

Lasting Connections

BRAZING SOLUTIONS FOR THE HVAC&R INDUSTRY



IN-DEPTH KNOW-HOW

As a leading brand of soldering and brazing consumables, Fontargen Brazing offers proven solutions based on 50 years of industrial experience, tried and tested processes and

methods. This In-Depth Know-How has made Fontargen Brazing an internationally preferred partner for every soldering and brazing task.

CUSTOMIZED SOLUTIONS FOR BRAZING IN THE HEATING AND COOLING INDUSTRY

Product solutions:

- » Bare and coated silver rods and wires
- » Fluxes
- » Copper phosphorus rods and wires (square and round)
- » Copper and aluminum wires
- » Brass filler metals
- » Preforms
- » Foils
- » Pastes
- » Solders (also as paste)

Services – Fontargen Brazing offers additional value by offering:

- » Process optimization in together work with the customer
- » Brazing process debugging
- » Courses for the staff
- » Expertise in brazing techniques
- » Intensive customer support by our competent staff

Important benefits for customers:

- » Solution provider
- » Global distribution and sales network
- » Broad product range
- » ISO 9001 / 14001 – Approvals
- » AEO Standard
- » Deliveries Just-in-Time-in all packing units
- » Financial performance

AWS classified Ag and CuP (Ag) brazing filler metals standard dimensions.

Product Name	Dimension (inch)	Dimension (mm)
High Ag alloys	1/16" x 18"	2.0 x 500
CuP Alloys	1/16" x 15"	2.0 x 500
CuP Ag alloys	Flat rods	2.0 x 500
BAISi-4	1/16" x 18"	2.0 x 500

Remark: Other dimensions possible on demand.

This chart below gives an information on possible combinations of brazing alloy and base metal for the HVAC area, but also for general use. It is supposed to give you a first recommendation. Feel free to contact Fontargen Brazing for further detailed discussions if needed.

Possible Combinations: Solder-base material

	Steel/CrNi-Steel	Copper	Brass	Gunmetal	Aluminum
Steel/CrNi-Steel	Group 1 + Flux	Group 1 + Flux	Group 1 + Flux	Group 1 + Flux	A 407 + Flux
Copper		Group 2	Group 1 & 2 + Flux	Group 1 & 2 + Flux	A 631 & A 407 + Flux
Brass			Group 1 & 2 + Flux	Group 1 & 2 + Flux	A 631 & A 407 + Flux
Gunmetal				Gruppe 1 & 2+ Flux	
Aluminum					A 631 & A 407 + Flux

Temperature resistance of the filler metals

	Composition					T _A / °C	Melting range	Temperature-resistance
Group 1:	Ag	Cu	Zn	Ni	Sn			
A 319	34	36	27.5	-	2.5	710	630 - 730	- 200°C
A 320	45	27	25.5	-	2.5	670	640 - 680	- 200°C
A 330	30	38	32	-	-	750	680 - 765	- 200°C
A 340	40	30	28	-	2	690	650 - 710	- 200°C
A 347	56	22	17	-	5	650	620 - 655	- 200°C
A 350	50	20	28	2	-	690	660 - 705	- 200°C
A 390	45	30	25	-	-	740	665 - 745	- 200°C
Group 2:	Ag	Cu	P	Sn				
A 2003	-	93	7.25	-	-	730	710 - 820	- 60°C ¹⁾
A 2004	-	93.8	6.2	-	-	760	710 - 890	- 60°C ¹⁾
A 2005	-	86.2	6.8	7	-	690	650 - 700	- 60°C ¹⁾
A 3002	2	91.7	7	-	-	740	643 - 788	- 60°C ¹⁾
A 3005	5	89	6	-	-	710	645 - 815	- 60°C ¹⁾
A 3015	15	80	5	-	-	700	645 - 800	- 70°C
A 3018	18	75	6.35	-	-	670	645 - 666	- 70°C

¹⁾ checked by notched flexural impact tests acc. to EN 10045

The temperature resistance of brazing joints is furthermore depending on the construction (gap geometry) and on the base material to be brazed. If necessary a process examination should be made.

HVAC&R Product program (Choice of standard filler metals and Fluxes)

		Fontargen name	DIN 8513	AWS	EN 1044	ISO 17672 / DIN 1707 - 100	Working temperature (°C)	Melting range (°C)	Rods blank ⁽¹⁾	Rods flux- coated ⁽²⁾	
Group 1	Silver Brazing filler metals	A 319	L-Ag34Sn	-	AG 106	Ag 134	710	630 - 730	X	X	
		A 320	L-Ag45Sn	BAG-36	AG 104	Ag 145	670	640 - 680	X	X	
		A 330	L-Ag30	BAG-20	AG 204	Ag 230	750	680 - 765	X	X	
		A 340	L-Ag40Sn	BAG-28	AG 105	Ag 140	690	650 - 710	X	X	
		A 347	L-Ag56Sn	BAG-7	AG 102	Ag 156	650	620 - 655	X	X	
		A 350	-	BAG-24	-	Ag 450	690	660 - 705	X	X	
		A 390	L-Ag45	BAG-5	-	Ag 245	740	665 - 745	X	X	
Group 2	Copper-Phosphor-Silver-brazing filler metals	A 3002	L-Ag2P	BCuP-6	-	CuP 280	740	643 - 788	X		
		A 3005	L-Ag5P	BCuP-3	CP 104	CuP 281	710	645 - 815	X		
		A 3015	L-Ag15P	BCuP-5	CP 102	CuP 284	700	645 - 800	X	X	
		A 3018	L-Ag18P	BCuP-8	-	CuP 285	670	645 - 666	X		
	Copper-Phosphor-brazing filler metals	A 2003	L-CuP7	BCuP-2	CP 202	CuP 180	730	710 - 820	X		
		A 2004	L-CuP6	-	CP 203	CuP 179	760	710 - 890	X		
		A 2005	L-CuSnP7	-	CP 302	CuP 386	700	650 - 700	X	X	
		A 204	L-CuP8	-	CP 201	CuP 182	720	710 - 770	X		
	Alu filler metals	A 407L ⁽⁴⁾	L-ALSi12	BAISi-4	AL 104	Al 112	590	575 - 585	X		
		A 631 ⁽⁵⁾	-	-	-	S-Zn98Al2	-	430 - 440			
(1) Round and square on request for CuP fillers (2) Diverse flux coating factors (thin, Extra thin a.s.o.), as well as flexible and water based coatings are possible (3) Rings and sections are standard. Other geometries on request (4) Flux = F400 series (5) Flux = F600 ZA									Delivery form Pastes and powders on request		

	Foils	Wires	Preforms (3)	F300 - Series*	Characteristics	Applications
	X	X	X	X	Good corrosion resistance; Good flow characteristics; DVGW GW2 (suitable for the use in drinkable water)	HVACR; White goods; Compressors; Copper pipes installations; Food industry; Plumbing installations
	X	X	X	X	Good corrosion resistance; Very good flow characteristics; DVGW GW2 (suitable for the use in drinkable water); Suitable for the use in see water	HVACR; Cooling devices; Plate heat exchangers; Food industry; Electrical engineering; Measuring instruments; Plumbing installations; Suitable for CrNi base materials
	X	X	X	X	Good corrosion resistance; Good flow characteristics; Great color matching on brass	HVACR; White goods; Compressors; Plumbing engineering
	X	X	X	X	Good corrosion resistance; Good ductility; Good flow characteristics; Suitable for the use in see water	HVACR; White goods; Plate heat exchangers; Compressors; Electrical engineering; Plumbing installations
	X	X	X	X	Good corrosion resistance; Very good flow characteristics; Low temperature melting; Suitable for the use in see water	HVACR; Food industry; Electrical engineering; Measuring instruments; Plumbing installations; Medical instruments; Suitable for CrNi base materials
		X	X	X	Good corrosion resistance; High strength; Very good wetting properties on steel and hard metals; Good flow characteristics	For gap brazing of hard metals in combination with steel, tungsten, tantalum and molybdenum base materials.
	X	X	X	X	Very good flowing characteristics; Good corrosion resistance; DVGW GW2 (suitable for the use in drinkable water); Suitable for the use in see water	HVACR; Cooling devices; Plate heat exchangers; Copper pipes installations; Measuring instruments; Plumbing installations
		X	X	X	Good flow characteristics; Very good gap filling ability; DVGW GW2 (suitable for the use in drinkable water); Large gap (> 0.1 mm), Gap length (< 1 cm)	HVACR; White goods; Tubular joints; Heat exchangers (U-bogen); Heat pumps; Copper pipes installations
	X	X	X	X	Good electrical conductivity; Good ductility; Good flow characteristics; Large gap (> 0.1 mm), Gap length (< 1 cm)	HVACR; White goods; Electrical engineering; Plumbing installations (Gas water heaters); Heat pumps; Compressors
	X	X	X	X	Very good electrical conductivity; Good ductility a. strength; Good gap filling ability; Medium flow characteristics; Medium gap	HVACR; Electric motors (Renewable energies); Electric supplies; Components with medium gaps
		X	X	X	Very good electrical conductivity; High ductility; High strength; Very fluid; Narrow gaps (0.03 - 0.1mm), Gap length (> 1 cm)	HVACR; Hot water treatment; Water heaters; Suitable for components that are subject to vibrations and thermal fluctuations
		X	X	X	Very good flow characteristics; Medium/high fluidity; Large gap (> 0.1 mm), Gap length (< 1 cm)	HVACR; Copper pipes installations; Standard assemblies (Sleeves/Tubes/Flanges) with important gaps; Universal alloy for plumbing
		X	X	X	Very good flow characteristics; controlled fluidity; DVGW GW2 (suitable for the use in drinkable water); Large gap (> 0.1 mm), Gap length (< 1 cm)	HVACR; Copper pipes installations; Standard assemblies (Sleeves/Tubes/Flanges) with important gaps; Universal alloy for plumbing
		X	X	X	Good flow characteristics; Good gap-bridging ability; Very good wetting ability; electroplating of brazing joint possible; Narrow gap (0.03 - 0.1 mm), Gap length (> 1 cm)	HVACR; Step brazing; Heat exchangers; Copper pipes installations
		X		X	Excellent flow characteristics; High fluidity; Low temperature melting; Low ductility; Narrow gap (0.03 - 0.1 mm), Gap length (> 1 cm)	HVACR; Vibration free components; Especially used for wetting of large surfaces with narrow gaps
		X	X		Capillary active; Color matching with aluminum	HVAC vehicle; Heat exchangers Al/CrNi steel assemblies; For Aluminum base materials with Mg content < 3 % and Solidus temperature > 630°C
		X			Low temperature aluminum solder; brazing of aluminum since the temperature delta between base and filler metals is wider.	HVACR; Heat exchangers; Tube connections; Al/Al; Al/Cu und Al/CrNi assemblies
					Flux type - Not flux necessary for brazing Cu/Cu since CuP brazing alloys are "self-fluxing" on copper	

SILVER-CONTAINING BRAZING CONSUMABLES TO YOUR REQUIREMENTS

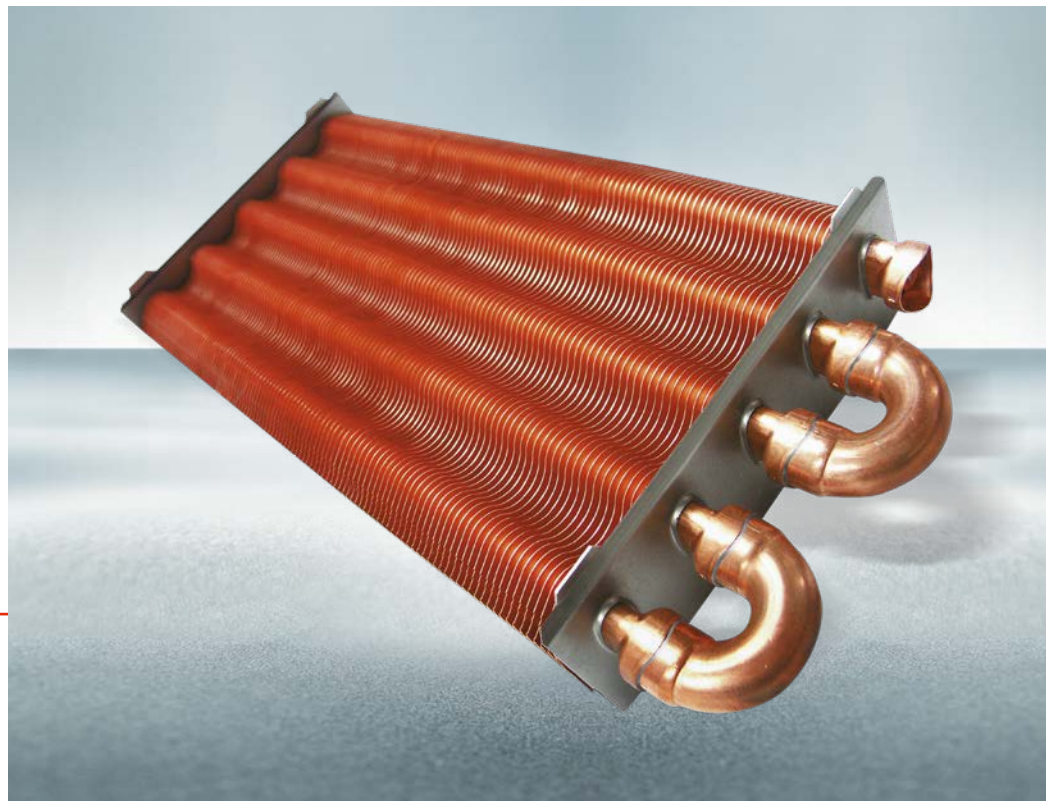
Through deep insight into processing methods and ways of application, Fontargen Brazing provides the best brazing and soldering solutions based on proven products with German technology.

China, Mexico, Middle East and Europe are the main markets for HVAC&R brazing. As a competent partner for brazing applications Fontargen Brazing serves customers in refrigeration, HVAC systems and vehicle air-conditioning as well as in the heat pump technology. The industry trends are taken into account in product selection and product development

- » Ongoing expansion of fast food chains with new equipments needed at smaller locations for cooling large volumes of food.
- » Market driven by the increase in frozen food consumption. Need to increase the cold chain quality in order to insure high hygiene standards.
- » Reduce production costs by optimizing brazing and post brazing processes
- » Avoid breakdown and loss of stocks and insure the concordance
- » Reliable compliance of all national legislations for food safety standards
- » Use of aluminum as new base material for micro-channels heat exchangers (HX)

Rely on a strong Partnership

Fontargen Brazing is involved in many global R&D projects, partnerships with HVAC&R manufacturers and networks. Fontargen Brazing provides the technical support for both developing the brazing process and choosing the appropriate alloys types and forms. Fontargen Brazing runs technical process optimization with the customer and support him in its new projects.



JOIN! voestalpine Böhler Welding

With over 100 years of experience, voestalpine Böhler Welding is the global top address for the daily challenges in the areas of joint welding, repair, hardfacing and cladding as well as brazing. Customer proximity is guaranteed by more than 43 subsidiaries in 25 countries, with the support of 2,300 employees, and through more than 2,000 distribution partners worldwide. With individual consultation by our application technicians and welding engineers, we make sure that our customers master the most demanding welding challenges. voestalpine Böhler Welding offers three specialized and dedicated brands to cater our customers' and partners' requirements.



Lasting Connections – As a pioneer in innovative welding consumables, Böhler Welding offers a unique product portfolio for joint welding worldwide. More than 2000 products are adapted continuously to the current industry specifications and customer requirements, certified by well-respected institutes and thus approved for the most demanding welding applications. As a reliable partner for customers, “lasting connections” are the brand’s philosophy in terms of both welding and people.



Tailor-Made Protectivity™ – UTP Maintenance ensures an optimum combination of protection and productivity with innovative and tailor-made solutions. Everything revolves around the customer and their individual requirements. That is expressed in the central performance promise: Tailor-Made Protectivity™.



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The Management System of voestalpine Böhler Welding Group GmbH, Peter-Mueller-Strasse 14-14a, 40469 Duesseldorf, Germany has been approved by Lloyd's Register Quality Assurance to: ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007, applicable to: Development, Manufacturing and Supply of Welding and Brazing Consumables. More information: www.voestalpine.com/welding



