



Technical Data Sheet

MM-metal SS-bronze

PolymerMetal for repairs of constructions made of bronze

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MultiMetal
the MetalExistenceCompany™

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MultiMetal • P.O. Box 12 02 64 • 41720 Viersen • Germany
Tel: +49 (0) 21 62-97 00 9-0 • Fax: +49 (0) 21 62-97 00 9-11
Email: info@polymermetal.com • Web: www.polymermetal.com

Technical Data Sheet

MM-metal SS-bronze

Product description

MM-metal SS-bronze is an alloy-related PolymerMetal. The formulation is a polymer and a copper and tin alloy especially to repair damages at metallic components made of bronze. MM-metal SS-bronze eliminates damages at metallic devices caused by mechanical, corrosive and/or chemical stress.

MM-metal SS-bronze is a two-component-product and it is available in pasty or liquid application consistency. MM-metal SS-bronze pasty does not run and keep its shape during application. MM-metal SS-bronze liquid can be poured, injected or applied with a brush.

Technical data

Application consistency:	pasty or liquid
Colour after curing:	bronze coloured
Compressive strength (DIN ISO 604):	179 MPa (25955 psi)
Tensile strength:	71 MPa (10295 psi)
Bending strength (DIN 53452):	63 MPa (9135 psi)
Tensile shearing strength on bronze:	27 MPa (3915 psi)
Brinell hardness (DIN 50351):	28
Specific passage resistance:	$6,55 \times 10^{13} \Omega \text{cm}$
Passage resistance:	$8,04 \times 10^{11} \Omega$
Linear expansion coefficient: at 25-45 °C	$1,5 \times 10^{-6} \text{ K}$
Temperature resistance:	-150 °C to +240 °C
Corrosion:	none
Electrochemical corrosion (DIN 50900):	none
<u>Machinability:</u>	with standard tools by dry cut
Cutting speed:	$v_c = 40 - 55 \text{ m/min}$
Cutting depth:	$a_p = 0,5 - 1 \text{ mm}$
Feed:	$f = 0,1 - 0,2 \text{ mm/r}$
Density (mixed components):	$2,77 \text{ g/cm}^3$

Processing data

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

Temperature	Pot life	Curing
5 °C	70 min	5 days
15 °C	50 min	2 days
20 °C	35 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.

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, cutting, grinding...
- Clean by sweeping, blowing off or exhausting
- Thoroughly degrease with MM-Degreaser Z or MM-Degreaser C or at least 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

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.

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

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

Depending on the application consistency the mixture (the PolymerMetal) can be applied with a spatula, brush or any other suitable tool by applying, pouring or injecting.

When using a spatula, a brush 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.

All used tools should be cleaned straight after use.

Rapid curing

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

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, it is obligatory to do a surface preparation again by roughening (preferably by careful light blasting) the previous coating before applying the next coating.

Reinforcement

If Fabric tapes (glass fibre or stainless steel) are used, the fibres should be completely coated from both sides when embedded in the PolymerMetal. Several layers increase strength.

Aftercuring

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

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

Both components (MM-metal SS-bronze + Hardener) can be stored for at least 5 years, if kept at temperatures below 25 °C. The materials do not lose their high quality performance after repeated openings of the containers.

Order information

No.	Product	Unit
211	MM-metal SS-bronze, pasty	1000 g
249	Hardener yellow, pasty	50 g
212	MM-metal SS-bronze, liquid	1000 g
250	Hardener yellow, liquid	50 g

Economicalness	Used quantity	Area	Volume
SS-bronze	1000 g	1050 g 0,380 m ²	380 cm ³
Hardener yellow	50 g		
SS-bronze	952 g	1000 g 0,362 m ²	362 cm ³
Hardener yellow	48 g		
SS-bronze	2634 g	2766 g 1 m ²	1000 cm ³
Hardener yellow	132 g		

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

No.	Accessories	Unit
26	Measuring spoon yellow	1 set
10	MM-Degreaser Z, liquid	1000 ml
11	MM-Degreaser Z, liquid	250 ml
24	MM-Degreaser C, liquid	250 ml
14	MM-Release agent, liquid	100 ml
18	Fabric tape (stainless steel)	100 x 10 cm
20	Fabric tape (glass fibre)	1000 x 5 cm

Availability

Technical data sheets are generally available in German or English language. MM-metal SS-bronze 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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