



Technical Data Sheet

**MM-metal**  
**S-steel**  
**S-iron**  
**S-aluminium**  
**S-copper**  
**S-bronze**

PolymerMetal with rapid hardening  
for quick repairs and visual improvements



**MultiMetall**  
the MetalExistenceCompany®

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## Technical Data Sheet

# MM-metal S-steel S-iron S-aluminium S-copper S-bronze

### Product description



PolymerMetals of the S-basis offer good technical data at a rapid hardening. By the variable mixing ratio of metal powder to hardener the mixed components receive a flexible application consistency from liquid

to pasty. PolymerMetals of the S-basis are primary used for quick repairs and visual improvements (sample remove of bubbles in cast parts). MM-metal S is available for steel, iron, aluminium, copper and bronze. At higher loads there should be used products from the SS product family instead.

PolymerMetals of the S-basis are two-component-products which can be used with Hardener S8 or Hardener S15. The pot life and curing times of Hardener S8 is shorter than of Hardener S15.

### Technical data

Application consistency:	from pasty to liquid
Corrosion:	none
Electrochemical corrosion (DIN 50900):	none
<u>Machinability:</u>	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

### Technical data for MM-metal S-steel

Colour after curing:	light grey
Compressive strength:	150 MPa (21750 psi)
Tensile strength:	60 MPa (8700 psi)
Bending strength:	65 MPa (9425 psi)
Specific passage resistance:	$3,80 \times 10^{14}$ $\Omega$ cm
Passage resistance:	$5,05 \times 10^{12}$ $\Omega$
Linear coefficient of thermal expansion at 25-45 °C:	$27,3 \times 10^{-6}$ K
Temperature resistance:	-150 °C to +220 °C
Density (mixed components):	2,65 g/cm <sup>3</sup> (pasty)
Density (mixed components):	2,06 g/cm <sup>3</sup> (liquid)

### Technical data for MM-metal S-iron

Colour after curing:	dark grey
Compressive strength:	140 MPa (20300 psi)
Tensile strength:	55 MPa (7975 psi)
Bending strength:	60 MPa (8700 psi)
Specific passage resistance:	$3,85 \times 10^{14}$ $\Omega$ cm
Passage resistance:	$5,05 \times 10^{12}$ $\Omega$
Linear coefficient of thermal expansion at 25-45 °C:	$27,3 \times 10^{-6}$ K
Temperature resistance:	-150 °C to +220 °C
Density (mixed components):	2,65 g/cm <sup>3</sup> (pasty)
Density (mixed components):	2,06 g/cm <sup>3</sup> (liquid)

### Technical data for MM-metal S-aluminium

Colour after curing:	aluminium coloured
Compressive strength:	110 MPa (15950 psi)
Tensile strength:	54 MPa (7830 psi)
Bending strength:	56 MPa (8120 psi)
Specific passage resistance:	$1,95 \times 10^{14}$ $\Omega$ cm
Passage resistance:	$2,35 \times 10^{12}$ $\Omega$
Linear coefficient of thermal expansion at 25-45 °C:	$34,6 \times 10^{-6}$ K
Temperature resistance:	-150 °C to +180 °C
Density (mixed components):	1,95 g/cm <sup>3</sup> (pasty)
Density (mixed components):	1,56 g/cm <sup>3</sup> (liquid)

### Technical data for MM-metal S-copper

Colour after curing:	copper coloured
Compressive strength:	125 MPa (18125 psi)
Tensile strength:	54 MPa (7830 psi)
Bending strength:	50 MPa (7250 psi)
Specific passage resistance:	$5,90 \times 10^{14}$ $\Omega$ cm
Passage resistance:	$4,41 \times 10^{12}$ $\Omega$
Linear coefficient of thermal expansion at 25-45 °C:	$10,1 \times 10^{-6}$ K
Temperature resistance:	-150 °C to +200 °C
Density (mixed components):	4,15 g/cm <sup>3</sup> (pasty)
Density (mixed components):	2,94 g/cm <sup>3</sup> (liquid)

### Technical data for MM-metal S-bronze

Colour after curing:	bronze coloured
Compressive strength:	135 MPa (19575 psi)
Tensile strength:	55 MPa (7975 psi)
Bending strength:	59 MPa (8555 psi)
Specific passage resistance:	$3,35 \times 10^{14}$ $\Omega$ cm
Passage resistance:	$4,07 \times 10^{12}$ $\Omega$
Linear coefficient of thermal expansion at 25-45 °C:	$24,5 \times 10^{-6}$ K
Temperature resistance:	-150 °C to +210 °C
Density (mixed components):	4,15 g/cm <sup>3</sup> (pasty)
Density (mixed components):	2,94 g/cm <sup>3</sup> (liquid)

### Chemical resistance

Already after curing a good resistance is existent; a higher 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, 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

#### Processing data

Mixing ratio by:	Volume	to	Volume
MM-metal S	2	to	1
Hardener S8 or S15	1		1
Application consistency	pasty	to	liquid

#### Processing data for use with Hardener S8

Temperature	Pot life	Curing
5 °C	30 min	7 h
10 °C	20 min	4 h
20 °C	8 min	45 min
25 °C	5 min	30 min
30 °C	4 min	20 min

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

#### Processing data for use with Hardener S15

Temperature	Pot life	Curing
5 °C	90 min	24 h
10 °C	50 min	7 h
20 °C	15 min	1 min
25 °C	9 min	45 min
30 °C	4 min	30 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. 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.

#### Multiple coating

If a secondary or multiple coating is required, a surface preparation of the previous coating must be done, 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 MM-metal S 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

Product	Temperature commendation	Shelf life
MM-metal S-steel		
MM-metal S-iron		
MM-metal S-aluminium		
MM-metal S-copper		
MM-metal S-bronze	~ 22 °C	min. 2 years
Hardener S8	~ 22 °C	min. 2 years
Hardener S15	~ 22 °C	min. 2 years

The basis MM-metal SQ, which is sensitive to low temperatures, must not be stored in a refrigerator. Even after repeated openings of the containers the high quality performance is preserved.

#### Order information

No.	Product	Unit
101	MM-metal S-steel, powdery	1000 g
102	MM-metal S-iron, powdery	1000 g
105	MM-metal S-aluminium, powdery	650 g
108	MM-metal S-copper, powdery	1650 g
109	MM-metal S-bronze, powdery	1650 g
147	Hardener S8, liquid	250 g
148	Hardener S15, liquid	250 g

Economicalness	Used quantity	Area	Volume
S-steel	1000 g	1250 g	0,472 m <sup>2</sup> 472 cm <sup>3</sup>
Hardener S	250 g		
S-iron	1000 g	1250 g	0,472 m <sup>2</sup> 472 cm <sup>3</sup>
Hardener S	250 g		
S-aluminium	650 g	900 g	0,462 m <sup>2</sup> 462 cm <sup>3</sup>
Hardener S	250 g		
S-copper	1650 g	1900 g	0,458 m <sup>2</sup> 458 cm <sup>3</sup>
Hardener S	250 g		
S-bronze	1650 g	1900 g	0,458 m <sup>2</sup> 458 cm <sup>3</sup>
Hardener S	250 g		

Above mentioned data were achieved at a pasty application consistency. The areas were achieved at a layer thickness of 1 mm.

Economicalness	Used quantity	Area	Volume
S-steel	1000 g	1500 g	0,728 m <sup>2</sup> 728 cm <sup>3</sup>
Hardener S	500 g		
S-iron	1000 g	1500 g	0,728 m <sup>2</sup> 728 cm <sup>3</sup>
Hardener S	500 g		
S-aluminium	650 g	1150 g	0,737 m <sup>2</sup> 737 cm <sup>3</sup>

Hardener S	500 g			
S-copper	1650 g	2150 g	0,731 m <sup>2</sup>	731 cm <sup>3</sup>
Hardener S	500 g			
S-bronze	1650 g	2150 g	0,731 m <sup>2</sup>	731 cm <sup>3</sup>
Hardener S	500 g			

Above mentioned data were achieved at a liquid application consistency. The areas were achieved at a layer thickness of 1 mm.

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
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

#### Availability

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