

# mClad™ Metal

## Product Technical Data

# MCOR™

# 3310

MCOR™ 3310 (mClad™ Metal) is an engineering grade, steel alloy reinforced epoxy. Thixotropic with high molecular weighing reactive polymers and oligomers; the molecular metal is utilized as a trowel grade paste-like polymer to restore, repair and reclaim metal components of engineering grade machinery, equipment, and other mechanical components.

The MCOR™ 3310 is often utilized as a high strength structural epoxy filler for load bearing correction, tooling and machining. It may be drilled, tapped, filed or machined for repair of equipment and parts that may require precision finishing. Once cured, the material replaces worn or lost metal and restores metallic profile with polymechnical bonding and reinforcing as a cold-weld alternative. Exhibits good heat tolerance and advanced wear resistance cladding as a solution for a wide range of industrial applied solutions.

### Applications Include

- Oversized bearing / bush housings
- Cavitated impellers / propellers
- Fractured and holed casings / blocks
- Corrosion cells and tank leaks
- Sloppy keyways
- Scored machine beds
- Flange faces
- Fractured pipes
- Pitted and warped valves
- Other metal filling, repair, and reclamation needs

### Features

- Machinable
- Abrasion, heat, and chemical resistant
- 100% solid
- Convenient 1:1 ratio by volume
- Cold-weld alternative

### Volume Capacity / Theoretical Coverage

The volume capacity of 1 kg. of mixed MCOR™ 3310 is 500 cm<sup>3</sup> (30 in<sup>3</sup>). Approximate coverage per 1 kilogram covers 500 cm<sup>2</sup> at 1 cm. thickness (1 kg covers 60 in<sup>2</sup> at 0.5 in. thickness).

### Film Thickness

MCOR™ 3310 is a thixotropic material intended to be applied in various controlled applications for specific needs, and can be further controlled by sanding/machining for precision dressing. Intended as a cladding epoxy or filler at various thicknesses, the MCOR™ 3310 can be applied at any thickness up to 1.25 cm (1/2 inch) per pass without sagging, without mechanical support; and thicker if applied in multiple passes or with mechanical support (reinforcement mesh, weld rods, metal and fabric scrim).

### Surface Preparation

The success of any coating application is directly proportional to the completeness of the substrate preparation and the care the application crew puts into the application. Surface must be clean and sound. Verify that the temperature of the surface is at least 3 degrees C (5 degrees F) higher than the dew point temperature to preclude condensation.

Metal: Before preparing steel, please inspect and remove oil, grease, or other contaminants - "Solvent Cleaning" (SSPC-SP1) may be required. Grind any weld spatter or steel weld inconsistencies. Abrasive blasting (or other approved mechanical methods) to SSPC SP-6/NACE No. 3 "Commercial Blast Cleaning" must be used in order to achieve a clean surface with a minimum profile of 75 microns (3 mils); remove dust and debris by high compressive air or solvent cleaning (SSPC-SP1) may be require again. MCOR™ 9521 | Primecoat™ MTE is advised as a primer should the substrate be susceptible to flash-rusting, to stripe coat any edges or bends in the metal for enhancing peak retention, or should the metal not possess the characteristics to achieve optimal profiling capability.

### Application Method

Material is supplied in two (2) containers (base+cure) as a unit. If possible, always mix a complete unit in the proportions supplied, if not, use a calibrated scale to weigh out each component or use measuring cups to measure by volume. Adding more or less hardener will adversely affect the cured physical properties. Measure the material temperature prior to mixing. If the material is cooler than 16 °C (60 °F), raise its temperature slowly to above 22 °C (72 °F). For published working time to remain manageable, do not exceed 32 °C (90 °F).

After the components have been measured, place equal volume of Part A and Part B on a clean, flat mixing board, mix thoroughly with a trowel/spatula/putty-knife until the mixture becomes a uniform in color and viscosity with no visible streaks or lumps (2 - 3 minutes). Incomplete mixing will result in loss of physical properties and unmixed/malcured patches.

Apply the mixture immediately with a trowel/spatula/putty-knife.

Cover large holes or cracks with mechanical support (mesh, weld rods, metal and fabric scrim) and apply MCOR™ 3310 or other 3000 (mClad™) series product over the patch and onto an adjacent solid area. Pipes can be repaired by coating a cloth "bandage" with MCOR™ 3310 or other 3000 (mClad™) series product and wrapping the bandage around the pipe. An additional layer of MCOR™ 3310 should be applied over the bandage.

Apply quickly- designed for quick return-to-service; hence, shortened pot life.



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Important! Although the technical details and recommendations contained in this data sheet correspond to the best of our knowledge and experience, all the above information must, in every case be taken as merely indicative and subject to confirmation after long-term practical applications; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application. In every case, the user alone is fully responsible for any consequences deriving from the use of the product. The sole liability of MCOR and Epoxytec International, Inc. for any claims out of the manufacturer's use of sale of its products shall be for the buyer's purchase price.

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## Packaging & Color

A unit is a two-component (base+cure)

MCOR™ 3310 is available in:

- Dark Grey (DGY)

## Thinning

Thin with MCOR™ 9001 | #1 Reduction not to exceed 2% by volume.

## Storage & Handling

Shelf life: 36 months, sealed.

Store in a dry area away from direct sunlight.

The material should be conditioned to between 24 °C (75 °F) and 35 °C (95 °F) before use.

Clean tools with MCOR™ 9015 | #5 Cut & Clean.

## Safety

Consult Safety Data Sheet (SDS) for all material safety information.

## Technical Properties

### General

<b>Type:</b>	Thixotropic Metal Epoxy	<b>Mixing ratio (by weight):</b>	1:1
<b>Base component (consistency):</b>	Paste	<b>Mixing ratio (by volume):</b>	1:1
<b>Base component (color):</b>	Dark grey	<b>Solids by volume:</b>	ASTM D2697 100%
<b>Solidified component (consistency):</b>	Paste	<b>Solvents (VOC) by volume:</b>	ASTM D2697 0%
<b>Solidified component (color):</b>	Grey	<b>Pot life (200g mass @ 20 °C):</b>	20 min.
<b>Finish:</b>	Matte		

### Curing Table

TEMPERATURE	41 °F (5 °C)	50 °F (10 °C)	59°F (15°C)	68 °F (20 °C)	77°F (25°C)	86 °F (30 °C)	150 °F (65 °C)
Use involving no loading (min.)	<u>16</u> hrs	<u>13</u> hrs	<u>10</u> hrs	<u>8</u> hrs	<u>6</u> hrs	<u>4</u> hrs	<u>0.6</u> hrs
Machining and/or light loading (min.)	<u>18</u> hrs	<u>14</u> hrs	<u>12</u> hrs	<u>10</u> hrs	<u>8</u> hrs	<u>5</u> hrs	<u>0.6</u> hrs
Full electrical, mechanical or thermal loading (min.)	<u>36</u> hrs	<u>30</u> hrs	<u>24</u> hrs	<u>18</u> hrs	<u>16</u> hrs	<u>14</u> hrs	<u>4</u> hrs
Immersion in chemicals (min.)	<u>36</u> hrs	<u>30</u> hrs	<u>24</u> hrs	<u>18</u> hrs	<u>16</u> hrs	<u>14</u> hrs	<u>6</u> hrs

### Adhesion

#### Tensile adhesion (pull-off bond strength)

In accordance with ASTM D4541/ISO 4624, the pull off strength from abrasive blasted steel yields on average:

19.36 MPa (2,810 psi)

### Hardness

#### Shore D

In accordance with ASTM D2240, typical values will yield: 88

#### Barcol

In accordance with ASTM D2583, typical values will yield: 87



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### Abrasion

#### Abrasion Resistance (Taber)

In accordance with ASTM D4060 and ASTM G195 with 1kg load, typical abrasion resistance values will yield:

CS-17 Wheel (Dry)	195 mm <sup>3</sup> @ 1000 cycles
H-10 Wheel (Wet)	552 mm <sup>3</sup> @ 1000 cycles

### Electrical Properties

#### Dielectric Constant & Dissipation Factor

When tested to ASTM D150 typical value when tested at 5V & 10 kHz will yield:

0.06 (Corrected Dissipation Factor, D)  
5.4 (Dielectric Constant, K')

#### Dielectric Strength

When tested to ASTM D149 typical value when tested at 2000V/s will yield:

205 V/mil

#### Surface & Volume Resistivity

When tested to ASTM D257 typical value when tested at 500V for 60 seconds will yield:

1.3 x 10<sup>13</sup> (Surface Resistivity)  
0.6 x 10<sup>13</sup> (Volume Resistivity)

### Mechanical Properties

Tensile strength:	ASTM D 638	28.9 MPa (4,200 psi)
Flexural strength:	ASTM D 790	51 MPa (7,400 psi)
Compressive strength:	ASTM D 695	96.5 MPa (14,000 psi)

### Impact Resistance

#### Izod Impact Strength

In accordance with ASTM D256, typical impact resistance values will yield:

0.303 [16.09]	ft-lbf/in [J/m]
0.758 [1,586.2]	ft-lbf/in <sup>2</sup> [J/m <sup>2</sup> ]

### Temperature Tolerance

#### Wet Heat Resistance

When exposed or in contact with high temperature immersion the product performance was acceptable. Wet heat resistance testing was performed by immersion of a 1" x 3" x 0.2" thick free film into a beaker of water maintaining the solution at 120 C for 24 hours. Resulting in no blistering or loss of adhesion.

#### Dry Heat Resistance

In accordance with ISO 11357, using differential scanning calorimetry (DSC) typical heat resistance tolerance yielded:

318.9 C (604.2 F)

#### Cold Temperature Tolerance

For most applications, the product is suitable in temperature as low as:

- 40 C (- 40 F)

