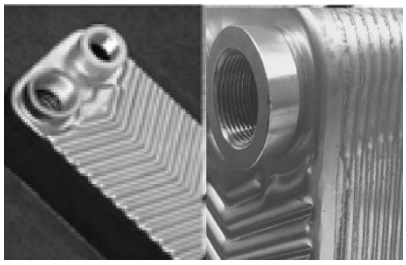


Metglas® Brazing Foil & Preforms

Components with rigid dimensional tolerances and high strength/stiffness-to-weight ratios are needed to handle the stresses and heat inherent in aerospace, heat exchanger, and automotive exhaust applications. ***Metglas***® Brazing Foils (MBFs) from ***Metglas, Inc.*** are produced as thin as 20 µm (0.78 mil) to satisfy these requirements. It gives consistently reliable and strong joints.

MBFs Provide extensive manufacturing and performance advantages over conventional metal joining methods.

Metglas® Brazing Foil Benefits

Unique foil form combined with outstanding ductility – MBF bends 180° without fracturing to comply with complex joint geometries to ease fixturing; ductile enough to be mechanically stamped and shaped to 3-D configurations.

Ease of automation – for enhanced manufacturing efficiency.

Consistent Performance – eliminates waste and creates high quality joints.

Unlimited shelf life

Contaminant free – for prolonged brazing furnace life.

Fast melting and outstanding wetting and flow – for void free, optimum strength joints.

Wide range of products – covering brazing temperatures from 950°C (1742°F) to 1195°C (2183°F).

Wide range of widths – for easy brazing of small and large areas.

Range of thicknesses available – for optimized joint gaps, including very thin foil, 20µm (0.78 mil) for decreased erosion of base metal.

Advantages of Brazing with Metglas® Brazing Foils

Vs. Mechanically-fastened joints
MBF provides higher strength, leak tightness and superior resistance to shock and vibration. Lighter gauge base metals may be used for substantial weight savings since MBF provides continuous, uniform joints.

Vs. Adhesive bonding and soldering
MBF offers superior strength, flexibility and temperature resistance.

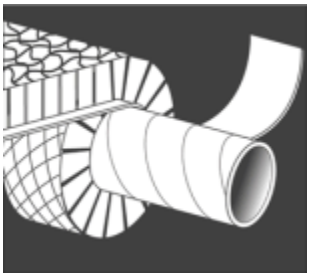
Vs. Welding
MBF provides much higher processing efficiency. The lower melting temperature of MBF eliminates erosion of base metals. No cleaning or finishing is required.

Vs. Powder, paste and tape forms of brazing
MBF contains no organic binders, thus eliminating contaminating residues and reducing furnace cycle times. Completely homogeneous, 100% metal MBF alloy optimizes brazed joint formation and performance. Reliable melting and flow reduces rework and reject rate as well.

Available Alloys

MBF Alloy	AWS & ASM Classifications	Nominal Composition, wt %								Melting Temp. C° (F°)		Braze Temp (Approx.)	Density g/cm^3 (lb/in^3)
		Cr	Fe	Si	C*	B	P	Mo	Ni	Solidus	Liquidus	C° (F°)	
15		13.0	4.2	4.5	0.03	2.8	-	-	Bal	965 (1769)	1103(2017)	1135(2075)	7.82 (0.283)
20	AWS BNi-2 / AMS 4777	7.0	3.0	4.5	0.06	3.2	-	-	Bal	969 (1776)	1024(1875)	1055 (1931)	7.88 (0.285)
30	AWS BNi-3 / AMS 4778	-	-	4.5	0.06	3.2	-	-	Bal	984 (1803)	1054 (1929)	1085 (1985)	8.07 (0.291)
50	AWS BNi-5a	19.0	-	7.3	0.08	1.5	-	-	Bal	1052 (1924)	1144 (2091)	1170 (2138)	7.70 (0.278)
51	AWS BNi-5b	15.0	-	7.25	0.06	1.4	-	-	Bal	1030 (1886)	1126 (2058)	1195 (2183)	7.73 (0.278)
53		15.0	-	7.25	0.06	1.4	-	5.0	Bal	1045 (1900)	1127 (2060)	1195 (2183)	7.75 (0.280)
60	AWS BNi-6	-	-	-	0.10	-	11.0	-	Bal	883 (1621)	921 (1688)	950 (1742)	8.14 (0.294)
62		21.0	<1	0.5	-	0.5	8.0	1.0	Bal	878 (1612)	940 (1724)	1020 (1868)	7.74 (0.280)
67		25.0	<1	1.5	-	0.5	6.0	1.5	Bal	890 (1634)	970 (1778)	1020 (1868)	7.70 (0.278)
601		16.0	32.0	1.5	-	0.5	6.0	1.5	Bal	960 (1760)	1030 (1886)	1060 (1940)	7.57 (0.273)
80	AWS BNi-9	15.0	-	-	0.06	4.0	-	-	Bal	1048 (1918)	1091 (1996)	1120 (2045)	7.94 (0.287)

*** Maximum concentration**



Tube is wrapped with MBF and fin stock in an automated brazing process

1) HEAT RECYCLER

Waste heat recovery systems are gaining popularity because of rising energy costs. This finned tube heat exchanger recovers waste heat as steam for a Rankine cycle turbine.

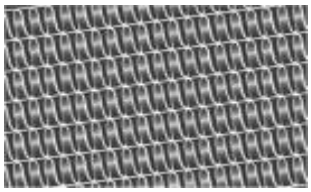
Brazing Application

Fins must be brazed up to 30m of indivisible lengths to the tube. Approximately 22 km of tubing may be used in a single exchanger. High flexibility and the ability to resist tension and crushing during assembly are crucial. High strength, corrosion resistant joints with a uniform thickness are essential. Brazing filler metals in powder and powder-binder composites are poor candidates because of contaminating residues and possible joint shrinkage.

Solution

MBF offers the advantage of a completely automated process, purity and consistent thickness. Each tube is rotated to wrap it with foil and fin. The machine tensions brazing foil and fin stock as it turns the tube. The fins are crimped at one edge which is pressed tightly against the brazing foil. The assembly is moving continuously through an induction heating station under the cover of pure Nitrogen. Brazing occurs when the assembly passes through the high powered heating zone at 1065°C for 1–2 minutes. Easy automation and low manufacturing costs are provided.

2) PLATE-FIN HEAT EXCHANGERS



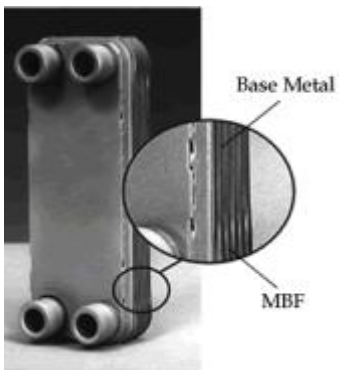
Metglas Brazing Foils offer excellent wetting and flow to fill all voids in the large number of joints in a typical plate fin heat exchanger.

Brazing Application

High efficiency use in demanding installations where light weight, corrosion resistant and high performance are necessary, such as aerospace and automotive exhaust applications.

Solution

MBF foil thickness can be controlled to provide at least 15% weight savings over similar powder alloys. Without binders or adhesives, the MBF joint is typically stronger than comparable powder, paste or tape joints by insuring clean, consistent, non-porous and complete joint coverage.



3) PLATE-HEAT EXCHANGERS

Brazing Application

The ability to resist corrosion in deionized water, ammonia, and other harsh chemical systems while sustaining design pressures up to 1760 psi (120 bar).

Solution

MBF series alloys are corrosion resistant to ammonia and other corrosive environments. High resistance to sulfuric, phosphoric, and nitric acids make MBF foil an ideal brazing filler metal for austenitic stainless steels.

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