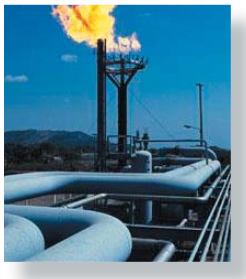
■ leakage ■ breakage ■ wear & tear ■ corrosion ■ erosion ■ cavitation ■ abrasion

MetaLine® Series XL Ceramic Repair Compounds

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

Proven worldwide since 1960!

- Power Generation
- Pulp & Paper
- Marine & Off-Shore
- General Industry
- Oil & Gas
- Heating & Ventilation
- Mining
- Hydro Engineering
- Petrochemical
- Food Processing








MetaLine®
surface protection
Alfred Schramm molecular-technik GmbH & Co. KG

Alfred Schramm molecular-technik GmbH & Co. KG ■ D-71157 Hildrizhausen (Germany)
Phone +49 7034 31000 ■ Fax +49 7034 31005 ■ www.metaline.eu ■ info@metaline.eu

MetaLine Series XL

abrasion-resistant, polymeric repair compounds

MetaLine Series XL represents a series of 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**

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


prevent bi-metallic corrosion


rebuild structural loss


repair cavitated areas


recontur eroded surfaces

easy to apply

fast cure characteristics

machinable

heat resistant up to 235 °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 **40 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.

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MetaLine Series XL

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 . . .

more versatile . . .

more durable . . .

more cost effective . . .

more professional . . .

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.

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

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

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MetaLine Series XL

choice of materials / how to select

Product name	MetaLine SXL	MetaLine KXL	MetaLine CXL
Description	trowelable, **ceramic-grade** for the rebuilding of worn areas or the repair of damaged equipment	brushable, semi self leveling **ceramic-grade** for the lining of surfaces impacted by **liquids**	trowelable, **carbide-grade** for the protection of dry/wet surfaces extremely impacted by **solids**
Thixothropie	paste-like (high density)	liquid (medium density)	paste-like (high density)
Method of application	trowel or spatula	brush or trowel	trowel or spatula
Typical applications	■ worn keyways ■ scored machine beds ■ cracked engine bodies	■ eroded vacuum pumps ■ cavitated valves ■ corroded heat exchangers	■ centrifuges / decanters ■ turbo separators ■ pulverizing mills / pulpers
Typical work size	partial repairs	full linings	partial linings
Cure time	24 hours at 20 °C	24 hours at 20 °C	24 hours at 20 °C
Film thickness	minimum: 0,1 mm maximum: unlimited recommended: > 1 mm	minimum: 0,1 mm maximum: unlimited recommended: 1,5 mm	minimum: 2,0 mm maximum: unlimited recommended: > 5 mm
Machinable by	grinding / milling / lathe	grinding / milling / lathe	grinding only

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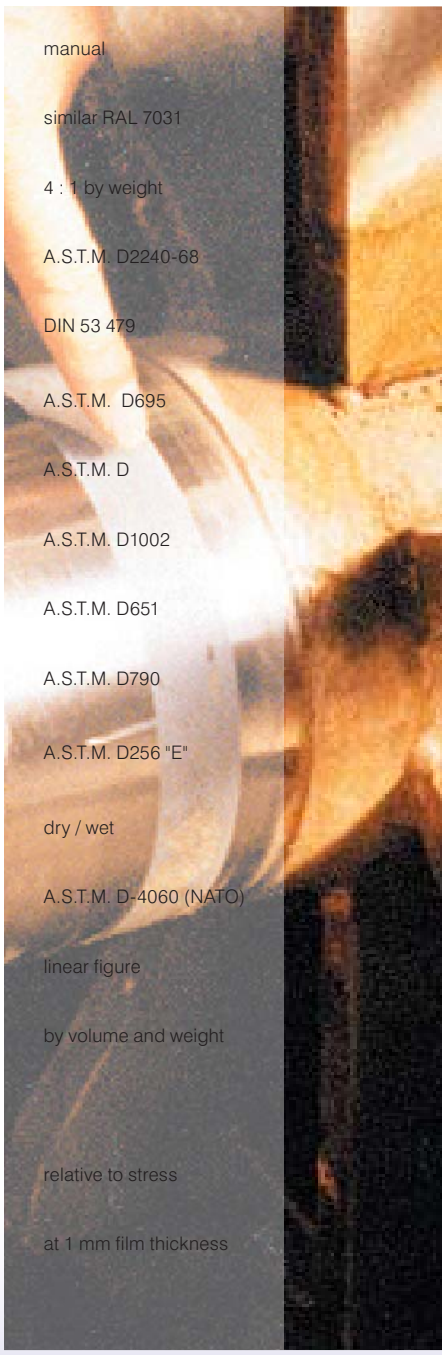
MetaLine SXL

putty ceramic repair compound

Application method	spatula / trowel	manual
Colour	grey	similar RAL 7031
Mixing ratio	3 : 1 by volume	4 : 1 by weight
Hardness	95 Shore D	A.S.T.M. D2240-68
Density	2,34 g/cm³	DIN 53 479
Compressive strength	156 N/mm²	A.S.T.M. D695
Tensile bond strength (mild steel)	20 N/mm²	A.S.T.M. D
Tensile shear adhesion (stainless steel)	21 N/mm²	A.S.T.M. D1002
Tensile strength	22 N/mm²	A.S.T.M. D651
Flexural strength	68 N/mm²	A.S.T.M. D790
Impact resistance (IZOD)	36 J/m	A.S.T.M. D256 "E"
Heat resistance	+235 °C / +90 °C	dry / wet
TABER-Abrasion (CS17, dry, 1 kg, 1000 rev.)	no measurable loss	A.S.T.M. D-4060 (NATO)
Coefficient of thermal expansion	23,3 x $10^{-6}K^{-1}$	linear figure
Solids content	100 %	by volume and weight
Working life (at 20 °C)	20 minutes	
Full Cure (at 20 °C)	> 1 day	relative to stress
Coverage	2.340 g/m²	at 1 mm film thickness
Chemical resistance	use separate guide	



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MetaLine KXL

liquid ceramic repair compound

Application method	brush / trowel	manual
Colour	light-grey	similar RAL 7035
Mixing ratio	14,3 : 1 by weight	no volume ratio possible
Hardness	97 Shore D	A.S.T.M. D2240-68
Density	2,20 g/cm³	DIN 53 479
Compressive strength	141 N/mm²	A.S.T.M. D695
Tensile bond strength (mild steel)	20 N/mm²	A.S.T.M. D
Tensile shear adhesion (stainless steel)	21 N/mm²	A.S.T.M. D1002
Tensile strength	21 N/mm²	A.S.T.M. D651
Flexural strength	58 N/mm²	A.S.T.M. D790
Impact resistance (IZOD)	66 J/m	A.S.T.M. D256 "E"
Heat resistance	+235 °C / +60 °C	dry / wet
TABER-Abrasion (CS17, dry, 1 kg, 1000 rev.)	no measurable loss	A.S.T.M. D-4060 (NATO)
Coefficient of thermal expansion	16,6 x $10^{-6}K^{-1}$	linear figure
Solids content	100 %	by volume and weight
Working life (at 20 °C)	30 minutes	
Full Cure (at 20 °C)	> 1 day	relative to stress
Coverage	2.200 g/m²	at 1 mm film thickness
Chemical resistance	use separate guide	

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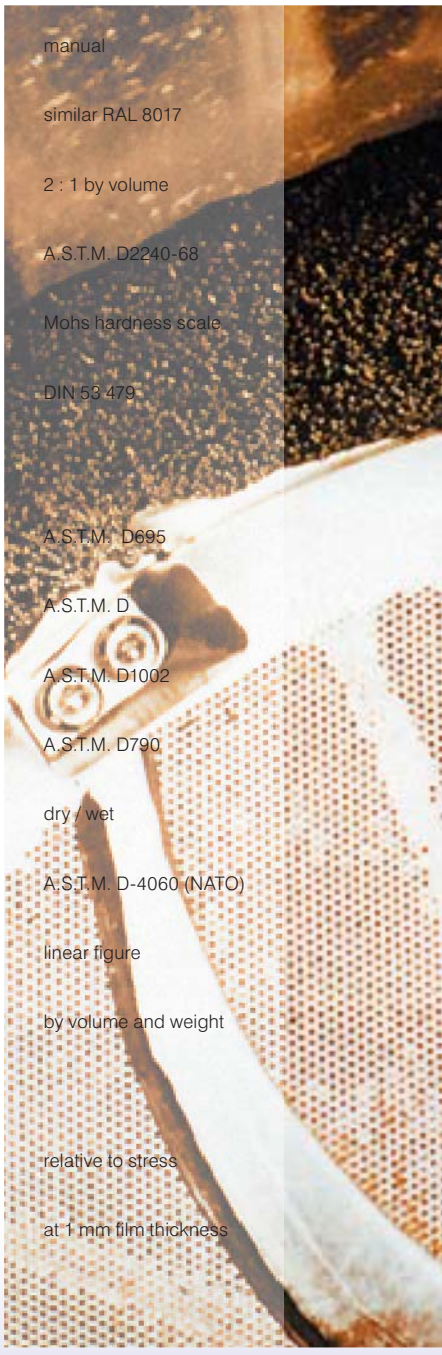
MetaLine CXL

ceramic carbide repair compound

Application method	trowel	manual
Colour	brown	similar RAL 8017
Mixing ratio	2 : 1 by weight	2 : 1 by volume
Hardness (polymeric matrix)	93 Shore D	A.S.T.M. D2240-68
Hardness (carbide filler)	9 Mohs	Mohs hardness scale
Density	2,53 g/cm³	DIN 53 479
Minimum film thickness	> 2 mm	
Compressive strength	109 N/mm²	A.S.T.M. D695
Tensile bond strength (mild steel)	21 N/mm²	A.S.T.M. D
Tensile shear adhesion (stainless steel)	21 N/mm²	A.S.T.M. D1002
Flexural strength	54 N/mm²	A.S.T.M. D790
Heat resistance	+235 °C / +90 °C	dry / wet
TABER-Abrasion (CS17, dry, 1 kg, 1000 rev.)	no measurable loss	A.S.T.M. D-4060 (NATO)
Coefficient of thermal expansion	25,5 x $10^{-6}K^{-1}$	linear figure
Solids content	100 %	by volume and weight
Working life (at 20 °C)	20 minutes	
Full Cure (at 20 °C)	> 1 day	relative to stress
Coverage	2.530 g/m²	at 1 mm film thickness
Chemical resistance	use separate guide	



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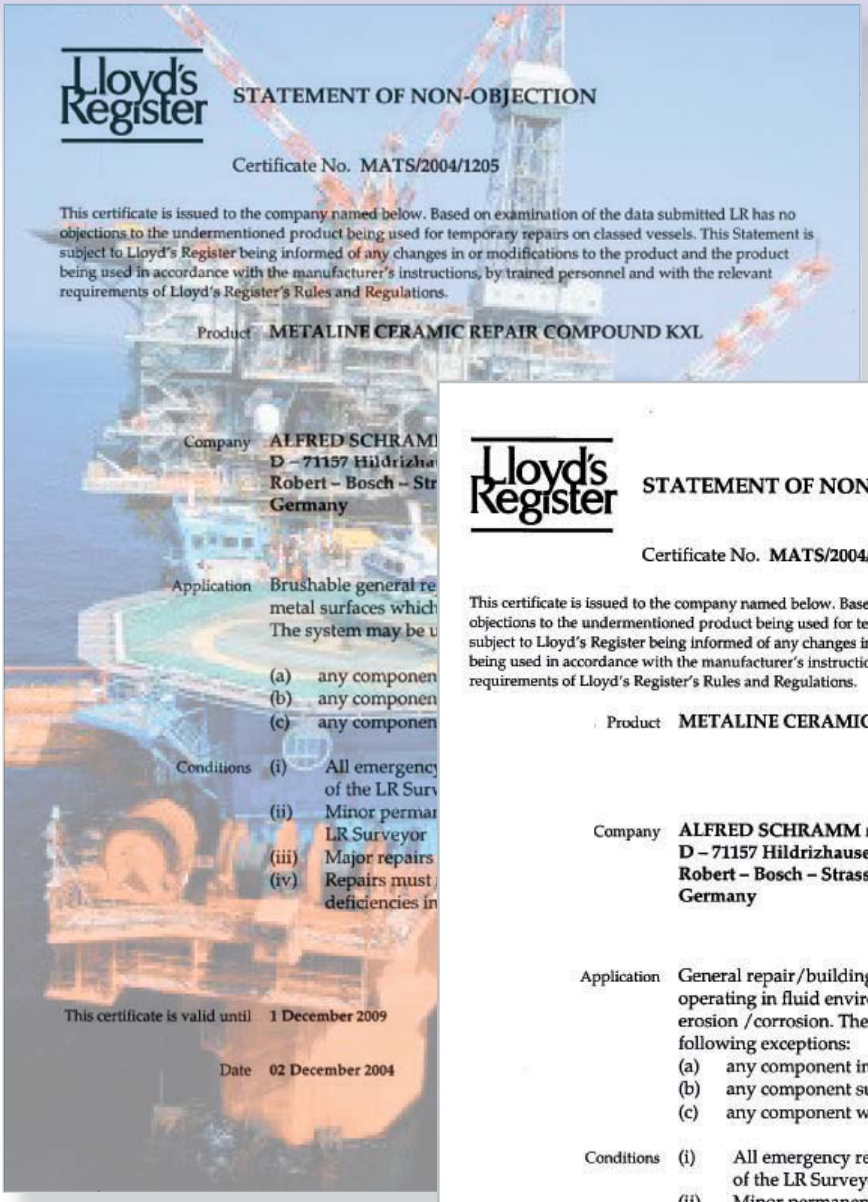

Lloyd's Register

STATEMENT OF NON-OBJECTION

Certificate No. **MATS/2004/1205**

This certificate is issued to the company named below. Based on examination of the data submitted LR has no objections to the undermentioned product being used for temporary repairs on classed vessels. This Statement 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, by trained personnel and with the relevant requirements of Lloyd's Register's Rules and Regulations.

Product **METALINE CERAMIC REPAIR COMPOUND KXL**

Company **ALFRED SCHRAM**
D – 71157 Hildrizha
Robert – Bosch – Str
Germany

Application Brushable general re
metal surfaces which
The system may be u

(a) any componen
(b) any componen
(c) any componen

Conditions (i) All emergency
of the LR Surv
(ii) Minor permar
LR Surveyor
(iii) Major repairs
(iv) Repairs must
deficiencies in

This certificate is valid until **1 December 2009**

Date **02 December 2004**

Lloyd's Register

STATEMENT OF NON-OBJECTION

Certificate No. **MATS/2004/1206**

This certificate is issued to the company named below. Based on examination of the data submitted LR has no objections to the undermentioned product being used for temporary repairs on classed vessels. This Statement 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, by trained personnel and with the relevant requirements of Lloyd's Register's Rules and Regulations.

Product **METALINE CERAMIC REPAIR COMPOUND SXL**

Company **ALFRED SCHRAMM molecular- technik GmbH & Co**
D – 71157 Hildrizhausen
Robert – Bosch – Strasse 9
Germany

Application General repair/building compound for rebuilding metal surfaces operating in fluid environments 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°

Conditions
(i) All emergency repairs are to be brought 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 consideration
(iv) Repairs must not be used as means of making good deficiencies in strength

This certificate is valid until **1 December 2009**

Date **02 December 2004**

J C Howson
Surveyor to Lloyd's Register EMEA
A member of the Lloyd's Register Group

D-71157 Hildrizhausen (Germany) ■ Phone +49 7034 31000 ■ info@metaline.eu

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 Solidifie
to rebuild or repair equipment and ma
food contact in federally inspected me
the chemical composition and surface
USDA on May 22, 1986. This accepta
chemical constituents against appropr
or guidelines and the physical surface
constitute a USDA endorsement of the

Were food adulterating vapors may be
tion or installation of this product, all u
materials must be moved out of the af
packaging materials may be returned
has been used, the area must be suffi
contamination of the food.

Any unacceptable condition resulting f
maintenance will be cause for the insp

..."

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

..."

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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

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


reinforcement plate for high load


pipe repair under field conditions

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

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

1.2. tanks, containers & vessels

seal leaking storage tanks

repair porous oil sumps

resurface corroded casings

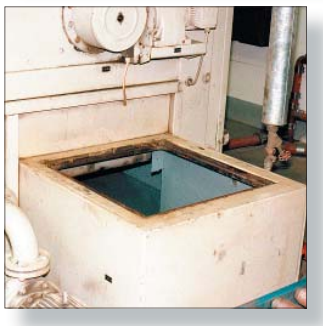
overcoat leaking welding seams

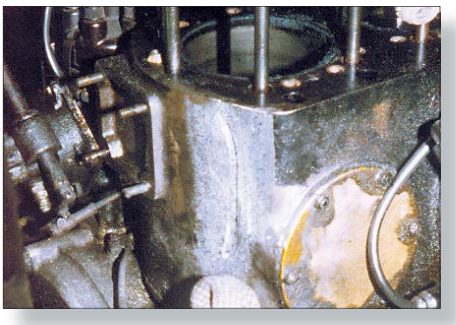
repair cracked engines blocks

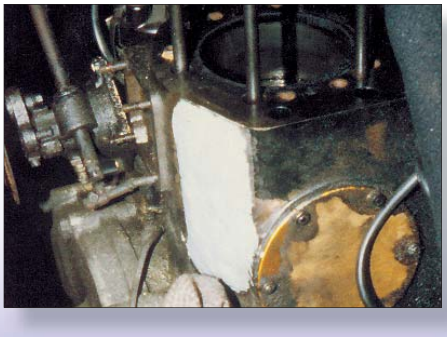
- **suitable for internal or external sealing**
- **approved for incidental food contact**


mechanical crack preparation


completed repair work







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

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

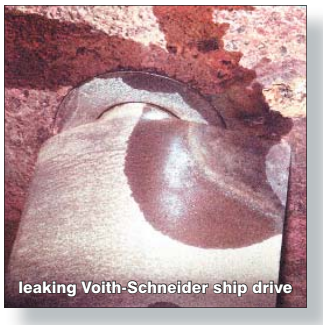
1.3. bearings & seats

seal leaking bearings

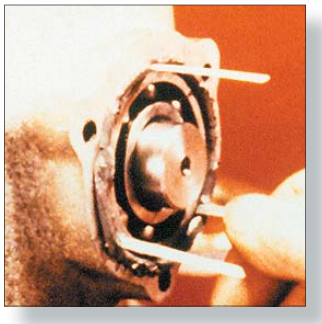
recontur oversized seats

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

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

1.4. flanges & couplings

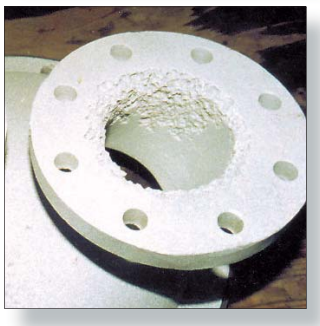
rebuild flange areas

repair drive faces

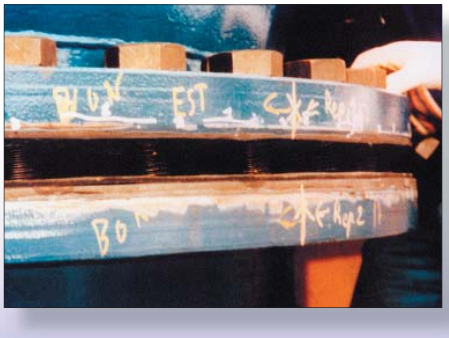
contour gasket areas


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

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

1.5. casing porosities & voids

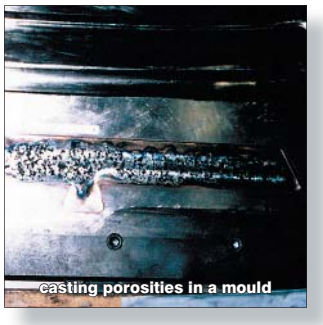
seal porous structures

create gas-tight linings

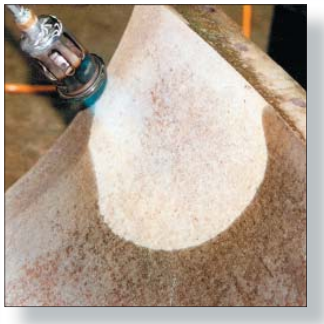
rebuild faulty castings

repair leaking transformers

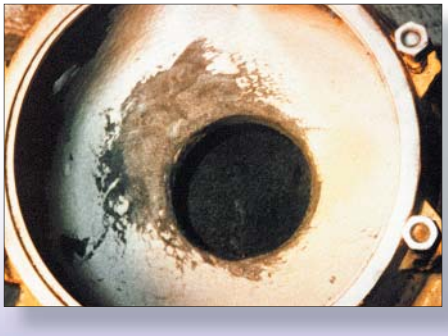
recontur damaged moulds


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

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

1.6. engines & drives

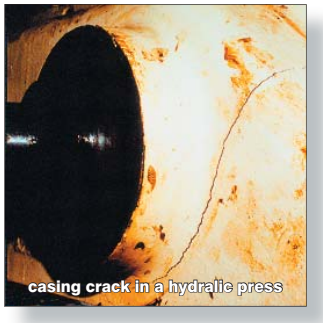
seal casings cracks

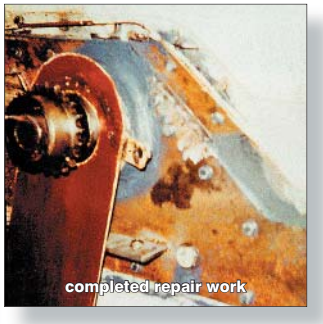
repair leaking equipment

stabilize crack sensitive areas

rebuild stripped threads

- **high thermal coefficient of expansion**
- **suitable for grey-cast-iron, aluminium, etc.**


casing crack in a hydralic press


completed repair work


professional crack preparation

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 bejond 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

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1.7. casing breakage

repair broken gear boxes

overbridge missing structures

rebuild frost damages

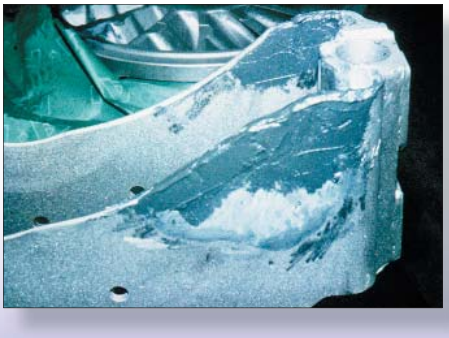

casing breakage at a cylinder head


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 bejond the prepared area
- Consider enough flexibilty in the system to balance thermal expansion in case of higher usage temperatures

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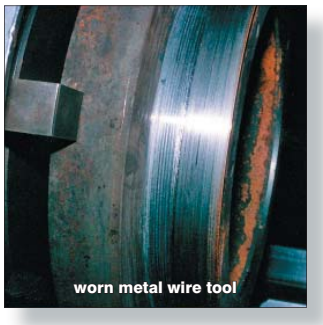
leakage ■ breakage ■ **wear & tear** ■ corrosion ■ erosion ■ cavitation ■ abrasion

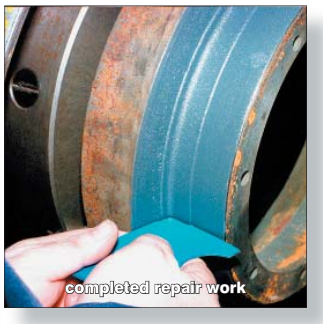
1.8. machine beds & guides

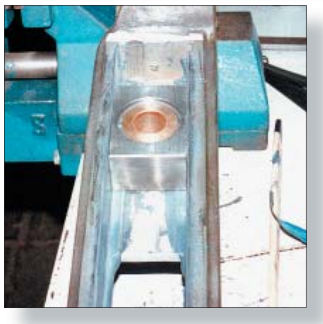
repair partial wear on beds

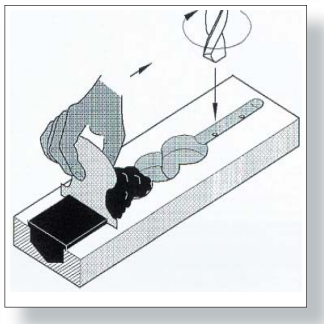
fill misdrilled holes

balance undersize tolerances

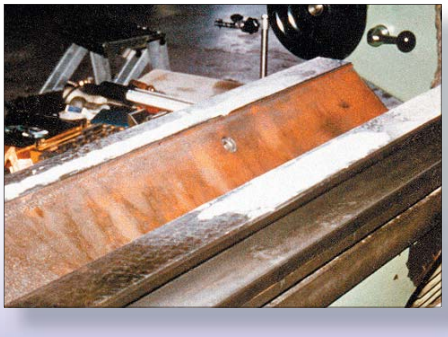

worn metal wire tool


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 enlargen 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, scrabbing or polishing

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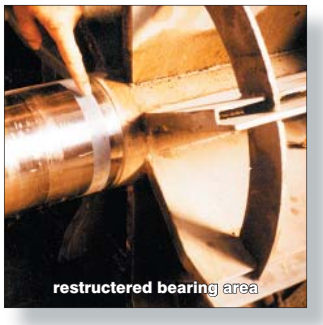
1.9. shafts, journals & hydraulic rams

repair worn bearing areas

rebuild spline couplings

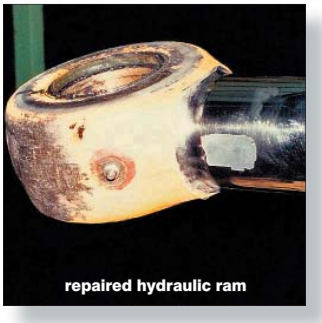
repair worn keyways

seal leaking hydraulic rams


restructered bearing area


coated journal prior grinding


shaft protection at a feeding screw


repaired hydraulic ram

- **machinable by drilling, milling, grinding, etc.**
- **matrix-moulding to final accuracy possible**

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 contured 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

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1.10. bearing seats

repair roller bearing seats

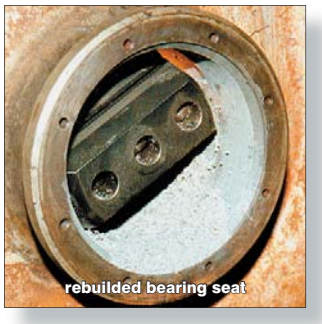
reseat bearing shells

reform division bar seats

reform ball joint housings

realign pins into oversized seats

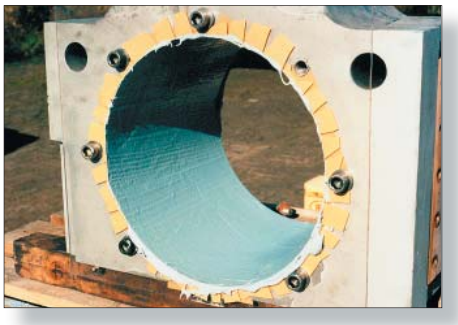
- **cures without swelling or shrinkage**
- **securely stops crevice corrosion**

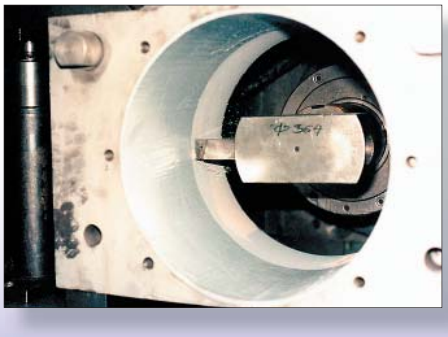

rebuilded bearing seat


completed repair work


scored bearing area


restructured area prior machining





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

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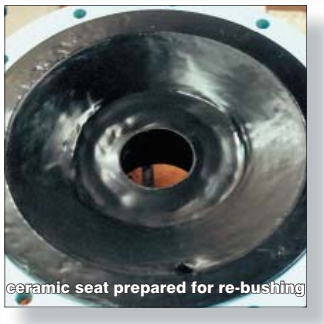
1.11. bushings

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 Compunds, more abrasion resistant bush materials can be used which normally would be unsuitable due to bi-metallic-corrosion

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1.12. chemical corrosion

line surface treatment systems

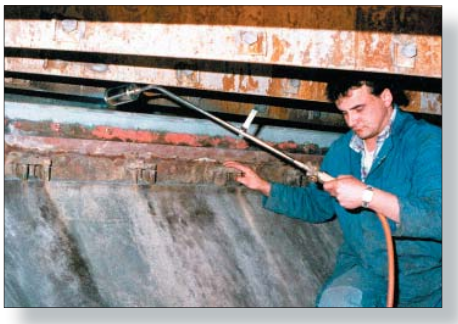
encapsulate immersed pumps

coat tanks and structures

protect de-sulphurisation units


ceramic-like high quality protection

- **seamless treatment on all complex surfaces**
- **extremely resistant against chemical attack**



Specific application information

- Grit blast corroded surfaces. Steam clean to disolve chemical inpurities. Flame treat to sweat out deeper penetrated residues and to dry (if allowed)
- Thoroughly grit blast the surface again. Use sharp contured 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

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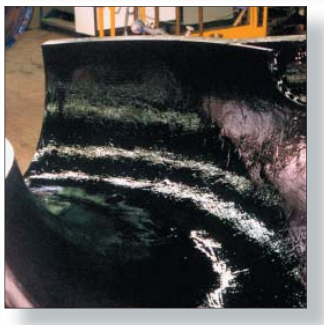
1.13. galvanic corrosion

line condensers

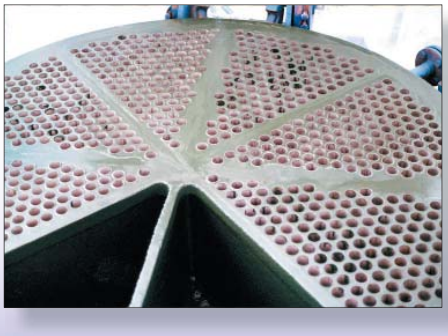
isolate heat exchangers

protect vapourizers

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 recontur 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-levelling material characteristics to smoothen the surface

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1.14. fluid-flow equipment (casings)

repair flow straigtheners

rebuild eroded pump casings

reprofile cutwater 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 contured 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

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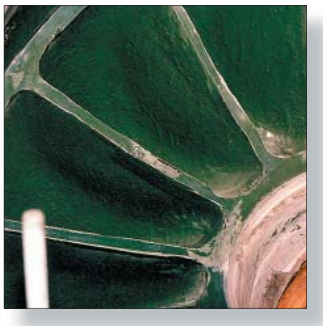
1.15. fluid-flow equipment (impellers & mixers)

repair impeller vane corrosion

recontur 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 reblast the surface. Use sharp contured 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 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

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1.16. liquid ring vacuum pumps (Nash & Emo)

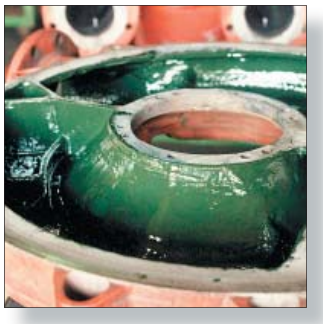
repair & protect rotors

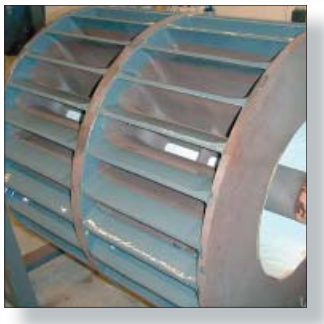
reduce cone clearances

repair valve plates

rebuild profile of end covers

restore accurate tolerances



- **thixothropic characteristic to ease over-head-work**
- **different colours 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 reblast the surface. Use sharp contured 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

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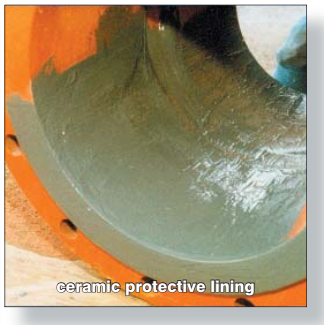
1.17. butterfly & gate valves

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 reblast the surface. Use sharp contured 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

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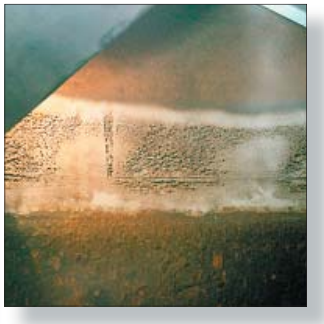
1.18. water turbines (casings)

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 conturs to a radius of minimum 3 mm

- Thoroughly reblast the surface. Use sharp contured 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

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1.19. water turbines (impellers)

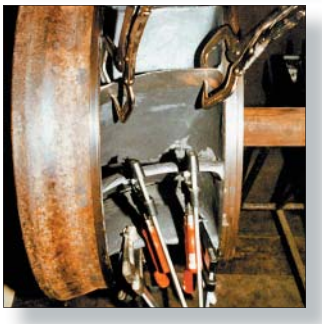
coat „Francis“ impellers

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 conturs to a radius of minimum 3 mm

- Thoroughly reblast the surface. Use sharp contured 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

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■ 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

- **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 reblast the surface. Use sharp contured 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 entrappement. Recommended material thickness is about 5 mm

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