

Technical Data Sheet



PolymerMetal for repairs of constructions made of bronze



MultiMetall the MetalExistenceCompany[®]

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Technical Data Sheet

MM-metal SS-bronze

Product description



MM-metal SS-bronze alloy-related an is PolymerMetal. The formulation is а polymer and a copper and tin alloy especially to repair damages at metallic components made of bronze. MMmetal 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. MMmetal 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 x 10 ¹³ Ωcm
Passage resistance:	8,04 x 10 ¹¹ Ω
Linear coefficient of thermal	
expansion at 25-45 °C:	1,5 x 10 ⁻⁶ K
Temperature resistance:	-150 °C to +240 °C
Corrosion:	none
Electrochemical corrosion	
(DIN 50900):	none
Machinability:	with standard tools
	by dry cut
Cutting speed:	v _c = 40 - 55 m/min
Cutting depth:	a _p = 0,5 - 1 mm
Feed:	f = 0,1 - 0,2 mm/r
Density (mixed components):	2,77 g/cm [°]

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 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

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 SSbronze, 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.

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

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 MMmetal SS-bronze can be improved by aftercuring, when warming up the metallic substrate for approx. 2 hours at approx. 100 $^{\circ}$ 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

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

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

Order information

No.	Product				Unit
211	MM-metal S	S-bronze,	pasty		1000 g
<u>249</u>	Hardener ye	llow, pasty	-		50 g
212	212 MM-metal SS-bronze, liquid			1000 g	
250 Hardener yellow, liquid 50 g			50 g		
Econ	omicalness	Used g	uantity	Area	Volume
SS-b	ronze	1000 g	1050 g	0,380 m ²	380 cm ³
Hard	ener yellow	50 g			
SS-b	ronze	952 g	1000 g	0,362 m ²	362 cm ³
Hard	ener yellow	48 g			
SS-b	ronze	2634 g	2766 g	1 m ²	1000 cm ³
Hard	ener yellow	132 g			
The areas were achieved at a layer thickness of 1 mm.					
<u>No.</u>	Accessories				Unit
10	MM-Degreas	ser Z, liquio	b		1000 ml
11	MM-Degreas	ser Z, liquio	b		250 ml
14	MM-Release	e agent, liq	uid		100 ml
33	Mixing plate	(synthetic	material)	2	20 x 12 cm

16	Mixing stick (stainless steel)	рс
15	Mixing cup (synthetic material)	pc
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	рс

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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