Höganäs

How to: BrazeLet® Ni613

BrazeLet Ni613 is a high chromium content brazing filler metal commonly used in applications that require high corrosion resistance. Due to its high chromium content, Ni613 is sensitive to oxidation during the brazing cycle, especially if the furnace conditions are not properly controlled. This may lead to discolourations or other unwanted defects of the brazing joint.

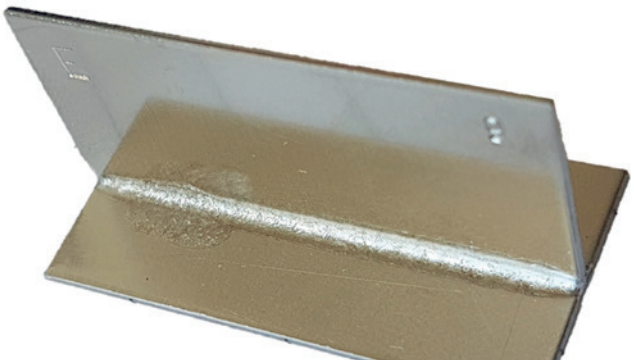
Common pitfalls

Too high temperature during binder burn-off

If the temperature is too high during binder burn-off or in the time following binder burn-off, the partial atmosphere that forms will oxidize the components. The temperature should not exceed 450°C.

Poor evacuation of binder burn-off gases

If the gases that are produced when the binder burns off (250°C - 450°C depending on binder type) are not disposed of, they can cause oxidation of the brazing filler and discolour the brazing seams. This can be avoided by properly controlling the vacuum level to below 10^{-3} - 10^{-4} mbar or having a partial pressure of dry process gas flow through the furnace during binder burn-off. The partial pressure should be in the region of 0.001 - 0.1 mbar.



Brazed T-sample with dot application of paste. The residue is metallic – furnace atmosphere has been good.

Brazed T-sample with dot application of paste. The residue is oxidized - furnace atmosphere has been poor.

Example of a proper brazing cycle

Temperature	Comments
Step 9°C /min from RT to 450°C	
Hold 30 minutes	(binder burn-off)
Step 9°C /min from 450°C to 950°C	
Hold 30 minutes	(homogenization)
Step 9°C /min from 950°C to 1100°C	
Hold 10 minutes	(brazing)
Cool down in vacuum. Possibly start slow cooling at 900°C to avoid sensitization of the base material	

Alternative brazing cycles that can have a positive effect on joint strength

Diffusion brazing, 2 hours hold time at brazing temperature instead of 10 minutes.

High temperature brazing, brazing temperature 1150°C instead of 1100°C.

Standard brazing cycle BrazeLet® Ni613