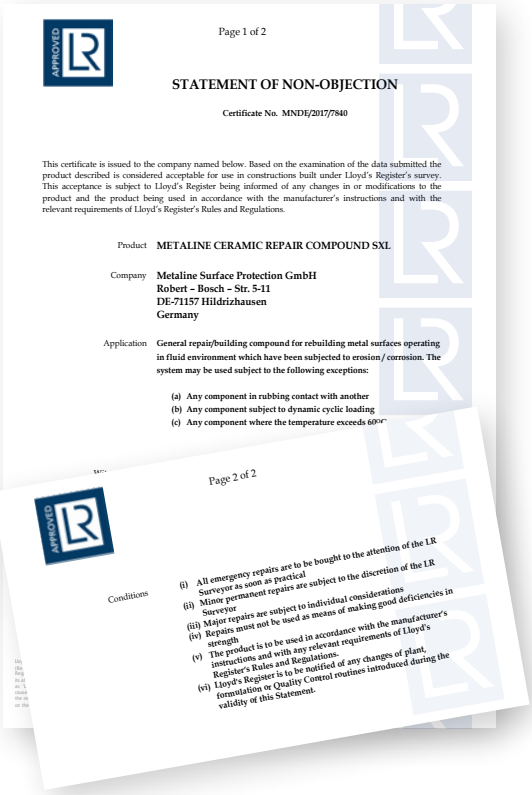
Physical properties & technical data

	MetaLine SXL	MetaLine KXL	MetaLine CXL
Material basis (2-component compound for manual self-mixing, solvent free (100 % solids)	Polymer-Ceramic	Polymer-Ceramic	Polymer-Ceramic with larger carbide components
Package size	1 kg 2.2 lbs	1 kg 2.2 lbs	2 kg 4.4 lbs
Color	dark grey similar to RAL 7031	light grey similar to RAL 7035	dark brown similar to RAL 8017
Surface preparation required for maximum adhesion	mechanical roughening or gritblasting / degreasing	mechanical roughening or gritblasting / degreasing	mechanical roughening or gritblasting / degreasing
Processing method manual hand operated	trowel	brush / casting / injection	trowel
Consistency in mixed status	paste-like (creamy)	viscous liquid (self-leveling)	paste-like (thixotropic)
Mixing ratio by weight and volume	4 : 1 by weight 3 : 1 by volume	14.3 : 1 by weight no volume ratio possible	2 : 1 by weight 2 : 1 by volume
Film thickness minimum / recommended / maximum	0.1 mm / 1 mm / infinite 4 mils / 40 mils / infinite	0.1 mm / 1 mm / infinite 4 mils / 40 mils / infinite	3 mm / 5 mm / infinite 120 mils / 200 mils / infinite
Consumption theoretically per mm (40 mils) film thickness	1,950 g/m² 0.40 lb per 40 mils/sqft	2,200 g/m² 0.45 lb per 40 mils/sqft	2,050 g/m² 0.42 lb per 40 mils/sqft
Processing time at 20 °C (68 °F)	20 minutes	30 minutes	25 minutes
Overcoating time at 20 °C (68 °F)	1 h minimum 6 h maximum	1 h minimum 6 h maximum	1 h minimum 6 h maximum
Solidification at 20 °C (68 °F) – dependent on stress	> 1 day	> 1 day	> 1 day
Hardness A.S.T.M. D2240-68	95 Shore D	97 Shore D	93 Shore D 9 Mohs (carbide filler)
Density DIN EN ISO 1183-2	1.95 g/cm³ 0.070 lb/in³	2.2 g/cm³ 0.079 lb/in³	2.05 g/cm³ 0.074 lb/in³
Compressive strength A.S.T.M. D695	156 N/mm² 22,625 psi	141 N/mm² 20,450 psi	109 N/mm² 15,809 psi
Tensile bond strength on 1.0037 / ASTM A36 mild steel	20 N/mm² 2,900 psi	20 N/mm² 2,900 psi	21 N/mm² 3,045 psi
Tensile shear adhesion on 1.4301 / AISI 304 stainless steel (A.S.T.M. D1002)	21 N/mm² 3,045 psi	21 N/mm² 3,045 psi	21 N/mm² 3,045 psi
Tensile strength A.S.T.M. D412-16	22 N/mm² 3,190 psi	21 N/mm² 3,045 psi	not specified not specified
Flexural strength A.S.T.M. D790	68 N/mm² 9,862 psi	58 N/mm² 8,412 psi	54 N/mm² 7,832 psi
Impact resistance (by IZOD) A.S.T.M. D256 „E“	36 J/m 0.67 ft.lb/in	66 J/m 1.23 ft.lb/in	not specified not specified
Temperature resistance dry / wet	+200 °C / +90 °C +390 °F / +194 °F	+200 °C / +60 °C +390 °F / +140 °F	+200 °C / +90 °C +390 °F / +194 °F
Linear abrasion (Taber®) A.S.T.M. D-4060 (NATO) – CS17, dry, 1 kg, 1.000 rev.	no measurable loss	no measurable loss	no measurable loss
Chemical resistance see MetaLine resistance chart: I061ME.pdf	usually pH 2-13	usually pH 2-13	usually pH 2-13
Mechanical Processing by ceramic-carbide or diamond-tipped tools	machinable by grinding / milling / lathe	machinable by grinding / milling / lathe	only grinding
Approvals dry / wet	USDA (incidental food) Lloyds Register of Shipping	USDA (incidental food) BS 6920 (drinking water) AS/NZS 4020:2005 (drinking water	USDA (incidental food)
Shelf-life	4 years	4 years	4 years

International approvals

Lloyds Register

Maritime Approval for MetaLine SXL



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STATEMENT OF NON-OBJECTION

Certificate No. MNDE/2017/7840

This certificate is issued to the company named below. Based on the examination of the data submitted the product described is considered acceptable for use in constructions built under Lloyd's Register's survey. This acceptance is subject to Lloyd's Register being informed of any changes in or modifications to the product and the product being used in accordance with the manufacturer's instructions and with the relevant requirements of Lloyd's Register's Rules and Regulations.

Product **METALINE CERAMIC REPAIR COMPOUND SXL**

Company **Metaline Surface Protection GmbH**
Robert – Bosch – Str. 5-11
DE-71157 Hildrizhausen
Germany

Application **General repair/building compound for rebuilding metal surfaces operating in fluid environment which have been subjected to erosion/ corrosion. The system may be used subject to the following exceptions:**

(a) Any component in rubbing contact with another
(b) Any component subject to dynamic cyclic loading
(c) Any component where the temperature exceeds 60°C

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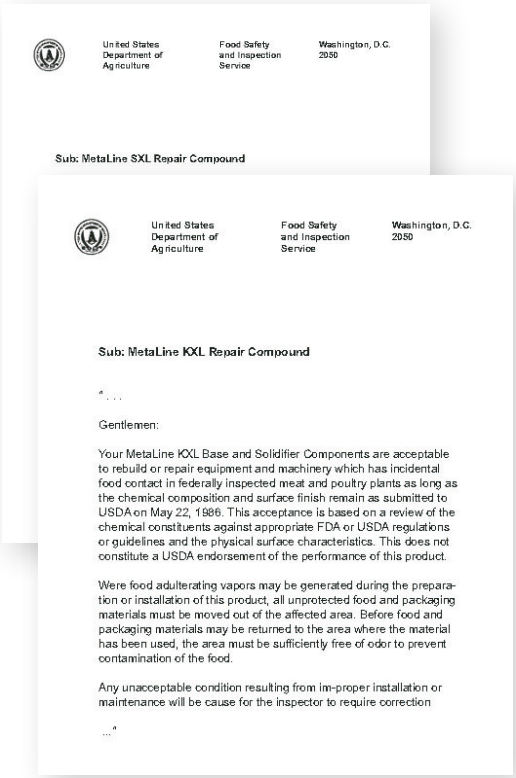
Conditions

(i) All emergency repairs are to be bought to the attention of the LR Surveyor as soon as practical
(ii) Minor permanent repairs are subject to the discretion of the LR Surveyor
(iii) Major repairs are subject to individual considerations
(iv) Repairs must not be used as means of making good deficiencies in strength
(v) The product is to be used in accordance with the manufacturer's instructions and with any relevant requirements of Lloyd's Register's Rules and Regulations.
(vi) Lloyd's Register is to be notified of any changes of plant, formulation or Quality Control routines introduced during the validity of this Statement.

USDA (U.S. Department of Agriculture):

Food Approval for MetaLine Series XL



United States Department of Agriculture | Food Safety and Inspection Service | Washington, D.C. 2050

Sub: MetaLine SXL Repair Compound

United States Department of Agriculture | Food Safety and Inspection Service | Washington, D.C. 2050

Sub: MetaLine KXL Repair Compound

Gentlemen:

Your MetaLine KXL Base and Solidifier Components are acceptable to rebuild or repair equipment and machinery which has incidental food contact in federally inspected meat and poultry plants as long as the chemical composition and surface finish remain as submitted to USDA on May 22, 1986. This acceptance is based on a review of the chemical constituents against appropriate FDA or USDA regulations or guidelines and the physical surface characteristics. This does not constitute a USDA endorsement of the performance of this product.

Were food adulterating vapors may be generated during the preparation or installation of this product, all unprotected food and packaging materials must be moved out of the affected area. Before food and packaging materials may be returned to the area where the material has been used, the area must be sufficiently free of odor to prevent contamination of the food.

Any unacceptable condition resulting from im-proper installation or maintenance will be cause for the inspector to require correction

Australian Water

Drinking water approval in accordance with AS/NZS 4020:2005 for MetaLine KXL

FINAL REPORT

Report ID : 227299

Report Information

Submitting Organisation : 00121781 : Global Pumps
Account : 142713 : Global Pumps
ARQC Reference : 142713-2018-CSR-1 Prod Test: Ceram Tech FG & Setzonia EZ Glide
Project Reference : PT-3370
Product Designation : Series KXL Brushable Ceramic Repair Compound
Composition of Product : Two Part Epoxy Type Ceramic Coating - Metaline KXL (Base) and Metaline KXL (Solidifier)
Product Manufacturer : Metaline, GERMANY
Use of Product : In-Line/Brushable Ceramic Repair Compound
Sample Selection : As provided by the submitting organisation
Testing Requested : **AS/NZS 4020:2005 TESTING OF PRODUCTS FOR USE IN CONTACT WITH DRINKING WATER**
Product Type : Composite
Samples : Samples were prepared and controlled as described in Appendix A of AS/NZS 4020: 2005
Extracts : Extracts were prepared as described in Appendix C, D, E, F, G, H.
Project Completion Date : 05-Jun-2018
Project Comment : The results presented herein demonstrate compliance of Series KXL Brushable Ceramic Repair Compound to AS/NZS 4020 when exposed at area to volume ratios up to 20,000 mm²/L at 25°C ± 2°C.

PLEASE NOTE THAT THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL

THE RESULTS STATED IN THIS REPORT RELATE TO THE SAMPLE OF THE PRODUCT SUBMITTED FOR TESTING. ANY CHANGES IN THE MATERIAL FORMULATION, PROCESS OF MANUFACTURE, THE METHOD OF APPLICATION, OR THE SURFACE AREA-TO-VOLUME RATIO IN THE END USE, COULD AFFECT THE SUITABILITY OF THE PRODUCT FOR USE IN CONTACT WITH DRINKING WATER.

Peter Christopoulos
APPROVED SIGNATORY

NATA

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British Standards Inst.

Drinking water approval in accordance with BS 6920 for MetaLine KXL

AL HOTY - STANGER LABORATORIES

TEST REPORT

MAJESTIC SBCT LLC

SUITABILITY OF NON-METALLIC PRODUCTS FOR USE IN CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION WITH REGARD TO THEIR EFFECT ON THE QUALITY OF WATER

Ajish Mathew
Head of Chemistry Department

Andrew Le Many
Division Manager – Life Sciences
For Al Hoty Stanger Laboratories

Pipe & elbow applications

Typical use for: ■ **leakage** □ breakage □ wear & tear ■ **corrosion** □ erosion □ cavitation ■ **abrasion**

1 - Seal leaking pipes

2 - Repair metallic & synthetic pipe-materials

3 - Strengthen impacted elbow areas

4 - Protect immersed equipment

Specific application information

- If possible, all pipe repairs should be realized at the outside of the pipe-work.
- Treat the surface by flame or heat to sweat out penetrated residues (if allowed due to safety regulations).
- Extend the actual repair area for minimum 100 mm (4 inch) in all directions by gritblasting or intensive roughening. If necessary use spark-protected tools. If emptying is not possible, stop leaking fluids by use of glue or ultra fast curing resin. Clean with solvent and let it dry.
- Prepare MetaLine SXL and apply. For pipe diameters less than 80 mm (3 inch) and low to medium pressure use several layers of fine metal sieve (mesh) to strengthen the compound. Wrap it around the pipe and saturate well all reinforcement material. Finally smoothen the surface.
- For larger diameters or high pressure applications use a grit blasted strong metal plate in the form of a half-pipe (**note picture above**). Apply MetaLine SXL and fix immediately with bolts & clamps

Technical reference

- non-flammable and non-sparking process
- resists pressure up to 200 bars (2,900 psi)

Tanks, containers & vessels

Typical use for: ■ **leakage** □ breakage □ wear & tear ■ **corrosion** □ erosion □ cavitation □ abrasion

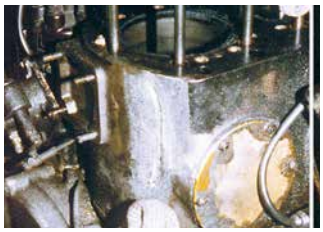
1 - Seal leaking storage tanks

2 - Repair porous oil sumps

3 - Resurface corroded casings

4 - Overcoat leaking welding seams

5 - Repair cracked engines blocks



Specific application information

- If possible, all leakage repairs should be realized at the inside of the vessel
- Treat the substrate by flame or heat to sweat out penetrated residues (if allowed)
- Grind down all welding seams. Extend the actual repair area for minimum 30 mm (1.2 inch) in all directions and grit blast or roughen it intensively. In case of cracks, drill holes at each end of the crack. Stop leaking fluids by use of glue or ultra fast curing resin. Clean with solvent and let it dry afterwards
- Apply MetaLine SXL. Use several layers of fine metal sieve (mesh) to strengthen the compound. Saturate well all reinforcement material and smoothen the surface finally
- In case of bigger cracks or missing structure use a heavy metal plate instead the mesh. Fix thoroughly with bolts. This will result in much higher tensile resistance and restrict expansion

Technical reference

- Suitable for internal or external sealing
- Approved for incidental food contact

Bearings & seats

Typical use for: ■ **leakage** □ breakage □ wear & tear ■ **corrosion** □ erosion □ cavitation ■ **abrasion**

1 - Seal leaking bearings

2 - Recontur oversized seats

3 - Repair cutlass bearings

4 - Cast line-shaft bearings

Specific application information

- Drain of all oil, grease or other lubricants from the bearing area
- Extend the actual dimension of the seat to a minimum bearing distance of 1 mm (40 mils) in the radius. Treat the seat by flame or heat to sweat out penetrated residues (if allowed)
- Thoroughly grit blast or roughen. Clean with solvent and let it dry afterwards
- Isolate the bearing by use of MetaLine Release Agent
- Apply or inject (by use of a cartridge) MetaLine SXL into the bearing seat as well as onto the bearing itself. Insert the bearing and take care not to pollute it. Avoid air entrapement
- Adjust the accurate bearing position and fix during the material cure

Technical reference

- Oil and salt water resistant
- Rebuilding without machining

Flange & couplings

Typical use for: ■ **leakage** □ breakage □ wear & tear ■ **corrosion** □ erosion □ cavitation ■ **abrasion**

1 - Rebuild flange areas

2 - Repair drive faces

3 - Contour gasket areas

Specific application information

- Deepen existing undersize to a minimum of 2 mm (80 mils). End all repair areas by a sharp (90 °) contour
- Treat the surface by flame or heat to sweat out penetrated residues (if allowed). Thoroughly grit blast or roughen the repair area. Clean with solvent and let it dry
- Isolate the other flange side (or alternatively a clean and smooth metal plate) by use of MetaLine Release Agent
- Apply or inject (by use of a cartridge) MetaLine SXL onto the roughened flange side. Bolt both flanges together and remove excessive material (moulding procedure)
- Alternatively apply MetaLine SXL and machine it after cure

Technical reference

- Resists high compression forces
- Extremely accurate when moulded

Casing porosities & voids

Typical use for: ■ **leakage** □ breakage □ wear & tear ■ **corrosion** □ erosion □ cavitation ■ **abrasion**

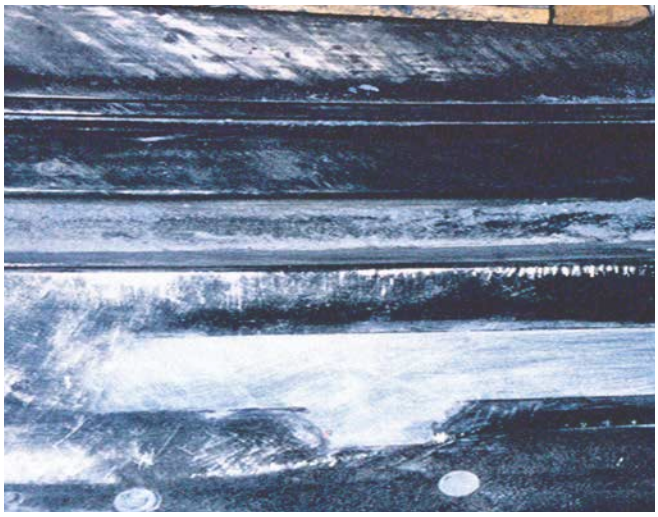
1 - Seal porous structures

2 - Create gas-tight linings

3 - Rebuild faulty castings

4 - Repair leaking transformers

5 - Recontur damaged moulds



Specific application information

- Deepen existing surface irregularities to a minimum of 1 mm (40 mils). End all repair areas by a sharp (90 °) contour
- Treat the surface by flame or heat to sweat out penetrated residues (if allowed). Thoroughly grit blast or roughen the repair area. Clean with solvent and let it dry
- Trowel-apply or inject (by use of a cartridge) MetaLine SXL onto the prepared surface
- In case of deep marks apply MetaLine KXL by brush first. Immediately followed by a smoothening coat of paste-like MetaLine SXL. Avoid to incorporate air pockets

Technical reference

- Easy to apply by brush or trowel
- Can be painted or treated by galvanizing processes

Engines & drives

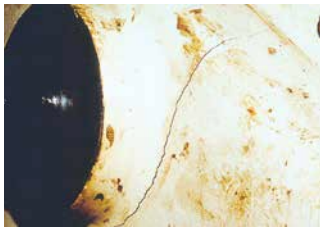
Typical use for: ■ **leakage** ■ **breakage** □ wear & tear ■ **corrosion** □ erosion □ cavitation ■ **abrasion**

1 - Seal casings cracks

2 - Repair leaking equipment

3 - Stabilize crack sensitive areas

4 - Rebuild stripped threads



Specific application information

■ Remove existing welding seams by grinding. Drill holes with diameter 5 mm (0.2 inch) at each end of the crack as well as every 50 mm (2 inch) along the entire crack. Grind along the crack and widen it in form of a „V“. Place screws in the holes and widen it to the expected operational expansion when it arrives to working temperature

■ Treat the surface by flame or heat to sweat out penetrated residues (if allowed). Extend the actual repair area for minimum 50 mm (2 inch) in all directions and thoroughly grit blast or roughen it. Clean with solvent and let it dry

■ Apply MetaLine SXL in a thickness of 5 mm (0.2 inch). Use several layers of fine metal sieve (mesh) to strengthen the compound. Saturate all reinforcement material and smoothen the surface. Never apply MetaLine SXL beyond the prepared area

■ In case of bigger cracks or high casing thickness use a heavy metal plate instead the mesh. Fix thoroughly with bolts. This will result in much higher tensile resistance and restrict expansion

Technical reference

■ High thermal coefficient of expansion

■ Suitable for grey-cast-iron, aluminum, etc.

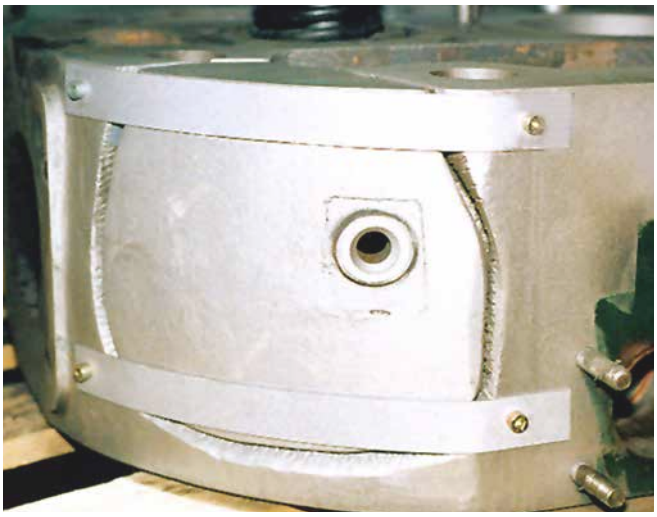
Casing breakage

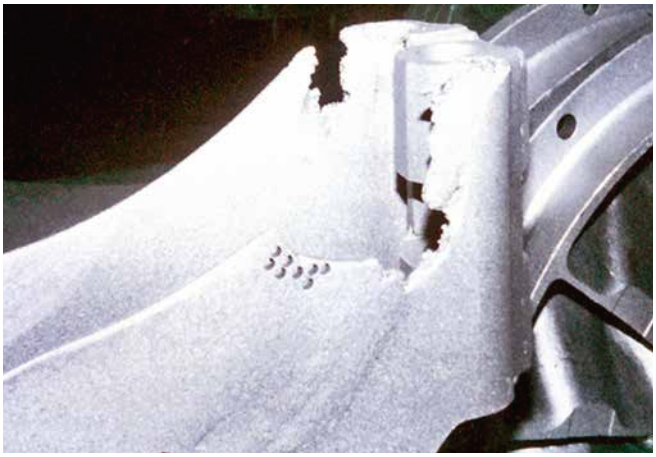
Typical use for: ■ **leakage** ■ **breakage** □ wear & tear ■ **corrosion** □ erosion □ cavitation ■ **abrasion**

1 - Repair broken gear boxes

2 - Over-bridge missing structures

3 - Rebuild frost damages





Specific application information

■ Remove existing welding seams by grinding. Check surface for cracks. If found, Drill holes with diameter 5 mm (0.2 inch) at each end of the crack as well as every 50 mm (2 inch) along the entire crack. Grind along the crack and widen it in form of a „V“. Place screws in the holes and widen it to the expected operational expansion when it arrives to working temperature. Treat the surface by flame or heat to sweat out penetrated residues (if allowed)

■ If the missing structure is still available, reduce it in its dimensions. Fix with metal bandages and bolts. If the structure is lost, use a heavy steel plate (thickness minimum 3 mm / 120 mils). Extend the actual repair area for minimum 50 mm (2 inch) in all directions and thoroughly grit blast or roughen it. Clean with solvent and let it dry

■ Apply MetaLine SXL and seal the structure from all sides. Bolt the steel plate over the repair area. Saturate all reinforcement material and smoothen the surface. Never apply MetaLine SXL beyond the prepared area

■ Consider enough flexibility in the system to balance thermal expansion in case of higher usage temperatures

Technical reference

■ Resistant against vibration and thermal shockl

■ Extended pot life for proper processiong

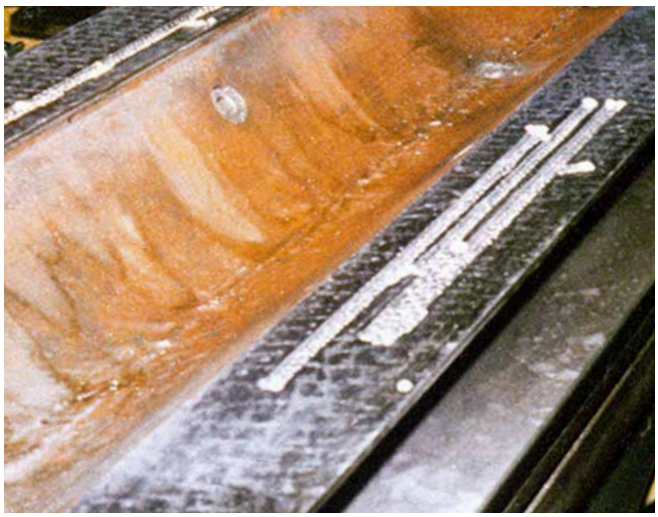
Machine beds & guides

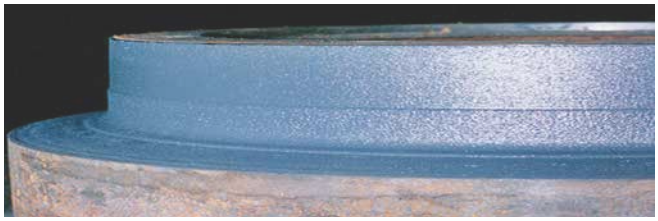
Typical use for: ☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ■ **abrasion**

1 - Repair partial wear on beds

2 - Fill misdrilled holes

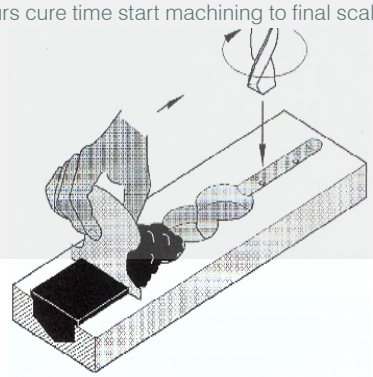
3 - Balance undersize tolerances





Specific application information

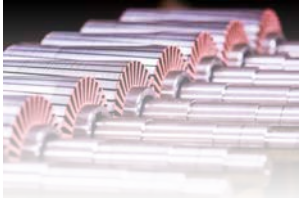
- Treat the surface by flame or heat to sweat out penetrated residues (if allowed)
- In case of scored machine beds drill holes along the wear area (diameter and depth about 2 mm / 80 mils). Distance about 2/3 of the diameter used later to enlarge the repair area
- Enlarge the scored area plus 3 mm (120 mils) in all directions by a second drilling procedure. Clean with solvent and let it dry
- Apply MetaLine SXL about 0.5 -1 mm (20 - 40 mils) thicker than required. Watch out not to incorporate air pockets
- After 3-4 hours cure time start machining to final scale. Use milling, lapping or grinding



Technical reference

- Sliding characteristics (no stick-slip)
- Reconstruction without dismantling of guides

Shaft, journals & hydraulic rams



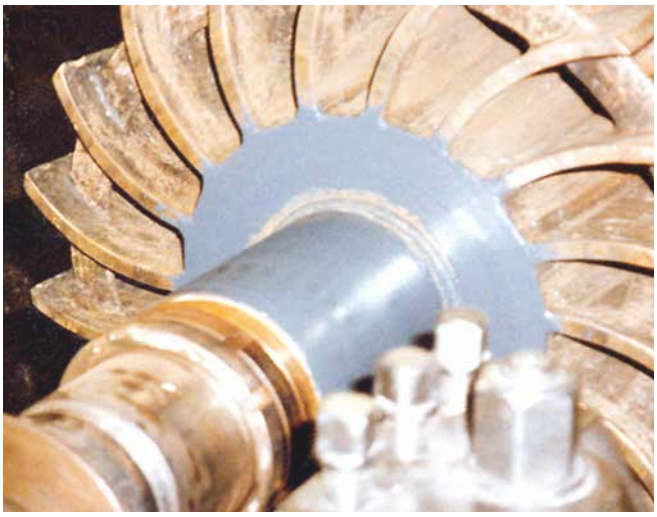
Typical use for: ☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ■ **abrasion**

1 - Repair worn bearing areas

2 - Rebuild spline couplings

3 - Repair worn key-ways

4 - Seal leaking hydraulic rams



Specific application information

- Treat the shaft by lathe operation with great feed into the form of a thread (15 revolutions per cm / 1/2 inch). Exterior angle about 90°. Cutting depth minimum 1.5 mm (60 mils). Create a sharp and rough contoured surface structure
- Treat the surface by flame or heat to sweat out penetrated residues (if allowed). Clean with solvent and let it dry
- Rotate the shaft slowly and apply MetaLine SXL about 2 mm thicker than required. Watch out not to incorporate air pockets. After 3-4 hours cure time start machining to final scale. Use lathe operation or preferably grinding
- Alternatively use two half-shells with an inside diameter corresponding to the requested outside diameter of the shaft. Isolate with MetaLine Release Agent. Apply MetaLine SXL to the prepared shaft as well as to the shells. Install the shells and press firmly. Adjust thoroughly. Remove shells after cure and grind down the seams. The final surface quality correspond to the actual surface quality of the shells

Technical reference

- Machinable by drilling, milling, grinding, etc.
- Matrix-moulding to final accuracy possible

Bearing seats

Typical use for: ☐ leakage ☐ breakage ☐ wear & tear ■ **corrosion** ☐ erosion ☐ cavitation ■ **abrasion**

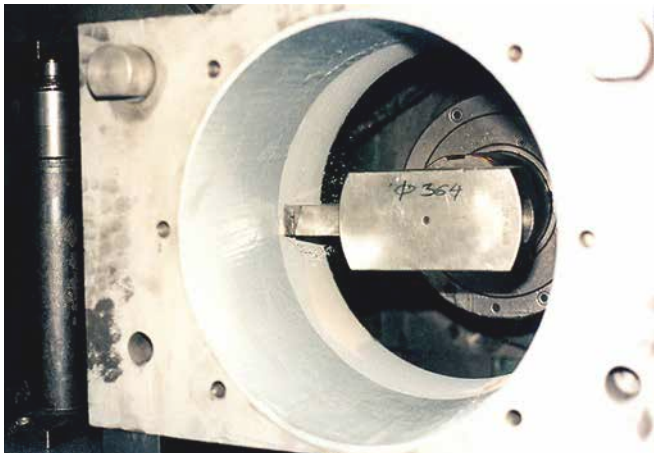
1 - Repair roller bearing seats

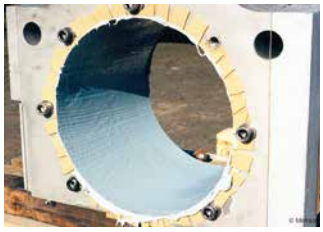
2 - Reseat bearing shells

3 - Reform division bar seats

4 - Reform ball joint housings

5 - Realign pins into oversized seats





Specific application information

- Extend the actual dimension of the seat to a minimum bearing distance of 1 mm (40 mils) in the radius. Flame treat to sweat out penetrated residues (if allowed)
- Thoroughly grit blast or roughen the surface. Clean with solvent and let it dry afterwards
- Isolate the bearing by use of MetaLine Release Agent
- Apply or inject (by use of a cartridge) MetaLine SXL into the bearing seat as well as onto the bearing itself. Insert the bearing and take care not to pollute it. Avoid air entrapement
- Adjust the accurate bearing position and fix during the material cure
- In case of ball joint housings treat the lower bearing shell first as indicated above. After cure treat the upper bearing shell

Technical reference

- Cures without swelling or shrinkage
- Securely stops crevice corrosion

Bushings

Typical use for: ☐ leakage ☐ breakage ☐ wear & tear ■ **corrosion** ☐ erosion ☐ cavitation ■ **abrasion**

1 - Reseat bushes

2 - Create non-metallic bush seats

3 - Restore bronze bushes

Specific application information

- Extend the actual dimension of the seat to a minimum bush distance of 1 mm (40 mils) in the radius. Flame treat to sweat out penetrated residues (if allowed)
- Thoroughly grit blast or roughen the seat as well as the outside of the bush. Clean with solvent and let it dry afterwards
- Apply MetaLine SXL on both parts. Insert the bush with a light rotating motion. Adjust and let it cure
- Due to the electro-chemically insulating properties of MetaLine Ceramic Compounds, more abrasion resistant bush materials can be used which normally would be unsuitable due to bi-metallic-corrosion

Technical reference

- Fast cure characteristics available
- Semi elastic properties resists cyclic load

Chemical corrosion

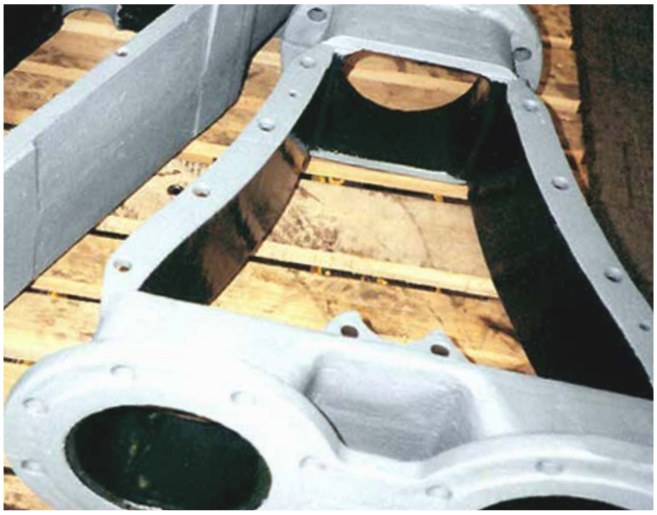
Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ☐ erosion ☐ cavitation ☐ abrasion

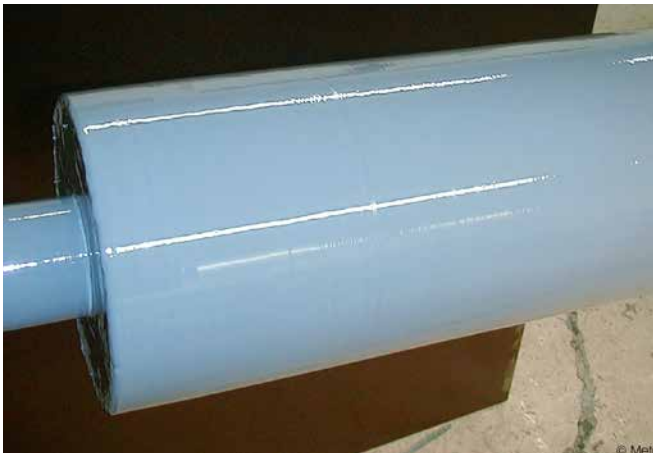
1 - Line surface treatment systems

2 - Encapsulate immersed pumps

3 - Coat tanks and structures

4 - Protect de-sulphurisation units





Specific application information

- Grit blast corroded surfaces. High-pressure hot water clean to dissolve chemical impurities. Flame treat to sweat out deeper penetrated residues and to dry (if allowed)
- Thoroughly grit blast the surface again. Use sharp contoured fresh blasting grit with a mesh-size of 1-2 mm (40-80 mils). Required profile is min. 75 microns (min. 3 mils) and a surface quality of SA 2 1/2 (Swedish Standard). Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally in case of leaks. Incorporate a fine metal sieve (mesh) in case of missing surface strength
- Continue wet in wet with a coat of brushable MetaLine KXL. As soon as the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

Technical reference

- Seamless treatment on all complex surfaces
- Extremely resistant against chemical attack

Galvanic corrosion

Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ☐ erosion ☐ cavitation ☐ abrasion

1 - Line condensers

2 - Isolate heat exchangers

3 - Protect vaporizers

4 - Bond steel to stainless steel

Specific application information

- Heat exchanger: Use a milling tool and deepen the plate around all tube ends. Flame treat to sweat out penetrated residues (if allowed). Close tubes with rubber plugs. Thoroughly grit blast the plate as well as all tubes from the outside. Minimum blasting profile is 75 microns (3 mils)
- Clean with solvent and let it dry
- Vertical positioning: Apply MetaLine SXL locally and re-contour manually to the original shape. Alternatively treat a smooth and heavy metal plate with MetaLine Release Agent. Press it against the uncured MetaLine SXL and fix with clamps until the repair compound is completely cured
- Horizontal positioning: Apply MetaLine KXL by use of a cartridge. Use the self-leveling material characteristics to smoothen the surface

Technical reference

- Electrically insulating (non-conductive)
- Extremely resistant against permeation

Fluid flow equipment (volutes)

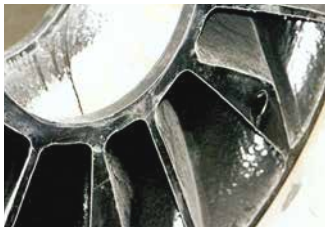
Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ■ **cavitation** ☐ abrasion

1 - Repair flow straighteners

2 - Rebuild eroded pump casings

3 - Re-profile cut-water profiles

4 - Reduce wear ring clearances



Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues
- Thoroughly grit blast the surface again. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2 (Swedish Standard). Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally in case of leaks or missing structure. Incorporate a fine metal sieve (mesh) to over-bridge holes or cracks
- Continue wet in wet with a coat of brushable MetaLine KXL. As soon as the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

Technical reference

- Exceptional resistance against erosion
- Performance gains up to 4 % on new equipment

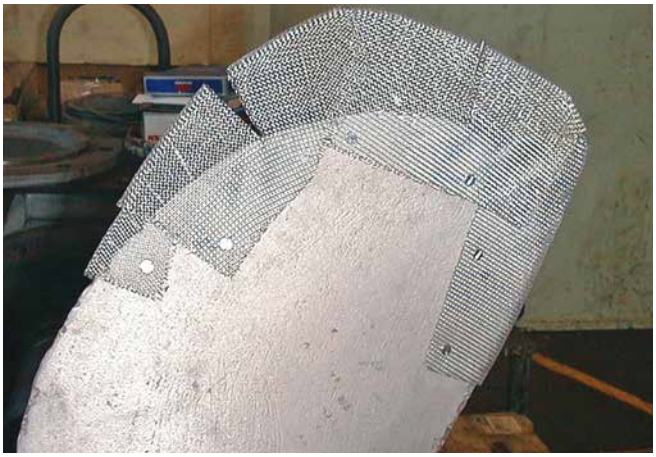
Fluid flow equipment (impeller & mixers)

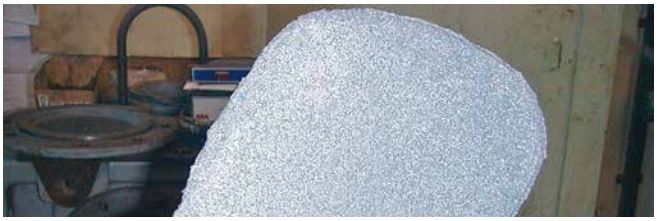
Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ■ **cavitation** ☐ abrasion

1 - Repair impeller vane corrosion

2 - Re-contour eroded mixers

3 - Treat mixer blades to non-stick





Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues
- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2. Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally in case of leaks or missing structure. Incorporate a fine metal sieve (mesh) to over-bridge holes or cracks
- Pin-hole like substrates should be treated with brushable MetaLine KXL instead, to minimize risk of air pockets. Continue wet in wet with MetaLine SXL
- Continue wet in wet with a coat of brushable MetaLine KXL. As soon as the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

Technical reference

- Low weight gravity reduce need for balancing
- Environmentaly friendly and user-safe technology

Liquid ring vacuum pumps

Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ■ **cavitation** ☐ abrasion

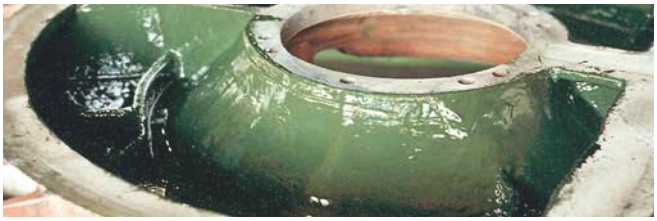
1 - Repair & protect rotors

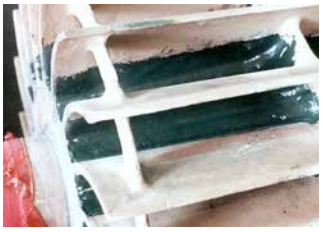
2 - Reduce cone clearances

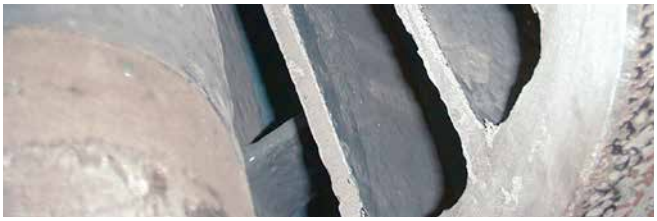
3 - Repair valve plates

4 - Rebuild profile of end covers

5 - Restore accurate tolerances







Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues
- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2. Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally and rebuild missing structure. Pin-hole like substrates should be treated with brushable MetaLine KXL instead, to minimize risk of air pockets. Continue wet in wet with MetaLine SXL
- After cure grind down to restore the accurate profile. Grit blast carefully to reactivate the whole surface. Clean with solvent and let it dry
- Apply MetaLine KXL. As soon as the minimum overcoating time has elapsed apply a second coat MetaLine KXL. After cure give a lathe or grinding operation to final scale

Technical reference

- Thixothropic characteristic to ease over-head-work
- Different colors per coat (visual life-time indicator)

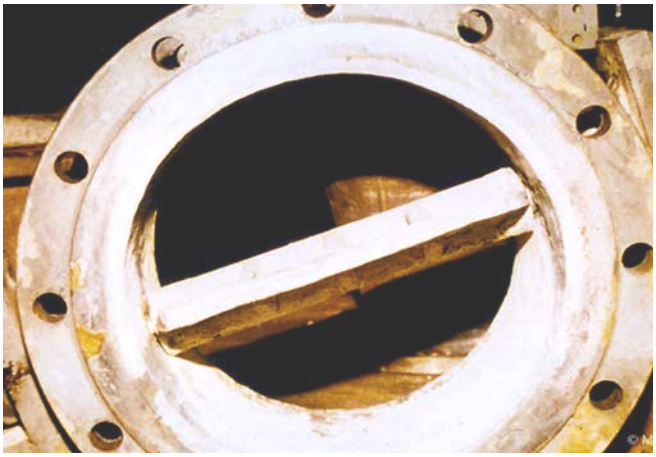
Butterfly & gate valves

Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ■ **cavitation** ☐ abrasion

1 - Re-profile slides

2 - Rebuild valve bodies

3 - Protect gates



Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues.
- Grind down edges to a radius of minimum 3 mm (120 mils). In case of partial coating work deepen all rebuilding areas with a sharp 90° angel to a minimum of 1.5 mm (60 mils)
- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2. Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally by trowel or inject with a cartridge. Rebuild missing structures by use of a precise metal or wooden stencil. Leave enough off-set for the following two layers MetaLine KXL
- Continue with a coat of brushable MetaLine KXL. After the minimum overcoating time as elapsed apply a second coat KXL in 90° application direction to the first coat

Technical reference

- Gas-tight properties (low permeability)
- Cures in any shape without surface tension

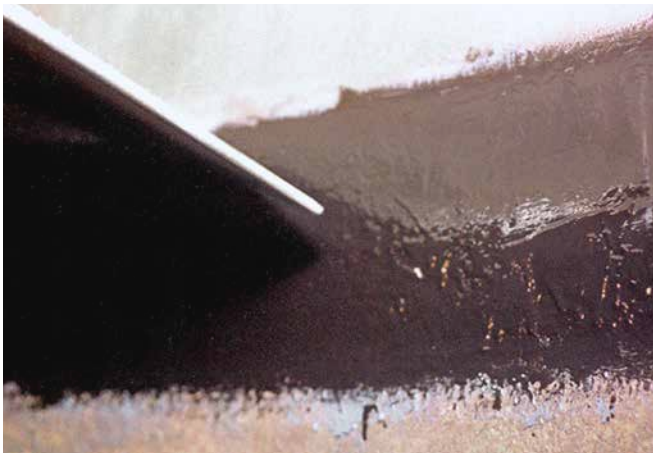
Water turbines (volutes)

Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ■ **cavitation** ☐ abrasion

1 - Repair cavitation damage

2 - Rebuild guide vanes

3 - Protect water outlet areas



Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues.
- Grind down edges to a radius of minimum 3 mm (120 mils). In case of partial coating work deepen all rebuilding areas with a sharp 90° angel to a minimum of 1.5 mm (60 mils)
- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2. Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally by trowel or inject with a cartridge. Rebuild missing structures. Pinhole-like substrates should be treated with brushable MetaLine KXL instead, to minimize risk of air pockets. Continue wet in wet with MetaLine SXL
- Continue wet in wet with a coat of brushable MetaLine KXL. As soon as the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

Technical reference

- Polymeric product matrix resists cavitation impact
- Can be heat treated to accelerate cure

Water turbines (impellers)

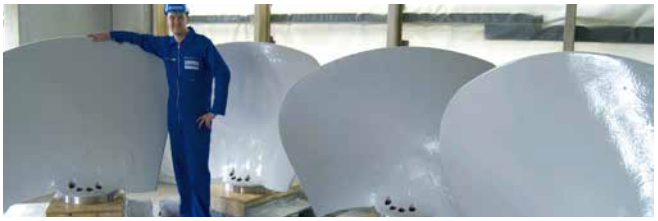
Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ■ **cavitation** ☐ abrasion

1 - Coat „Francis“ impellers

2 - Rebuild „Kaplan“ impellers

3 - Protect turbine shafts

Note: Not suitable for „Pelton“ turbines



Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues.
- Grind down edges to a radius of minimum 3 mm (120 mils). In case of partial coating work deepen all rebuilding areas with a sharp 90° angle to a minimum of 1.5 mm (60 mils)
- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2. Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine SXL locally by trowel or inject with a cartridge. Rebuild missing structures. Pinhole-like substrates should be treated with brushable MetaLine KXL instead, to minimize risk of air pockets. Continue wet in wet with MetaLine SXL
- Continue wet in wet with a coat of brushable MetaLine KXL. As soon as the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

Technical reference

- Self-leveling properties reduce impingement
- Applicable in every desired thickness

Solids impingement (centrifuges & decanters)

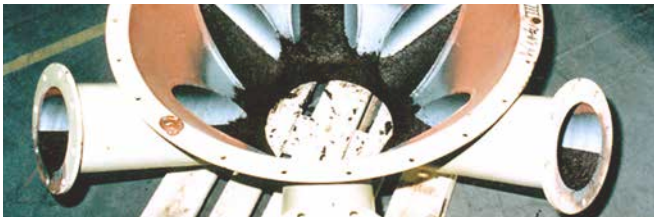
Typical use for: ☐ leakage ☐ breakage ■ **wear & tear** ■ **corrosion** ■ **erosion** ☐ cavitation ☐ abrasion

1 - Repair centrifuges / decanters

2 - Protect feeding screws

3 - Restore pulper

4 - Rebuild wear plates



Specific application information

- Grit blast all surfaces. High pressure hot water wash if previously exposed to salt water or chemicals. Flame treat to sweat out penetrated residues.
- Remove existing welding seams. Grind down edges to a radius of minimum 3 mm (120 mils)
- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1 - 2 mm (40 - 80 mils). In case of stainless steel surfaces use ferrous-free grit (e.g. Aluminiumoxyde). Required profile is minimum 75 microns (3 mils) and a surface quality of SA 2 1/2. Vacuum clean afterwards to dedust. Clean with solvent and let it dry
- Apply MetaLine CXL by trowel. Rebuild missing structures by use of a precise metal or wooden stencil. Press down firmly to receive a perfect bond and to avoid air enentrapment. Recommended material thickness is minimum about 5 mm (0,2 inch)

Technical reference

- Resists impacting solids in dry or wet environment
- Easy to repair in case of partial damage

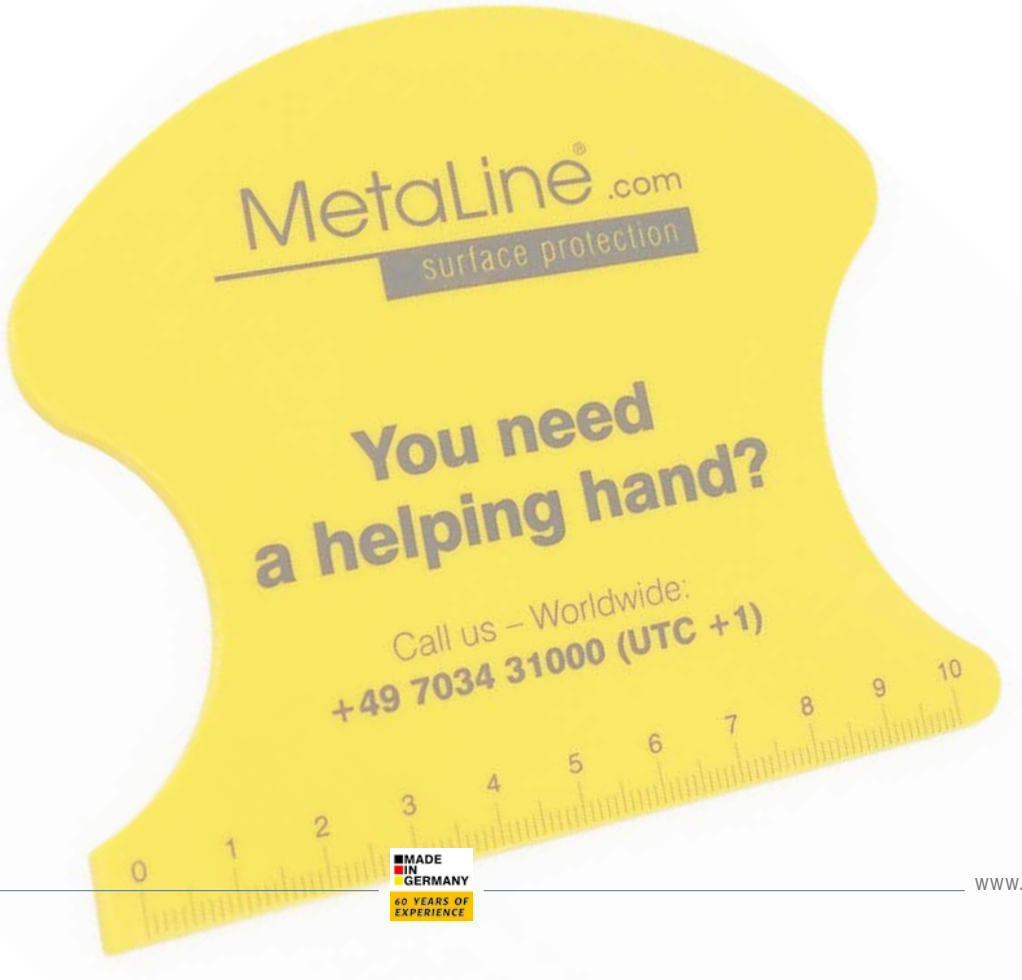
For your notes

More versatile - as I have fewer types to choose from . . .

More durable - than permanently changing the same spares . . .

More cost effective - than my existing supplier . . .

More sustainable - as I give my equipment a second life . . .



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P-100XL (EN), January 2021