MetaLine®.com

surface protection

Ceramic Repair Compounds

Power Generation, Pulp & Paper, Marine & Off-Shore, General Industry, Raw material extraction, Heating & Ventilation, Hydro-engineering, Mining, Petrochemical industry, etc.

MetaLine® Series XL

Trowelable or brushable ceramic products for the fast and professional reconstruction of worn surfaces

Since 1960 – Made in Germany

Ceramic Repair Compounds

MetaLine Series XL represents a series of three modern synthetic repair products designed to solve maintenance problems like leakage, breakage, erosion, corrosion, cavitation or wear. Internationally accepted as a leading technology to refurbish and strengthen 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
For field and „in-situ“ use. No cost-intensive application specialists are required. USDA approved for incidental food contact.

easy to apply

fast cure characteristics

machinable

heat resistant up to 200 °C

corrosion resistant

withstands deterioration

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. Formulated with the MetaLine experience of **over 50 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 wear-resistant compounds with outstanding mechanical properties against aging, erosion, corrosion, cavitation or impingement. Resists linear or dynamic impact in dry and turbulent fluid-flow installations. Provides extraordinary chemical resistance against acids, caustics, salts, oils or gases. Electrically non-conductive.

Choice of materials / How to select

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

Typical work size

Partial repairs

Working life (at 20 °C)

20 minutes

Cure time (at 20 °C)

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

Film thickness

Minimum:	0.1 mm
Maximum:	unlimited
Recommended:	> 1 mm

Machinable by

grinding / milling / lathe

MetaLine KXL

Description

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

Typical applications

- eroded vacuum pumps
- cavitated valves
- corroded heat exchangers

Typical work size

Full linings

Working life (at 20 °C)

30 minutes

Cure time (at 20 °C)

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

Film thickness

Minimum:	0.1 mm
Maximum:	unlimited
Recommended:	1 mm

Machinable by

grinding / milling / lathe

MetaLine CXL

Description

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

Typical applications

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

Typical work size

Partial linings

Working life (at 20 °C)

25 minutes

Cure time (at 20 °C)

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

Film thickness

Minimum:	3.0 mm
Maximum:	unlimited
Recommended:	> 5 mm

Machinable by

grinding only

Typical process characteristics

- **cold curing**
  no thermal disforming of substrates
- **pro environment**
  solvent free and non toxic
- **polymeric process**
  no flame or explosion risks
- **machinable**
  to every desired accuracy
- **non-conductive**
  prevents electro-chemical corrosion
- **resists**
  mechanical / chemical / thermal load
- **multi-purpose**
  bonds ferrous to non-ferrous items
- **long lasting**
  extend equipment life
- **economical**
  cheaper than common repair methods
- **engineering solution**
  safes spare-parts and shut down time

State-of-the-art alternatives against impingement forces ...

Process philosophy

a worldwide proven technology for do-it-yourself linings and professional repair work. Small range of different material types avoids large inventory. Easy and straight product selection reduces risks of mis-handling. Always available because of infinite shelf life properties. Exceptional performance profits due to the inherent, non-corroding synthetic product nature offering approved technical solutions.

more versatile ...

more durable ...

more cost effective ...

more professional ...

Eases daily repair demands and quickly solves most renovative, preventive and constructive maintenance problems – just over night!

- engine bodies
- cylinders
- shafts / keyways
- keyways
- flange areas
- bearing houses
- pump casings
- cooling units
- butterfly valves
- turbine impellers
- machine beds
- heat exchangers
- hydraulic systems
- valve seats
- tanks and pipes

... and much more

Product name	MetaLine SXL	MetaLine KXL	MetaLine CXL
Material basis (2-component material for manual self-mixing, solvent free	Polymer-Ceramic	Polymer-Ceramic	Polymer-Ceramic with carbide components
Package size	1 kg	1 kg	2 kg
Color	dark grey similar to RAL 7031	light grey similar to RAL 7035	dark brown similar to RAL 8017
Substrate preparation	mechanical roughening or sandblasting / degreasing	mechanical roughening or sandblasting / degreasing	mechanical roughening or sandblasting / degreasing
Type of application	trowel	brush / casting / injection	trowel
Consistency	paste-like (smooth)	viscous liquid (self-leveling)	paste-like (thixotropic)
Solids content	100 %	100 %	100 %
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
Layer thickness recommended *	> 0,1 mm * > 1 mm	> 0,1 mm * 1 mm	> 3 mm * > 5 mm
Area weight (Coverage) (theoretical per mm layer thickness)	2.340 g/m^2	2.200 g/m^2	2.530 g/m^2
Processing time in minutes (at 20 °C)	20 min	30 min	25 min
Overcoating time (at 20 °C)	1 h minimum / 6 h maximum	1 h minimum / 6 h maximum	1 h minimum / 6 h maximum
Solidification (at 20 °C – 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 53 479)	2.34 g/cm^3	2,2 g/cm^3	2,53 g/cm^3
Compressive strength (A.S.T.M. D695)	156 N/mm^2	141 N/mm^2	109 N/mm^2
Tensile bond strength (on 1.0037 mild steel)	20 N/mm^2	20 N/mm^2	21 N/mm^2
Tensile shear adhesion (on 1.4301 stainless steel), (A.S.T.M. D1002)	21 N/mm^2	21 N/mm^2	21 N/mm^2
Tensile strength (A.S.T.M. C307)	22 N/mm^2	21 N/mm^2	not specified
Flexural strength (A.S.T.M. D790)	68 N/mm	58 N/mm	54 N/mm
Impact resistance (by IZOD) (A.S.T.M. D256 „E“)	36 J/m	66 J/m	not specified
Temperature resistance (dry / wet)	+200 °C / +90 °C	+200 °C / +60 °C	+200 °C / +90 °C
Abrasion according to Taber® (A.S.T.M. D-4060 (NATO) – CS17, dry, 1 kg, 1.000 U)	no measurable loss	no measurable loss	no measurable loss
Coefficient of thermal expansion linear figure	23,3 x 10^{-6} K^{-1}	16,6 x 10^{-6} K^{-1}	25,5 x 10^{-6} K^{-1}
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- / Diamond tools	machinable by grinding / milling / lathe	machinable by grinding / milling / lathe	only grinding
Approvals	Lloyds / USDA	USDA	USDA
Shelf-life	at least 24 months	at least 24 months	at least 24 months

Lloyds Register:

Maritime Approval for MetaLine SXL

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 60ºC

Witnessed test **Tensile strength (ASTM C307): 4621.8 PSI**
Shore D Hardness: 95 +/-2

Valid until **3rd May 2022**

Date **8th May 2017**

M Jogia
Lead Specialist to Lloyd's Register EMEA
A member of the Lloyd's Register group

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:

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

"...

Gentlemen:

Your MetaLine SXL 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

..."

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.

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..."

■ **leakage** ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.1. Pipe-work & elbows

Seal leaking tubes

Repair synthetic pipe-materials

Strengthen elbow areas

Protect immersed equipment


Reinforcement plate for high load


Pipe repair under field conditions

- **Non-flammable and non-sparking process**
- **Resists pressure up to 200 bars**

Specific application information

- If possible, all pipe repairs should be realized at the outside diameter of the pipe-work.
- Treat the surface by flame or heat to sweat out penetrated residues (if allowed)
- Extend the actual repair area for minimum 100 mm in all directions and grit blast or roughen it. 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 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. Apply MetaLine SXL and fix immediately with bolts

■ **leakage** ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.2. Tanks, containers & vessels

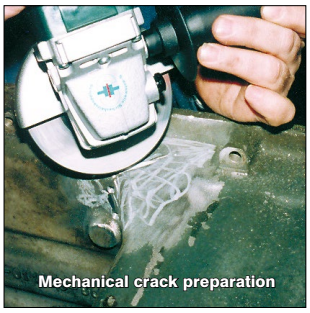
Seal leaking storage tanks

Repair porous oil sumps

Resurface corroded casings

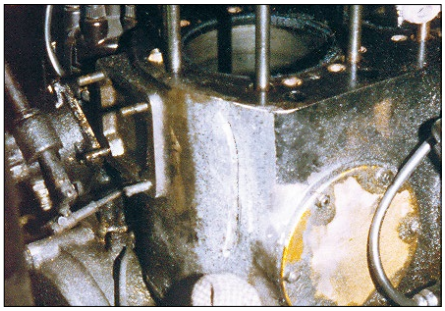
Overcoat leaking welding seams

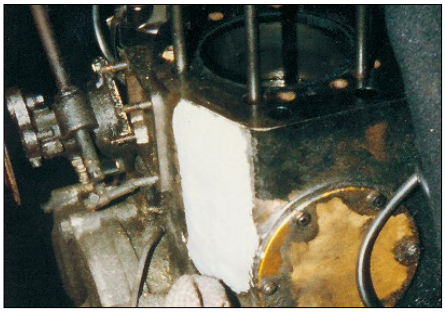
Repair cracked engines blocks


Mechanical crack preparation


Completed repair work

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





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 in all directions and grit blast or roughen it. In case of open 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 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
- 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

■ **leakage** ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

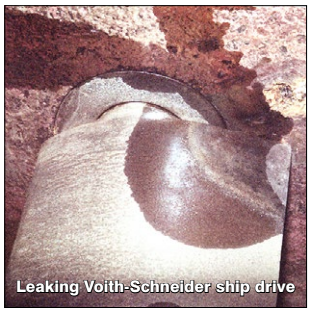
1.3. Bearings & seats

Seal leaking bearings

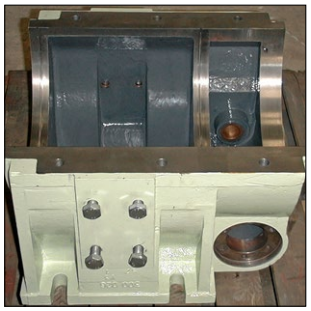
Recontur oversized seats

Repair cutlass bearings

Cast line-shaft bearings


Leaking Voith-Schneider ship drive


Completed repair work



- **Oil and salt water resistant**
- **Rebuilding without machining**

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 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 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
- Adjust the accurate bearing position and fix during the material cure

■ **leakage** ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.4. Flanges & couplings

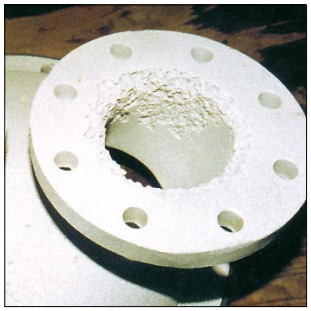
Rebuild flange areas

Repair drive faces

Contour gasket areas


Flange damage at a steam turbine


Completed repair work



- **Resists high compression forces**
- **Extremely accurate when moulded**

Specific application information

- Deepen existing undersize to a minimum of 2 mm. 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 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

■ **leakage** ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.5. Casing porosities & voids

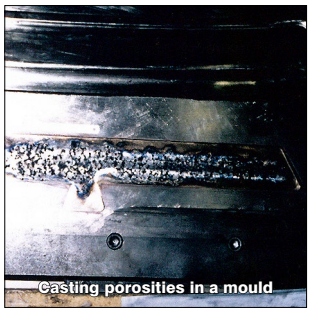
Seal porous structures

Create gas-tight linings

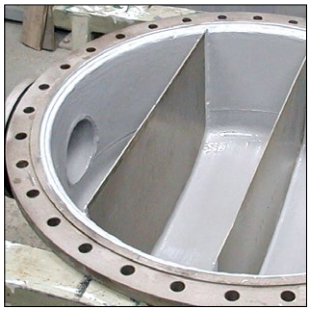
Rebuild faulty castings

Repair leaking transformers

Recontur damaged moulds


Casting porosities in a mould


Completed repair work



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

Specific application information

- Deepen existing surface irregularities to a minimum of 1 mm. 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

☐ leakage ■ **breakage** ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

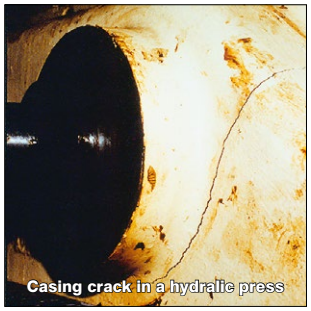
1.6. Engines & drives

Seal casings cracks

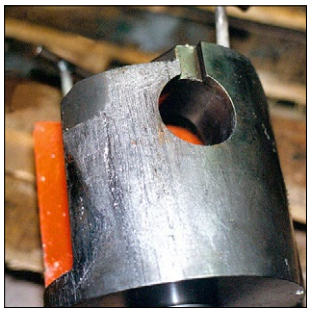
Repair leaking equipment

Stabilize crack sensitive areas

Rebuild stripped threads

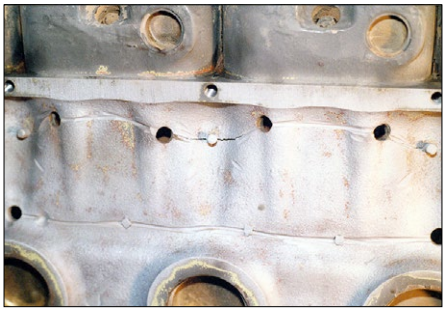

Casing crack in a hydralic press

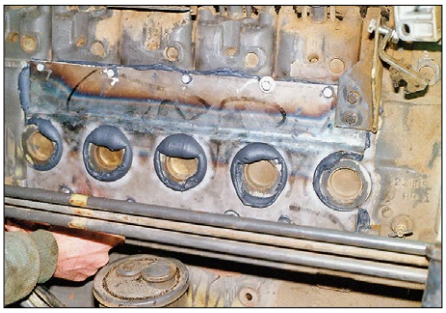

Completed repair work




Professional crack preparation

- **High thermal coefficient of expansion**
- **Suitable for grey-cast-iron, aluminum, etc.**





Specific application information

Remove existing welding seams by grinding. Drill holes (diameter 5 mm) at each end of the crack as well as every 50 mm through the crack. Grind along the crack and widen it in form of a „V“. Place screws in the holes and widen it to the expected expansion if it arrives to usage temperature

Treat the surface by flame or heat to sweat out penetrated residues (if allowed). Extend the actual repair area for minimum 50 mm 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. 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 screws. This will result in much higher tensile resistance and restrict expansion

☐ leakage ■ **breakage** ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.7. Casing breakage

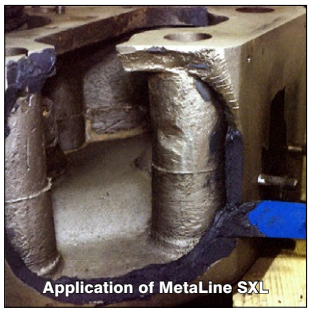
Repair broken gear boxes

Over-bridge missing structures

Rebuild frost damages

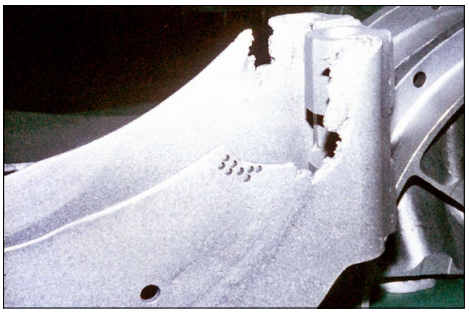

Casing breakage at a cylinder head

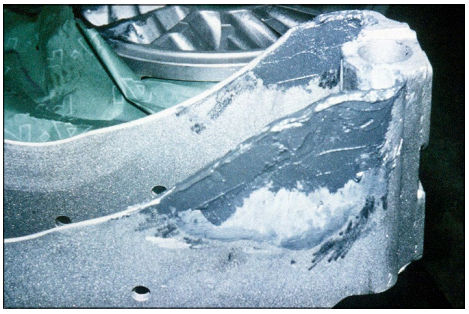

Metallic reinforcement bandage


Application of MetaLine SXL


Completed repair work

- **Resistant against vibration and thermal shock**
- **Extended application life for proper installation**





Specific application information

- Remove existing welding seams by grinding. Check surface for cracks and treat as indicated in 1.6. 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). Extend the actual repair area for minimum 50 mm 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

☐ leakage ☐ breakage ■ **wear & tear** ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.8. Machine beds & guides

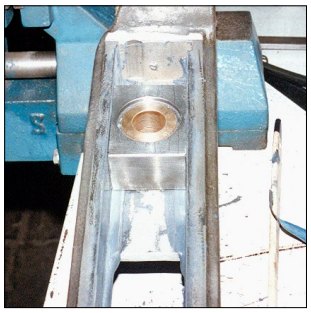
Repair partial wear on beds

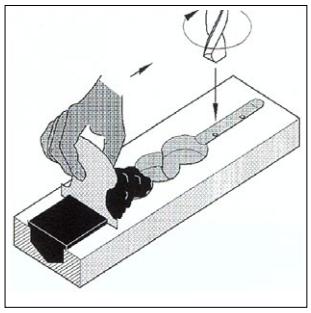
Fill misdrilled holes

Balance undersize tolerances

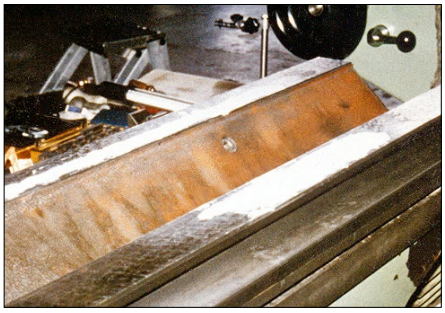

Worn metal wire tool


Completed repair work





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



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). Distance about 2/3 of the diameter used later to enlarge the repair area
- Enlarge the scored area plus 3 mm in all directions by a second drilling procedure. Clean with solvent and let it dry
- Apply MetaLine SXL about 0,5 -1 mm thicker than required. Watch out not to incorporate air pockets
- After 3-4 hours cure time start machining to final scale. Use milling, scraping or polishing

☐ leakage ☐ breakage ■ **wear & tear** ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

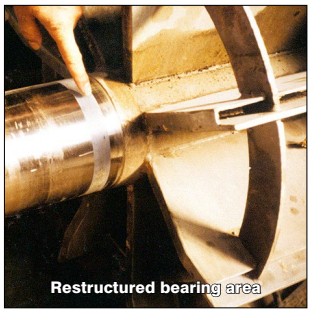
1.9. Shafts, journals & hydraulic rams

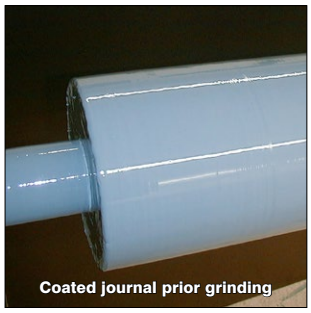
Repair worn bearing areas

Rebuild spline couplings

Repair worn key-ways

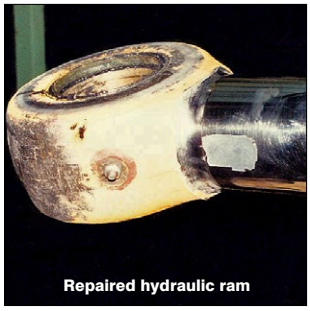
Seal leaking hydraulic rams

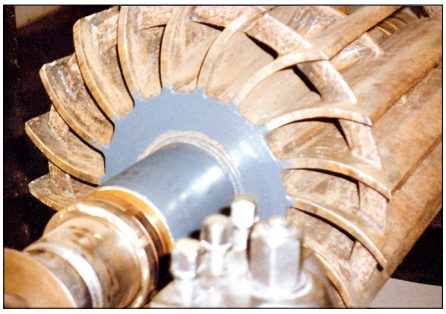

Restructured bearing area


Coated journal prior grinding

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


Shaft protection at a feeding screw


Repaired hydraulic ram



Specific application information

- Treat the shaft by turning (lathe operation) with great feed into the form of a thread (15 turns per cm). Exterior angle about 90°. Cutting depth minimum 1,5 mm. 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

☐ leakage ☐ breakage ■ **wear & tear** ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

1.10. Bearing seats

Repair roller bearing seats

Reseat bearing shells

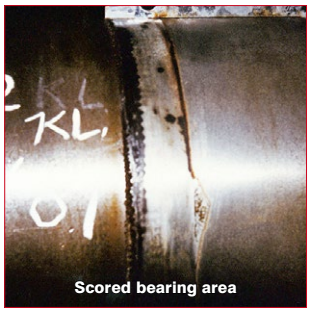
Reform division bar seats

Reform ball joint housings

Realign pins into oversized seats

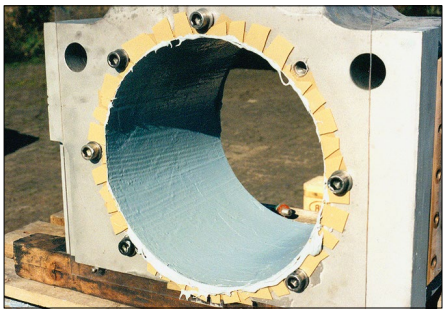

Rebuilded bearing seat

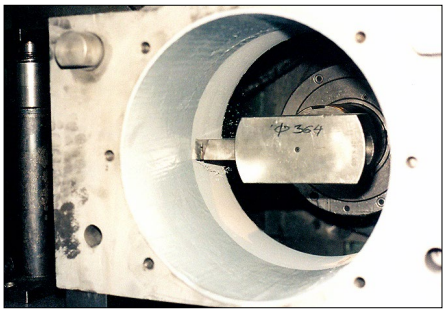

Completed repair work


Scored bearing area


Restructured area prior machining

- **Cures without swelling or shrinkage**
- **Securely stops crevice corrosion**





Specific application information

- Extend the actual dimension of the seat to a minimum bearing distance of 1 mm in the radius. Flame treat to sweat out penetrated residues (if allowed)
- Thoroughly grit blast or roughen the surface. Clean with solvent and 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
- 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

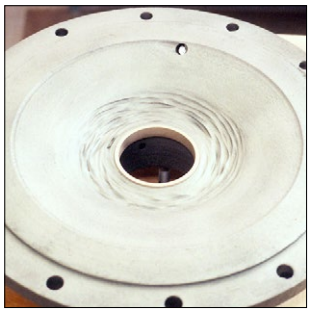
☐ leakage ☐ breakage ■ **wear & tear** ☐ corrosion ☐ erosion ☐ cavitation ☐ abrasion

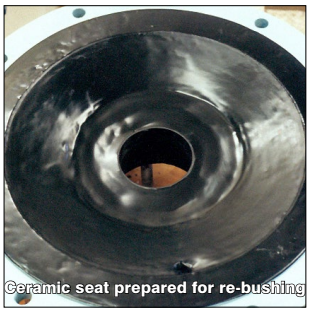
1.11. Bushings

Reseat bushes

Create non-metallic bush seats

Restore bronze bushes





Ceramic seat prepared for re-bushing

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

Specific application information

- Extend the actual dimension of the seat to a minimum bush distance of 1 mm 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 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 isolating properties of MetaLine Ceramic Compounds, more abrasion resistant bush materials can be used which normally would be unsuitable due to bi-metallic-corrosion

☐ leakage ☐ breakage ☐ wear & tear ■ **corrosion** ☐ erosion ☐ cavitation ☐ abrasion

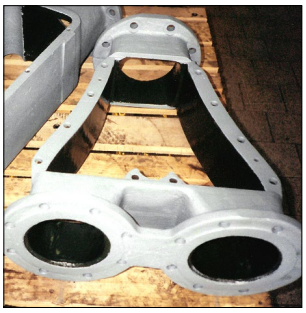
1.12. Chemical corrosion

Line surface treatment systems

Encapsulate immersed pumps

Coat tanks and structures

Protect de-sulphurisation units



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

Specific application information

- Grit blast corroded surfaces. Steam 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. Required profile is 50-75 microns and a surface quality of SA 2 1/2 (Swedish Standard). Vacuum afterwards. 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. After the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

☐ leakage ☐ breakage ☐ wear & tear ■ **corrosion** ☐ erosion ☐ cavitation ☐ abrasion

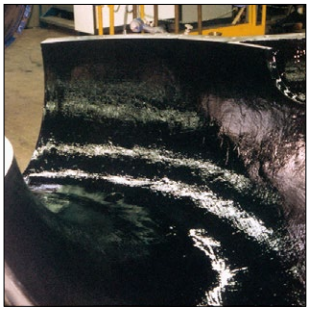
1.13. Galvanic corrosion

Line condensers

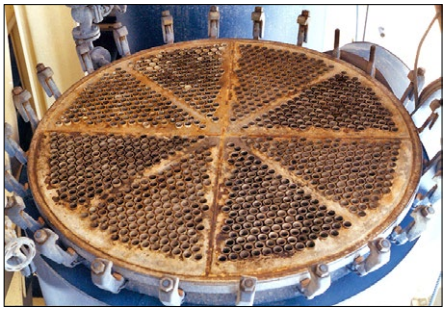
Isolate heat exchangers

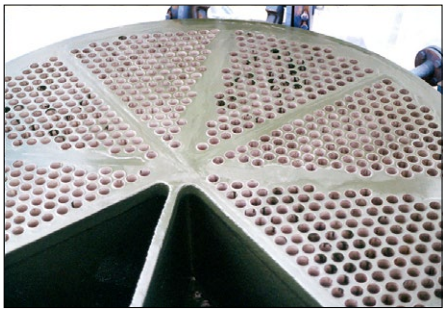
Protect vaporizers

Bond steel to stainless steel



- **Electrically isolating (non-conductive)**
- **Extremely resistant against permeation**





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 50-75 my
- Clean with solvent and let it dry
- Vertical positioning: Apply MetaLine SXL locally and re-contour manually to the original shape. Alternatively treat a 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

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ■ **erosion** ☐ cavitation ☐ abrasion

1.14. Fluid-flow equipment (casings)

Repair flow straighteners

Rebuild eroded pump casings

Re-profile cut-water profiles

Repair split casings pumps

Reduce wear ring clearances

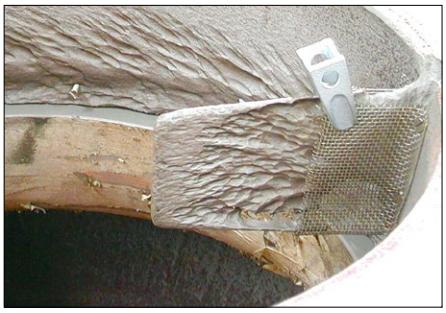
Restore scroll pump bores

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

Trowel application of MetaLine SXL

Severe erosive damage

Completed repair work



Specific application information

- Grit blast all surfaces. Steam clean the part (high pressurized hot water) in case it has been objected to salt-water or chemicals before. 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. Required profile is 50-75 microns and a surface quality of SA 2 1/2 (Swedish Standard). Vacuum afterwards. 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 overbridge holes or cracks

- Continue wet in wet with a coat of brushable MetaLine KXL. After the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ■ **erosion** ☐ cavitation ☐ abrasion

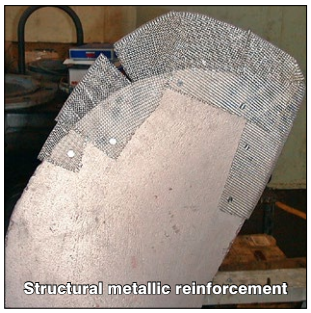
1.15. Fluid-flow equipment (impellers & mixers)

Repair impeller vane corrosion

Re-contour eroded mixers

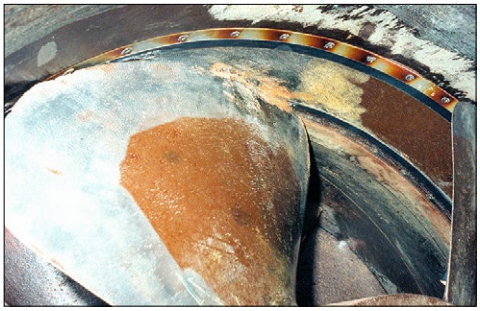
Treat mixer blades to non-stick

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



Structural metallic reinforcement

Completed repair work



Specific application information

- Grit blast all surfaces. Steam clean (high pressurized hot water) in case it has been objected to salt-water or chemicals before. 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. Required profile is 50-75 microns and a surface quality of SA 2 1/2. Vacuum afterwards. 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 brush-able 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. After the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ■ **erosion** ☐ cavitation ☐ abrasion

1.16. Liquid ring vacuum pumps (Nash & Elmo)

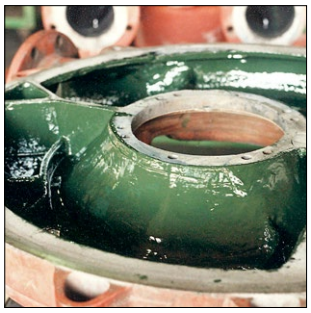
Repair & protect rotors

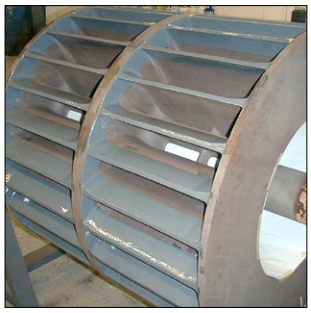
Reduce cone clearances

Repair valve plates

Rebuild profile of end covers

Restore accurate tolerances





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

Specific application information

- Grit blast all surfaces. Steam clean (high pressurized hot water) in case the part has been objected to salt-water or chemicals before. 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. Required profile is 50-75 microns and a surface quality of SA 2 1/2. Vacuum afterwards. 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
- Apply MetaLine KXL. After the minimum overcoating time has elapsed apply a second coat MetaLine KXL. After cure give a lathe or grinding operation to final scale

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ■ **cavitation** ☐ abrasion

1.17. Butterfly & gate valves

Re-profile slides

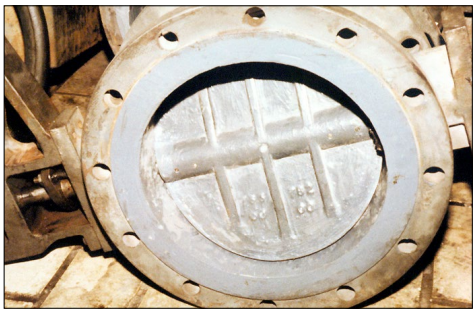
Rebuild valve bodies

Protect gates


Severe cavitation damage


Ceramic protective lining

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



Specific application information

- Grit blast all surfaces. Steam clean (high pressurized hot water) in case the part has been objected to salt-water or chemicals before. Flame treat to sweat out penetrated residues. Grind down edges to a radius of minimum 3 mm. In case of partial coating work deepen all rebuilding areas with a sharp 90 ° angel to a minimum of 1,5 mm

- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1-2 mm. Required profile is 50-75 microns and a surface quality of SA 2 1/2. Vacuum afterwards. 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

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ■ **cavitation** ☐ abrasion

1.18. Water turbines (casings)

Repair cavitation damage

Rebuild guide wings

Protect water outlet areas


Kaplan Water Turbine


Completed repair work

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

Specific application information

Grit blast all surfaces. Steam clean (high pressurized hot water) in case it has been objected to salt-water or chemicals before. Flame treat to sweat out penetrated residues. Grind down edges or sharp contours to a radius of minimum 3 mm

Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1-2 mm. Required profile is 50-75 microns and a surface quality of SA 2 1/2. Vacuum afterwards. 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. After the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ■ **cavitation** ☐ abrasion

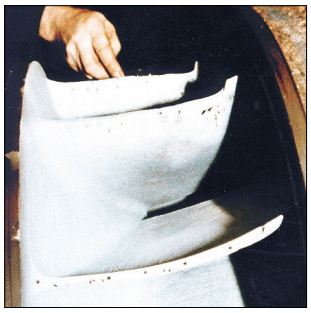
1.19. Water turbines (impellers)

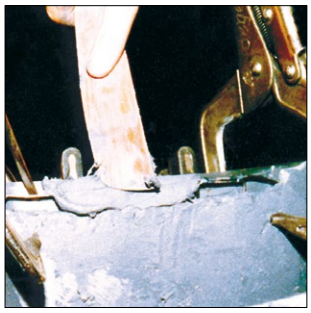
Coat „Francis“ impellers

Rebuild „Kaplan“ impellers

Protect turbine shafts

Note: Not suitable for „Pelton“ turbines





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

Specific application information

- Grit blast all surfaces. Steam clean (high pressurized hot water) in case it has been objected to salt-water or chemicals before. Flame treat to sweat out penetrated residues. Grind down edges or sharp contours to a radius of minimum 3 mm

- Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1-2 mm. Required profile is 50-75 microns and a surface quality of SA 2 1/2. Vacuum afterwards. 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. After the minimum overcoating time as elapsed apply a second coat MetaLine KXL in 90° application direction to the first coat

☐ leakage ☐ breakage ☐ wear & tear ☐ corrosion ☐ erosion ☐ cavitation ■ **abrasion**

1.20. Solids impingement (centrifuges & decanters)

Repair centrifuges / decanters

Protect feeding screws

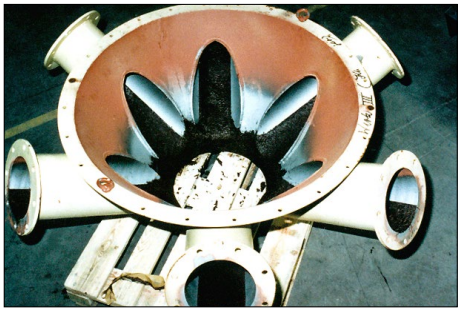
Restore pulpers

Rebuild wear plates

Complete protection of a pulper

Repair-work at a decanter

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



Specific application information

Grit blast all surfaces. Steam clean (high pressurized hot water) in case the part has been objected to salt-water or chemicals before. Flame treat to sweat out penetrated residues. Remove existing welding seams. Grind down edges to a radius of minimum 3 mm

Thoroughly re-blast the surface. Use sharp contoured fresh blasting grit with a mesh-size of 1-2 mm. In case of stainless steel surfaces use non-metallic (ceramic) grit. Required profile is 50-75 microns and a surface quality of SA 2 1/2. Vacuum afterwards. 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 entrapment. Recommended material thickness is about 5 mm

Notes

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- Automotive Manufacturing
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- Metal Foundries
- Mining Industry and Mining Technology
- Municipal Technology
- Nautical
- Occupational Safety
- Offshore & Marine
- Packaging Technology
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