Technical Data Sheet

MM-metal
SS-steelceramic

PolymerMetal with the widest range of application
for repairs and maintenance of all metals and alloys

MultiMetall
the MetalExistenceCompany®

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Technical Data Sheet

MM-metal SS-steelceramic

Product description

MM-metal SS-steelceramic is the PolymerMetal with the widest range of application for repairs and maintenance of all metals and alloys. MM-metal SS-steelceramic offers a very high quality at mechanical repairs of damaged devices (i.e. caused by crack, corrosion, abrasion, impact or chemical stress). High technical data and also the chemical resistance and bonding with the structure of metallic surfaces are remarkable features of MM-metal SS-steelceramic.

MM-metal SS-steelceramic is a two-component-product and can be either used with Hardener yellow or Hardener red. The Hardener yellow offers better technical data; the Hardener red is suitable for emergency and quick repairs or at non high-stressed repairs because of the short curing time.

After the usage of Hardener red another overlapping coat with Hardener yellow is always recommended. A metal component with two hardener components facilitates an efficient and practise-orientated use.

Technical data

Application consistency:	pasty
Colour after curing:	dark grey
Specific passage resistance:	5,3 x 10^{14} Ωcm
Passage resistance:	7,52 x 10^{12} Ω
Corrosion:	none
Electrochemical corrosion (DIN 50900):	none
Machinability:	with SiC-grinding plates or Diamond tools by dry cut
Cutting speed:	v_c = 60 - 125 m/min
Cutting depth:	a_p = 0,5 - 1 mm
Feed:	f = 0,1 - 0,2 mm/r

Technical data for use with Hardener yellow

Compressive strength (DIN ISO 604):	200 MPa (29000 psi)
Tensile strength:	83 MPa (12035 psi)
Bending strength (DIN 53452):	78 MPa (11310 psi)
Tensile shearing strength on steel:	31 MPa (4495 psi)
Brinell hardness (DIN 50351):	35
Linear shrinkage (ASTM D 2566):	0,0001968 cm/cm
Linear coefficient of thermal expansion at 25-45 °C:	5,1 x 10^{-6} K
Temperature resistance:	-150 °C to +280 °C
Roughness grade after use of diamond-equipped tools:	3,4 µm
Density (mixed components):	2,44 g/cm^3

Technical data for use with Hardener red

Compressive strength (DIN ISO 604):	104 MPa (15080 psi)
Tensile strength:	54 MPa (7830 psi)
Bending strength (DIN 53452):	67 MPa (9715 psi)
Tensile shearing strength on steel:	19 MPa (2755 psi)
Temperature resistance:	-150 °C to +120 °C
Density (mixed components):	2,12 g/cm^3

Chemical resistance

Already after curing a very good resistance is existent; highest resistance is effected after curing for approx. 6 days at approx. 21°C (alternatively for approx. 4 h at approx. 21°C followed by approx. 15 h at 35 - 40°C). The resistance to chemical stress like acids, caustic solutions, solvents, salts, gases, etc. depends on the concentration, temperature and duration of the exposure. Further details can be given on request.

Surface preparation

- Mechanically rough up the surface by blasting (it is recommended for blasting to use angular grit material; surface finish approx. 75 µm; purity level approx. Sa 2½ according to Swedish standard SIS 055900 / ISO 8501-1), cutting, grinding…
- Clean by sweeping, blowing off or exhausting
- Thoroughly degrease with MM-Degreaser Z or at least with a good grease dissolver (ethyl acetate, acetone,…); don't use alcohol, benzine or paint thinner
- Apply a thin layer of MM-Release agent on the surfaces, that should not bond with the PolymerMetal and polish after a short drying period

Processing data for use with Hardener yellow

Mixing ratio by:	Weight	Volume
MM-metal SS-steelceramic	20	8
Hardener yellow	1	1
Tool		Measuring spoon yellow

Temperature	Pot life	Curing
5 °C	60 min	5 days
15 °C	45 min	2 days
20 °C	30 min	24 h
25 °C	25 min	20 h
30 °C	20 min	18 h

The processing shouldn't be carried out below + 5 °C.

Processing data for use with Hardener red

Mixing ratio by:	Weight	Volume
MM-metal SS-steelceramic	5	2
Hardener red	1	1
Tool		Measuring spoon red

Temperature	Pot life	Curing
5 °C	10 min	6 h
15 °C	5 min	2,5 h
20 °C	4 min	45 min

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25 °C	3,5 min	40 min
30 °C	3 min	35 min

The processing shouldn't be carried out below + 5 °C.

Application instruction
Before mixing the components the work piece should be prepared in accordance with the surface preparation. Always use clean tools for the removal of the components to avoid a reaction within the tins. We recommend mixing only the quantity of material which can be processed within the pot life. Especially in case of using Hardener red the curing starts very fast.

The available measuring spoons yellow (or measuring spoons red) can be used to measure the required volume parts of the components. The big measuring spoon is for the use of MM-metal SS-steelceramic, the small spoon is for Hardener yellow (or Hardener red). Spoons must be filled levelled.

Under consideration of the mixing ratio the components must be mixed very thoroughly.

When using a spatula et cetera, first thoroughly apply a thin layer of the PolymerMetal with pressure onto the work piece to avoid air bubbles in the interface between metal and PolymerMetal ensuring a good surface contact. Immediately afterwards apply the required layer thickness on the still soft PolymerMetal.

After the usage of Hardener red another overlapping coat with Hardener yellow is always recommended.

All used tools should be cleaned straight after use.

Rapid curing for use with Hardener yellow
After application the curing process can be accelerated by heat addition. Here only the metallic substrate and not the PolymerMetal must be warmed up. A temperature of 70 °C over a period of one hour is enough for remarkable good technical data of dimensionally stable layer thicknesses up to 10 mm. The metal temperature should not exceed a maximum of 120 °C. The quick curing procedure can even be carried out at ambient temperatures below 0 °C.

Multiple coating

Application of a successive layer on
MM-metal SS-steelceramic / Hardener yellow

At work piece temperature	apply successive layer after
approx. 15 - 17 °C	approx. 3 h 30 min
approx. 20 - 22 °C	approx. 90 min
approx. 28 - 30 °C	approx. 80 min

At a work piece temperature of 29 °C for example a successive layer should be applied approx. 80 min after mixing the PolymerMetal for the previous layer.

If the previous coating is already partly cured, a surface preparation must be carried out by roughening the previous coating, preferably by careful light blasting, before applying the next coating.

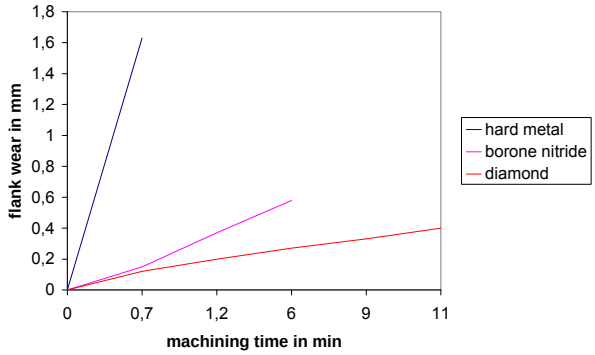
Application of a successive layer on
MM-metal SS-steelceramic / Hardener red

The application of a successive layer can be carried out after the previous layer has partly cured without the necessity of a surface preparation.

Reinforcement
If Fabric tapes or mats made of glass fibre or stainless steel are used optionally, the fabric should be completely coated on both sides and embedded in the PolymerMetal. Several layers increase strength.

Aftercuring
The mechanical, thermal and chemical properties of MM-metal SS-steelceramic can be improved by aftercuring, when warming up the metallic substrate for approx. 2 hours at approx. 100 °C after partial curing or curing.

Tool-life of machining tools
Wear behaviour of hard metal, borone nitride and diamond tools when turning MM-metal SS-steelceramic:



Working security
Avoid eye and skin contact. In case of skin contact, wash thoroughly with soap and water. In case of eye contact, rinse thoroughly with water.

Storage

Product	Temperature commendation	Shelf life
MM-metal SS-steelceramic	~ 22 °C	min. 5 years
Hardener yellow	~ 22 °C	min. 5 years
Hardener red	~ 22 °C	min. 5 years

Even after repeated openings of the containers the high quality performance is preserved.

Order information

No.	Product	Unit
200	MM-metal SS-steelceramic, pasty	1000 g
249	Hardener yellow, pasty	50 g
248	Hardener red, pasty	100 g

Economicalness	Used quantity		Area	Volume
SS-steelceramic	1000 g	1050 g	0,431 m^2	431 cm^3
Hardener yellow	50 g			
SS-steelceramic	952 g	1000 g	0,410 m^2	410 cm^3
Hardener yellow	48 g			
SS-steelceramic	2321 g	2437 g	1 m^2	1000 cm^3
Hardener yellow	116 g			

The areas were achieved at a layer thickness of 1 mm.

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Economicalness	Used quantity		Area	Volume
SS-steelceramic Hardener red	1000 g 200 g	1200 g	0,566 m^2	566 cm^3
SS-steelceramic Hardener red	833 g 167 g	1000 g	0,472 m^2	472 cm^3
SS-steelceramic Hardener red	1766 g 353 g	2119 g	1 m^2	1000 cm^3

The areas were achieved at a layer thickness of 1 mm.
To process a complete tin of MM-metal SS-steelceramic with Hardener red, 2 tins of Hardener red are required.

No.	Accessories	Unit
10	MM-Degreaser Z, liquid	1000 ml
11	MM-Degreaser Z, liquid	250 ml
14	MM-Release agent, liquid	100 ml
33	Mixing plate (synthetic material)	20 x 12 cm
16	Mixing stick (stainless steel)	pc
15	Mixing cup (synthetic material)	pc
25	Measuring spoon red	set
26	Measuring spoon yellow	set
18	Fabric tape (stainless steel)	100 x 10 cm
20	Fabric tape (glass fibre)	1000 x 5 cm
22	Fabric mat (glass fibre)	30 x 40 cm
23	Application roller	pc

MM-metal SS-steelceramic is also available in:

No.	Product	Unit
802	MM-Basic Set	pc
803	MM-Set SS	pc

Availability
Technical data sheets are generally available in German or English language. MM-metal SS-steelceramic is only produced in Germany and delivered worldwide within short time by MultiMetall. In addition to that our products are internationally available from many MultiMetall-partners. Ask for further products from MultiMetall.

Note
The product information and instructions provided in this leaflet were prepared to the best of our knowledge and serve information purposes only. We recommend that appropriate tests are carried out prior to application in order to ensure that the products and methods fulfil the purpose desired by the user. In this procedure, the given data may serve as a basis. Application and processing of the products lie outside our possible control and are therefore the sole responsibility of the user.

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