



## Ematal

Surface treatment

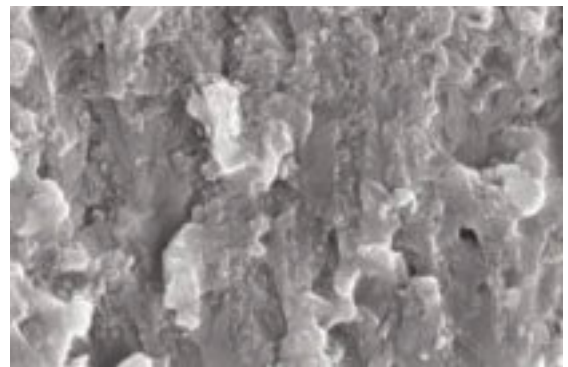
Product Information

## Ematal-Surface Treatment

Ematal-coating of aluminium components creates an ultra-smooth, wear-resistant, inert surface that stands the test of time. Ematal's thin, uniform coating ensures precision within the tightest tolerances, making it the go-to choice for high-precision components. At Digitel, we use this coating to refine components that come into contact with the measuring air. Ematal-coated inlet heads and supply lines stand for the highest sampling quality, precision of the cut-off points and durability of the components.

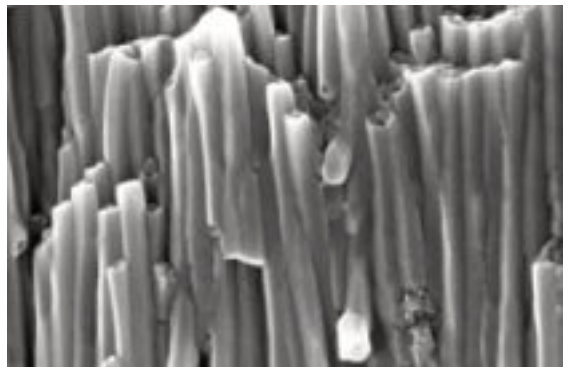
## Comparison with Conventional Anodization

When comparing the properties of Ematal and conventional hard anodizing, findings reveal that Ematal coating is superior to the classic method especially in terms of corrosion resistance and wear resistance. Additionally, images captured through a scanning electron microscope show a significantly finer surface structure.



## Procedure

During ematalization, a hard and compact oxide is produced by anodic surface transformation of the aluminium. Titanium and zirconium compounds are embedded in this oxide layer, resulting in a highly wear-resistant, smooth and almost pore-free surface.



*Figure 1: Comparison of SEM images of Ematal and GSX, the image width corresponds to 600nm.*

## PROPERTIES

- Smooth surface
- High chemical resistance
- High dimensional accuracy
- High wear resistance

# Chemical resistance of Ematal

## Resistant against:

Acetone	Diammonium Phosphate (up to 3%)	Cresol	Carbon disulphide
Acetylene	Iron rust	Copper lime broth	Hydrogen sulphide
Ether	Ferrous sulphate (vitriol)	Tap water	Sulphurous acid (aqueous)
Aethyl alcohol (concentrated)	Glacial acetic acid	Lithopone	Marine water (sea water)
Aethyl chloride (dry)	Egg white	Lohtannin	Soap solution
Aluminum formate	Acetic ester (ether)	Lysol (up to 5%)	Silicon tetrachloride (anhydrous)
Aluminum nitrate	Acetic acid	Magnesium chloride	Stearic acid
Aluminum sulfate	Fats	Magnesium sulfate	Sulfanol
Ammonia	Fatty acids	Methyl alcohol	Sulphuryl chloride (anhydrous)
Ammonium chloride	Varnish	Methylamine	Tannin
Ammonium carbonate	Formaldehyde (neutral)	Methyl chloride	Tar
Ammonium nitrate	Fruit acids	Mineral oils	Tar oils
Ammonium sulfate	Furfural	Mineral water	Turpentin oil
Ammonium sulfide	Gallic acid	Naphthalene	Carbon tetrachloride (anhydrous)
Ammonium sulfocyanate	Generator gas	Sodium bicarbonate	Tetralin
Amyl acetate	Tannins	Sodium chlorate (chloride free)	Toluene
Amyl alcohol	Glucose	Sodium carbonate (cold)	Transformer oil
Aniline	Glycerol	Sodium nitrate	Trichloroethylene (anhydrous)
Anthracene	Glyserin	Sodium nitrite	Tricresyl phosphate
Anthrachinone	Urine	Sodium silicofluoride (up to 1%)	Trisodium phosphate
Valeric acid	Resins (rosin, copal etc.)	Sodium sulphate	Water
Barium chloride	Henko	Sodium sulphite	Water vapor
Benzaldehyde (dry)	Iodine (dry)	Sodium thiosulphate	Water glass (alkali silicate)
Gasoline	Tincture of iodine	Nitrocellulose	Hydrogen peroxide
Benzoic acid	Yoghurt	Nitroglycerine	tartaric acid
Benzene	Potassium alum	Nitrophenols	Zinc sulphate
Lead arsenate (highly diluted solution)	Potassium	Oxalic ethyl ester	Citric acid
Lead azide	Potassium bichromate	Oxalic acid	
Borax	Potassium bitartrate (cream of tartar)	Ozone	
Boric acid solution	Potassium bromide	Palmitic acid	
Broman ammonium	Potassium chlorate	Kerosene	
Bromine potassium	Potassium chloride	Paraformaldehyde	
Bromoform	Potassium chromate	Paratoluenesulfonic acid	
Butyric acid	Potassium carbonate (cold)	Phthalic acid	
Butyl acetate	Potassium nitrate	Phenols	
Butyl alcohol	Potassium nitrite	Phosphoric sulfide	
Calcium chloride	Potassium Permanganate	Picric acid	
Calcium oxalate (moist)	Potassium rhodanide	Curing salt and curing Broth	
Calcium sulphate (gypsum)	Potassium silicate (see water glass)	Propyl alcohol	
Ceresin	Potassium sulphate	Propionic acid	
Chlorine (dry)	Carbolic acid (phenol)	Resorcinol	
Chloramine (up to 0.5%)	Carbonileum	Rhodanammonium	
Chloroform	Ketones	Rhodanum potassium	
Chromalaun	Carbon (carbons)	Salicylic acid (solution)	
Crotonaldehyde	Carbon oxide	Salicylic acid (dry)	
Hydrocyanic acid	Carbonic acid (dry)	Nitric acid (concentrated)	
Steam (water)	Hydrocarbons (aromatic)	Soft soap (solution)	
Distilled water	Condensation water	Sulphur	
Diammoniumphosphat (bis 3%)	Creosote	Sulphur ammonium	
		Lime sulphur broth	

## Conditionally resistant to:

Colorants, organic	Nicotine	Rainwater, standing water
Sodium chloride (table salt)	Nitrous vapors, dry	Castor oil

## Not resistant to:

Aluminum chloride**	Calcium sulfide**	Carbide sludge	Sulphuric acid
Formic acid	Calcium hydroxide	Copper salts**	Silver salts**
aniline chloride	Chlorine (wet)	Sodium hydroxide**	Zinc chloride**
Aniline sulfate**	Chlorinated lime**	Nickel salts**	Tin chloride**
Antiformin	Chromic acid**	Oleum	
Barium hydroxide**	Ferric chloride**	Phosphoric acid	**Hygroscopic substances, only resistant if anhydrous
lead acetate**	Hydrofluoric acid (hydrofluoric acid)	Mercury	
lead nitrate**	Potassium hydroxide	Mercury salts**	
Bromine	Potassium cyanide**	Nitric acid, diluted	
Hydrobromic acid	Carbide**	Hydrochloric acid (hydrochloric acid)	
Calcium carbide**			

### Sources:

Pfenninger, M. (2016): Ematal - eine alternative Hartanodierenschicht. In: Alexander Michaelis, Michael Schneider (Hrsg.) Tagungsband Symposium Anodisieren - Oxidschichten von hart bis smart S.61-66, Fraunhofer-Institut für Keramische Technologien und Systeme IKTS. Retrieved from website <https://publica.fraunhofer.de> on 03/14/2024.

Eugen Seitz AG (2012): Hartematal-Oberflächenbehandlung für Magnetventile. Retrieved from website <https://yumpu.com> on 03/14/2024.

BWB Group (2024): Ematal. Retrieved from website <https://www.bwb-group.com/downloads/> on 03/14/2024.

## Have a question? We'd love to help!

If you have questions about anything, please contact us and we will be glad to assist you.

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