



Technical Data Sheet

MM-metal SS-steel 382

PolymerMetal and construction material
with excellent technical data

(Data Sheet Version 11.0 dd. 01.04.2009)



MultiMetal
the MetalExistenceCompany™

PolymerMetal® • MultiMetal® • Ceramium® • Molymetal® • Sealium® • XETEX®



Interested parties, please contact
Authorized Exclusive Distributor in Indonesia, Singapore, Malaysia, Phillipine, Brunei
PT BAUMA ADHESIVE

16th Floor, Wisma Metropolitan II, Kav. 29-31, Jalan Jendral Sudirman, Jakarta 12920, Indonesia

Phone : (62-21) 5711850 • Fax : (62-21) 5711861 • Website : www.bauma.com/multimetal • E-mail : baumaadhesive.sales@bauma.co.id

Technical Data Sheet

MM-metal SS-steel 382

Product description

MM-metal SS-steel 382 is a PolymerMetal and construction material, which can optimise the desired material properties. The high performance material MM-metal SS-steel 382 delivers the best technical data under mechanical and physical stress.

MM-metal SS-steel 382 is a two-component-product and it is available in pasty or liquid application consistency.

MM-metal SS-steel 382 is a new formulation of the previous MM-metal SS-steel 381 available in two different basis components. Now it can be processed even easier. The very thin product variant is extremely free-flowing and pourable, because of its high surface tension. It can be even injected through very small openings (i.e. diameter of 2 mm). By the modified density, MM-metal SS-steel 382 will be delivered in tins of 1000 g now. The technical properties of MM-metal SS-steel 382 are largely identical with its predecessor MM-metal SS-steel 381.

Technical data

| | |
|---|--------------------------------------|
| Application consistency: | pasty or liquid |
| Colour after curing: | grey |
| Compressive strength (DIN ISO 604): | 211 MPa (30595 psi) |
| Compressive strength (DIN ISO 604) after 3 h after-cured at approx. 130-150 °C: | approx. 245 MPa (35525 psi) |
| Tensile strength: | 80 MPa (11600 psi) |
| Bending strength (DIN 53452): | 110 MPa (15950 psi) |
| Tensile shearing strength on steel: | 30 MPa (4350 psi) |
| Brinell hardness (DIN 50351): | 55 |
| Specific passage resistance: | $5,7 \times 10^{13} \Omega\text{cm}$ |
| Passage resistance: | $7,2 \times 10^{11} \Omega$ |
| Linear shrinkage (ASTM D 2566): | 0,0001181 cm/cm |
| Linear expansion coefficient at 25-45 °C: | $3,6 \times 10^{-6} \text{ K}$ |
| E-module at 20 °C (DIN EN ISO 6721-5): | 15.600 MPa (2.262.000 psi) |
| Torsional storage module at 20°C (DIN EN ISO 6721-2): | 5.900 MPa (855.500 psi) |
| Temperature resistance: | -150 °C to +280 °C |
| Corrosion: | none |
| Electrochemical corrosion (DIN 50900): | none |
| Machinability: | 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: | $f = 0,1 - 0,2 \text{ mm/r}$ |
| Roughness grade after grinding: | approx. 0,52 μm |
| Density (mixed components): | 2,68 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 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

Processing data

| Mixing ratio by: | Weight | Volume |
|-----------------------|--------|------------------------|
| MM-metal SS-steel 382 | 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.

Application instruction

Before mixing the components the work piece should be prepared in accordance with the surface preparation. MM-metal SS-steel 382 should be stirred very well before taking it out of the tin. 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-steel 382, 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. Injection is possible through cannulas of 2 mm diameter.

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 approx. 15 - 17 °C | apply successive layer after 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-steel 382 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-steel 382 + 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.

Pressure load at thin layers

Two previously according to the surface preparation prepared metal blocks are fixed together by a thin layer (1-3 mm) of MM-metal SS-steel 382 with Hardener yellow between. In a test row the samples are exposed to a pressure (of 200 – 500 MPa) for 24 hours.

Layer thickness reduction of the originally 1 mm thick layer in 1/1000 mm

| | | | | | | | | |
|-----------|---|-----|-----|-----|-----|-----|-----|-----|
| MPa | 0 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
| 1/1000 mm | 0 | 5 | 7,5 | 10 | 15 | 25 | 50 | 90 |

Layer thickness reduction of the originally 3 mm thick layer in 1/1000 mm

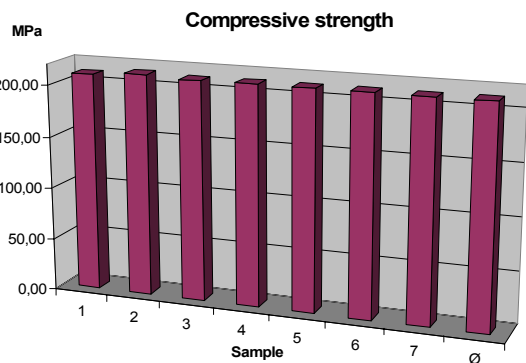
| | | | | | |
|-----------|---|-----|-----|-----|-----|
| MPa | 0 | 200 | 250 | 300 | 350 |
| 1/1000 mm | 0 | 15 | 20 | 20 | 85 |

There was not measured an essential change of the height of the embedded MM-metal SS-steel 382. Furthermore the construction metal block/PolymerMetal was still stable. This is an evidence for the superb strength of the material MM-metal SS-steel 382.

Information about tests, where samples of 10 x 10 x 20 mm have been exposed to a steady pressure of approx. 150 MPa over a period of approx. 8 days can be found in our technical report # 024.

Compressive strength

During examinations carried out at a well-known German research institute, cured MM-metal SS-steel 382 was tested. 7 specimens with the dimensions of 10 x 10 x 4 mm were manufactured and subjected to a compression test according to DIN EN ISO 604.



| Sample | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Ø |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| MPa | 209,77 | 212,94 | 211,12 | 211,60 | 211,55 | 211,52 | 211,19 | 211,38 |

During additional tests of aftercured samples compressive strengths of Ø 245 MPa have been determined.

Order information

| No. | Product | Unit |
|-----|-------------------------------|--------|
| 217 | MM-metal SS-steel 382, pasty | 1000 g |
| 249 | Hardener yellow, pasty | 50 g |
| 218 | MM-metal SS-steel 382, liquid | 1000 g |
| 250 | Hardener yellow, liquid | 50 g |

| Economicalness | Used quantity | Area | Volume |
|-----------------|---------------|--------|--|
| SS-steel 382 | 1000 g | 1050 g | 0,392 m ² 392 cm ³ |
| Hardener yellow | 50 g | | |
| SS-steel 382 | 952 g | 1000 g | 0,374 m ² 374 cm ³ |
| Hardener yellow | 48 g | | |
| SS-steel 382 | 2549 g | 2676 g | 1 m ² 1000 cm ³ |
| Hardener yellow | 127 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-steel 382 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.

MultiMetall

the MetalExistenceCompany™

Data Sheet Version 11.0 dd. 01.04.2009

© copyright MultiMetall



Interested parties, please contact
Authorized Exclusive Distributor in Indonesia, Singapore, Malaysia, Phillipine, Brunei

PT BAUMA ADHESIVE

16th Floor, Wisma Metropolitan II, Kav. 29-31, Jalan Jendral Sudirman, Jakarta 12920, Indonesia

Phone : (62-21) 5711850 • Fax : (62-21) 5711861 • Website : www.bauma.com/multimetall • E-mail : baumaadhesive.sales@bauma.co.id