
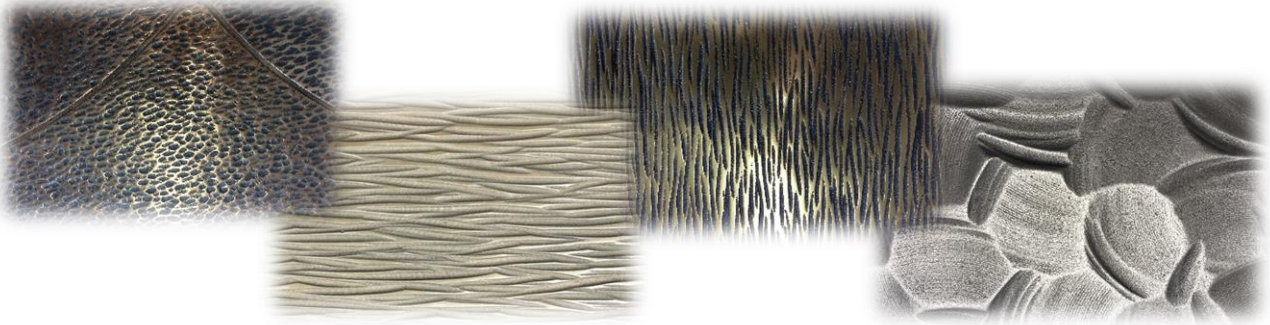


Form-Id: MS-LAB-130		
Version: 1	Liquid Metal In-Mould Application (IMO) Firequard Epoxy FR932 System	
Owner: QM		

Introduction:

Metallic surfaces are becoming increasingly popular and can be processed almost indefinitely. Whether with conventional silicone molds or direct application to the substrate, 'almost' everything is possible!

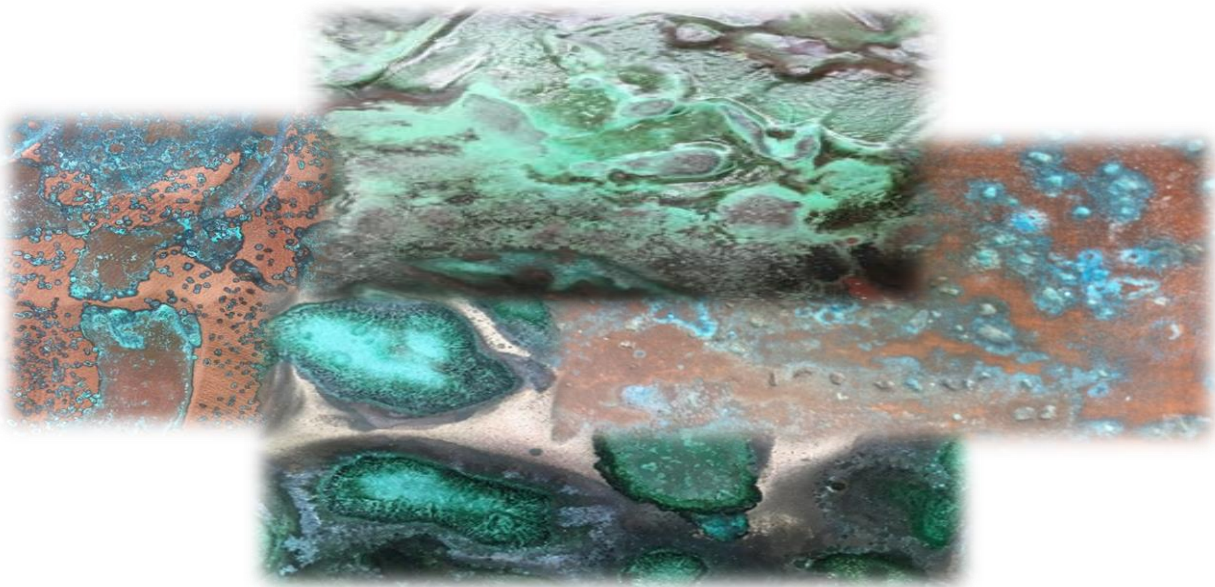


Many commercially available bronze, brass, copper, iron or other metal powders are suitable as metal powders.


The following work process describes all the necessary steps and materials used so that 'Liquid Metal' surfaces can be produced successfully.

The Firequard® Epoxy Resins can all be deformed afterwards without affecting the metal surface.

Likewise, nothing stands in the way of patinating by means of color mixtures or chemically.



In order to prevent subsequent oxidation of the metallic surface, a protective layer must then be applied (topcoat, wax, stain, etc.).

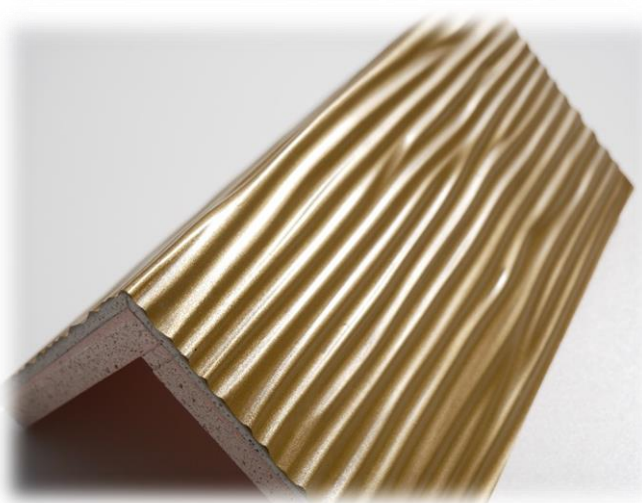
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Material list


Mateial name	Article number
Firequard® Epoxy Resin FR932	631-005-3
Firequard® Epoxy Hardener FR914	631-002-1
Firequard® EP Foaming Additive	631-900-1
Firequard® Ceramic Foam FR900	631-102-1
Firequard® EP Flexibilizer Additive	631-910-1
Microboard® IMBHP-03 to IMBHP-18 (3-18mm Thickness)	640-0XX-1 ¹
Firequard® EP Degasser Additive	631-915-1
Microshield® Silicon Mould Cleaner (Concentrate)	631-990-1

Patterns from development practice

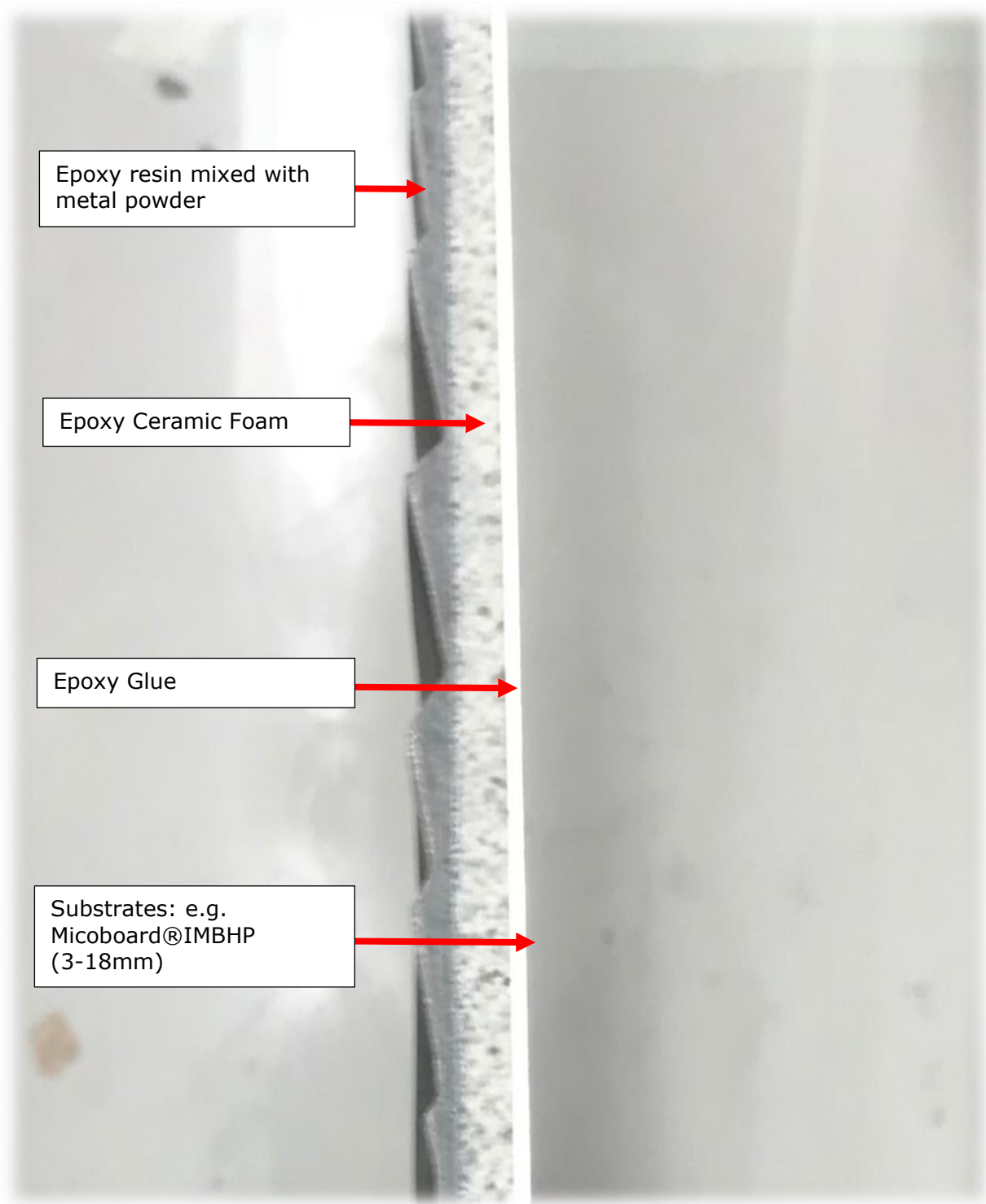
(chemically patinated, stained, formed as a corner, etc.):




¹ XX = thickness of the microboard in mm




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Side view of the overall structure:


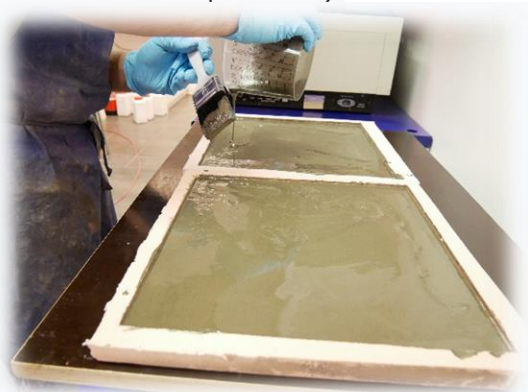



Form-Id: MS-LAB-130		 MICROSHIELD
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Process description


Pos.	Process	Microshield® Products
1.	<p>Clean the silicone mold with Microshield® silicone mold cleaner (concentrate) and warm water.</p> 	Microshield Silicon Mould Cleaner (Concentrate)
2.	<p>Apply silicone-free release agent to the mold. Two thin layers are enough. Promotes true-to-shape release and extends the life of the mold!</p> 	Commercially available wax product for spraying on
3.	<p>Heat the silicone mold to 40-50 ° C. This significantly improves the surface quality, as bubbles, foam or even defects in the silicone mold can be reduced in size when cooling.</p> 	Commercial oven or a self-made one e.g. by means of a hot air blower.



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4.	<p>Mixing instructions:</p> <table><tr><td>Firequard® Epoxy Resin FR932</td><td>100 w/w ²</td></tr><tr><td>Firequard® EP Degasser Additive</td><td>5 w/w</td></tr><tr><td>Firequard® EP Flexibilizer Additive</td><td>10w/w</td></tr><tr><td>Metal-Pulver ³</td><td>200 w/w</td></tr><tr><td>Firequard® Epoxy Hardener FR914</td><td>43 w/w</td></tr></table> 	Firequard® Epoxy Resin FR932	100 w/w ²	Firequard® EP Degasser Additive	5 w/w	Firequard® EP Flexibilizer Additive	10w/w	Metal-Pulver ³	200 w/w	Firequard® Epoxy Hardener FR914	43 w/w	<p>Firequard Epoxy Resin FR932 Firequard Epoxy Hardener FR914 Firequard EP Degasser Additive Firequard EP Flexibilizer Additive</p>
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Metal-Pulver ³	200 w/w											
Firequard® Epoxy Hardener FR914	43 w/w											
5.	<p>Pour the epoxy mixture into the silicone mold and use a fine brush to spread it evenly until all contours are evenly covered with the epoxy mixture. Depending on the shape, it makes sense to redistribute the resin in the mold shortly before the gelling point. For better distribution it is advisable to use a vibration table (e.g. homemade with ignition element or loudspeaker ...).</p>  											


² w/w = (Parts per weight)


³ Metal powder; from different sources, depending on the desired particle size and surface quality

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6.	Drying time approx. 3 hours at room temperature of 20-25 ° C or 1 hour in the oven at 35-40 ° C.							
7.	If necessary, subdivide steps 4 to 6 into several passes to create complex 3D shapes and vertical, sharp edges ⁴							
8.	<p>Sand the back with 180 grit Be careful when roughening the back surface - risk of breakage!</p> 							
9.	<p>Mixing instructions for backfilling the mold with ceramic foam (if necessary):</p> <table><tr><td>Microshield® Ceramic Foam FR900</td><td>100w/w</td></tr><tr><td>Microshield® Epoxy Hardener FR914</td><td>40 w/w</td></tr><tr><td>Microshield® EP Foaming Additive</td><td>2.5 w/w</td></tr></table> 	Microshield® Ceramic Foam FR900	100w/w	Microshield® Epoxy Hardener FR914	40 w/w	Microshield® EP Foaming Additive	2.5 w/w	<p>Firequard Ceramic Foam FR900 Firequard Epoxy Hardener FR914 Firequard EP Foaming Additive</p>
Microshield® Ceramic Foam FR900	100w/w							
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⁴ Apply the resin-metal mixture in several layers to avoid reaction bubbles at higher thicknesses


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10.	Drying time min. 4-8h at room temperature.	
11.	Calibrate the plate to the desired thickness using 40-80 grit. Usually the thickness depends on the 3D shape, but should be max. 4-5mm.	
12.	Prepare Microboard® IMBHP (3mm-18mm) or other similar substrate suitable for your application. Aluminum is generally not advised because this metal shows a large cold-warm expansion and cracks can appear on the surface over time.	
13.	<div>The substrate is glued to the calibrated decorative panel using the same resin system.</div> <div><div>Firequard® Epoxy Resin FR932100w/w⁵</div><div>Firequard® EP Flexibilizer Additive10w/w</div><div>Firequard® Epoxy Hardener FR91443w/w</div></div>	Firequard Epoxy Resin FR932 Firequard Epoxy Hardener FR914 Firequard EP Flexibilizer Additive
14.	Apply the resin mixture with a roller or a fine toothed spatula approx. 120-180g / m²	
15.	Press the calibrated plate onto a Microboard® IMBHP (3mm-18mm) or another substrate for 2-4 hours at RT until the adhesive has completely cured. Depending on the hardener used and / or the increased temperature, the curing time can be greatly reduced (approx. 12-20 minutes at 60 ° C).	
16.	<div>Sanding the surface with grit or steel wool: 500/800/1000/2000/3000</div> <div></div>	Commercial products such as: <ul style="list-style-type: none">• Mirka Abralon Pad• 3M Produkte• etc.
17.	This is followed by patination of the metal. This can be done either by means of a color solution or a chemical reaction solution.	Ask us, we have many products on offer.
18.	For a matt or satin finish, spray on a thin, approx. 50% thinned layer of polyurethane varnish.	Commercial products such as: <ul style="list-style-type: none">• Votteler 33056• Hesse MEGA-PUR• etc.⁶
19.	For a high-gloss finish, the surface is polished with suitable polishing and polishing pads / creams and then coated with a polyurethane clear lacquer.	Commercial products such as: <ul style="list-style-type: none">• Votteler, Hesse, Adler• etc.

⁵ w/w = (Parts per weight)

⁶ The material can also be used as a final anti-oxidation layer on polished surfaces

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20.	<p>This is what the end result can look like. Some real-life examples:</p> 	<p>There are no limits to the shapes, colors and patinas.</p>
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Please do not hesitate to call in should further information be required or if additional support could be of any help to you.