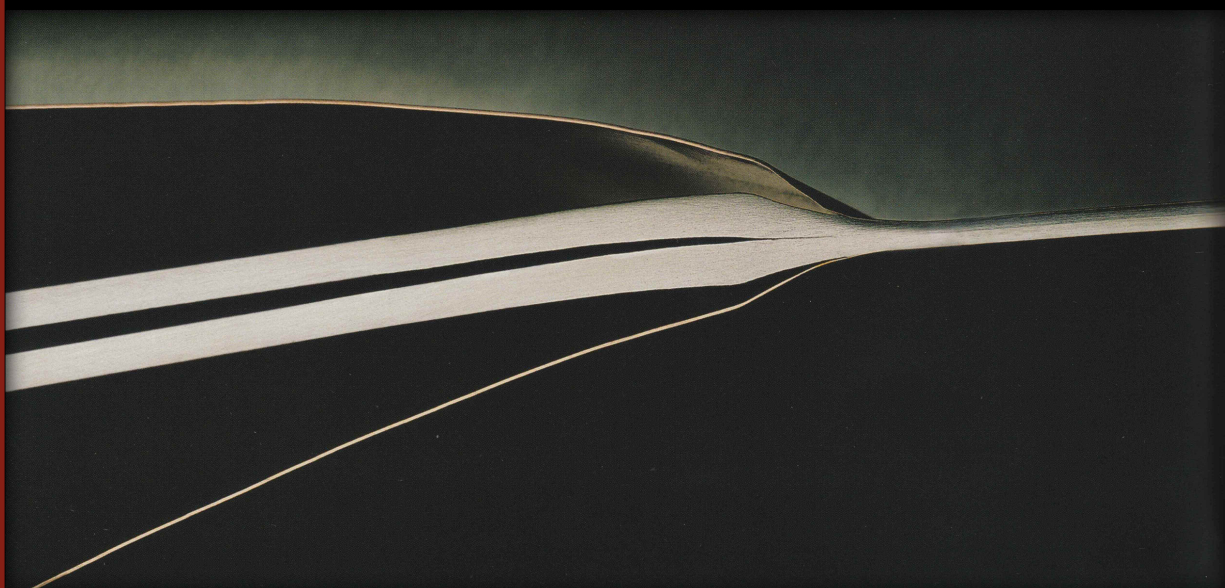
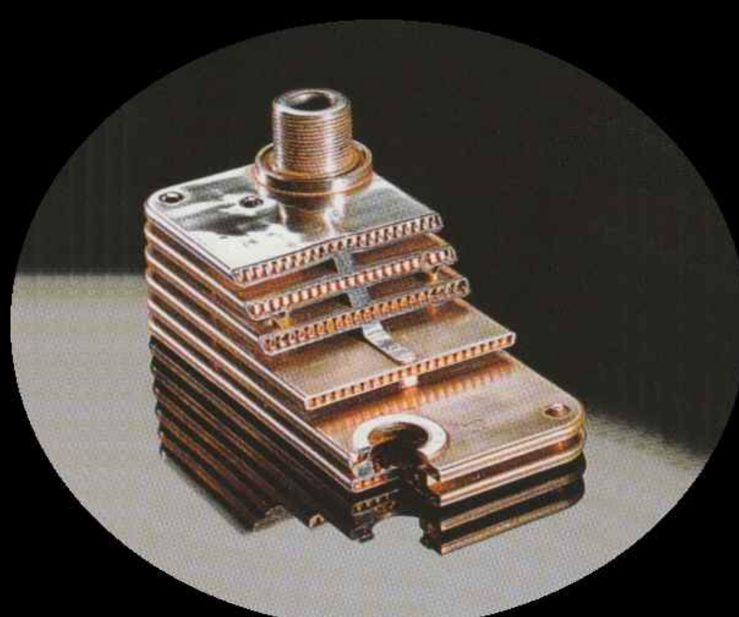
Engineered Materials Solutions

Improve process yield and quality

CLAD BRAZE MATERIALS

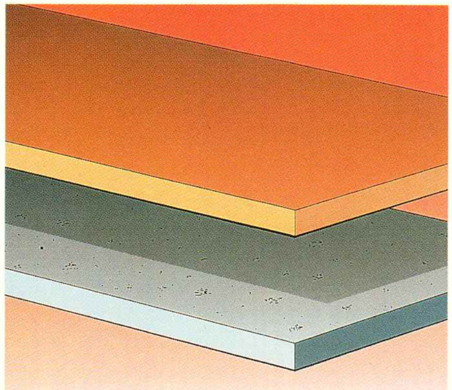




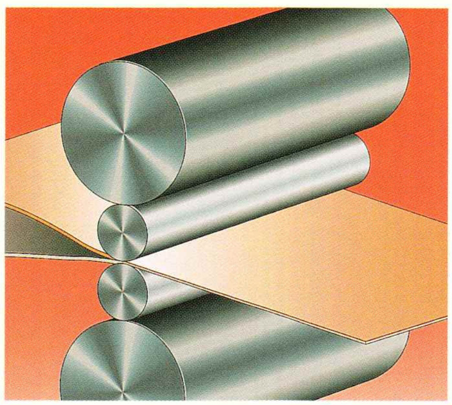
HOW CLAD BECOMES CLAD.

Anatomy of a metallurgical bond.

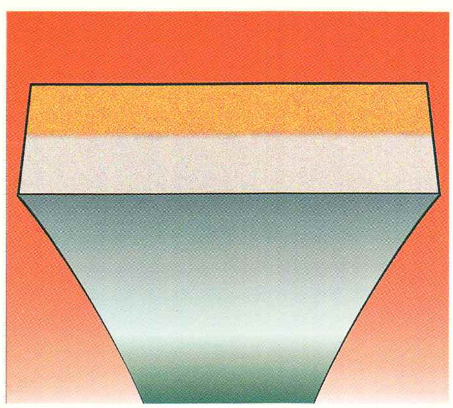
Clad metals are joined by a roll bonding and thermal treatment process that produces a metallurgical bond as the lattice structures of the metals are forced into conformance with each other. High pressure, producing massive deformation of the metals, causes a sharing of electrons at the interface, which produces a bond on the atomic level. No intermediate layers such as adhesives or braze metal are involved.



Roll bonding starts with two or more coils of cold finished strips of different metals or alloys. The metals are cleaned chemically, then abraded by a brushing operation to eliminate oxides and other surface impurities.



The cleaned metals are rolled under very high pressure, which reduces their thickness and bonds the metals together. As their surfaces are extended, typically by more than five times that of their original area, the atomic lattices of the metals merge, sharing electrons between mating surfaces.

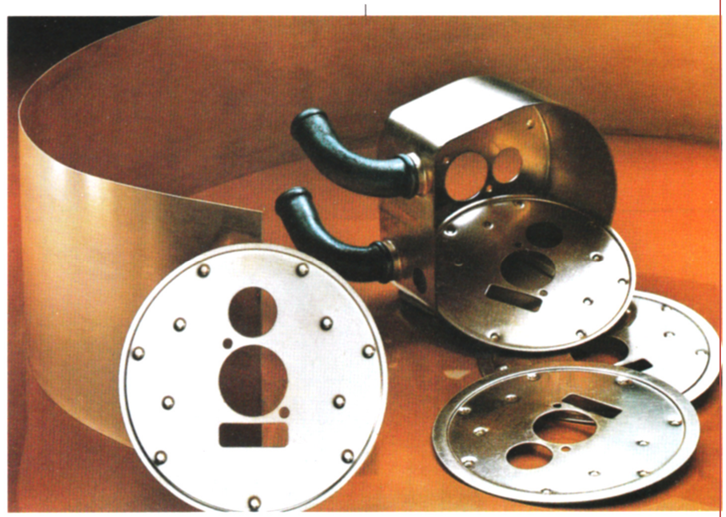


Coils of bonded strip are heat treated to "relax" the materials and to extend diffusion of the electrons of one material into the other at the bond interface. Impurities that become gaseous when heated diffuse into the metals; nondiffusible impurities consolidate by spheroidization.

Heat exchangers built from Clad

EMS clad materials are designed to combine the best qualities of the parent metals.

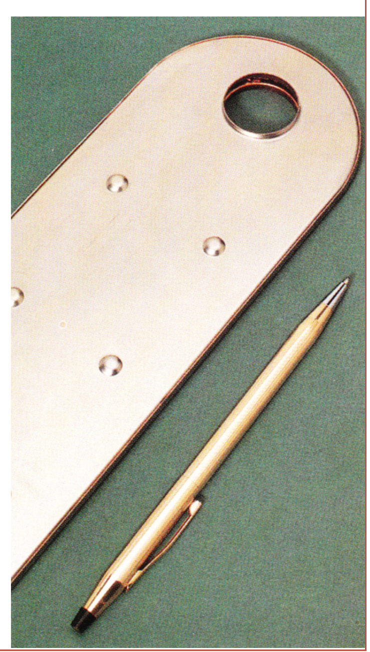
EMS Clad self-braze strip permit the brazing of heat exchanger and other components without the addition of additional filler materials or brazing shims. The brazing filler material is clad directly to the strip required for the structural components of the heat exchanger. Once the components have been stamped, assembled, and placed in a brazing oven, the filler melts, brazing the assembly together. The filler flows by capillary action into all joints between the sheets, providing a high degree of strength and integrity.



Features:

Compared to shims or foils:

- reduced stamping operations;
- reduction in resources required for assembly;
- no pastes or fluxes;
- design flexibility:
  - certain wetting;
  - brazing material is certain to be in contact with all components.



Low Nickel:

Because the copper brazing material is constantly in contact with the functional steel components, there are no wetting problems. This means that stainless steel alloys which would otherwise be unsuitable – for example 409 (DIN 1.4512) – can be used with no concerns about wetting or capillary action. The copper is in contact with the steel before the brazing process is initiated.

Sample of Typical Clad Products

				Gauge	Temper	Tensile	Yield	Elongation
	Copper	Stainless	Copper	0.021" 0.53mm or 0.030" 0.76mm	Annealed	58 kpsi 400 MPa	33 kpsi 228 MPa	37%
Alloy	CDA 122	409	CDA 122					
Ratio	10	80	10					
Ratio	5	80	15					
Ratio	15	85	-					
	Copper	Stainless	-	0.020" 0.51mm	Annealed	92 kpsi 634 MPa	42 kpsi 290 MPa	56%
Alloy	CDA 122	304	-					
Ratio	13.5	86.5	-					
	Copper	Stainless	Copper	0.012" 0.30mm	Annealed	90 kpsi 621 MPa	40 kpsi 276 MPa	55%
Alloy	CDA 122	304	CDA 122					
Ratio	10	80	10					
	Copper	L C Steel	Copper	0.015" 0.38mm	No. 4 Temper Skin Roll	55 kpsi 379 MPa	42 kpsi 290 MPa	35%
Alloy	CDA 122	1008	CDA 122					
Ratio								
	Brass	Copper	Brass	0.020" 0.51mm	Annealed	40 kpsi 270 MPa	14 kpsi 97 MPa	48%
Alloy	CDA 524	CDA 122	CDA 524					
Ratio	10	80	10					
Ratio	5	95	-					

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