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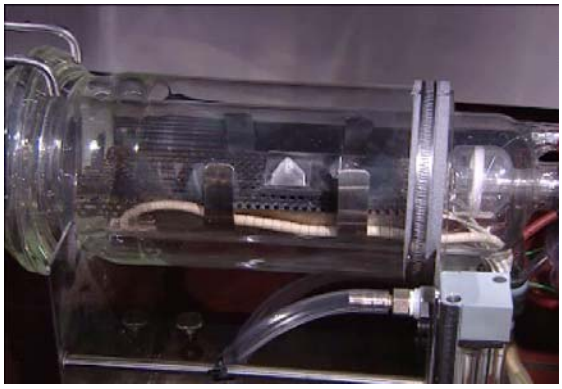
NOCOLOK® Flux – TECHNICAL INFORMATION

NOCOLOK® Flux Application with Binders

Brazing tests with Binders:

Small-scale brazing experiments in Solvay's Technical Center are conducted in a glass tube furnace - with the so called "Angle-on-Coupon" test (see picture 1).

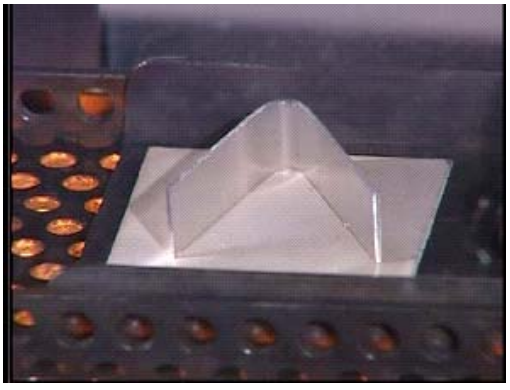


Picture 1: Glass tube furnace experiment: Angle-on-coupon test

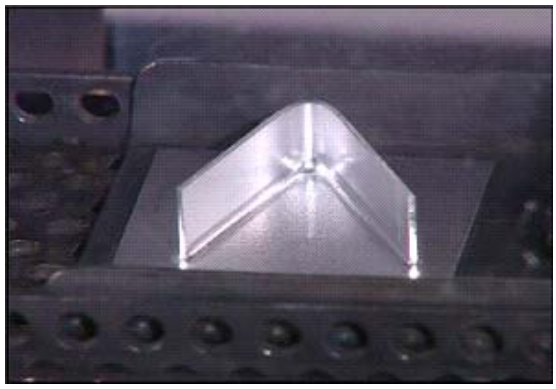
Picture 2 and 3 show an angle-on-coupon test with NOCOLOK® Flux applied by binder:

- During heat-up prior to joint formation – and
- After joint formation.

The coupons are pre-coated by spraying a NOCOLOK® Binder-based flux slurry.



Picture 2: Angle-on-coupon test with binder spray application of NOCOLOK® Flux – During heat-up



Picture 3: Angle-on-coupon test with binder spray application of NOCOLOK® Flux – After joint formation

During the brazing cycle, the binder is removed before reaching brazing temperature without leaving residues – provided the product is used in accordance with the technical instructions.

The evaporation behavior of a pure NOCOLOK® Binder film in air is illustrated by the following DTA diagram:

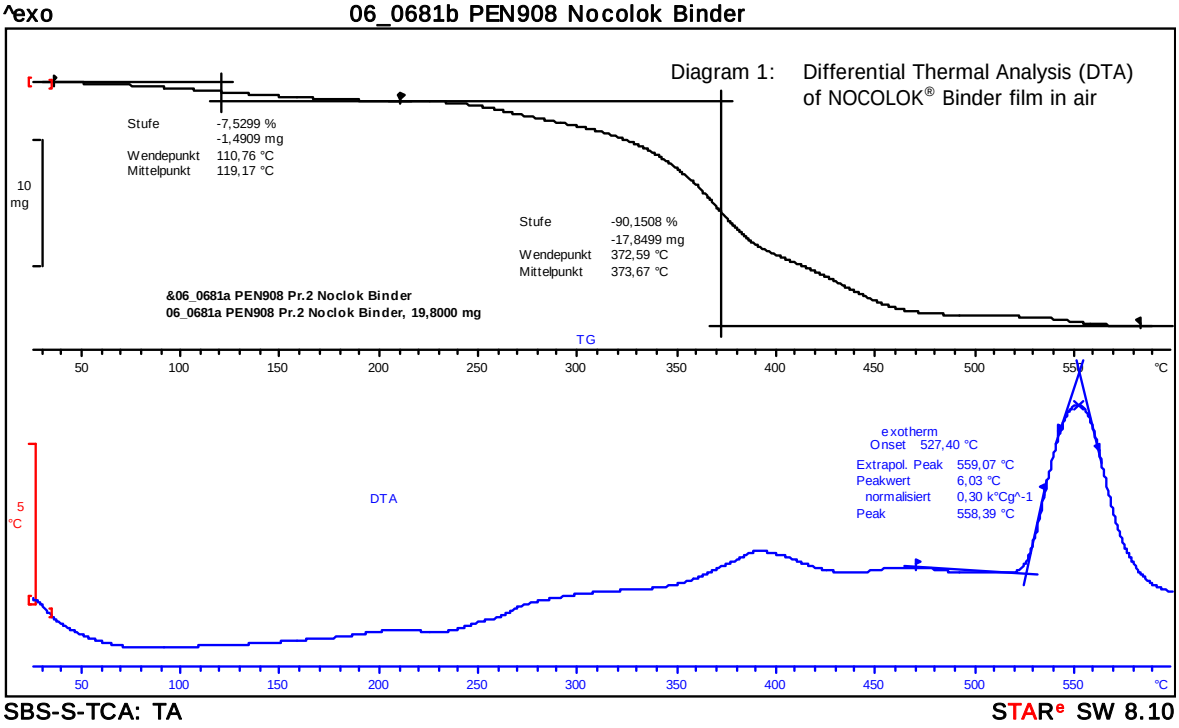
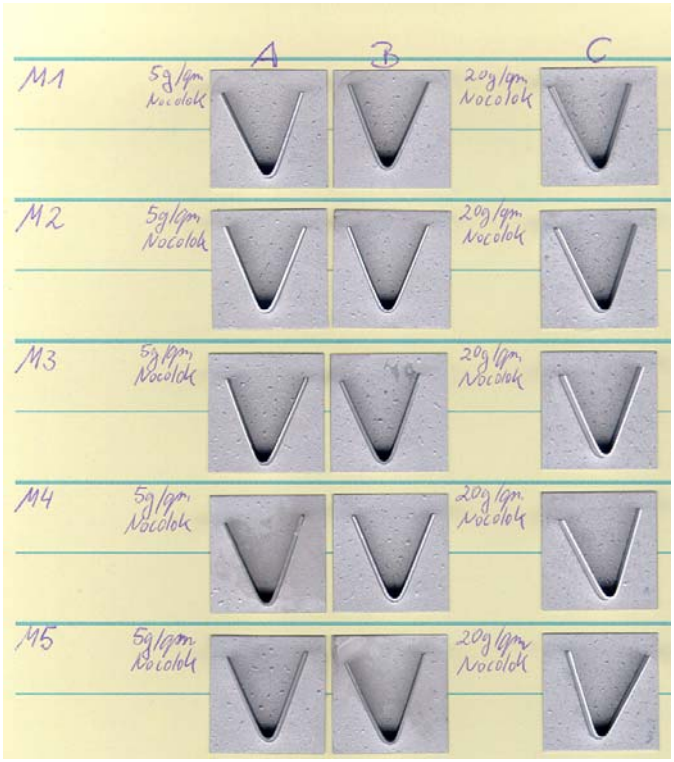


Diagram 1: Differential Thermal Analysis (DTA) of NOCOLOK® Binder film in air

More than 97% evaporates/burns off upon heat up to 450°C.

A series of brazing tests was carried out with different flux loads and using 5 binder mixtures. Picture 4 shows some of the brazed coupons in three columns (A and B: with 5g/m^2, C: with 20g/m^2) and five rows (M 1 through M5 – different binder mixtures).

All samples brazed well in the glass furnace - with uniform joints and full fillets. There was no discoloration or any residue left on the surfaces – even at a flux load of 20g/m^2.



Picture 4: Angle-on-coupon tests with binder spray application of NOCOLOK® Flux
A and B: 5g/m^2 flux load
C: 20g/m^2 flux load
M 1 – M 5: different binder mixtures

Adhesion tests with Binders:

On picture 5 results of some simple adhesion experiments are presented.

Coupons were coated with NOCOLOK® Binder suspensions and dried for 20 minutes at 80°C. Thereafter, scratching and bending resistance was tested.

NOCOLOK® Binder coatings provide good adhesion for handling and touching the components. Some of the flux can be removed by scratching with finger nails.

Based on the experience we made with several chemical systems used as flux binders, we conclude that there is a correlation between adhesion and evaporation characteristics. As a rule of thumb, we found that very strong adhesion is only possible with chemicals showing a too high flash point. A binder with high flash point will cause more discoloration and eventually leave residues after brazing.

The NOCOLOK® Binder products offer sufficient flux adhesion and show very good removal behavior – without causing discoloration.

Picture 5: Aluminum-coupons coated with binder-based NOCOLOK® Flux slurry
D: 5g/m² flux load
E and F: 20g/m² flux load
M 1 – M 5: different binder mixtures
Column F shows coupons after bending

Examples for flux application with binder:

Flux application with binders presents advantages for pre-fluxing of selective surfaces. Typically, this method will be utilized prior to component assembly for applying specific flux loads.

Of particular interest are binder mixtures for flux application on internal surfaces and in critical areas (i. e., for component surfaces difficult to reach in standard flux application).

The binder will provide improved flux adhesion properties. Consequently, there is less flux fall-off and reduced dust formation during handling and assembly of binder pre-fluxed parts.

All NOCOLOK® Binder products from Solvay are water-based mixtures. The best and most uniform application process is by spray. Alternative techniques include dipping and brushing.

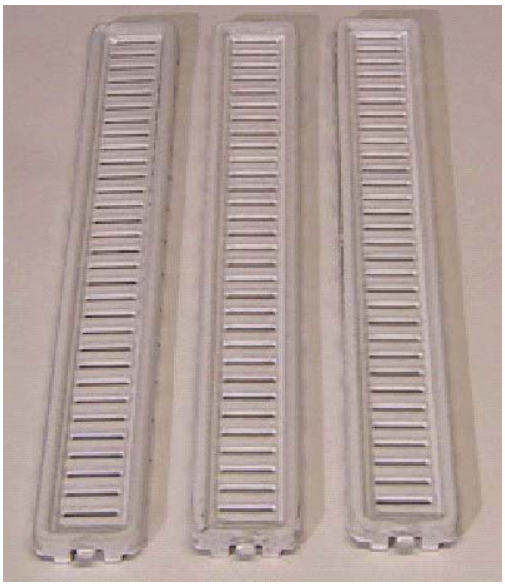
Some examples for heat exchanger components can be found on the following pictures:

Picture 6 and 7: Selectively pre-fluxed condenser headers – NOCOLOK® binder spray application

The condenser manifolds (picture 6 and 7) are selectively spray coated on specific surface areas only – in this particular case in the manifold -to-block area.

The radiator headers shown on picture 8 are completely spray-coated on the air side.

Picture 8: Pre-fluxed radiator headers (air side) – NOCOLOK® binder spray application



NOCOLOK® Binder products have very good wetting properties in spraying application; i.e. the flux slurry spreads out well, which results in uniform flux coverage after drying.

March 13th, 2003
Updates July 5th, 2006, November 26th, 2010, June 15th, 2011, May 28th, 2013*

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