

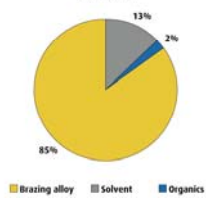
Composition of brazing paste

Properties of filler metal
 Gas atomized powder, spherical
 Grain size: < 90 µm;
 average particle size 15 - 30 µm

CPO 600 (OKC 600)
 Cu rem.; Sn 15,6; P 5,3; Ni 4,2
 Melting range: 590-610 °C

CPO 610
 Composition similar to CPO 600
 Melting range: 595-620 °C

General composition of a brazing paste by wt. %



Environmental issues

Brazing alloy

- Lead free

Brazing paste

- Flux free for fin to tube joint
- Solvent evaporation during drying process
- Organic decomposition during brazing
- Exhaust gas treatment according to local legal requirements

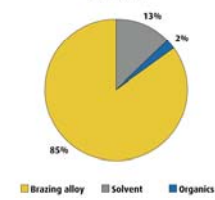
Aftertreatment

- No rinsing step required

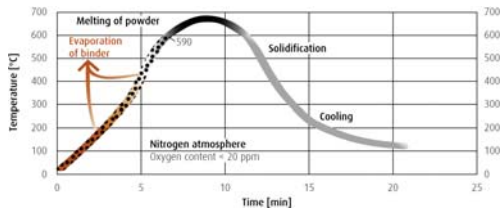
CuproBraz heat exchanger

- Recyclable

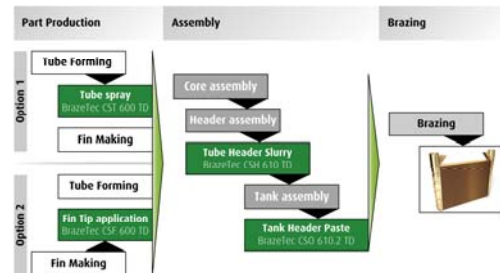
General composition of a brazing paste by wt. %



Typical brazing process



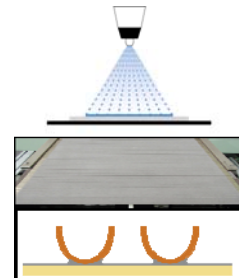
CuproBraz process chart



Paste & application

BrazeTec CST 600 TD

- Application: **Tube Spray**
- Alloy: CPO 600 (OKC 600)
- Easy to spray with conventional spraying equipment
- Homogenous paste layer - high quality joints
- No settling - only short homogenisation process
- No smelling during application and drying
- Quick drying time - high throughput
- Good adhesion - easy to handle coated tubes






BrazeTec CST 600 TD: Cross sections of brazed tube-to-fin joint



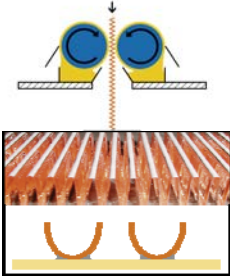
200 µm

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BrazeTec CSF 600 TD

- Application: **Fin Tip Coating**
- Alloy: CPO 600 (OKC 600)
- No settling - only short homogenisation process
- Quick drying time - high throughput
- No smelling during application and drying
- Good adhesion - easy to handle



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BrazeTec CSH 610 TD

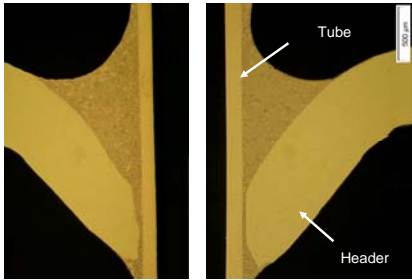
- Application: **Tube - Header Joints**
- Alloy: CPO 610
 - Marginal flux content (2 wt.-%)
- No leakages with standard radiators & CAC's using standard CuproBraz parameters
- No settling - only short homogenisation process
- Quick drying time - high throughput
- No smelling during application and drying



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BrazeTec CSH 610 TD: Cross sections of brazed tube-to-header joints



Tube
Header

200 µm

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BrazeTec CSH 610.2 TD

- Application: **Fin Stiffening**
- Special powder composition
 - Marginal flux content (2 wt.-%)
- Wear resistance of fins
- No settling - only short homogenisation process
- Quick drying time - high throughput
- No smelling during application and drying



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BrazeTec CSO 610.2 TD

- Application: **Tank-Header Joints**
- Special powder composition
 - Marginal flux content (2 wt.-%)
- Ready mixed paste - approved quality
- No settling - only short homogenisation process
- No smelling during application and drying
- Stays in brazing gaps during drying and brazing



One Shot Brazing

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BrazeTec CuproBrazec pastes

Paste	Joint	Paste Application Method	Flux content
BrazeTec CST 600 TD	Fin - Tube	Spraying	No
BrazeTec CSF 600 TD	Fin - Tube	Fin-tip	No
BrazeTec CSH 610 TD	Tube - Header	Slurry	2 %
BrazeTec CSH 610.2 TD	Fin stiffing	Spraying	2 %
BrazeTec CSO 610.2 TD	Tank - Header	Dispensing	2 %

Key parameters

CuproBrazec key parameters

- Cleanliness
- Tolerances
 - Brazing gap < 50 µm
- Brazing paste
 - Spraying 150 – 250 g/m²
 - Fin tip 0,008 g/tip (16 mm, 15 fpi)
 - Tube to Header 0,5 g/joint (16 mm tube)
 - Drying below 130 °C
- Brazing atmosphere & temperature
 - Nitrogen or N₂/H₂ 95/5
 - Oxygen content < 20 ppm
 - Dew point < -40 °C
 - Part temperature min. 650 °C



Quality control

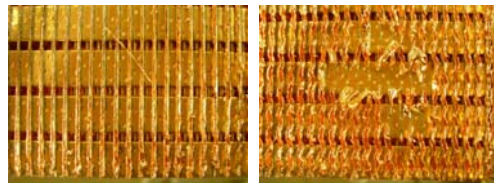
CuproBrazec quality control

- Leakage test of all cores with compressed air
- Localization of leakages
- Take measures for error correction



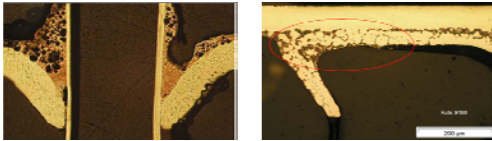
CuproBrazec quality control

- Visual inspection
- Destructive visual inspection
- Take measures for error correction



CuproBrazing quality control

- Metallographic investigation
- Take measures for error correction



Production machine matrix

CuproBrazing production volume matrix

	Low Volume < 10,000 units	Medium Volume < 50,000 units	Big Volume > 50,000 units
Tube forming	Purchase	Purchase / In-house	In-house
Fin / Header forming	In-house	In-house	In-house
Filler metal (tube-fin-joint)	Manual Spray / Foil	Fin Tip / Aut. tube spray	Automated tube spray
Filler metal (tube-header)	Manual squeeze bottle	Automated paste application	Automated paste application
Furnace	Batch type	Semi continuous	Continuous

Thank you

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