NOCOLOK® News #1-2021

April, 2021

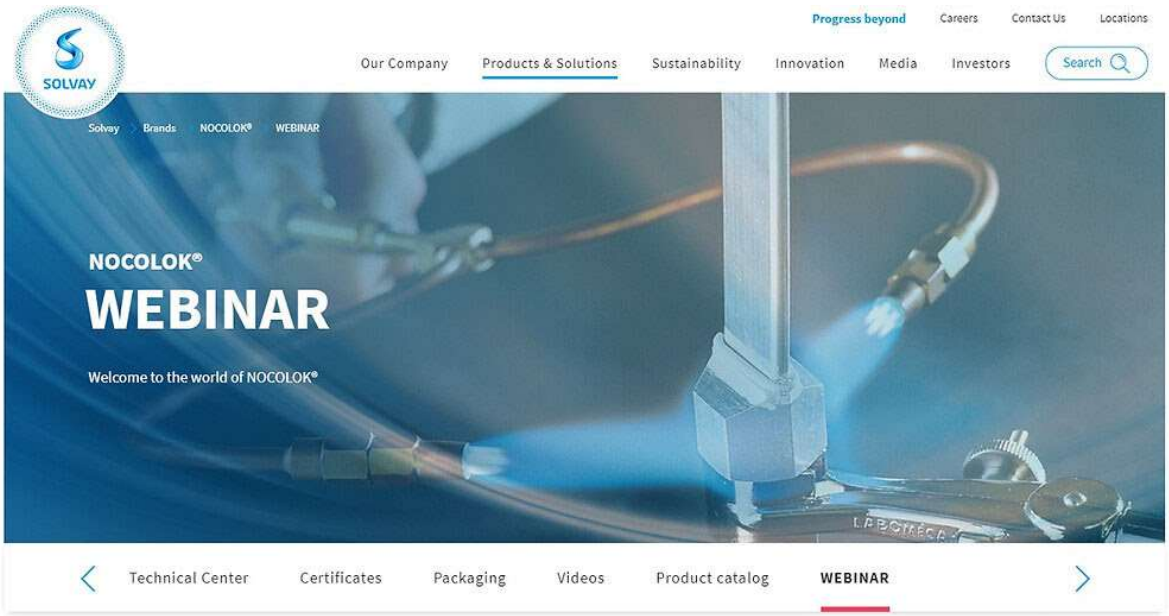
Member of the NOCOLOK® Team – Yuta Kobayashi

Since mid-2020 Yuta Kobayashi supports the team as Business Development Manager in the Japanese and South East Asian markets. He is mainly in charge of technical support but also has commercial responsibilities and works as Key Account Manager for Japanese customers. He achieved his expertise in the automotive industry by working for companies like T.Rad and Plastic Omnium in various functions such as manufacturing, design and industrial engineering and serving OEMs like Toyota and Nissan.

As a reward and alternative challenge, Yuta likes mogul skiing.

NOCOLOK® Aluminium Brazing Webinar – Successful and Well Received

The pandemic situation these days forces us to do things in a different way and to be more innovative. Therefore, the 20th annual technical training event was organized as a Google Meet Webinar – on 2 days tailored for NAM and Asia time zones beginning of November.



SOLVAY Aluminium Brazing Webinar

Flame and Furnace Brazing with NOCOLOK®

This technical training seminar will provide information concerning the manufacturing practices commonly used for brazing operations. In particular, the fundamental aspects of industrial scale brazing of aluminium are addressed - for:

- Controlled Atmosphere Brazing (CAB) of aluminium heat exchangers with non-corrosive fluxes (NOCOLOK® Flux)
- Paints and Pastes for selective fluxing
- Flame brazing of aluminium
- Brazing process control and case studies/ problem solving

This webinar is presented in English.

376 registrations for the Webinar in 18 countries demonstrate the continuous interest in the aluminium brazing process, as well as NOCOLOK® Flux and its application. The biggest remote community share with 40% comes from NAM region, followed by India and China. The participants represent 85 companies and entities around the globe.

The four hour webinar content covered the following topics:

- Fundamentals of aluminium brazing – by Dr. Hans Swidersky, our Tec Center Manager.
- Usage of flux paints and pastes – presented by Hynek Pawera, our Tec BDM consultant
- Flame brazing – by Leszek Orman, our Tec BDM metallurgical consultant
- And special case studies collected over the years – by Leszek as well.

Nadja Plote, one of our Account Managers in EMEA, moderated in between.

The team decided for a pre recording of the presentations to manage the timing and to prepare subtitles. In addition, such recordings can be used for other webinar sessions with special target groups.

The satisfaction form at the end gives the participants opportunity for feedback incl. questions, and for further contact. Newcomers for aluminium brazing can use such educational lectures for the personal training programs and the high satisfaction ratings encourage us to continue with such kind of technical seminars.

Replay the Webinar

Welcome to our 1st Digital International Congress on Aluminium Brazing and Aluminium Heat Exchanger Technologies for HVAC in Combination with a Digital Exhibition

Last year DVS was forced to postpone the Congress on Aluminium Brazing (due to COVID-19) to 2021 and to link this event with the congress on Aluminium Heat Exchanger Technologies for HAVCR. A combination of both events will enable more attraction to a wider audience of the aluminium brazing community.

DVS still sticks to this concept, but decided for event digitally based on the current vaccine supply situation. They will combine pre-recorded video presentations with an exciting innovative and interactive conference format. Using an additional chat function people can also exchange ideas with other attendees.

Exhibitors can present their products via a virtual platform for the exhibition.

This event will remain an excellent opportunity for all attendees meeting online with leading specialists, authorities and well-known experts.

The congress is truly an event which anyone involved in sophisticated joining challenges should attend, even if it will solely take place online.

Registration

Successful NOCOLOK®-Logistics even through

Successful NOCOLOK®-Logistics even through hard COVID times

Together we continue facing unprecedented challenges resulting from the COVID-19 pandemic. One of them is the significant increase in transport volume in recent months after the first lockdown last year, impacting availability of drivers and sea container or cargo space.

We, the Solvay NOCOLOK®-Team, are continuously monitoring the situation and taking efficient actions as needed. Our strengths: anticipation of risk with a ready BCP - Business Continuity Plan.

The reliability of transport transit times is at risk and unpredictable. In the light of existing and potential restrictions in various countries and resulting consequences on trade, we may at some point no longer be able to avoid constraints in delivery schedules.

Success always results from a strong collaboration and understanding between business partners. Because uncertainty prevails in these times, a proactive communication is a must:

- provided in a timely manner your precise forecast (split for Production and Inventory)
- regular update and anticipation that large non forecasted in increases might be at risk
- product validation of our various sites to increase flexibility in QM and lower risk of BCP

The priority for your NOCOLOK®-Team is to support your activity. With a constant alignment between us, we can ensure that proper plans are in place to mitigate any business disruption.

Analysis of Brazing Imperfections by Metallographic Investigation / Optical Microscopy – Part 1

In everyday practice we can encounter problems connected with brazing imperfections - often manifested as leaking. In order to identify the failure root causes, usually a detailed examination needs to be perform. Optical metallography is one of the most important tools for such an analysis.

The purpose of this article is to present the basic principles for performing analysis of brazing joints, and to show what information can be obtained from the investigation.

Before starting to work with an optical microscope, the part to be examined must be prepared appropriately. There are several steps in this procedure:

- Cutting out smaller pieces to about 30mm to 40mm with a band saw
- Embedding the cut sections in epoxy resin
- Step grinding with sand paper (220 grit, 500 grit, 1000 grit)
- Polishing with diamond suspension (6 µm, and 3 µm) and with oxide polishing suspensions (OP-S)
- Microscopic observation in non-etched conditions - mainly to determine if the quality of polishing is sufficient
- Microscopic observation after etching - most common etchant: 0.5% hydrofluoric acid, (10 -15 seconds immersion)

There are usually two steps in a metallographic examination.

The first one is to evaluate the brazing quality. It is usually performed when introducing a new product. In such case the manufacturer should define the way the sample is cut for microscope observations. In most cases the tube to header and the fin to tube joints are examined. Such exemplary cutting is shown in fig. 1:

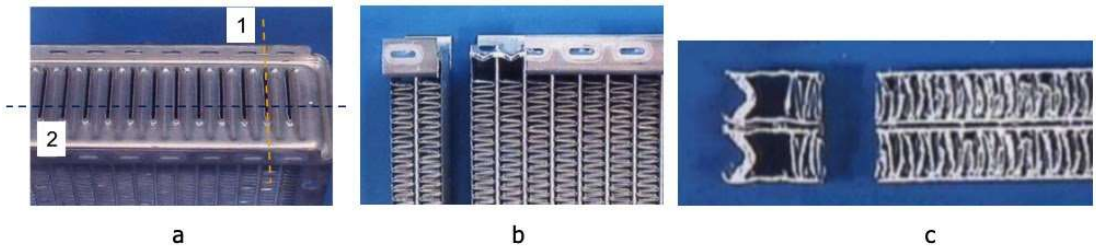


Fig. 1: Cutting of a radiator for examination of the joint quality
a) Brazed part with marked cutting lines
b) Part after cutting along line 1
c) Part after cutting along line 2

The second step is connected with the actual examination of the parts - looking for root causes

The second step is connected with the actual examination of the parts - looking for root causes of not brazed parts.

It is of primary importance to choose properly the observation plain. In most cases it runs across the examined defect. This will be seen case by case in the following industrial cases examples.

However; before we go into fault analysis we should understand what can be seen in an optical microscope metallographic picture. Figure 2 represents the metallurgical structure of a tube to header joint of a brazed aluminum radiator.

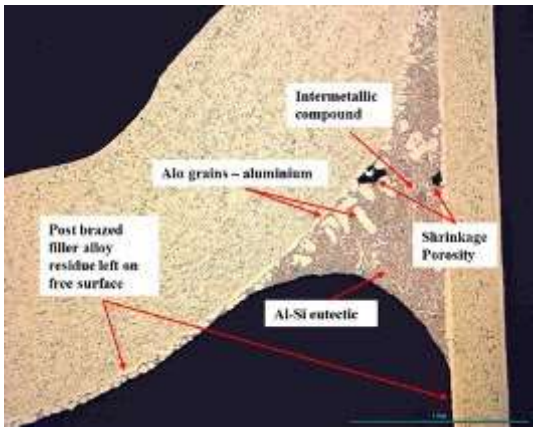


Fig. 2: Metallographic structure of a tube to header joint - etched with HF

Apart from the intrinsic features of the brazed structure quite often we can observe another phenomena strictly connected with the brazing process. Example of such phenomenon is shown in figure 3.

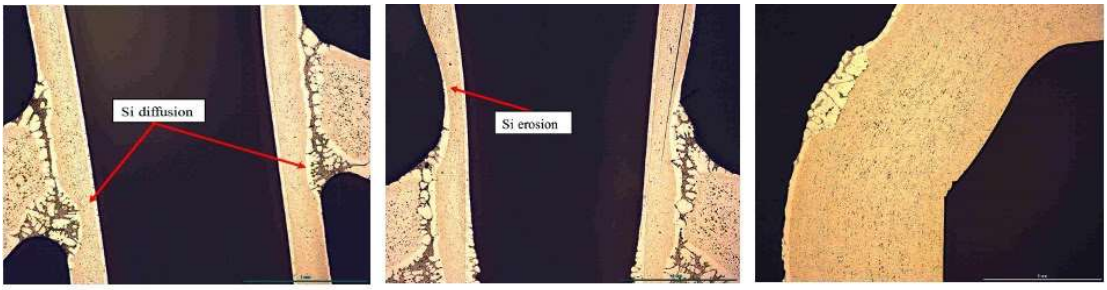


Fig. 3: Examples of structural brazing phenomena
a) Silicon diffusion
b) Erosion
c) Liquid Film Migration

Silicon diffusion is a phenomenon where silicon diffuses from static liquid filler into the base metal and aluminum diffuses into the liquid filler - resulting in partial melting of the base metal at brazing temperature. The extent of this phenomenon is enhanced by too high brazing temperature and/or too long time at brazing temperature.

The phenomenon of diffusion sometimes can develop into so-called erosion. In such cases the liquid part of the base metal had flown away - leaving a gutter behind. That can potentially happen at the end of a brazing cycle, when significant temperature gradients develop during cooling. It should be noticed that this phenomenon, which results in thinning out of for example the tube wall cross section, is very dangerous for part performance, because the thinner tube wall could be a potential place for fatigue and/or corrosion failure.

The Liquid Film Migration [LFM] physically is an entirely different phenomenon than the two ones discussed above. During brazing, there are always some interactions between the filler alloy and the base alloy. They take place before and after melting of the filler alloy. However, in some situations they have a very specific character. It is a phenomenon of rapid silicon diffusion into the matrix alloy. It starts at temperatures below the brazing window. During that process a moving liquid interface is created, which sweeps from the clad/core interface into the core of the material.

The degree of LFM depends on cold deformation induced to the base metal before brazing and also strongly depends on the alloy type of the part. Since this process diminishes the amount of liquid available to form joints - and it can also destroy a sacrificial layer in the base alloy (e.g. used for corrosion protection) - it should be avoided in the brazing practice. It is worthwhile

used for corrosion protection) - it should be avoided in the brazing practice. It is worthwhile pointing out that minimization of LFM can be achieved by proper choice of the base material and its temper, thus for a given part it must be done at designing stage.

To be continued.

Expansion of Fluorine Research – Pilot plant moves from Hanover to Bad Wimpfen

Solvay´s lead plant is located in Bad Wimpfen and more NOCOLOK® research and development will be concentrated here in future. In spring 2021 the NOCOLOK® pilot plant will move from Hanover to Bad Wimpfen.

"The relocation of the pilot plant is a strategically important investment for our location", plant manager Uwe Männel emphasizes. "Bad Wimpfen will become a global research centre for our NOCOLOK® business." Small quantities for experimental purposes and practical tests are produced. "We bundle our capacity. Professionals from production, development and application technology work together in one place. Through the personnel interlinking and short distances we can shorten development times and increase time efficiency," Uwe Männel is adding.

Good luck for the move!

[The NOCOLOK® website gives access to all information]

[Exchange your experiences about aluminium brazing in the Brazing Blog]

[All videos about aluminium brazing on YouTube]

Contact us

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