EDITION 1

PANORAMA **OF BRAZING PRODUCTS**

- Complete programme (CuP-Ag, Ag, brass, Al, etc.)
- Control of the entire manufacturing process
- The last remaining brazing foundry in France
- Development of products according to customer specifications

Selectarc
BRAZING

FSH WELDING GROUP

INNOVATIVE WELDING CONSUMABLES

Innovation
Quality
Responsiveness
Customization
Flexibility

■ ■ ■

THE ONLY METAL FOUNDRY FOR BRAZING FILLER METALS IN FRANCE AND INVENTORS OF THE COPPER-PHOSPHORUS BRAZING TECHNOLOGIES!

The FSH Welding Group is striving to provide its customers with the full benefits of its extensive expertise. Since 1948, Reboud-Roche, the Group's manufacturer of brazing consumables, has consistently built recognised expertise, becoming one of the major industrial and distribution players in France. This "all-inclusive" entity comprises an R&D Department, the foundry, alloy processing units, packaging and customer service.

The impeccable quality and wide range of standard or custom-made products as well as its Quality Assurance System ensure strict compliance with customer specifications. Our goal is simple, yet ambitious: to continuously improve and achieve the full satisfaction of each of our clients.

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www.fsh-welding.com

CONTENTS

Selectarc
BRAZING

Since 1948, the Group's Brazing Division has developed brazing consumables under **"THE SELECTARC BRAZING BRAND NAME"**, building a widely recognized expertise and becoming a major industrial and distribution player in Europe and worldwide.

The production activities are located in the centre of Europe (at Roche-lez-Beaupré in Franche-Comté, FRANCE) and meet the highest quality standards and latest European directives.

PRODUCT QUALITY: our products are made using selected raw materials with a high level of purity. ISO 9001 Quality Assurance System: all our products are subjected to testing batteries, including thermal and spectrometric analysis, dimensional analysis and brazing tests.

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www.fsh-welding.com

The design of our products primarily targets enhancing the performance characteristics (quality, cost, etc.) of the products we provide to our customers!

INNOVATION IN PRODUCTION

★ **CONTROL OF THE ENTIRE MANUFACTURING PROCESS:** the full control of the manufacturing cycle, from the control of raw materials to finished products, has given us flexibility and versatility, enabling us to adapt to the requests of our customers.

★ **CLARIFICATION:** the melting points of our copper-phosphorus and copper-phosphorus-silver alloys are guaranteed within ±3°C by means of thermal analysis performed when preparing the alloy. Alloys prepared in this manner produce high consistency of oven brazing operations.

★ **INDUCTION MELTING:** this process guarantees excellent alloy homogeneity (obtained by bath stirring).

★ **CONTINUOUS CASTING OF ALL OUR PRODUCTS:** in contrast to static casting, this process offers the advantage of a very low level of impurities in the alloy!

★ **POSSIBILITY OF HIGH-PRECISION WIRE STRAIGHTENING:** ensuring the appropriate straightness for automatic rod insertion.

PRODUCTION FLEXIBILITY

Whether in standard or made-to-measure lengths and whether in the form of coils or spools of different types and weights or as preforms, "SELECTARC BRAZING" meets all your needs!

★ A wide range of bare and flux-coated rods in different colours corresponding to different percentages of flux coating, etc. *(see p.55)*.

PRODUCT INNOVATION R&D - LABORATOIRES

Always sensitive to market developments and listening to the needs of customers, the R&D department is striving to provide the best solutions to our partners:

★ Meet specific requirements, prepare customer specifications, integrate customer constraints (quality, productivity, implementation requirements, etc.) and develop alloys and product shapes adapted to the specific needs of each application.

★ Apply our expertise to different areas of application with the goal of improving the manufacturing processes of our customers. Improvement areas, such as testing, production trials, joining quality or reducing the rate of rejects, are defined together.

We have recently developed two highly innovative products offering you high added value in production:

★ **TUBULAR BRAZING WIRE (TBW):** a unique innovative technology offering great convenience of use thanks to its binder-free embedded flux, providing unparalleled economic benefits. This technology is suitable for aluminium and silver alloys and enables automation of the manufacturing processes *(the full advantages of these products are described in the brochure "Tubular Brazing Wire-TBW" at: www.fsh-welding.com/documents-pour-le-brasage.htm).*

★ **TOTAL BRAZING MIX™ (TBM)** is a unique self-fluxing high-precision patented technology suitable for aluminium alloys that enables quantity control and produces workpieces with improved cleanliness.

SERVICES

Fast response, specific manufacturing, laboratory brazing tests, technical and technical-sales training.

OUR INDUSTRY FOCUS:

- HEATING AND VENTILATION
- AIR CONDITIONING, DOMESTIC AND INDUSTRIAL REFRIGERATION SYSTEMS
- AUTOMOBILE INDUSTRY
- PLUMBING AND SANITARY FACILITIES
- RENEWABLE ENERGY, SOLAR PANELS
- CARBIDE AND DIAMOND TIPPED TOOLS
- MEASURING AND CONTROL DEVICES
- ELECTRO-MECHANICAL CONSTRUCTIONS
- TUBULAR STRUCTURES

OVERVIEW

BRAZING

Brazing is a joining method whereby the metallic continuity of the base metals is provided by a filler metal whose melting point (liquidus) is lower than that of the metals being joined. The filler metal penetrates in-between the joined surfaces by capillary action.

Brazing is an easy, economical, reliable and proven joining solution. Brazing allows joining metals of different types, such as: copper, brass, steel, stainless steel, aluminium, etc.

It should be noted that, unlike welding, the base metals do not melt. Brazing is very widely used as a joining technique in all industries.

The type of process is selected according to:

- Type of metals to be joined,
- Size and geometry of the joints,
- Mechanical stresses,
- Thermal stresses,
- Clearance between workpieces (at brazing temperature),
- Cleanliness of the workpieces,
- Heating method,
- Aesthetic requirements of the joint,
- Regulatory constraints (food industry, gas industry, etc.),
- Mechanical strength and vibration resistance,
- Electrical conductivity.

BRAZE-WELDING

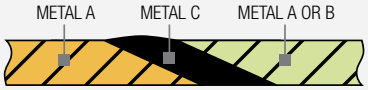
Braze-welding is a hard brazing method whereby the braze-welded joint is butt welded by a method that is similar to fusion welding, but without capillary action as in brazing, and without melting the base metals.

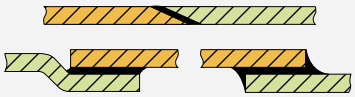
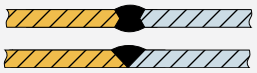
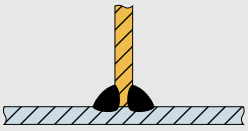
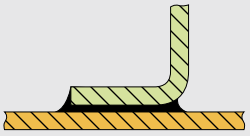
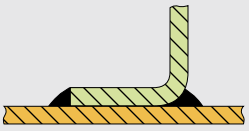
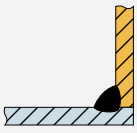
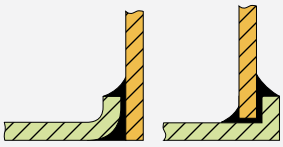
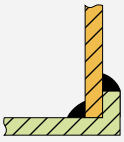
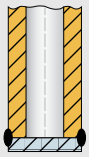
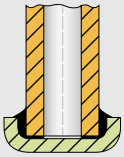
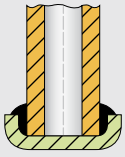
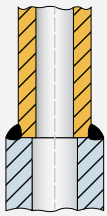
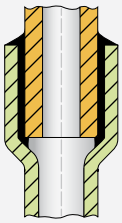
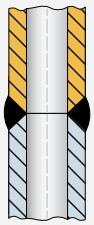
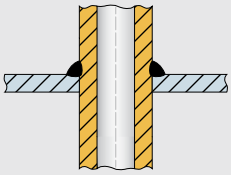
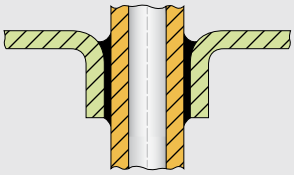
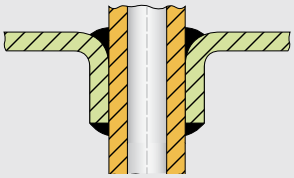
Braze-welding is generally preferable to autogenous welding for joining steels of questionable grades or poor weldability.

This is a particularly economical joining method enabling significantly faster performance than the permissible speed of autogenous welding for certain Thicknesses.

OVERVIEW

JOINT PREPARATION TECHNIQUES
FOR WELDING AND BRAZING

WELDING: permanent joining of two or more parts that ensures continuity of the material between the parts.	BRAZING: the joint is ensured by the fundamental phenomena of wetting, diffusion and capillary action. Joint characteristics are determined by the utilised filler metal, the base metals, the hot clearances and the heating method. Properly defining and controlling all these elements will ensure good flow of the filler metal into the joint. Brazing preserves the dimensional integrity of workpieces.
	

TYPE OF WELDS	WELDED JOINTS	BRAZED JOINTS	BRAZE-WELDED JOINTS
▪ **SQUARE BUTT JOINT**			
▪ **T-JOINT**			
▪ **ANGLE JOINT**			
▪ **TUBE CAPPING**			
▪ **TUBE JOINING**			
▪ **TUBE SHEET METAL JOINING**			

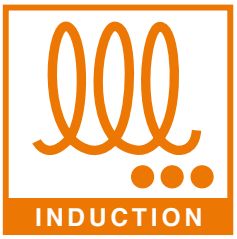
MAIN ADVANTAGES OF BRAZING COMPARED TO WELDING:

- The main advantage of brazing lies in the ability to assemble metals that are completely dissimilar, which is not always possible by welding.
- Another advantage lies in the used temperatures. The temperature required for joining parts using brazing is usually 650 °C to 1150 °C, which is much lower than the temperatures required for welding.
- The problems encountered when welding construction steel workpieces with a high content of carbon, nitrogen, phosphorus and sulphur are completely unknown in brazing and there are no traces of oxide scale (calamine) on the bead.

DIFFERENT HEATING METHODS

OXYACETYLENE FLAME

- The oxyacetylene flame is based on a mix of two gases: oxygen and acetylene, which can be used to produce high temperatures flame.
- Brazing using this type of torch is widely used and is suitable for most applications.

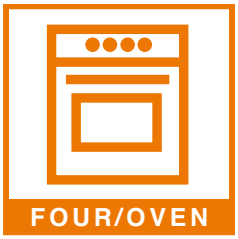


INDUCTION

- Induction brazing is a method mainly used in automation and/or for joints where a precise and fast heating method is sought.

AIR-PROPANE FLAME

- Air-propane torches can be easily obtained and are very cheap.
- Unlike the oxyacetylene torch, air-propane torches use the oxygen in the surrounding air, so the temperature generated by this combustion process provides less energy and therefore lower temperatures flame.
- Accordingly, the type of brazing alloy must be carefully chosen (melting point less than or equal to 730 °C) and requires validation testing.



OVEN BRAZING

- Oven brazing is a method used for processing a large series of parts in a continuous oven or for producing individual pieces of high technical complexity in a vacuum oven.

TEMPERATURES
OF THE DIFFERENT TYPES OF FLAME

▪ FLAMES

The flames used for brazing are produced by a mixture of combustible gases (acetylene, hydrogen, propane, etc.) with oxygen, a gas that activates combustion.

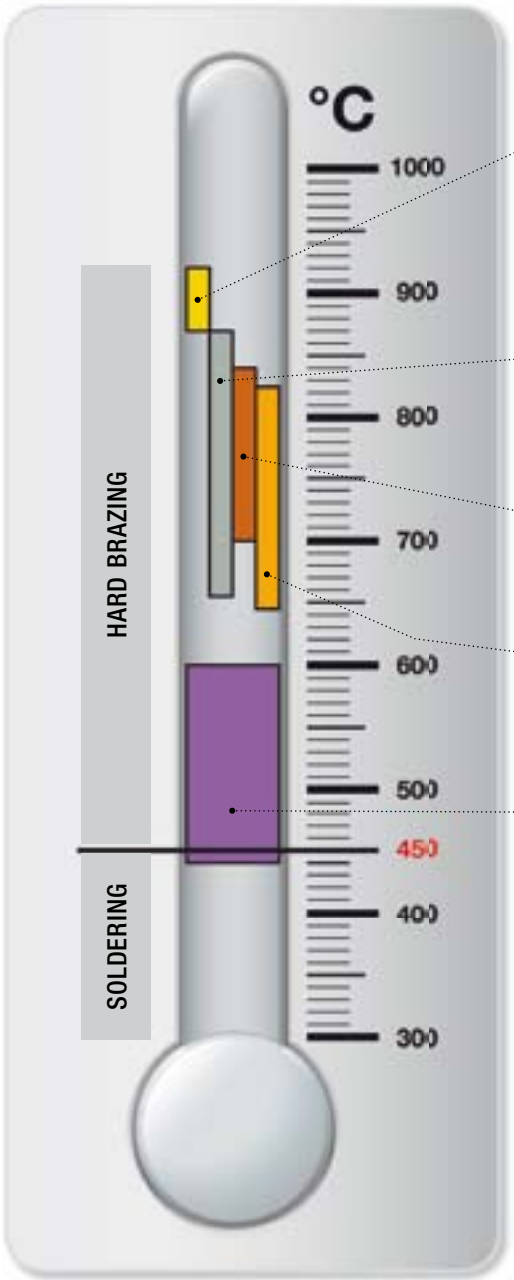
▪ FLAMES ADJUSTMENT

The oxy-acetylene flame is obtained from a mixture of acetylene and oxygen in proportions that determine its properties (normal, oxidising or carburising flame). At the same time, a nozzle that is suitable for the processed Thickness must also be considered.

Type of flame	Combustion temperature (°C)
Oxyacetylene flame	3100
Oxy-propylene flame	2870
Oxy-propane flame	2830
Oxy-domestic gas flame	2800
Oxy-natural gas flame	2770
Air-acetylene flame	2400
Air-propane flame	1980
Air-natural gas flame	1750

OVERVIEW

TEMPERATURE RANGES OF OUR BRAZING ALLOYS



TEMPERATURES BETWEEN 870-920 °C

NICKEL SILVER ALLOYS

NICROX, 506, SUPER-NICROX

BRASS

CUPROX®, SUPER-CUPROX

TEMPERATURES BETWEEN 655-870 °C

SILVER ALLOYS

BRAZARGENT® 1500	BETWEEN 735-870 °C
BRAZARGENT® 5000	BETWEEN 655-750 °C

TEMPERATURES BETWEEN 700-840 °C

CuP ALLOYS

PHOSBRAZ®...

TEMPERATURES BETWEEN 645-825 °C

CuP-Ag ALLOYS

PHOSBRAZ®...

TEMPERATURES BETWEEN 440-600 °C

ALUMINIUM ALLOYS

ZINAL 4, AL12, HARASIL NC 12, TBM 12 NCs

- **Hard brazing:** brazing procedure wherein the joint, usually a capillary (film-type) joint, is obtained using a filler metal having a melting temperature (liquidus) above 450 °C (silver, copper or aluminium alloys).

- **Soldering:** brazing procedure where the melting temperature (liquidus) of the filler metal is lower than 450 °C (filler metal: lead + tin, tin + silver).

DISCOVER OUR FULL RANGE OF ALTERNATIVE CADMIUM-FREE PRODUCTS!

PROHIBITION OF THE USE OF CADMIUM
IN FILLER METALS FOR BRAZING

BRAZING ALLOYS CONTAINING CADMIUM HAVE BEEN PROHIBITED IN THE EUROPEAN UNION SINCE DECEMBER 2011 (COMMISSION REGULATION (EU) N°. 494/2011) AND THEIR USE IS NO LONGER ALLOWED.

CRITERIA FOR SELECTING A FILLER METAL SUBSTITUTE

1 1st choice: an alloy that is equivalent to the cadmium-containing alloy

2 2nd choice: a different possible substitute alloy

CADMIUM-CONTAINING ALLOYS (Cd)		OUR RANGE OF ALTERNATIVE CADMIUM-FREE PRODUCTS			
ALLOY	Melting temperature (°C)	1st choice: AN EQUIVALENT ALLOY	Melting temperature (°C)	2nd choice: A SUBSTITUTE ALLOY	Melting temperature (°C)
■ BRAZARGENT 2017	610-780	1 BRAZARGENT 1520 Si	690-810	-	-
■ BRAZARGENT 2020	610-780	1 BRAZARGENT 5025	680-760	2 BRAZARGENT 1520 Si	690-810
■ BRAZARGENT 2021	610-750	1 BRAZARGENT 5030	665-755	2 BRAZARGENT 5025	680-760
■ BRAZARGENT 2025	605-720	1 BRAZARGENT 5034	630-730	2 BRAZARGENT 5030	665-755
■ BRAZARGENT 2030	610-690	1 BRAZARGENT 5040	650-710	2 BRAZARGENT 5034	630-730
■ BRAZARGENT 2034	610-670	1 BRAZARGENT 5045	640-680	2 BRAZARGENT 5038	660-700
■ BRAZARGENT 2035	610-700	1 BRAZARGENT 5045	640-680	2 BRAZARGENT 5040	650-710
■ BRAZARGENT 2040	595-630	1 BRAZARGENT 5055 or 1 BRAZARGENT 5056	630-660 620-655	2 BRAZARGENT 5045	640-680
■ BRAZARGENT 2042	610-620	1 BRAZARGENT 5056 or 1 BRAZARGENT 5055	620-655 630-660	2 BRAZARGENT 5045	640-680
■ BRAZARGENT 2045	605-620	1 BRAZARGENT 5056	620-655	2 BRAZARGENT 5055	630-660
■ BRAZARGENT 2050	625-635	1 BRAZARGENT 5056	620-655	2 BRAZARGENT 5055	630-660
■ BRAZARGENT 2550	635-660	1 BRAZARGENT 3049+	680-705	-	-

For further inShapeation, please contact our Technical Department: ***brazing@fsh-welding.com***

CLASSIFICATION & STANDARDS

COPPER-PHOSPHORUS ALLOYS

	Type	Shape	Main characteristic	Melting range (°C)	Classification			
		Bare			EN ISO 17672	AWS A5.8	DIN 8513	
MANUAL BRAZING	**PHOSBRAZ M60**	x	Special purpose - Pitting	710-860	CuP 179	-	L-Cu P6	p 19
	PHOSBRAZ V6	x	Special purpose - Pitting	710-845	CuP 179	-	L-Cu P6	p 19
	PHOSBRAZ P66	x	Intermediate alloy	710-825	CuP 180	-	L-Cu P6	p 19
	PHOSBRAZ P68	x	Intermediate alloy	710-815	CuP 180	-	L-Cu P7	p 19
	PHOSBRAZ M70	x	Capillary brazing	710-860	CuP 180	B Cu-P 2	L-Cu P7	p 20
	PHOSBRAZ M73	x	Controlled fluidity	710-785	CuP 181	B Cu-P 2	L-Cu P7	p 20
	PHOSBRAZ E80	x	High fluidity	710-750	CuP 182	-	L-Cu P8	p 20
	PHOSBRAZ E80+	x	Very high fluidity	710-738	CuP 182	-	L-Cu P8	p 20
	PHOSBRAZ 675Sn	x	Very high fluidity - Copper and tin alloy	650-700	CuP 385	B CuP-9	-	p 20

COPPER-PHOSPHORUS ALLOYS - OVEN BRAZING

	Type	Shape	Main characteristic	Melting range (°C)	Classification			
		Bare			EN ISO 17672	AWS A5.8	DIN 8513	
OVEN BRAZING	**PHOSBRAZ 840**	x	Oven brazing - High temperature	710-840	CuP 179	-	L-Cu P6	p 21
	PHOSBRAZ 815	x	Oven brazing - Medium fluidity	710-815	CuP 180	-	L-Cu P7	p 21
	PHOSBRAZ 790	x	Oven brazing - Medium fluidity	710-790	CuP 181	B Cu-P 2	L-Cu P7	p 22
	PHOSBRAZ 770	x	Oven brazing - High fluidity	710-770	CuP 182	B Cu-P 2	L-Cu P7	p 22
	PHOSBRAZ 750	x	Oven brazing - Very high fluidity	710-750	CuP 182	-	L-Cu P8	p 22
	PHOSBRAZ 738	x	Oven brazing - Very high fluidity	710-738	CuP 182	-	L-Cu P8	p 22

SILVER-COPPER-PHOSPHORUS ALLOYS

	Type	Shape		Main characteristic	Melting range (°C)	Classification			
		Bare	Coated			EN ISO 17672	AWS A5.8	DIN 8513	
	PHOSBRAZ M68	x		CuP Ag / 0,2 % Ag	710-815	-	-	-	p 25
	PHOSBRAZ AG4	x		CuP Ag / 0,4 % Ag	650-825	-	-	-	p 25
	PHOSBRAZ AG10	x		CuP Ag / 1 % Ag	650-820	-	-	-	p 25
	PHOSBRAZ AG20	x		CuP Ag / 2 % Ag	650-820	CuP 279	-	L-Ag 2 P	p 25
	PHOSBRAZ AG20+	x		Copper multipurpose / 2 % Ag	650-800	CuP 280	BCuP-6	-	p 25
	PHOSBRAZ AG50	x		CuP Ag / 5 % Ag	650-810	CuP 281	BCuP-3	L-Ag 5 P	p 26
	PHOSBRAZ AG50+	x		Special purpose: cold - vibrations / 5 % Ag	650-770	CuP 282	BCuP-7	-	p 26
	PHOSBRAZ AG60	x	x	Copper piping / 6 % Ag, + Ni NEW	650-720	CuP 283a	-	-	p 26
	PHOSBRAZ AG61	x		Copper piping / 6 % Ag - AWS NEW	643-718	CuP 283	BCuP-4	-	p 26
	PHOSBRAZ AG100	x	x	Copper brass joints / 10 % Ag NEW	650-750	-	-	-	p 26
	PHOSBRAZ AG150	x		Copper brass joints / 15 % Ag	650-800	CuP 284	BCuP-5	L-Ag 15 P	p 27
	PHOSBRAZ AG180	x		CuP Ag (Copper piping) / 18 % Ag	645	CuP 286	-	L-Ag 18 P	p 27
	PAG 60	x		Combustible gas installations / 6 % Ag	645-725	**NF A81-362:** CuP 291			p 27

BRAZE-WELDING ALLOYS

	Type	Shape		Main characteristic	Melting range (°C)	Classification			
		Bare	Coated			EN ISO 17672	AWS A5.8	DIN 8513	
	CUPROX	x	x	Bonding and repair of stainless steel, copper or cast iron	870-890	~Cu 471	~RCu-Zn C	L CuZn40	p 28
	SUPER-CUPROX	x	x	Braze-welding alloy / 1 % Ag	850-870	**EN ISO 3677:** B Cu 59 Zn Ag Si 850-870			p 28
	506	x	x	Braze-welding alloy with nickel	890-900	**EN ISO 3677:** B Cu 50 Zn Si 890-900			p 29
	NICROX 49 C1	x	x	High strength braze-welding	890-920	Cu 773	Rcu-Zn D	L CuNi10Zn42	p 29
	SUPER-NICROX	x	x	High strength braze-welding / 1 % Ag	870-900	**EN ISO 3677:** B Cu 48 Zn Ni Ag Si 870-900			p 29

Certification of the Technical Association of the Gas Industry in France (ATG)

Filler alloys and brazing fluxes used for bonding natural gas and propane piping require the approval of the French Gas Association (AFG). Products that meet these criterias are identified by the above symbol.

SILVER ALLOYS

	Type	Shape			Main characteristic	Melting range (°C)	Classification			
		Bare	Coated	TBW			EN ISO 17672	AWS A5.8	DIN 8513	
TERNARY ALLOYS	**BRAZARGENT 1505**	x	x		Ternary alloys / 5 % Ag	820-870	Ag 205	-	L-Ag 5	p 32
	BRAZARGENT 1520 Si	x	x		Economical, all joints (except for Al)	690-810	-	-	L-Ag 20	p 32
	BRAZARGENT 1535	x	x		Ternary alloys / 35 % Ag	685-755	Ag 235	BAg-35	-	p 32
	BRAZARGENT 1544	x	x		Ternary alloys / 44 % Ag	675-735	Ag 244	-	L-Ag 44	p 32
QUATERNARY ALLOYS	**BRAZARGENT 5018**	x	x		Cadmium free / 18 % Ag	720-790	-	-	-	p 33
	BRAZARGENT 5025	x	x		Cadmium free / 25 % Ag	680-760	~Ag 125	BAg-37	L-Ag 25 Sn	p 33
	BRAZARGENT 5030	x	x		Cadmium free / 30 % Ag	665-755	~Ag 130	-	L-Ag 30 Sn	p 33
	BRAZARGENT 5034	x	x	x	Cadmium free / 34 % Ag	630-730	~Ag 134	-	L-Ag 34 Sn	p 33
	BRAZARGENT 5038	x	x		Cadmium free / 38 % Ag	660-700	~Ag 138	BAg-34	-	p 34
	BRAZARGENT 5040	x	x	x	Universal Ag brazing metal (except for Al)	650-710	~Ag 140	BAg-28	L-Ag 40 Sn	p 34
	BRAZARGENT 5045	x	x	x	Cadmium free / 45 % Ag	640-680	~Ag 145	BAg-36	L-Ag 45 Sn	p 34
	BRAZARGENT 5055	x	x		Cadmium free / 55 % Ag	630-660	~Ag 155	-	L-Ag 55 Sn	p 34
	BRAZARGENT 5056	x	x	x	Superior mechanical characteristics	620-655	~Ag 156	BAg-7	-	p 35
	BRAZARGENT 5000	x			Combustible gas installations / 40 % Ag	650-710	~Ag 140 according to ATG B.524-3 certification			p 35
	BRAZARGENT 3049+	x	x		High strength NEW	680-705	Ag 449	BAg-22	L-Ag 49	p 35

ALUMINIUM ALLOYS

	Type	Shape			Main characteristic	Melting range (°C)	Classification		
		Bare	TBM	TBW			Composition	EN ISO 17672	
SOLID WIRE	**ZINAL 4**	x		x	For joining dissimilar materials Cu / Al	377-385	98 % Zn - 2 % Al	-	p 36
	AL12	x			Al / Al joints	575-585	88 % Al - 12 % Si	Al 112	p 36
TBW / TBM WIRE	**ZINAL 4 TBW**	x		x	For joining dissimilar materials Cu / Al (flux and metal)	385-420	98 % Zn - 2 % Al	-	p 37
	HARASIL NC 12* TBW			x	Al / Al joints (flux and metal)	575-585	88 % Al - 12 % Si	Al 112	p 37
	TBM 12 NCs*		x		Al / Al joints (flux and metal mix)	575-585	88 % Al - 12 % Si	Al 112	p 37

* Non-corrosive flux.

BRAZING FLUXES

Type	Shape		Main characteristic	Melting range (°C)	Classification	
	Powder	Paste			NF EN 1045	
AGFLUX AGFLUX (Paste) ATG Certification No.1530 and 1598	x	x	For silver brazing / Boric acid-free flux	500-800	FH10	p 38
BORINOX	x	x	For steel brazing	500-800	FH10	p 38
POLYFLUX	x	x	For braze-welding	800-1000	FH20	p 38
FLUX ODAL	x		For aluminium	450-550	FL10	p 39
ALUNOX NC	x		For aluminium / Non-corrosive flux / AL12	560-570	FL20	p 39
ALUNOX NCs	x		For aluminium / Non-corrosive flux / ZINAL 4	420-450	FL20	p 39

MAINTENANCE AND REPAIR ALLOYS

Type	Shape		Main characteristic	Working temperature (°C)	
	Coated	TBW			
SELECTARC G810	x		Special purpose: copper / copper and copper / brass	710	p 40
SELECTARC G820	x		Brazing of dissimilar materials	650	p 40
SELECTARC G830	x		Special purpose: cast Iron	890	p 40
SELECTARC G840		x	Aluminium / copper	440	p 40
CUBRA	x		Special purpose: copper / brass NEW	730	p 40

HOW TO CHOOSE?

PRODUCTS SELECTION
ACCORDING TO THE BASE METALS

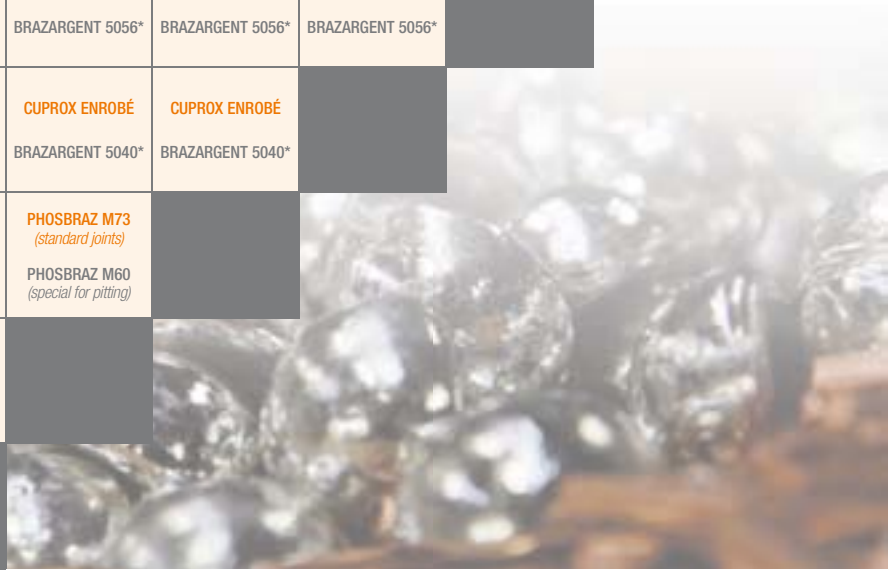
PRODUCTS COMPLIANT WITH THE RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE (**RoHS**)

WE CAN CREATE ALLOYS ACCORDING TO YOUR SPECIFICATIONS!
JUST CONTACT US!

1st **"STANDARD"** CHOICE:
The best solution in terms of performance-cost ratio.

2nd CHOICE **"TECHNICAL PERFORMANCE"**:
The solution that provides ease of implementation and optimum final result.

BASE METALS	STEEL	ALUMINIUM	COPPER	CAST IRON (PREHEATING AND SLOW COOLING)	STAINLESS STEEL	BRASS	GALVANISED STEEL	NICKEL
NICKEL	BRAZARGENT 5040* BRAZARGENT 5056*	-	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5040* BRAZARGENT 5056*	CUPROX ENROBÉ BRAZARGENT 1520Si*	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5040* BRAZARGENT 5056*
GALVANISED STEEL	CUPROX ENROBÉ BRAZARGENT 1520Si*	ZINAL 4 TBW	CUPROX ENROBÉ BRAZARGENT 5034*	CUPROX ENROBÉ BRAZARGENT 5034*	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5034* BRAZARGENT 5040*	CUPROX ENROBÉ BRAZARGENT 5034*	
BRASS	BRAZARGENT 5034* BRAZARGENT 5040*	ZINAL 4 TBW	PHOSBRAZ AG100 ENROBÉ BRAZARGENT 5034*	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5040* BRAZARGENT 5056*	PHOSBRAZ AG100 ENROBÉ BRAZARGENT 5034*		
STAINLESS STEEL	BRAZARGENT 5040* BRAZARGENT 5056*	ZINAL 4 TBW	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5040* BRAZARGENT 5056*	BRAZARGENT 5040* BRAZARGENT 5056*			
CAST IRON (PREHEATING AND SLOW COOLING)	CUPROX ENROBÉ BRAZARGENT 5040*	-	CUPROX ENROBÉ BRAZARGENT 5040*	CUPROX ENROBÉ BRAZARGENT 5040*				
COPPER	CUPROX ENROBÉ BRAZARGENT 1520Si*	ZINAL 4 TBW	PHOSBRAZ M73 *(standard joints)* PHOSBRAZ M60 *(special for pitting)*					
ALUMINIUM	ZINAL 4 TBW	HARASIL NC 12 TBW TBM 12 NCs						
STEEL	CUPROX ENROBÉ BRAZARGENT 1520Si*							



Ref. *: for use in conjunction with our AGFLUX flux, or in the Shape of flux coated rods or TBW.
Ref.: embedded flux of self-fluxing alloy.

OUR PRODUCTS

COPPER-PHOSPHORUS ALLOYS
COPPER-PHOSPHORUS ALLOYS OVEN BRAZING
SILVER-COPPER-PHOSPHORUS ALLOYS
BRAZE-WELDING ALLOYS
SILVER ALLOYS
ALUMINIUM ALLOYS
BRAZING FLUXES
MAINTENANCE AND REPAIR ALLOYS






CuP ALLOYS

RoHS 2002/95/EC

+ PRODUCT ADVANTAGES: the phosphorus present in copper-phosphorus alloys renders the alloy self-fluxing on red coppers. These products are primarily intended for copper-copper and copper-brass joints using brazing flux.

- Their main use is for fluid conveyance piping systems made of copper.

PHOSBRAZ® is a registered trademark designating the most comprehensive range of phosphorus alloys of REBOUD-ROCHE.
PHOSBRAZ® alloys are exclusively intended for work with copper and copper alloys.

THE MELTING POINTS OF OUR ALLOYS ARE GUARANTEED WITHIN ±3°C, WHICH ENSURES THE CONSISTENCY OF YOUR BRAZING OPERATIONS.

Unlike most of the alloys listed in this catalogue, our PHOSBRAZ® products are sufficiently fluid to enable brazing at temperatures well below liquidus.

PHOSBRAZ M60
★ Semi-solid alloys
★ Large clearances up to 2 mm

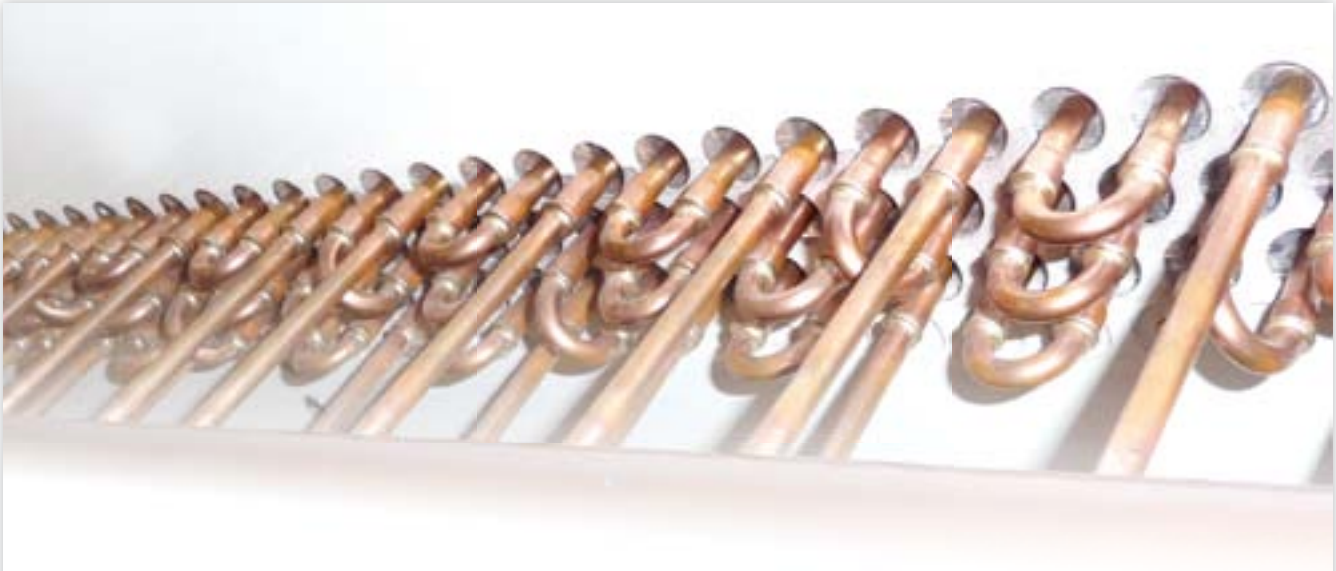
PHOSBRAZ M73
★ Standard fluidity
★ Standard clearances

PHOSBRAZ E80+
★ High fluidity
★ Very tight clearances

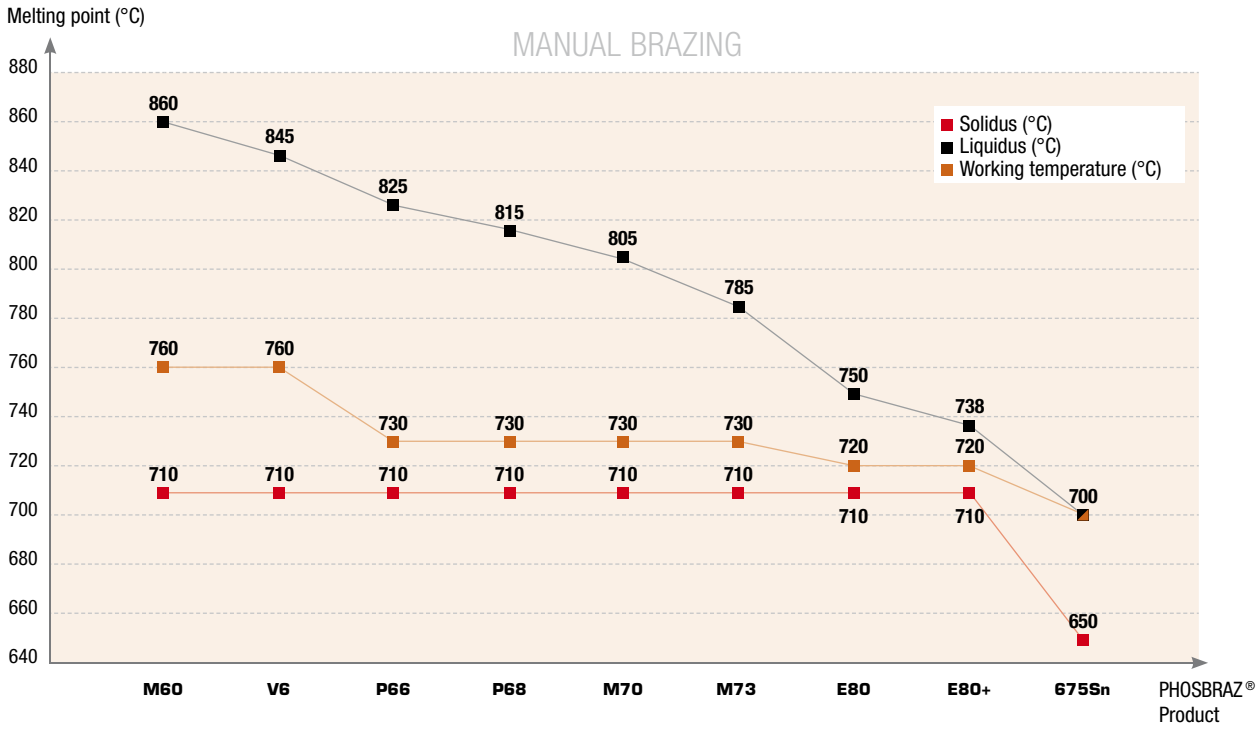
CHOICE

SELECTION CRITERIA - FLUIDITY OF THE CuP ALLOY RANGE

Reference	Fluidity		Characteristics
PHOSBRAZ E80+ PHOSBRAZ 675Sn	VERY HIGH FLUIDITY	💧💧💧💧💧	These alloys melt at low temperature. Joints with very small clearances.
PHOSBRAZ E80	HIGH FLUIDITY	💧💧💧💧	These alloys melt at low temperature. Joints with very small clearances.
PHOSBRAZ M70 PHOSBRAZ M73	GOOD FLUIDITY	💧💧💧	These grades are used for brazing of couplings and connectors. Standard clearances.
PHOSBRAZ P66 PHOSBRAZ P68	INTERMEDIATE ALLOYS	💧💧	Brazing of joints in position.
PHOSBRAZ M60 PHOSBRAZ V6	SEMI-SOLID ALLOYS	💧	Recommended for tube-assembly by pitting.



SELECTION CRITERIAS - MELTING POINT / WORKING TEMPERATURE

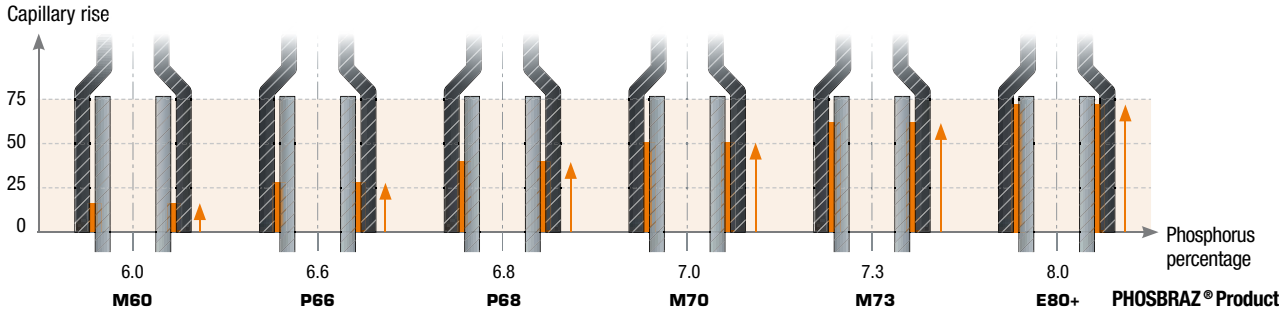


	Type	Technical characteristics					Chemical composition		
		Solidus (°C)	Liquidus (°C)	Working temperature (°C)	Rm (MPa)	A (%)	P (%)	Sn (%)	Cu (%)
MANUAL BRAZING	**PHOSBRAZ M60**	710	860	760	550	6	6	-	Balance
	PHOSBRAZ V6	710	845	760	550	5	6.3	-	Balance
	PHOSBRAZ P66	710	825	730	500	4	6.6	-	Balance
	PHOSBRAZ P68	710	815	730	450	4	6.8	-	Balance
	PHOSBRAZ M70	710	805	730	450	4	7	-	Balance
	PHOSBRAZ M73	710	785	730	450	4	7.3	-	Balance
	PHOSBRAZ E80	710	750	720	450	3	7.8	-	Balance
	PHOSBRAZ E80+	710	738	720	400	2	8	-	Balance
	PHOSBRAZ 675Sn	650	700	700	350	2	6.75	7	Balance

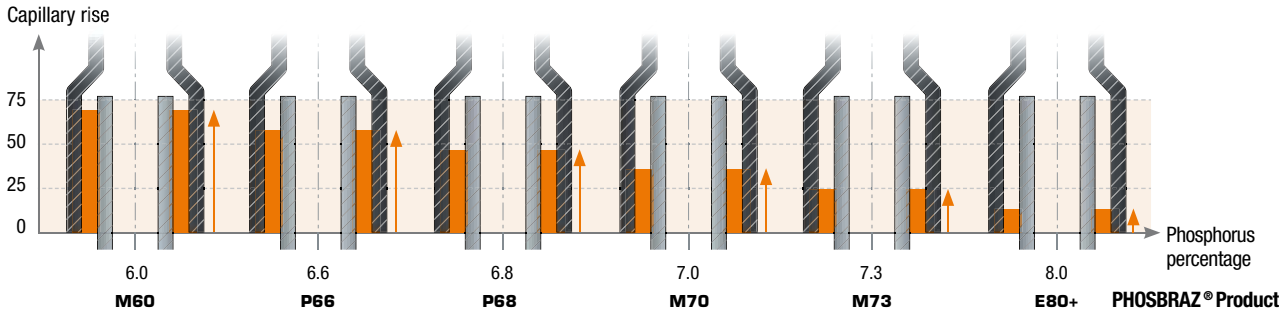
FIGURATIVE REPRESENTATION OF THE CAPILLARY ACTION OF PHOSBRAZ® (CuP) ALLOYS

Capillarity characterises the overall phenomena defining the behaviour of liquids in very narrow tubes and, more generally, situations where a separation surface meets a solid wall.

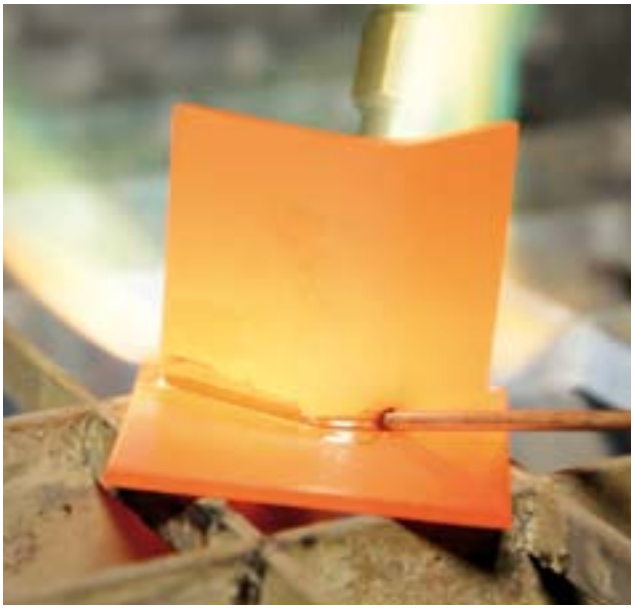
IN THE CASE OF SMALL CLEARANCES (such as < 0,05 mm)

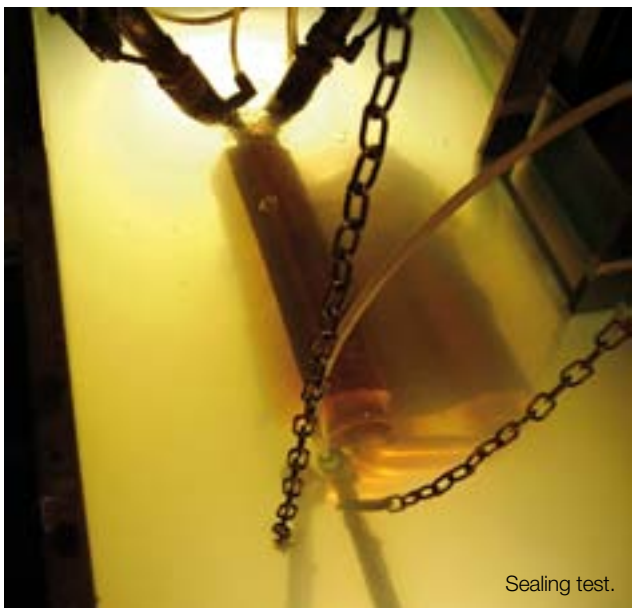


IN THE CASE OF LARGE CLEARANCES (such as > 1 mm)



Non-contractual drawings.





Sealing test.

MANUAL BRAZING

PHOSBRAZ M60

SPECIAL PURPOSE - PITTING

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 179	Solidus	710	760	P	6	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	860		Cu	Balance	A (%)	6					
DIN 8513	L-Cu P6						d (g/cm)	8.1					

PHOSBRAZ M60 with 6 % phosphorus content is a thick alloy that allows brazing of tappings with large clearances. By maintaining this alloy in a viscous state during heating, you can build bridges between two walls located at a distance of 1 to 2 mm.

▪ **APPLICATIONS: Brazing of copper-copper connecting pipes. Plumbing.**

PHOSBRAZ V6

SPECIAL PURPOSE - PITTING

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 179	Solidus	710	760	P	6.3	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	845		Cu	Balance	A (%)	5					
DIN 8513	L-Cu P6						d (g/cm)	8.1					

PHOSBRAZ V6 with 6.3 % phosphorus content is a thick alloy, which can therefore be used for pitting involving large clearances. By maintaining this alloy in a thick state during heating, you can build bridges between two walls located at a distance of 1 to 2 mm.

▪ **APPLICATIONS: Brazing of copper-copper connecting pipes. Plumbing.**

PHOSBRAZ P66

INTERMEDIATE ALLOY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 180	Solidus	710	730	P	6.6	Rm (MPa)	500	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	825		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P6						d (g/cm)	8.1					

PHOSBRAZ P66 with 6.8 % phosphorus content, is a medium fluidity alloy that enables to work on joints with poorly controlled clearances between 0.5 mm and 1 mm.

▪ **APPLICATIONS: Brazing of copper-copper connecting pipes. Plumbing.**

PHOSBRAZ P68

INTERMEDIATE ALLOY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 180	Solidus	710	730	P	6.8	Rm (MPa)	450	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	815		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm)	8					

PHOSBRAZ P68, with 6.8 % phosphorus content, is an alloy with “standard fluidity”, enabling to work on joints with standard clearances but of poor quality, which allow variations of tolerances (such as, cheaply done plumbing connecting pipes). Allows brazing parts with clearances of up to 1 mm.

▪ **APPLICATIONS: Copper-copper connections. Plumbing.**

COPPER-PHOSPHORUS ALLOYS

PHOSBRAZ M70

CAPILLARY BRAZING

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 180	Solidus	710	730	P	7	Rm (MPa)	450	Bare	✓	✓	-	-
AWS A5.8	B Cu-P 2	Liquidus	805		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm)	8					

PHOSBRAZ M70 with 7 % phosphorus content is an alloy with "standard fluidity", enabling good capillary brazing according to best industry practices. Recommended for brazing pipes and connections, water heaters and cooling systems.

▪ **APPLICATIONS: Copper-copper and copper-brass connections. Plumbing, heating.**

PHOSBRAZ M73

CONTROLLED FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 181	Solidus	710	730	P	7.3	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	B Cu-P 2	Liquidus	785		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm)	8					

PHOSBRAZ M73 with 7.3 % phosphorus content is an alloy with "standard fluidity", enabling good capillary brazing according to best industry practices. Compared to M70, the PHOSBRAZ M73 alloy has slightly better fluidity, so that working on joints with high-quality clearances is even more convenient.

▪ **APPLICATIONS: For brazing copper-copper pipes and connections, water heaters and cooling systems. Plumbing, heating.**

PHOSBRAZ E80

HIGH FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	720	P	7.8	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus	750		Cu	Balance	A (%)	3					
DIN 8513	L-Cu P8						d (g/cm)	8					

PHOSBRAZ E80 with 7.8 % phosphorus content is a high fluidity alloy, which enables to work on joints with clearances below 0.5 mm using relatively low brazing temperatures.

▪ **APPLICATIONS: Copper-copper and copper-brass connections. Plumbing.**

PHOSBRAZ E80+

VERY HIGH FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	720	P	8	Rm (MPa)	400	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus	738		Cu	Balance	A (%)	2					
DIN 8513	L-Cu P8						d (g/cm)	8					

PHOSBRAZ E80+ with 8 % phosphorus content is a very high fluidity alloy enabling to work on joints with clearances below 0.5 mm using relatively low brazing temperatures below those required for PHOSBRAZ E80.

▪ **APPLICATIONS: Copper-copper and copper-brass connections. Plumbing.**

PHOSBRAZ 675Sn

VERY HIGH FLUIDITY + Sn

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 385	Solidus	650	700	P	6.75	Rm (MPa)	350	Bare	✓	✓	✓	✓
AWS A5.8	B CuP-9	Liquidus	700		Sn	7	A (%)	2					
DIN 8513	-				Cu	Balance	d (g/cm)	8					

PHOSBRAZ 675Sn with 6.75 % phosphorus and 7 % tin content is a very high fluidity alloy enabling to work on joints with clearances below 0.5 mm using relatively low brazing temperatures, below those required for PHOSBRAZ E80+.

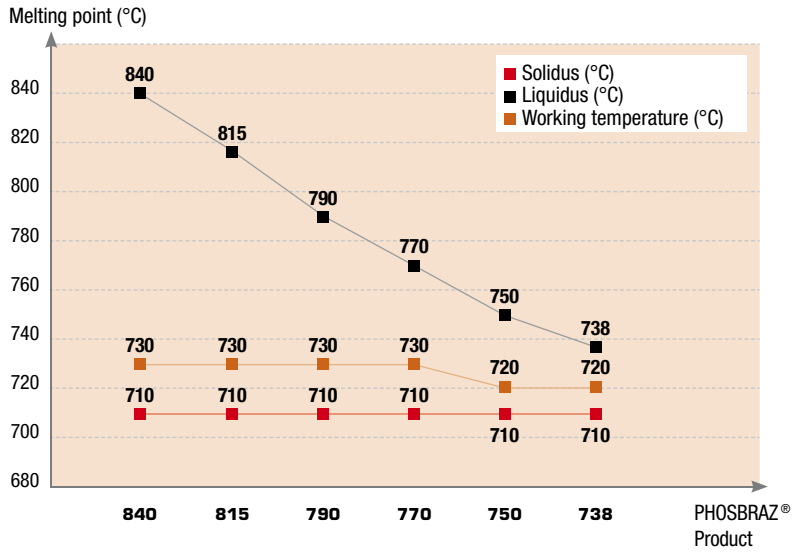
▪ **APPLICATIONS: Copper-copper and copper-brass connections. Plumbing.**

The technical characteristics of the PHOSBRAZ® products are presented in the tables on p. 22 or p. 54.

The PHOSBRAZ® Oven product range guarantees the specified melting points, thereby allowing performance of simultaneous multiple brazing on a complex workpiece with points of dissimilar temperatures. Typically, when passing through an oven, the interior of a complex workpiece is colder than its outside, so that brazing temperatures are different.

THE MELTING POINTS OF OUR ALLOYS ARE GUARANTEED WITHIN ±3°C. THESE ALLOYS HAVE BEEN DESIGNED TO PREVENT OCCURRENCE OF A LIQUATION PHENOMENON DURING THE RISE IN TEMPERATURE.

SELECTION CRITERIAS
MELTING POINT / WORKING TEMPERATURE



	Type	Technical characteristics					Chemical composition	
		Solidus (°C)	Liquidus (°C)	Working temperature (°C)	Rm (MPa)	A (%)	P (%)	Cu (%)
OVEN BRAZING	**PHOSBRAZ 840**	710	840	730	520	5	6.4	Balance
	PHOSBRAZ 815	710	815	730	450	4	6.8	Balance
	PHOSBRAZ 790	710	790	730	450	4	7.2	Balance
	PHOSBRAZ 770	710	770	730	450	4	7.5	Balance
	PHOSBRAZ 750	710	750	720	450	3	7.8	Balance
	PHOSBRAZ 738	710	738	720	400	2	8	Balance

PHOSBRAZ 840

OVEN BRAZING - HIGH TEMPERATURE

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 179	Solidus	710	730	P	6.4	Rm (MPa)	520	Bare	-	-	-	✓
AWS A5.8	-	Liquidus	840		Cu	Balance	A (%)	5					
DIN 8513	L-Cu P6						d (g/cm)	8.1					

This alloy was developed for oven brazing while ensuring the absence of liquation phenomena, being therefore suitable for slow increases in temperature. Self-fluxing on copper. The accuracy of the melting point 815 °C (±3 °C) enables total control and repeatability of the brazing process.

▪ **APPLICATIONS: Brazing of copper fins on copper tubes, heating elements, domestic boilers, and turbulator plates inside tubes. Copper heat exchangers. Domestic boilers.**

PHOSBRAZ 815

OVEN BRAZING - MEDIUM FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 180	Solidus	710	730	P	6.8	Rm (MPa)	450	Bare	-	-	-	✓
AWS A5.8	-	Liquidus	815		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm)	8					

Alloy developed for oven brazing, ensuring the absence of liquation phenomena. Self-fluxing on copper. Melting point: 840 °C ±3 °C.

▪ **APPLICATIONS: Brazing of copper fins on copper tubes, heating elements, domestic boilers, and turbulator plates inside tubes. Copper heat exchangers. Domestic boilers.**

The technical characteristics of the PHOSBRAZ® products are presented in the tables on p. 22 or p. 54.

COPPER-PHOSPHORUS ALLOYS - OVEN BRAZING

PHOSBRAZ 790

OVEN BRAZING - MEDIUM FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 181	Solidus	710	730	P	7.2	Rm (MPa)	450	Bare	-	-	-	✓
AWS A5.8	B Cu-P 2	Liquidus	790		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm)	8					

This alloy was developed for oven brazing ensuring the absence of liquation phenomena, being therefore suitable for slow increases in temperature. Self-fluxing on copper. The accuracy of the melting point (790 °C ± 3 °C) enables total control and repeatability of the brazing process.

▪ **APPLICATIONS: Brazing of copper fins on copper tubes, heating elements, domestic boilers, and turbulator plates inside tubes. Copper heat exchangers. Domestic boilers.**

PHOSBRAZ 770

OVEN BRAZING - HIGH FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	730	P	7.5	Rm (MPa)	450	Bare	-	-	-	✓
AWS A5.8	B Cu-P 2	Liquidus	770		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm)	8					

This alloy was developed for oven brazing ensuring the absence of liquation phenomena, being therefore suitable for slow increases in temperature. Self-fluxing on copper. The accuracy of the melting point (770 °C ± 3 °C) enables total control and repeatability of the brazing process.

▪ **APPLICATIONS: Brazing of copper fins on copper tubes, heating elements, domestic boilers, and turbulator plates inside tubes. Copper heat exchangers. Domestic boilers.**

PHOSBRAZ 750

OVEN BRAZING - VERY HIGH FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	720	P	7.8	Rm (MPa)	450	Bare	-	-	-	✓
AWS A5.8	-	Liquidus	750		Cu	Balance	A (%)	3					
DIN 8513	L-Cu P8						d (g/cm)	8					

This alloy was developed for oven brazing ensuring the absence of liquation phenomena, being therefore suitable for slow increases in temperature. Self-fluxing on copper. The accuracy of the melting point (750 °C ± 3 °C) enables total control and repeatability of the brazing process.

▪ **APPLICATIONS: Brazing of copper fins on copper tubes, heating elements, domestic boilers, and turbulator plates inside tubes. Copper heat exchangers. Domestic boilers.**

PHOSBRAZ 738

OVEN BRAZING - VERY HIGH FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	720	P	8	Rm (MPa)	400	Bare	-	-	-	✓
AWS A5.8	-	Liquidus	738		Cu	Balance	A (%)	2					
DIN 8513	L-Cu P8						d (g/cm)	8					

This alloy was developed for oven brazing ensuring the absence of liquation phenomena, being therefore suitable for slow increases in temperature. Self-fluxing on copper. The accuracy of the melting point (738 °C ± 3 °C) enables total control and repeatability of the brazing process.

▪ **APPLICATIONS: Brazing of copper fins on copper tubes, heating elements, domestic boilers, and turbulator plates inside tubes. Copper heat exchangers. Domestic boilers.**

TECHNICAL CHARACTERISTICS OF THE PHOSBRAZ® CuP AND CuP FOUR

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,5 → 3,0	100-700 (with controlled straightness for CuP Oven)	1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	15 (+/- 1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 10 % (Other types may be provided on request.)		

CuP-Ag ALLOYS

+ PRODUCT ADVANTAGES: addition of silver to copper-phosphorus alloys causes their melting point to become lower. This addition also refines the texture, improves the electrical conductivity and increases the ductility of the alloy.

- Examples of use: production of electrical motors, air conditioning, etc.

CHOICE

PHOSBRAZ AG20+
- ★ Multipurpose
- ★ Economical

PHOSBRAZ AG50+
- ★ Easy to use
- ★ Good resistance to vibration

PHOSBRAZ AG100
- ★ Copper brass joints
- ★ Excellent technical performance/price ratio

PHOSBRAZ AG150
- ★ Electrical connections
- ★ Standard to large clearances

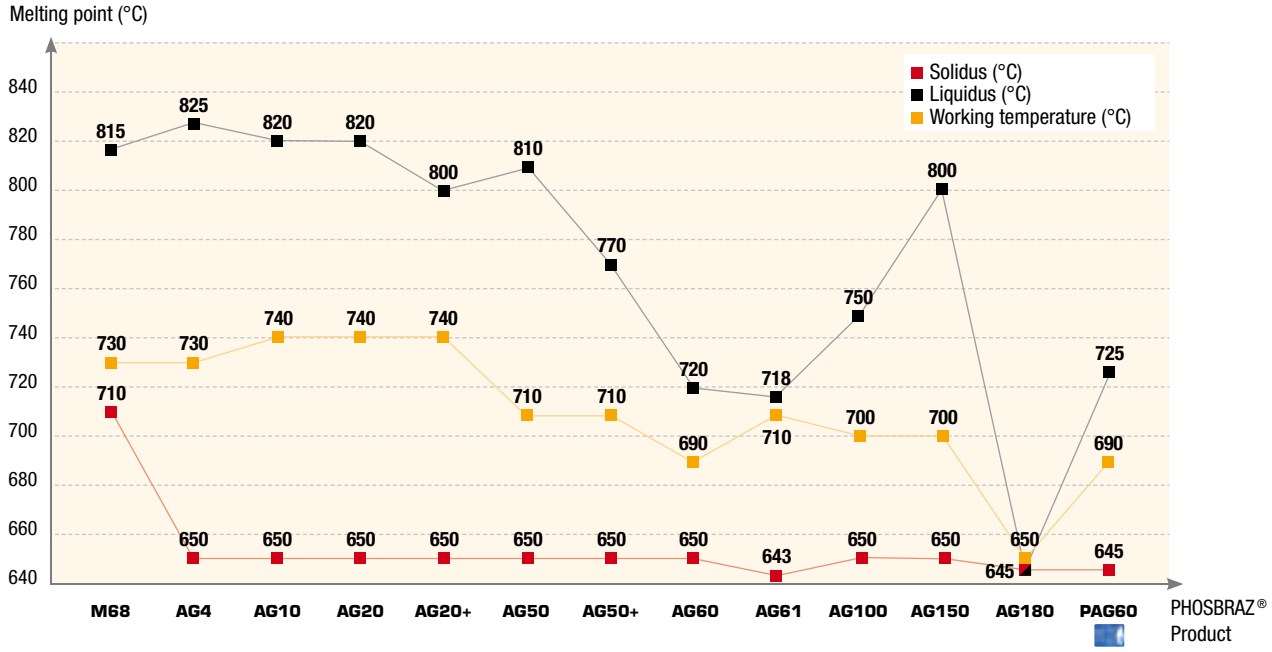
PHOSBRAZ AG60
- ★ Copper piping
- ★ Very narrow clearances

SELECTION CRITERIA - FLUIDITY OF THE CuP-Ag ALLOY RANGE

Reference	Fluidity		Characteristics
PHOSBRAZ AG180 PAG 60 PHOSBRAZ AG60 PHOSBRAZ AG61	HIGH FLUIDITY	💧💧💧💧	These alloys melt at low temperature. Joints with very small clearances.
PHOSBRAZ M68 PHOSBRAZ AG20+ PHOSBRAZ AG50+ PHOSBRAZ AG100	GOOD FLUIDITY	💧💧💧	These grades are used for brazing of couplings and connectors in systems operating at low temperature (such as air conditioning).
PHOSBRAZ M68 PHOSBRAZ AG4 PHOSBRAZ AG10 PHOSBRAZ AG20 PHOSBRAZ AG50 PHOSBRAZ AG150	INTERMEDIATE ALLOYS	💧💧	Standard clearances. AG150 is suitable for use for connections requiring good electrical conductivity.

SILVER-COPPER-PHOSPHORUS ALLOYS

SELECTION CRITERIAS - MELTING POINT / WORKING TEMPERATURE



Type	Technical characteristics					Chemical composition			
	Solidus (°C)	Liquidus (°C)	Working temperature (°C)	Rm (MPa)	A (%)	P (%)	Ag (%)	Ni (%)	Cu (%)
PHOSBRAZ M68	710	815	730	500	5	6.8	0.2	-	Balance
PHOSBRAZ AG4	650	825	730	550	6	6.5	0.4	-	Balance
PHOSBRAZ AG10	650	820	740	550	6	6.7	1	-	Balance
PHOSBRAZ AG20	650	820	740	550	6	6.7	2	-	Balance
PHOSBRAZ AG20+	650	800	740	550	6	7	2	-	Balance
PHOSBRAZ AG50	650	810	710	650	8	6	5	-	Balance
PHOSBRAZ AG50+	650	770	710	600	7	6.6	5	-	Balance
PHOSBRAZ AG60	650	720	690	450	4	7.3	6	0.1	Balance
PHOSBRAZ AG61	643	718	710	450	4	7.3	6	-	Balance
PHOSBRAZ AG100	650	750	700	650	8	6.2	10	-	Balance
PHOSBRAZ AG150	650	800	700	530	10	5	15	-	Balance
PHOSBRAZ AG180	645	645	650	480	10	7	18	-	Balance
PHOSBRAZ PAG 60	645	725	690	450	4	7.3	6	0.1	Balance

PHOSBRAZ M68

CuP Ag / 0,2 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	710	730	P	6.8	Rm (MPa)	500	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	815		Ag	0.2	A (%)	5					
DIN 8513	-				Cu	Balance	d (g/cm)	8.1					

The PHOSBRAZ M68 brazing metal is a CuP alloy containing 0.2 % silver, which confers it slightly better fluidity compared to PHOSBRAZ P68.
▪ **APPLICATIONS: Recommended for brazing pipes and connections, water heaters and cooling systems. Primarily used by plumbers and heating engineers. Copper-copper joints. Industrial HVAC systems.**

PHOSBRAZ AG4

CuP Ag / 0,4 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	650	730	P	6.5	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	825		Ag	0.4	A (%)	6					
DIN 8513	-				Cu	Balance	d (g/cm)	8.1					

The PHOSBRAZ AG4 brazing metal is a CuP alloy containing 0.4 % silver, which confers it slightly better fluidity compared to PHOSBRAZ M68.
▪ **APPLICATIONS: Recommended for brazing pipes and connections, water heaters and cooling systems. Primarily used by plumbers and heating engineers. Copper-copper joints. Industrial HVAC systems.**

PHOSBRAZ AG10

CuP Ag / 1 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	650	740	P	6.7	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	820		Ag	1	A (%)	6					
DIN 8513	-				Cu	Balance	d (g/cm)	8.1					

The PHOSBRAZ AG10 brazing metal is an alloy containing 1 % silver, which confers it slightly better fluidity compared to PHOSBRAZ AG4.
▪ **APPLICATIONS: Copper-copper joints. Industrial HVAC systems.**

PHOSBRAZ AG20

CuP Ag / 2 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 279	Solidus	650	740	P	6.7	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	820		Ag	2	A (%)	6					
DIN 8513	L-Ag 2 P				Cu	Balance	d (g/cm)	8.1					

The PHOSBRAZ AG20 brazing metal is an alloy containing 2 % silver. The addition of silver to the alloy increases its resistance to vibrations and pressure surges.
▪ **APPLICATIONS: Primarily used for brazing copper connections of industrial and domestic heat exchangers (such as brazing of U-bend tubes). Copper-copper joints. Industrial HVAC systems.**

PHOSBRAZ AG20+

COPPER MULTIPURPOSE / 2 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 280	Solidus	650	740	P	7	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	BCuP-6	Liquidus	800		Ag	2	A (%)	6					
DIN 8513	-				Cu	Balance	d (g/cm)	8.1					

The PHOSBRAZ AG20+ brazing metal is an alloy containing 2 % silver and additional 0.3 % phosphorus compared to AG20, which lowers its melting point and confers it higher fluidity. The addition of silver to the alloy increases its resistance to vibrations and pressure surges.
▪ **APPLICATIONS: Primarily used for brazing the copper connections of industrial and domestic heat exchangers (such as brazing of U-bend tubes). Copper-copper joining by swaging and tapping. Heat exchangers (hot/cold) and ventilation systems.**

The technical characteristics of the PHOSBRAZ® products are presented in the tables on p. 27 or p. 54.

SILVER-COPPER-PHOSPHORUS ALLOYS

PHOSBRAZ AG50

CuP Ag / 5% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 281	Solidus	650	710	P	6	Rm (MPa)	650	Bare	✓	✓	-	-
AWS A5.8	BCuP-3	Liquidus	810		Ag	5	A (%)	8					
DIN 8513	L-Ag 5 P				Cu	Balance	d (g/cm)	8.2					

The PHOSBRAZ AG50 brazing metal is an alloy containing 5% silver. The addition of silver to the alloy increases its resistance to vibrations and pressure surges.
▪ APPLICATIONS: Primarily used for brazing the copper connections of industrial and domestic heat exchangers (such as brazing of U-bend tubes). Copper-copper joints. Industrial HVAC systems.

PHOSBRAZ AG50+

SPECIAL PURPOSE: COLD - VIBRATIONS / 5% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 282	Solidus	650	710	P	6.6	Rm (MPa)	600	Bare	✓	✓	-	-
AWS A5.8	BCuP-7	Liquidus	770		Ag	5	A (%)	7					
DIN 8513	-				Cu	Balance	d (g/cm)	8.2					

The PHOSBRAZ AG50+ brazing metal is an alloy containing 5% silver and an addition of 0.6% phosphorus compared to AG50, which lowers its melting point and confers it higher fluidity. The addition of silver to the alloy increases its resistance to vibrations and pressure surges.
▪ APPLICATIONS: Primarily used for brazing the copper connections of industrial and domestic heat exchangers. Copper-copper joints by swaging. Heat exchangers (hot/cold), ventilation and compressor systems.

PHOSBRAZ AG60 NEW

COPPER PIPING / 6% Ag + Ni

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 283a	Solidus	650	690	P	7.3	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus	720		Ag	6	A (%)	4	Coated	✓	✓	✓	-
DIN 8513	-				Ni	0.1	d (g/cm)	8.2					
					Cu	Balance							

The PHOSBRAZ AG60 brazing metal is a copper-phosphorus alloy containing 6% silver, nickel added (for refining the texture), recommended for copper pipes.
▪ APPLICATIONS: Piping and combustible gas installations.

PHOSBRAZ AG61 NEW

COPPER PIPING / 6% Ag - AWS

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 283	Solidus	643	710	P	7.3	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	BCuP-4	Liquidus	718		Ag	6	A (%)	4					
DIN 8513	-				Cu	Balance	d (g/cm)	8.2					

The PHOSBRAZ AG61 brazing metal is a copper-phosphorus alloy with 6% silver content that meets the AWS A5-8 BCup-4 specifications.
▪ APPLICATIONS: Brazing of copper piping of industrial and domestic air conditioning systems.

PHOSBRAZ AG100 NEW

COPPER BRASS JOINTS / 10% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 3677	B Cu 84 Ag P 650-750	Solidus	650	700	P	6.2	Rm (MPa)	650	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus	750		Ag	10	A (%)	8	Coated	✓	✓	✓	-
DIN 8513	-				Cu	Balance	d (g/cm)	8.3					

The PHOSBRAZ AG100 brazing metal is an alloy containing 10% silver. The addition of silver in the alloy increases the alloy's electrical conductivity as well as its ductility.
The PHOSBRAZ AG100 brazing metal (coated) offers an economical alternative of equivalent technical performance to brazing metals of the BRAZARGENT 5034 type for joining copper pieces to brass. It offers a simplified use of the brazing metal, without the need to manually control the addition of flux.
▪ APPLICATIONS: Primarily used for brazing copper electrical connections. Copper-copper joints. Electrical motors.

PHOSBRAZ AG150

COPPER-BRASS JOINTS / 15% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 284	Solidus	650	700	P	5	Rm (MPa)	530	Bare	✓	✓	✓	-
AWS A5.8	BCuP-5	Liquidus	800		Ag	15	A (%)	10					
DIN 8513	L-Ag 15 P				Cu	Balance	d (g/cm)	8.4					

The Phosbraz AG150 brazing metal containing 15 % silver is primarily used in the manufacture of electric motors (brazing of squirrel-cage rotors and peripheral connections). Its composition provides high ductility, excellent fluidity, low melting point and excellent resistance to vibration.

▪ **APPLICATIONS: Recommended for delicate work, copper-copper joints. Electrical motors, electrical connections.**

PHOSBRAZ AG180

CuP Ag (COPPER PIPING) / 18% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	CuP 286	Solidus	645	650	P	7	Rm (MPa)	480	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus			Ag	18	A (%)	10					
DIN 8513	L-Ag 18 P				Cu	Balance	d (g/cm)	8.4					

The PHOSBRAZ AG180 brazing metal containing 18 % silver is a eutectic alloy (645 °C), which confers it very high fluidity. It is primarily used for brazing joints of considerable importance. It is also used for jobs that require a low melting point and is recommended for delicate work on copper-copper joints.

▪ **APPLICATIONS: Electrical motors.**

PAG 60

No.1539

COMBUSTIBLE GAS INSTALLATIONS / 6% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 3677	B Cu 87 P Ag (Ni) 645-725	Solidus	645	690	P	7.3	Rm (MPa)	450	Bare (Ø 2 x 500mm)	✓	✓	✓	✓
NF A81-362	CuP 291	Liquidus	725		Ag	6	A (%)	4					
					Ni	0.1	d (g/cm)	8.2					
					Cu	Balance							

PAG 60 has been certified by ATG (French Ministry of Industry) for use in conjunction with AGFLUX 1530. It is recommended for hard brazing of copper and optionally copper-brass pipes of combustible gas installations, as well as for all delicate work at low temperature.

▪ **APPLICATIONS: Piping and combustible gas installations.**

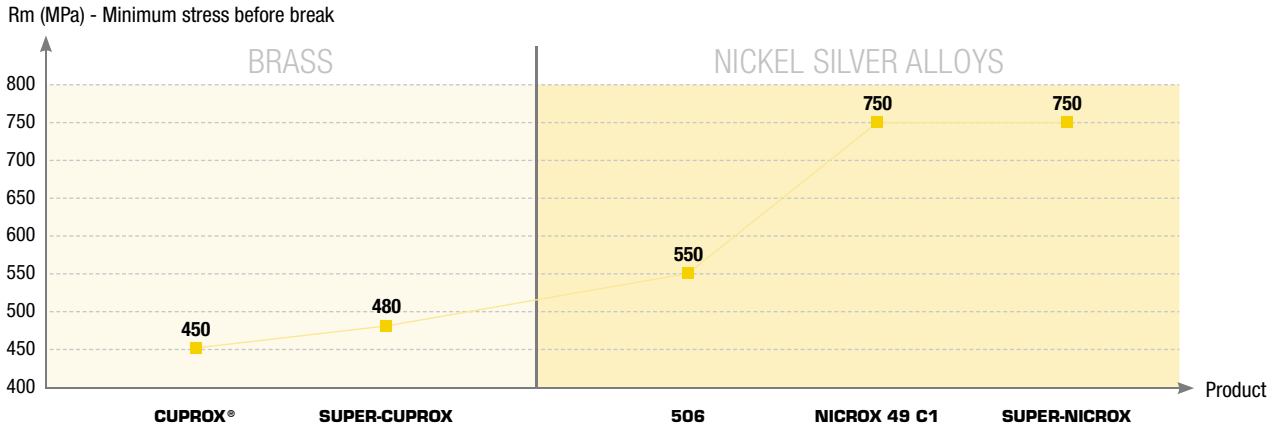
TECHNICAL CHARACTERISTICS OF THE PHOSBRAZ® CuP-Ag PRODUCTS

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,5 → 3,0	500	1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	15 (+/- 1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 10 % (Other types may be provided on request.)		

BRAZE-WELDING ALLOYS

+ PRODUCT ADVANTAGES: braze-welding alloys are used for joining steel, copper and cast iron for butt welding and tubes with large diameters. Their high mechanical strength, the aesthetically appealing results, their ease of application and their excellent cost-effectiveness, make them suitable for use in several industrial areas, such as: manufacturing of bicycle frames, metal furniture and delicate work, especially involving galvanised steels.

SELECTION CRITERIA - MECHANICAL STRENGTH



CUPROX

BONDING AND REPAIR OF STAINLESS STEEL, COPPER OR CAST IRON

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Cu 471	Solidus	870	Cu	59.7	Rm (MPa)	450	Bare	✓	✓	-	✓
AWS A5.8	~RCu-Zn C	Liquidus	890	Ni	0.2	A (%)	35	Coated	✓	-	-	-
DIN 8513	L CuZn40			Zn	Balance	d (g/cm)	8.4					
				Miscellaneous materials	Si, Mn, Sn							

CUPROX is a copper and zinc-based braze-welding alloy, with a small addition of silicon, nickel and manganese, intended to increase adhesion. It is recommended for joining steels, steel castings, copper, nickel-silver and nickel (when working with cast iron, the workpieces should not be overheated).
CUPROX (coated) enables simplified use of the brazing metal, without the need to manually control the addition of flux.
If needed it should be used in conjunction with our POLYFLUX.

▪ **APPLICATIONS: Locksmithing and automatic workshops on turntables.**

SUPER-CUPROX

BRAZE-WELDING ALLOY / 1 % Ag

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 3677	B Cu 59 Zn Ag Si 850-870	Solidus	850	Cu	58.0	Rm (MPa)	480	Bare	✓	✓	-	✓
		Liquidus	870	Ni	1.0	A (%)	30	Coated	✓	-	-	✓
				Ag	1.0	d (g/cm)	8.5					
				Zn	Balance							
				Miscellaneous materials	Si, Mn, Sn							

SUPER-CUPROX is a copper, zinc and silver-based braze-welding alloy, with a small addition of silicon, manganese and tin, intended to increase adhesion. Compared to CUPROX, it also contains 1 % of silver. This addition lowers its melting temperature while producing superior fluidity, thereby providing good capillarity enabling performance of delicate work. Due to its slightly lower melting temperature, it is recommended for brazing galvanised steels, as it protects the zinc layer.
SUPER-CUPROX (flux coated) enables simplified use of the brazing metal, without the need to manually control the addition of flux.
If needed it should be used in conjunction with our POLYFLUX

▪ **APPLICATIONS: Locksmithing and automatic workshops on turntables.**

506

BRAZE-WELDING ALLOY WITH NICKEL

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 3677	B Cu 50 Zn Ni Si 890-900	Solidus	890	Cu	51.0	Rm (MPa)	550	Bare	✓	✓	-	✓
		Liquidus	900	Ni	6.0	A (%)	30	Coated	✓	-	-	✓
				Zn	Balance	d (g/cm)	8.5					
				Miscellaneous materials	Si							

Alloy 506 is a braze-welding alloy with 6 % nickel, which confers it increased mechanical strength compared to CUPROX. It is used for high-stress joints and for chromium and nickel plating.
Alloy 506 (coated) enables simplified use of the brazing metal, without the need to manually control the addition of flux.
If needed it should be used in conjunction with our POLYFLUX.

- **APPLICATIONS: Mainly in locksmithing, manufacturing of office equipment or bicycle frames.**

NICROX 49 C1

HIGH STRENGTH BRAZE-WELDING

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Cu 773	Solidus	890	Cu	48.0	Rm (MPa)	750	Bare	✓	✓	-	✓
AWS A5.8	Rcu-Zn D	Liquidus	920	Ni	10.0	A (%)	25	Coated	✓	-	-	-
DIN 8513	L CuNi10Zn42			Zn	Balance	d (g/cm)	8.7					
				Miscellaneous materials	Si							

NICROX 49 C1 is a braze-welding alloy with 10 % nickel, which increases its mechanical strength compared to alloy 506.
NICROX 49 (flux coated) enables simplified use of the brazing metal, without the need to manually control the addition of flux.
If needed it should be used in conjunction with our POLYFLUX.

- **APPLICATIONS: High stress joints, locksmithing, mountain bicycles frames, metal furnishings, carbide inserts.**

SUPER-NICROX

HIGH STRENGTH BRAZE-WELDING - 1 % Ag

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 3677	B Cu 48 Zn Ni Ag Si 870-900	Solidus	870	Cu	49.0	Rm (MPa)	750	Bare	✓	✓	-	✓
		Liquidus	900	Ni	9.0	A (%)	25	Coated	✓	-	-	✓
				Ag	1.0	d (g/cm)	8.7					
				Zn	Balance							
				Miscellaneous materials	Si, Mn, Sn							

SUPER-NICROX is a high-quality braze-welding alloy with 1 % nickel, as compared to NICROX 49 C1. This addition lowers its melting temperature while producing superior fluidity, thereby providing good capillarity enabling performance of delicate work.
SUPER-NICROX (coated) enables simplified use of the brazing metal, without the need to manually control the addition of flux.
If needed it should be used in conjunction with our POLYFLUX.

- **APPLICATIONS: Delicate work, high stress joints, carbide inserts.**

TECHNICAL CHARACTERISTICS OF BRASS / NICKEL SILVER ALLOY PRODUCTS

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,5 → 3,0	500 - 1000	1 - 5
▪ **FLUX COATED RODS**	1,5 → 3,0	500 - 1000	1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	15 (+/- 1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 10 % (Other types may be provided on request.)		

SILVER ALLOYS

+ PRODUCT ADVANTAGES: these alloys are used for brazing steel, brass, bronze, nickel and copper alloys as well as all ferrous and non-ferrous metals (except for aluminium and manganese). The presence of silver in large amounts makes it possible to develop alloys with relatively low melting temperatures. Silver brazing metals are recommended for all brazing methods. The use of flux is indispensible when brazing in open air. The coated BRAZARGENT® rods simplify the use of the brazing metal, without the need to manually control the addition of flux.

REBOUD-ROCHE is continuously developing and expanding its range of brazing metals based on this type of alloys, and **BRAZARGENT®** is one of its registered trademarks.

OUR RANGE OF METALS
COMPRISES TWO LARGE PRODUCT FAMILIES

1 TERNARY ALLOYS

Our BRAZARGENT® "Series 15" product range comprises ternary alloys (containing silver, copper and zinc) with a melting temperature above 720 °C, enabling to use stepped brazing.

Our range of BRAZARGENT® ternary alloys:

- compared to quaternary alloys, this range provides higher ductility and is considered thick,
- enables use of stepped brazing at melting temperatures above 720 °C,
- enables brazing parts with large joining tolerances,
- provides good filling of joint menisci.

2 QUATERNARY ALLOYS WITH TIN

Our BRAZARGENT® "Serie 50" and "Serie 30" range of products is a quaternary range of alloys containing silver, copper, zinc and tin. Increasing the percentage of silver of a quaternary braze results in a lower melting point and improved fluidity. These alloys are used for joining copper alloys as well as the strongest grades of steel and stainless steel.

They are highly valued in equipment manufacturing, tool making, precision mechanics, jewellery and eyeglass manufacture, the aerospace industry, the food industry, medical gas supply networks, etc.

Our range of BRAZARGENT® quaternary alloys:

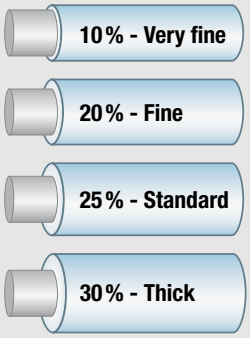
- has high mechanical strength and good flowability,
- enables brazing most metals that can be brazed in open air,
- requires controlled cooling to prevent the risks of weakening of the brazed joint,
- produces brazed joints and couplings that are practically invisible, being thus suitable for delicate work with tight clearances between 0.05 to 0.15 mm,
- is used both in manufacturing and in maintenance.

SELECTION CRITERIA - TYPE OF COATING

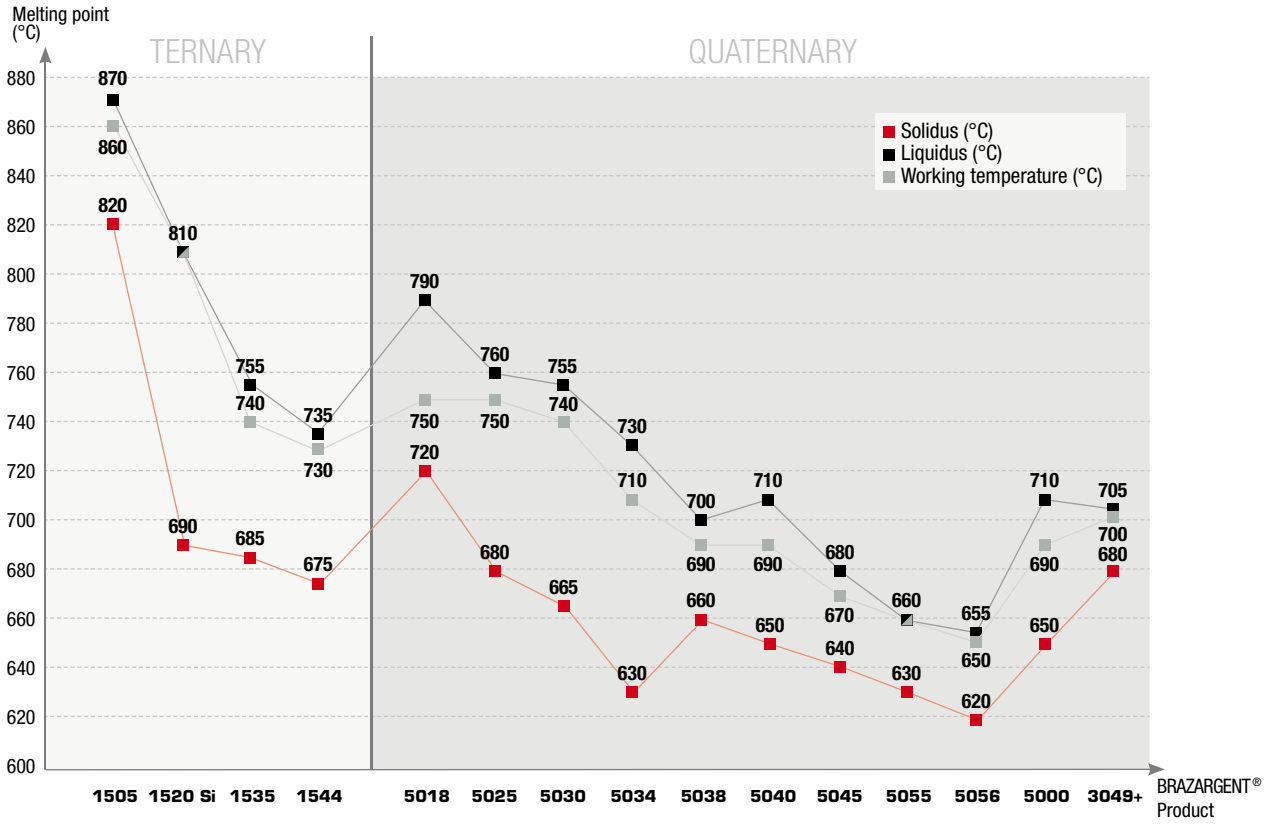
When evaluating an offer of flux coated rods, it is important to consider their proportion of coating. The same type of product may be offered with Thicker coatings (30%, 35%, or even more) and achieve a price advantage by providing more flux and less metal.
Be aware of this situation!

BY MAKING THE RIGHT CHOICE OF COATING YOU CAN ACHIEVE SAVINGS AND PROTECT THE ENVIRONMENT!

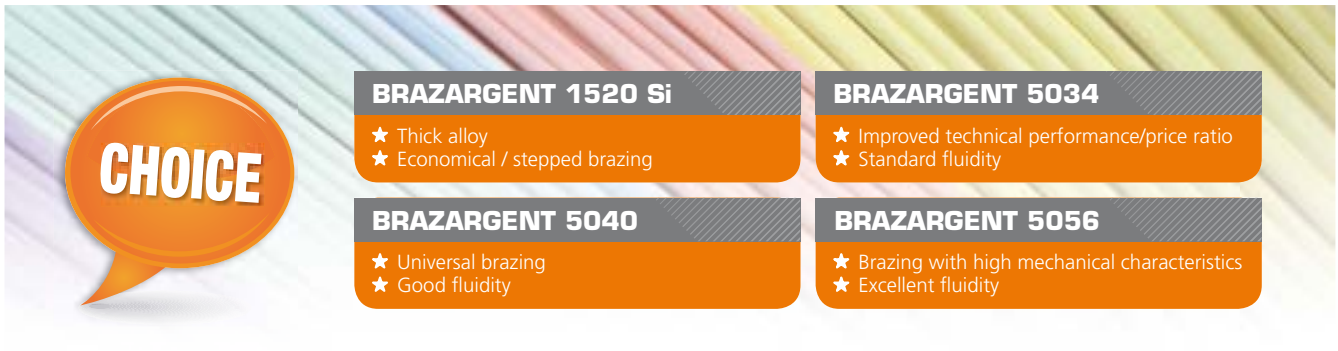
FOR FLUX COATED RODS	
Coating percentage (%)	Coating type
10	Very fine
20	Fine
25	Standard
30	Thick



SELECTION CRITERIAS - MELTING POINT / WORKING TEMPERATURE



		Technical characteristics					Chemical composition						
	Type	Solidus (°C)	Liquidus (°C)	Working temperature (°C)	Rm (MPa)	A (%)	Ag (%)	Cu (%)	Zn (%)	Sn (%)	Mn (%)	Si (%)	Ni (%)
TERNARY	**BRAZARGENT 1505**	820	870	860	380	15	5	54.5	40.4	-	-	-	-
	BRAZARGENT 1520 Si	690	810	810	400	20	20	46	33.8	-	-	0.2	-
	BRAZARGENT 1535	685	755	740	420	22	35	32	33	-	-	-	-
	BRAZARGENT 1544	675	735	730	400	25	44	30	26	-	-	-	-
QUATERNARY	**BRAZARGENT 5018**	720	790	750	450	15	18	47.2	33	1.8	-	-	-
	BRAZARGENT 5025	680	760	750	510	18	25	40	33	2	-	-	-
	BRAZARGENT 5030	665	755	740	500	18	30	36	32	2	-	-	-
	BRAZARGENT 5034	630	730	710	500	18	34	36	27	3	-	-	-
	BRAZARGENT 5038	660	700	690	520	18	38	31	28.8	2.2	-	-	-
	BRAZARGENT 5040	650	710	690	500	17	40	30	28	2	-	-	-
	BRAZARGENT 5045	640	680	670	405	38	45	27	25	3	-	-	-
	BRAZARGENT 5055	630	660	660	510	11	55	21	22	2	-	-	-
	BRAZARGENT 5056	620	655	650	375	30	56	22.5	16.5	5	-	-	-
	BRAZARGENT 5000	650	710	690	500	17	40	30	28	2	-	-	-
	BRAZARGENT 3049+	680	705	700	500	-	49	16	23	-	7.5	-	4.5



1 TERNARY ALLOYS

BRAZARGENT 1505

TERNARY ALLOY / 5 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Ag 205	Solidus	820	860	Ag	5.0	Rm (MPa)	380	Bare	✓	✓	-	✓
AWS A5.8	-	Liquidus	870		Cu	54.5	A (%)	15	Coated	✓	-	-	✓
DIN 8513	L-Ag 5				Zn	40.4	d (g/cm)	8.4					

Ternary alloy containing 5 % silver. The highest melting point of the BRAZARGENT® product range. Use in conjunction with POLYFLUX or in the form of flux coated rods.

▪ **APPLICATIONS: Brazing of steel parts.**

BRAZARGENT 1520 Si

ECONOMICAL - ALL JOINTS (EXCEPT FOR ALUMINIUM)

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	690	810	Ag	20.0	Rm (MPa)	400	Bare	✓	✓	-	✓
AWS A5.8	-	Liquidus	810		Cu	46.0	A (%)	20	Coated	✓	✓	-	✓
DIN 8513	L-Ag 20				Zn	33.8	d (g/cm)	8.4					
					Si	0.2							

Ternary alloy containing 20 % silver with medium fluidity, ideal for both single and multiple material joints. Its structure enables stepped brazing (re-heating) and performance of difficult jobs on steel parts, where a standard brass brazing alloy cannot properly produce the joint. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

▪ **APPLICATIONS: Difficult jobs, food industry.**

BRAZARGENT 1535

TERNARY ALLOY / 35 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Ag 235	Solidus	685	740	Ag	35.0	Rm (MPa)	420	Bare	✓	✓	-	✓
AWS A5.8	BAg-35	Liquidus	755		Cu	32.0	A (%)	22	Coated	✓	✓	-	✓
DIN 8513	-				Zn	33.0	d (g/cm)	9.0	TBW	✓	✓	-	✓

Ternary alloy containing 35 % silver with standard fluidity. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

▪ **APPLICATIONS: Brazing of industrial and domestic air conditioning equipment.**

BRAZARGENT 1544

TERNARY ALLOY / 44 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Ag 244	Solidus	675	730	Ag	44.0	Rm (MPa)	400	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	735		Cu	30.0	A (%)	25	Coated	✓	-	✓	✓
DIN 8513	L-Ag 44				Zn	26.0	d (g/cm)	8.9					

Ternary alloy containing 44 % silver. Higher elongation than BRAZARGENT 1520 Si. To be used in conjunction with our AGFLUX flux or in the form of flux coated rods, for brazing in open air.

▪ **APPLICATIONS: Alloy suitable for wide clearances, forming a large fillet. Used in the electrical industry and brass brazing.**

2 CADMIUM-FREE QUATERNARY ALLOYS WITH TIN

BRAZARGENT 5018

CADMIUM-FREE / 18% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 3677	B Cu 47 Zn Ag Sn 720-790	Solidus	720	750	Ag	18.0	Rm (MPa)	450	Bare	✓	✓	-	✓
AWS A5.8	-	Liquidus	790		Cu	47.2	A (%)	15	Coated	✓	-	-	✓
DIN 8513	-				Zn	33.0	d (g/cm)	8.4					
					Sn	1.8							

Quaternary alloy containing 18% silver. Its minimum fluidity makes it suitable for brazing parts with small clearances or small areas. It has good joint filling capacity. Lap joints are recommended. However, butt joints are permissible if conditions are less demanding. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

▪ **APPLICATIONS: Brazing of steel, copper or brass parts that have no particular specifications or restrictions.**

BRAZARGENT 5025

CADMIUM-FREE / 25% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 125	Solidus	680	750	Ag	25.0	Rm (MPa)	510	Bare	✓	✓	-	✓
AWS A5.8	BAg-37	Liquidus	760		Cu	40.0	A (%)	18	Coated	✓	-	-	✓
DIN 8513	L-Ag 25 Sn				Zn	33.0	d (g/cm)	8.5					
					Sn	2.0							

Quaternary alloy containing 25% silver. Its minimum fluidity makes it suitable for brazing parts with small clearances or small areas. It has good joint filling capacity. Lap joints are recommended. However, butt joints are permissible if conditions are less demanding. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

▪ **APPLICATIONS: Brazing of steel, copper or brass parts that have no particular specifications or restrictions.**

BRAZARGENT 5030

CADMIUM-FREE / 30% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 130	Solidus	665	740	Ag	30.0	Rm (MPa)	500	Bare	✓	✓	-	✓
AWS A5.8	-	Liquidus	755		Cu	36.0	A (%)	18	Coated	✓	-	-	✓
DIN 8513	L-Ag 30 Sn				Zn	32.0	d (g/cm)	8.8					
					Sn	2.0							

Quaternary alloy containing 30% silver. Its minimum fluidity makes it suitable for brazing parts with small clearances. It has good capillarity and good joint filling capacity. Lap joints are recommended. However, butt joints are permissible if conditions are less demanding. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

▪ **APPLICATIONS: Brazing of steel, copper or brass parts that have no particular specifications or restrictions.**

BRAZARGENT 5034

CADMIUM-FREE / 34% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 134	Solidus	630	710	Ag	34.0	Rm (MPa)	500	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	730		Cu	36.0	A (%)	18	Coated	✓	✓	✓	✓
DIN 8513	L-Ag 34 Sn				Zn	27.0	d (g/cm)	8.8	TBW	✓	-	-	-
					Sn	3.0							

Multi-purpose quaternary alloy containing 34% silver recommended for all single and multiple material joints. Very good brazing properties. High performance, cost-effective alloy.
The BRAZARGENT 5034 products (bare, coated, TBW) have some of the best technical performance/price ratios of the BRAZARGENT® series. This alloy offers good performance in terms of operating brazeability (melting point/fluidity) and good mechanical properties.
To be used in conjunction with our AGFLUX flux, or in the form of flux coated rods or TBW.

▪ **APPLICATIONS: Cold/hot industrial equipment (HVAC), household appliances, and a variety of applications in the food and healthcare sectors.**

The technical characteristics of BRAZARGENT® products are presented in the tables on p. 35 or p. 54.

BRAZARGENT 5038

CADMIUM-FREE / 38 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 138	Solidus	660	690	Ag	38.0	Rm (MPa)	520	Bare	✓	✓	✓	✓
AWS A5.8	BAg-34	Liquidus	700		Cu	31.0	A (%)	18	Coated	✓	-	✓	✓
DIN 8513	-				Zn	28.8	d (g/cm)	8.8					
					Sn	2.2							

Quaternary alloy containing 38 % silver with good fluidity. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

- **APPLICATIONS: Cold/hot industrial equipment (HVAC), household appliances, food and healthcare sectors, etc.**

BRAZARGENT 5040

UNIVERSAL AG BRAZING METAL (EXCEPT FOR ALUMINIUM)

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 140	Solidus	650	690	Ag	40.0	Rm (MPa)	500	Bare	✓	✓	✓	✓
AWS A5.8	BAg-28	Liquidus	710		Cu	30.0	A (%)	17	Coated	✓	-	✓	✓
DIN 8513	L-Ag 40 Sn				Zn	28.0	d (g/cm)	9.1	TBW	✓	✓	✓	✓
					Sn	2.0							

Multi-purpose quaternary alloy containing 40 % silver recommended for all single and multiple material joints. BRAZARGENT 5040 is a universal brazing alloy with good fluidity, excellent brazing properties, wetting quality and ease of application. This alloy offers good performance in terms of operating brazeability (melting point/fluidity) and good mechanical properties. To be used in conjunction with our AGFLUX flux, or in the form of flux coated rods or TBW.

- **APPLICATIONS: Cold/hot industrial equipment (HVAC), household appliances, food and healthcare sectors, etc.**

BRAZARGENT 5045

CADMIUM-FREE / 45 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 145	Solidus	640	670	Ag	45.0	Rm (MPa)	405	Bare	✓	✓	✓	✓
AWS A5.8	BAg-36	Liquidus	680		Cu	27.0	A (%)	38	Coated	✓	-	✓	✓
DIN 8513	L-Ag 45 Sn				Zn	25.0	d (g/cm)	9.1	TBW	✓	✓	✓	✓
					Sn	3.0							

Quaternary alloy containing 45 % silver. BRAZARGENT 5045 is the standard for silver brazing. Suitable for use for delicate jobs. This alloy offers good performance in terms of operating brazeability (melting point/fluidity) and good mechanical properties. To be used in conjunction with our AGFLUX flux, or in the form of flux coated rods or TBW.

- **APPLICATIONS: Cold/hot industrial equipment (HVAC), household appliances, food and healthcare sectors, etc.**

BRAZARGENT 5055

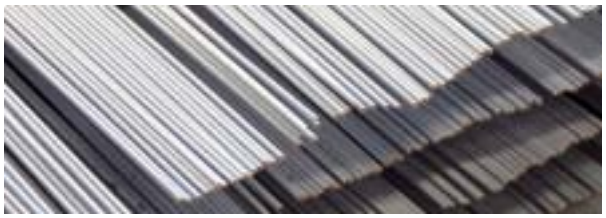
CADMIUM-FREE / 55 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 155	Solidus	630	660	Ag	55	Rm (MPa)	510	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	660		Cu	21	A (%)	11	Coated	✓	-	✓	✓
DIN 8513	L-Ag 55 Sn				Zn	22	d (g/cm)	9.2					
					Sn	2							

Quaternary alloy containing 55 % silver. To be used bare in conjunction with our AGFLUX flux or in the form of flux coated rods.

- **APPLICATIONS: All types of delicate jobs on stainless steel parts or joints that require the lowest possible brazing temperature.**





BRAZARGENT 5056

SUPERIOR MECHANICAL CHARACTERISTICS - CADMIUM-FREE / 56% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 156	Solidus	620	650	Ag	56	Rm (MPa)	375	Bare	✓	✓	✓	✓
AWS A5.8	BAg-7	Liquidus	655		Cu	22.5	A (%)	30	Coated	✓	-	✓	✓
DIN 8513	-				Zn	16.5	d (g/cm)	9.5	TBW	✓	✓	✓	✓
					Sn	5							

Quaternary alloy containing 56% silver, used for joints that must meet strict safety requirements. This grade has the lowest melting point of the BRAZARGENT® product range. It has excellent capillarity and produces brazed joints with a beautiful appearance. This alloy offers good performance in terms of operating brazeability (melting point/fluidity) and good mechanical properties. To be used in conjunction with our AGFLUX flux, or in the form of flux coated rods or TBW.

▪ **APPLICATIONS: Food industry, medical instruments, cooling systems, compressors, special joints, jewellery, etc.**

BRAZARGENT 5000

No.1598

COMBUSTIBLE GAS INSTALLATIONS - CADMIUM-FREE / 40% Ag

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	~Ag 140 according to ATG B.524-3 certification	Solidus	650	690	Ag	40.0	Rm (MPa)	500	Bare (Ø 2 x 500mm)	✓	✓	✓	✓
AWS A5.8		Liquidus	710		Cu	30.0	A (%)	17					
DIN 8513					Zn	28.0	d (g/cm)	9.1					
					Sn	2.0							

Quaternary alloy containing 40% silver, certified by CERTIGAS (Gaz de France), in conjunction with our AGFLUX flux under reference ATG 1598. It is recommended for high-strength capillary brazing of copper/brass/steel pipes of combustible gas installations. Its excellent fluidity makes it suitable for brazing of joints with tight clearances.

▪ **APPLICATIONS: Combustible gas installations.**

BRAZARGENT 3049+

NEW

HIGH STRENGTH

Classification		Melting point (°C)		Working temperature (°C)	Weld metal composition (%)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Ag 449	Solidus	680	700	Ag	49.0	Rm (MPa)	300	Bare	✓	✓	✓	✓
AWS A5.8	BAg-22	Liquidus	705		Cu	16.0	A (%)	-	Coated	✓	-	✓	✓
DIN 8513	L-Ag 49				Zn	23.0	d (g/cm)	8.9					
					Mn	7.5							
					Ni	4.5							

BRAZARGENT 3049+ was specifically developed for brazing tungsten carbide on steel or stainless steel supports. This is an alloy with manganese and nickel that has a low melting point and good wetting characteristics. For use in conjunction with our AGFLUX flux.

▪ **APPLICATIONS: Inserts, cutting tools, drilling bits, etc.**

TECHNICAL CHARACTERISTICS OF BRAZARGENT® PRODUCTS (ternary and quaternary alloys)

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,0 → 3,0	500	0,25 - 1 - 5
▪ **FLUX COATED RODS**	1,5 → 3,0	500	0,25 - 1 - 5
▪ **TBW**	1,6 → 3,0	500	0,25 - 1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	1 - 5 - 15 (+/- 0,1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 25 % (Other types may be provided on request.)		

ALUMINIUM ALLOYS

+ PRODUCT ADVANTAGES: our alloys (aluminium-silicon and zinc-aluminium) can be used for most brazing applications of aluminium parts among themselves or with other materials. Significant development efforts to simplify and optimise this class of brazing alloys (such as the TBW and TBM technologies) have resulted in improved stability, repeatability and higher profitability of brazing operations.

SOLID WIRES

ZINAL 4

FOR JOINING DISSIMILAR MATERIALS Cu / Al

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	377	Zn	98.0	Rm (MPa)	-	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	385	Al	2.0	A (%)	-					
DIN 8513	-					d (g/cm)	-					

ZINAL 4 is a zinc and aluminium alloy. It is primarily designed for brazing magnesium-free aluminium with other metals, typically aluminium/copper. To be used with our ALUNOX NCs flux (non-corrosive).

▪ **APPLICATIONS: Heat exchangers, household appliances, steel-aluminium and galvanised steel-aluminium electrical connections.**

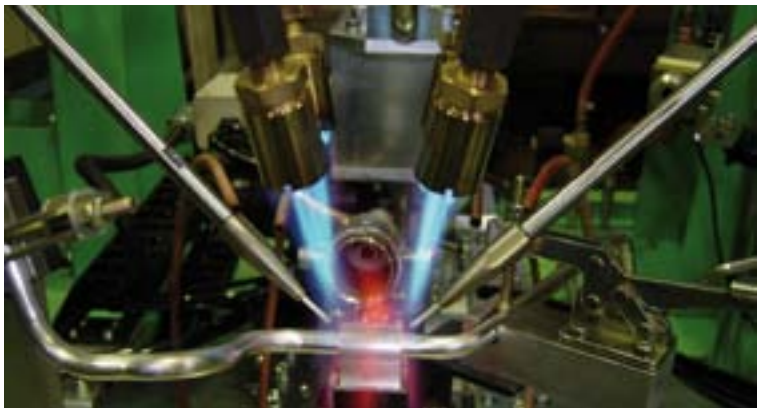
AL12

Al / Al JOINTS

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Al112	Solidus	575	Si	12.0	Rm (MPa)	140	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	585	Al	88.0	A (%)	20					
DIN 8513	-					d (g/cm)	-					

AlSi12 aluminium alloy. To be used with our ALUNOX NC (non-corrosive) flux or our FLUX-ODAL flux (corrosive).

▪ **APPLICATIONS: Automotive air conditioning, heat exchangers, household appliances.**



TBW

TBM™

TBW / TBM™ WIRES

ZINAL 4 TBW

FOR JOINING DISSIMILAR MATERIALS Cu / Al (FLUX AND METAL)

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	385	Zn	98.0	Rm (MPa)	-	TBW	✓	-	✓	-
AWS A5.8	-	Liquidus	420	Al	2.0	A (%)	-					
DIN 8513	-					d (g/cm)	-					

The ZINAL TBW 4 is a zinc and aluminium alloy offering the advantage of tubular brazing, a technology that is unique in the world. Tubular wire with incorporated non-corrosive flux. This alloy is designed for brazing magnesium-free aluminium parts with other metals (copper, steel, aluminium).

▪ **APPLICATIONS: Heat exchangers, household appliances, steel-aluminium and galvanised steel-aluminium electrical connections.**

HARASIL NC 12 TBW

Al / Al JOINTS (FLUX AND METAL)

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	-	Solidus	575	Si	12.0	Rm (MPa)	140	TBW	✓	✓	✓	✓
AWS A5.8	-	Liquidus	585	Al	88.0	A (%)	20					
DIN 8513	-					d (g/cm)	-					

Alloy designed for brazing magnesium-free aluminium parts. Tubular wire with incorporated non-corrosive flux, melting point: 575-585 °C.

▪ **APPLICATIONS: Automotive air conditioning, heat exchangers, household appliances.**

TBM 12 NCs

Al / Al JOINTS (FLUX AND METAL MIX)

Classification		Melting point (°C)		Weld metal composition (°C)		Mechanical properties		Shape	Recommended heating method			
EN ISO 17672	Al112	Solidus	575	Si	12.0	Rm (MPa)	140	Mix	✓	✓	✓	✓
AWS A5.8	-	Liquidus	585	Al	88.0	A (%)	20					
DIN 8513	-					d (g/cm)	-					

Alloy designed for brazing magnesium-free aluminium parts. Non-corrosive flux mixed inside the metal, melting point: 575-585 °C.

▪ **APPLICATIONS: Automotive air conditioning, heat exchangers, household appliances.**

TECHNICAL CHARACTERISTICS OF ALUMINIUM ALLOYS (Al-Si / Zn-Al)

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **RODS**	1,6 → 3,0	500 - 1000	1 - 5
▪ **SPOOL, COIL**	1,6 → 3,0	spools (random wound)	5 (+/- 0,1 kg)
		coils	5 (Other weights can be provided on request.)

BRAZING FLUXES

+ PRODUCT ADVANTAGES: the purpose of a flux is to dissolve residual impurities, while its increasing fluidity guides the operator in determining the moment when the filler metal must be added. A good flux delays the escape of volatile elements and should be displaced by the filler metal once it has melted. After brazing, the flux is removed from the parts by rinsing in hot water or mechanically. When permissible, the thermal shock produced by submerging a hot part causes the flux to be eliminated by bursting.

AGFLUX / AGFLUX (Paste)

No.1530 No.1598

FOR SILVER BRAZING / BORIC ACID-FREE FLUX

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Shape	Recommended heating method			
EN 1045	FH10	Paste	Solidus	500	Plastic jar (with child safety mechanism and tactile indicator)	60-200-400-1000	Paste	✓	✓	✓	✓
		Powder	Liquidus	800		200-400-1000	Powder	✓	✓	✓	✓

This pickling flux may be used in conjunction with our BRAZARGENT® product line (silver-base brazing alloy with a melting temperature below 800 °C). Boric acid-free flux. In powder or ready-to-use paste form. High efficiency with minimal application.

- **APPLICATIONS: AGFLUX (Paste) is used for combustible gas installations. It has been certified in conjunction with the PAG 60 brazing alloy under ATG registration number 1530 and in conjunction with the BRAZARGENT 5000 alloy under ATG registration number 1598.**

AGFLUX (Powder): this flux powder is generally used for brazing of alloys, steels and copper-based alloys. This high-quality flux produces perfect results even on non-cleaned surfaces.

BORINOX

FOR STEEL BRAZING

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Shape	Recommended heating method			
EN 1045	FH10	Paste	Solidus	500	Plastic jar (with child safety mechanism and tactile indicator)	400	Paste	✓	✓	✓	✓
		Powder	Liquidus	800		200	Powder	✓	✓	✓	✓

This multipurpose pickling flux may be used in the form of paste or powder in combination with all our BRAZARGENT® brazing filler metals with melting temperatures between 590-730 °C. In powder or ready-to-use paste form.

- **APPLICATIONS: This flux has a powerful deoxidising action.**

POLYFLUX

FOR BRAZE-WELDING

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Shape	Recommended heating method			
EN 1045	FH20	Paste	Solidus	800	Plastic jar (with child safety mechanism and tactile indicator)	300	Paste	✓	✓	✓	✓
		Powder	Liquidus	1000		150	Powder	✓	✓	✓	✓

General use brazing flux for braze-welding as well as for autogenous welding of cast iron. POLYFLUX is a high-efficiency flux enabling strong pickling even on non-cleaned surfaces and producing outstanding adhesion. In powder or ready-to-use paste form.

- **APPLICATIONS: Can be used in combination with braze-welding alloys such as CUPROX®, NICROX and BRAZARGENT 1505.**

FLUX-ODAL

FOR ALUMINIUM

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Shape	Recommended heating method			
EN 1045	FL10	Powder	Solidus	450	Plastic jar (with child safety mechanism and tactile indicator)	200	Powder	✓	✓	✓	✓
			Liquidus	550							

Corrosive scouring flux in powder form intended for brazing aluminium alloys, other than magnesium-containing alloys. Exceptional wetting properties. Has a strong deoxidising action.

▪ **APPLICATIONS: To be used in conjunction with the AL 12 brazing alloy.**

ALUNOX NC

FOR ALUMINIUM / NON-CORROSIVE FLUX

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Shape	Recommended heating method			
EN 1045	FL20	Powder	Solidus	560	Plastic jar (with child safety mechanism and tactile indicator)	200	Powder	✓	✓	✓	✓
			Liquidus	570							

Non-corrosive scouring flux in powder form for manual and automatic brazing of aluminium and aluminium alloys among themselves (not including aluminium alloys containing magnesium, and not for stainless steel or copper).

▪ **APPLICATIONS: To be used in conjunction with our AL 12 brazing alloy.**

ALUNOX NCs

FOR ALUMINIUM / NON-CORROSIVE FLUX

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Shape	Recommended heating method			
EN 1045	FL20	Powder	Solidus	420	Plastic jar (with child safety mechanism and tactile indicator)	200	Powder	✓	✓	✓	✓
			Liquidus	450							

Non-corrosive pickling flux for magnesium-free aluminium alloys.

▪ **APPLICATIONS: To be used in conjunction with our ZINAL 4 brazing alloy.**

TECHNICAL CHARACTERISTICS OF BRAZING FLUXES

Reference		Shape (powder)	Shape (paste)	Weight (g)
▪ **AGFLUX**	AGFLUX (paste) No.1530 No.1598	x		200 - 400 - 1000
			x	60 - 200 - 400 - 1000
▪ **BORINOX**		x		400
			x	150
▪ **POLYFLUX**		x		200
			x	400
▪ **FLUX-ODAL**		x		200
▪ **ALUNOX NC**		x		200
▪ **ALUNOX NCs**		x		200

For further information on other brazing fluxes, their packaging and minimum order quantities, **please contact our Sales Department.**

CLEANING OF WORKPIECES

Depending on the type of fluxes and their corrosive or non-corrosive residues, it is recommended to clean workpieces by:

- cleaning by submerging in hot water for about half an hour,
- mechanical cleaning,
- using a 10% sodium hydroxide solution.

MAINTENANCE AND REPAIR ALLOYS

PRODUCT ADVANTAGES: a range of high-quality filler metals, perfectly mastered after decades of experience and meeting the most demanding needs of the various industrial sectors. Our technical advisors are at your disposal for guidance in selecting the most appropriate products for your application.

SELECTARC G810

SPECIAL PURPOSE: COPPER / COPPER AND COPPER / BRASS

Working temperature (°C)	Shape	Recommended heating method			
				*	
710	Coated	✓	✓	✓	-

Ready-to-use alloy for maintenance and repair of copper-to-copper or copper-to-brass parts. Excellent fluidity and low temperature with a very good rate of penetration.

- **APPLICATIONS: All types of sensitive/ localised repairs.**

SELECTARC G820

BRAZING OF DISSIMILAR MATERIALS

Working temperature (°C)	Shape	Recommended heating method			
				*	
650	Coated	✓	✓	✓	✓

Ready-to-use alloy with excellent fluidity, intended for all types of delicate work for single and multiple material joints, not including aluminium.

- **APPLICATIONS: All sectors of activity.**

SELECTARC G830

SPECIAL PURPOSE: CAST IRON

Working temperature (°C)	Shape	Recommended heating method			
				*	
890	Coated	✓	-	-	✓

Ready-to-use alloy intended for the repair of hard to repair cast iron parts, reconditioning of carbide tools, etc.

- **APPLICATIONS: Drilling bits, metal furniture, locksmithing, etc.**

SELECTARC G840

ALUMINIUM / COPPER

Working temperature (°C)	Shape	Recommended heating method			
				*	
440	TBW	✓	✓	✓	✓

Alloy intended for the repair of aluminium and/or copper/aluminium joints.

- **APPLICATIONS: Automobile radiators.**

CUBRA

NEW

SPECIAL PURPOSE: COPPER / BRASS

Working temperature (°C)	Shape	Recommended heating method			
				*	
730	Coated	✓	✓	✓	-

Ready-to-use alloy for maintenance and repair of copper-on-brass parts. Medium fluidity.

- **APPLICATIONS: Repair of various types of sanitary piping, etc.**

APPLICATIONS

- HEATING AND VENTILATION
- AIR CONDITIONING, DOMESTIC AND INDUSTRIAL REFRIGERATION SYSTEMS
- AUTOMOBILE INDUSTRY
- PLUMBING AND SANITARY FACILITIES
- RENEWABLE ENERGY, SOLAR PANELS
- CARBIDE AND DIAMOND TIPPED TOOLS
- MEASURING AND CONTROL DEVICES
- ELECTRO-MECHANICAL CONSTRUCTIONS
- TUBULAR STRUCTURES

APPLICATIONS

Selectarc

OFFERS SUITABLE SOLUTIONS FOR ALL INDUSTRIAL SECTORS
AND OFFERS ASSISTANCE FOR MAKING THE RIGHT CHOICES!

HEATING
AND VENTILATION

AIR CONDITIONING,
DOMESTIC AND INDUSTRIAL
REFRIGERATION SYSTEMS

AUTOMOBILE
INDUSTRY

PLUMBING
AND SANITARY FACILITIES

RENEWABLE ENERGY,
SOLAR PANELS

CARBIDE AND DIAMOND
TIPPED TOOLS

MEASURING
AND CONTROL DEVICES

ELECTRO-MECHANICAL
CONSTRUCTIONS

TUBULAR
STRUCTURES

HEATING AND VENTILATION

MAIN APPLICATIONS

- Air conditioning units, heat exchangers,
- Heating systems,
- Floor heating,
- Distribution systems (water, gas, steam),
- Etc.

AIR CONDITIONING, DOMESTIC AND INDUSTRIAL REFRIGERATION SYSTEMS

MAIN APPLICATIONS

- Refrigeration systems,
- Industrial and domestic refrigerators, cold rooms,
- Household appliances,
- Evaporators,
- Etc.

AUTOMOBILE INDUSTRY

MAIN APPLICATIONS

- Automobile radiators,
- Air conditioning,
- Braking systems,
- Power steering,
- Etc.

APPLICATIONS

PLUMBING AND SANITARY FACILITIES

MAIN APPLICATIONS

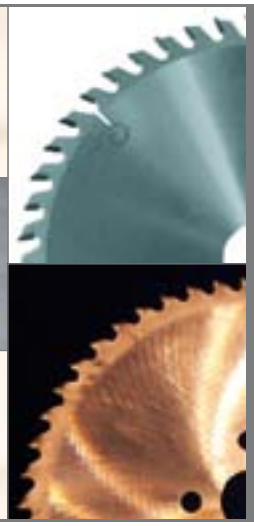
- For private homes and industrial buildings:
  - Hot/cold water installations,
  - Gas pipes,
- Etc.

RENEWABLE ENERGY, SOLAR PANELS

MAIN APPLICATIONS

- Solar panels,
- Solar water heaters,
- Tidal power equipment,
- Windmills,
- Alternators,
- Etc.

CARBIDE AND DIAMOND TIPPED TOOLS



MAIN APPLICATIONS

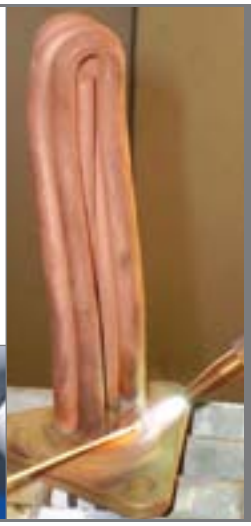
- Diamond tools,
- Knives for cardboard, plastic and leather,
- Surgical instruments,
- Saw blades, drill bits, plastic recycling grinders,
- Cement, stone and wood cutting and working tools,
- Etc.

MEASURING AND CONTROL DEVICES

MAIN APPLICATIONS

- Measuring instruments,
- Thermostats,
- Pressure buttons,
- Manometers, hygrometers,
- Etc.

ELECTRO-MECHANICAL CONSTRUCTIONS



MAIN APPLICATIONS

- Power generators,
- Transformers,
- Electrical motors,
- Heating elements,
- Electro-mechanical units,
- Alternators,
- Etc.

TUBULAR STRUCTURES

MAIN APPLICATIONS

- Metal structures,
- Eyeglass frames,
- Bicycle frames,
- Metal furnishings,
- Etc.

APPLICATIONS

Selectarc BRAZING

CHOICE

SELECTION CRITERIAS

FIND THE PRODUCT THAT MEETS YOUR NEEDS!

WE SUGGEST THE BEST CHOICE, BUT OTHER COMBINATIONS ARE POSSIBLE.

The products may be used in bare form, flux coated, as TBW or in conjunction with flux.

		Areas of application								
	Reference									
COPPER-PHOSPHORUS	PHOSBRAZ M60	✓				✓				
	PHOSBRAZ V6	✓			✓					
	PHOSBRAZ P66	✓			✓					
	PHOSBRAZ P68	✓			✓					
	PHOSBRAZ M70	✓			✓	✓				
	PHOSBRAZ M73	✓			✓					
	PHOSBRAZ E80	✓			✓	✓				
	PHOSBRAZ E80+	✓								
	PHOSBRAZ 675Sn	✓				✓		✓		
	PHOSBRAZ 840	✓								
	PHOSBRAZ 815	✓			✓					
	PHOSBRAZ 790	✓			✓					
	PHOSBRAZ 770	✓								
	PHOSBRAZ 750	✓								
	PHOSBRAZ 738	✓			✓					

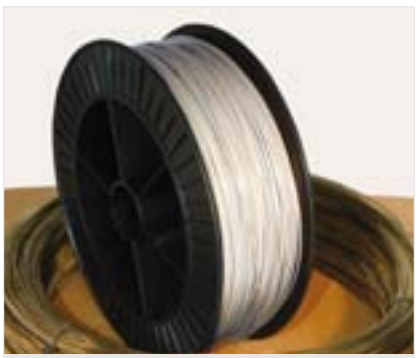
	Reference	Areas of application								
SILVER-COPPER-PHOSPHORUS	PHOSBRAZ M68	✓								
	PHOSBRAZ AG4	✓								
	PHOSBRAZ AG10				✓					
	PHOSBRAZ AG20	✓	✓		✓	✓			✓	
	PHOSBRAZ AG20+		✓		✓					
	PHOSBRAZ AG50	✓	✓			✓			✓	
	PHOSBRAZ AG50+		✓							
	PHOSBRAZ AG60				✓	✓				
	PHOSBRAZ AG61				✓					
	PHOSBRAZ AG100		✓		✓				✓	
	PHOSBRAZ AG150	✓				✓		✓	✓	
	PHOSBRAZ AG180	✓				✓				
	PAG 60 No.1539		✓		✓					
BRASS	CUPROX	✓	✓		✓		✓			✓
	SUPER-CUPROX	✓	✓		✓		✓			✓
	506									✓
	NICROX 49 C1	✓			✓		✓			✓
	SUPER-NICROX	✓			✓		✓			✓
SILVER	BRAZARGENT 1505									✓
	BRAZARGENT 1520 Si				✓				✓	✓
	BRAZARGENT 1535				✓			✓	✓	
	BRAZARGENT 1544		✓				✓	✓	✓	
	BRAZARGENT 5018								✓	✓
	BRAZARGENT 5025								✓	✓
	BRAZARGENT 5030	✓	✓	✓					✓	✓
	BRAZARGENT 5034	✓	✓	✓					✓	
	BRAZARGENT 5038	✓		✓	✓	✓		✓	✓	✓
	BRAZARGENT 5040	✓		✓	✓	✓		✓	✓	✓
	BRAZARGENT 5045	✓		✓	✓	✓	✓	✓	✓	✓
	BRAZARGENT 5055	✓	✓		✓	✓	✓	✓	✓	✓
	BRAZARGENT 5056					✓		✓	✓	
	BRAZARGENT 5000 No.1598		✓							
	BRAZARGENT 3049+						✓			
ALUMINIUM	ZINAL 4	✓		✓						
	AL12	✓								
	HARASIL NC 12 TBW			✓						
	TBM 12 NCs			✓						
M & R	G810	✓	✓		✓			✓		
	G820	✓	✓		✓	✓	✓	✓	✓	✓
	G830						✓			✓
	G840	✓	✓	✓	✓	✓		✓		
	CUBRA				✓	✓				

PACKAGING

TYPES OF AVAILABLE SHAPES & THEIR PACKAGING

BARE RODS

FLUX COATED RODS



SPOOLS OR COILS

TUBULAR BRAZING WIRE (TBW)

TBM™

PREFORMS

RINGS

RINGS (ON MANDREL)

PICKLING FLUX

PRINTING

PACKAGING

DEPARTMENTS

• Advice and customer assistance

Our team of experienced engineers and metallurgical professionals provides guidance to customers in selecting the most suitable materials for each specific application.

• Research and Development (R&D)

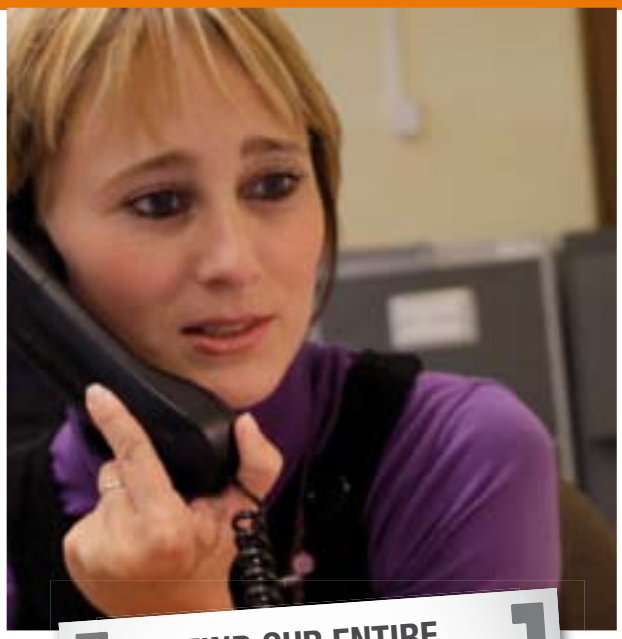
The R&D department develops alloys, product shapes and procedures and carries out product testing (chemical and thermal analyses, mechanical testing) according to customer requests.

• Customer support

The Sales Department is available for fast response to all requests.

• Specific requests

Custom-made alloys: colour, printing, packaging, brazing demonstrations, technical training on site or on customer's site, etc.



QUALITY ASSURANCE

ISO 9001 Certification.

FOR ORDERING…

FOR ORDERING?
THE STRUCTURE OF OUR PRODUCT CODES!

Proper definition of your selected product (catalogue reference) will enable faster service!

1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9
Alloy code		Form		Wire ø O.D.		Inner ø I.D.		Length		Colour		Printing		Packaging		Packaging colour

1 UNDERSTANDING OUR CATALOGUE REFERENCE FORMAT

Examples of catalogue reference codes	Product description	1 Alloy code	2 Form	3 ø Wire O.D. (mm)	4 ø Inner I.D. (mm)	5 Length (mm)	6 Colour	7 Printing	8 Packaging	9 Packaging colour
M7B30500R T200 M7 B 30 - 500 R - T20 0	PHOSBRAZ M70 ▪ bare rod	M7	B	3,0	-	500	R (= pink)	-	T20 (= 5 kg)	0 (= orange)
P60B20500R/FT180 P60 B 20 - 500 R /FT T18 0	PHOSBRAZ PAG 60 ▪ marked bare rod	P60	B	2,0	-	500	R (= pink)	/FT = GDF	T18 (= 1 kg)	0 (= orange)
CXE20999S T380 CX E 20 - 999 S - T38 0	CUPROX ▪ coated rod	CX	E	2,0	-	999 (= 1000)	S (= sienna)	-	T38 (= 5 kg)	0 (= orange)
C5056200RE C 5056 20 - - N - - RE	BRAZARGENT 5056 ▪ annealed wire coil	5056	C (positioned before the alloy code)	2,0	-	-	N (= natural)	-	-	RE (= annealed)
C5056200EC C 5056 20 - - N - - EC	BRAZARGENT 5056 ▪ cold formed wire coil	5056	C (positioned before the alloy code)	2,0	-	-	N (= natural)	-	-	EC (= cold forming)
5056A30I55N 5056 A 30 55 - N - - -	BRAZARGENT 5056 ▪ rings	5056	A	3,0	55	-	N (= natural)	-	-	-

2 CREATE YOUR OWN ORDERING CODES!
(USE THE LIST OF ALL OUR PRODUCTS AND THEIR RESPECTIVE CODES PROVIDED ON THE OPPOSITE SIDE)

1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9
1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9

YOU CAN NOW PLACE YOUR ORDERS
USING OUR REFERENCE SYSTEM (refer to the price list data).

3 LISTING OF ALL POSSIBLE CODES

1 ALLOY CODES

Alloy code	Alloy
M6	PHOSBRAZ M60
V6	PHOSBRAZ V6
P6	PHOSBRAZ P66
P68	PHOSBRAZ P68
M7	PHOSBRAZ M70
M73	PHOSBRAZ M73
E80	PHOSBRAZ E80
E8+	PHOSBRAZ E80+
675SN	PHOSBRAZ 675Sn
840	PHOSBRAZ 840
815	PHOSBRAZ 815
790	PHOSBRAZ 790
770	PHOSBRAZ 770
750	PHOSBRAZ 750
738	PHOSBRAZ 738
M68	PHOSBRAZ M68
AG04	PHOSBRAZ AG4
AG10	PHOSBRAZ AG10
AG20	PHOSBRAZ AG20
AG20+	PHOSBRAZ AG20+
AG50	PHOSBRAZ AG50
AG50+	PHOSBRAZ AG50+
AG60	PHOSBRAZ AG60
AG61	PHOSBRAZ AG61
AG100	PHOSBRAZ AG100
AG150	PHOSBRAZ AG150
AG180	PHOSBRAZ AG180
P60	PAG 60
CX	CUPROX
SN	SUPER-CUPROX
506	506
NX	NICROX 49 C1
SN	SUPER-NICROX
1505	BRAZARGENT 1505
1520	BRAZARGENT 1520 Si
1535	BRAZARGENT 1535
1544	BRAZARGENT 1544
5018	BRAZARGENT 5018
5025	BRAZARGENT 5025
5030	BRAZARGENT 5030
5034	BRAZARGENT 5034
5038	BRAZARGENT 5038
5040	BRAZARGENT 5040
5045	BRAZARGENT 5045
5055	BRAZARGENT 5055
5056	BRAZARGENT 5056
5034T	BRAZARGENT 5034 TBW
5040T	BRAZARGENT 5040 TBW
5045T	BRAZARGENT 5045 TBW
5056T	BRAZARGENT 5056 TBW
5000	BRAZARGENT 5000
3049+	BRAZARGENT 3049+
ZINAL4	ZINAL 4
ZINAL4T	ZINAL 4 TBW
ALSI12	AL12
NC12T	HARASIL NC 12* TBW
TBM12	TBM 12 NCs*
G810	G810
G820	G820
G830	G830
G840	G840
CB	CUBRA
FLAGF/G	AGFLUX (Paste)
FLAGF	AGFLUX (Powder)
BORINOXPATE	BORINOX (Paste)
BORINOXPOUDRE	BORINOX (Powder)
FLPOL/G	POLYFLUX (Paste)
FLPOL/P	POLYFLUX (Powder)
FLODAL/P	FLUX ODAL (Powder)
FLALUNC/P	ALUNOX NC (Powder)
FLALUNCS/P	ALUNOX NCs (Powder)

2 FORMS

Symbol	Form
B	Bare rods
E	Coated rods
K	Square rods
T	TBW
-	TBM
A	Rings
C	Spool (+ additional code)
C	Wire coil

3 WIRE DIAMETERS

Symbol	Wire diameter (mm)
15	1,5
20	2,0
25	2,5
30	3,0

Diameter between: 1,0 < 6,0 mm
(according to alloy, see the table on p. 55)

4 INNER DIAMETERS

Inner diameter (mm)
By specific customer request.

5 STANDARD LENGTHS

Symbol	Length (mm)
500	500
999	1000

6 STANDARD COATING COLOURS

Symbol	Coating colour	Reference
S	Burnt sienna (brown)	CUPROX
V	Violet	SUPER-CUPROX
G	Gray	506
F	Blue	NICROX 49 C1
U	Salmon pink	SUPER-NICROX
B	White	BRAZARGENT 1505
B	White	BRAZARGENT 1520 Si
B	White	BRAZARGENT 1544
B	White	BRAZARGENT 1545
B	White	BRAZARGENT 5018
B	White	BRAZARGENT 5025
B	White	BRAZARGENT 5030
F	Blue	BRAZARGENT 5034
B	White	BRAZARGENT 5038
B	White	BRAZARGENT 5040
B	White	BRAZARGENT 5045
R	Pink	BRAZARGENT 5055
R	Pink	BRAZARGENT 5056

6 STANDARD BARE COLOURS

Symbol	Bare color	Alloy
R	Pink	CuP / CuPAg
N	Natural	Silver brazing metal
N	Natural	Brasses/Nickel silver alloys
N/A	Not applicable	Aluminium

7 PRINTING

Printing
For GDF-certified alloys or according to specific customer request.

8 PACKAGING

Symbol	Weight (kg)	Length (mm)
T18	1 kg - Bare	500
T19	1 kg - Coated	500
T20	5 kg - Bare	500
T21	5 kg - Coated	500
28028203	5 kg - Bare	1000
28028204	5 kg - Coated	1000

9 PACKAGING COLOURS

Symbol	Packaging colours
B	White
F	Blue
J	Yellow
N	Black
O	Orange
R	Red

TABLE OF EQUIVALENCES

COPPER-PHOSPHORUS ALLOYS

	Type	Classification - Standards					YOUR REFERENCE
		EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	
MANUAL BRAZING	**PHOSBRAZ M60**	B Cu 94 P 710-860	CuP 179	CP 203	-	L-Cu P6	
	PHOSBRAZ V6	B Cu 94 P 710-845	CuP 179	CP 203	-	L-Cu P6	
	PHOSBRAZ P66	B Cu 93 P 710-825	CuP 180	CP 202	-	L-Cu P6	
	PHOSBRAZ P68	B Cu 93 P 710-815	CuP 180	CP 202	-	L-Cu P7	
	PHOSBRAZ M70	B Cu 93 P 710-805	CuP 180	CP 202	B Cu-P 2	L-Cu P7	
	PHOSBRAZ M73	B Cu 93 P 710-785	CuP 181	CP 202	B Cu-P 2	L-Cu P7	
	PHOSBRAZ E80	B Cu 92 P 710-750	CuP 182	CP 201	-	L-Cu P8	
	PHOSBRAZ E80+	B Cu 92 P 710-738	CuP 182	CP 201	-	L-Cu P8	
	PHOSBRAZ 675Sn	B Cu 86 Sn Si P 650-700	CuP 385	-	B CuP-9	-	
OVEN BRAZING	**PHOSBRAZ 840**	B Cu 94 P 710-840	CuP 179	CP 203	-	L-Cu P6	
	PHOSBRAZ 815	B Cu 93 P 710-815	CuP 180	CP 202	-	L-Cu P7	
	PHOSBRAZ 790	B Cu 93 P 710-790	CuP 181	CP 202	B Cu-P 2	L-Cu P7	
	PHOSBRAZ 770	B Cu 93 P 710-770	CuP 182	-	B Cu-P 2	L-Cu P7	
	PHOSBRAZ 750	B Cu 92 P 710-750	CuP 182	CP 201	-	L-Cu P8	
	PHOSBRAZ 738	B Cu 92 P 710-738	CuP 182	CP 201	-	L-Cu P8	

SILVER-COPPER-PHOSPHORUS ALLOYS

Type	Classification - Standards					YOUR REFERENCE
	EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	
PHOSBRAZ M68	B Cu 93 P Ag 710-815	-	-	-	-	
PHOSBRAZ AG4	B Cu 93 P Ag 650-825	-	-	-	-	
PHOSBRAZ AG10	B Cu 93 P Ag 650-825	-	-	-	-	
PHOSBRAZ AG20	B Cu 91 P Ag 650-820	CuP 279	CP 105	-	L-Ag 2 P	
PHOSBRAZ AG20+	B Cu 91 P Ag 650-800	CuP 280	-	BCuP-6	-	
PHOSBRAZ AG50	B Cu 89 P Ag 650-810	CuP 281	CP 104	BCuP-3	L-Ag 5 P	
PHOSBRAZ AG50+	B Cu 88 P Ag 650-770	CuP 282	-	BCuP-7	-	
PHOSBRAZ AG60	B Cu 87 P Ag (Ni) 650-720	CuP 283a	CP 103	-	-	
PHOSBRAZ AG61	B Cu 87 P Ag 643-718	CuP 283	-	BCuP-4	-	
PHOSBRAZ AG100	B Cu 84 Ag P 650-750	-	-	-	-	
PHOSBRAZ AG150	B Cu 80 Ag P 650-800	CuP 284	CP102	BCuP-5	L-Ag 15 P	
PHOSBRAZ AG180	B Cu 75 Ag P 645-650	CuP 286	CP101	-	L-Ag 18 P	
PAG 60	B Cu 87 P Ag (Ni) 645-725	**NF A81-362:** CuP 291	-	-	-	

BRAZE-WELDING ALLOYS

Type	Classification - Standards					YOUR REFERENCE
	EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	
CUPROX	B Cu 60 Zn Si 870-890	~Cu 471	~CU304	~RCu-Zn C	L CuZn40	
SUPER-CUPROX	B Cu 59 Zn Ag Si 850-870	-	-	-	-	
506	B Cu 50 Zn Ni Si 890-900	-	-	-	-	
NICROX 49 C1	B Cu 48 Zn Ni Si 890-920	Cu 773	CU305	Rcu-Zn D	L CuNi10Zn42	
SUPER-NICROX	B Cu 48 Zn Ni Ag Si 870-900	-	-	-	-	

Certification of the Technical Association of the Gas Industry in France (ATG)

Filler alloys and brazing fluxes used for bonding natural gas and propane piping require the approval of the French Gas Association (AFG). Products that meet these criterias are identified by the above symbol.

FIND MATCHING PRODUCTS!

SILVER ALLOYS

	Type	Classification - Standards					YOUR REFERENCE
		EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	
TERNARY ALLOYS	**BRAZARGENT 1505**	B Cu 55 Zn Ag Si 820-870	Ag 205	~AG208	-	L-Ag 5	
	BRAZARGENT 1520 Si	B Cu 46 Zn Ag Si 690-810	-	~AG206	-	L-Ag 20	
	BRAZARGENT 1535	B Ag 35 Cu Zn 685-775	Ag 235	-	BAg-35	-	
	BRAZARGENT 1544	B Ag 44 Cu Zn 675-735	Ag 244	AG203	-	L-Ag 44	
QUATERNARY ALLOYS	**BRAZARGENT 5018**	B Cu 47 Zn Ag Sn 720-790	-	-	-	-	
	BRAZARGENT 5025	B Cu 40 Zn Ag Sn 680-760	~Ag 125	AG108	BAg-37	L-Ag 25 Sn	
	BRAZARGENT 5030	B Cu 36 Zn Ag Sn 665-755	~Ag 130	AG107	-	L-Ag 30 Sn	
	BRAZARGENT 5034	B Cu 36 Ag Zn Sn 630-730	~Ag 134	AG106	-	L-Ag 34 Sn	
	BRAZARGENT 5038	B Ag 38 Cu Zn Sn 660-700	~Ag 138	-	BAg-34	-	
	BRAZARGENT 5040	B Ag 40 Cu Zn Sn 650-710	~Ag 140	AG105	BAg-28	L-Ag 40 Sn	
	BRAZARGENT 5045	B Ag 45 Cu Zn Sn 640-680	~Ag 145	AG104	BAg-36	L-Ag 45 Sn	
	BRAZARGENT 5055	B Ag 55 Zn Cu Sn 630-660	~Ag 155	AG103	-	L-Ag 55 Sn	
	BRAZARGENT 5056	B Ag 56 Zn Cu Sn 620-655	~Ag 156	AG102	BAg-7	-	
	BRAZARGENT 5000	B Ag 40 Cu Zn Sn 650-710	~Ag 140 according to ATG B.524-3 certification				
	BRAZARGENT 3049+	B Ag 49 Zn Cu Mn Ni 680-705	Ag 449	-	BAg-22	L-Ag 49	

ALUMINIUM ALLOYS

	Type	Classification - Standards		YOUR REFERENCE
		Chemical composition	EN ISO 17672	
SOLID WIRES	**ZINAL 4**	98 % Zn - 2 % Al	-	
	AL12	88 % Al - 12 % Si	Al 112	
TBW / TBM WIRES	**ZINAL 4 TBW**	98 % Zn - 2 % Al	-	
	HARASIL NC 12* TBW	88 % Al - 12 % Si	Al 112	
	TBM 12 NCs*	88 % Al - 12 % Si	Al 112	

* Non-corrosive flux.

BRAZING FLUXES

Type	Melting range (°C)	Classification - Standards		YOUR REFERENCE
		NF EN 1045	DIN 8511	
AGFLUX AGFLUX (Paste)	500-800	FH10	F-SH 1	
BORINOX	500-800	FH10	F-SH 1	
POLYFLUX	800-1000	FH20	F-SH 1	
FLUX ODAL	450-550	FL10	F-SH 2	
ALUNOX NC	560-570	FL20	-	
ALUNOX NCs	420-450	FL20	-	

MAINTENANCE AND REPAIR ALLOYS

Type	Working temperature (°C)	YOUR REFERENCE
SELECTARC G810	710	
SELECTARC G820	650	
SELECTARC G830	890	
SELECTARC G840	440	
CUBRA	730	

TECHNICAL DATA

STANDARD DIMENSIONS AND WEIGHT BY PRODUCT RANGE

TECHNICAL CHARACTERISTICS OF THE PHOSBRAZ® (CuP, CuP OVEN, CuP-Ag)

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,5 → 3,0	100-700 (with controlled straightness for CuP Oven)	1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	15 (+/- 1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 10 % (Other types may be provided on request.)		

TECHNICAL CHARACTERISTICS OF BRASS / NICKEL SILVER ALLOY PRODUCTS

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,5 → 3,0	500 - 1000	1 - 5
▪ **FLUX COATED RODS**	1,5 → 3,0	500 - 1000	1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	15 (+/- 1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 10 % (Other types may be provided on request.)		

TECHNICAL CHARACTERISTICS OF BRAZARGENT® PRODUCTS (ternary and quaternary alloys)

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,0 → 3,0	500	0,25 - 1 - 5
▪ **FLUX COATED RODS**	1,5 → 3,0	500	0,25 - 1 - 5
▪ **TBW**	1,6 → 3,0	500	0,25 - 1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (random wound)	1 - 5 - 15 (+/- 0,1 kg)
		spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard - 25 % (Other types may be provided on request.)		

TECHNICAL CHARACTERISTICS OF ALUMINIUM ALLOYS (Al-Si / Zn-Al)

Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **RODS**	1,6 → 3,0	500 - 1000	1 - 5
▪ **SPOOL, COIL**	1,6 → 3,0	spools (random wound)	5
		coils	5 (Other weights can be provided on request.)

TECHNICAL CHARACTERISTICS OF BRAZING FLUXES

Reference		Shape (powder)	Shape (paste)	Weight (g)
▪ **AGFLUX**	AGFLUX (paste)  No.1530 No.1598	x		200 - 400 - 1000
			x	60 - 200 - 400 - 1000
▪ **BORINOX**		x		400
			x	150
▪ **POLYFLUX**		x		200
			x	400
▪ **FLUX-ODAL**		x		200
▪ **ALUNOX NC**		x		200
▪ **ALUNOX NCs**		x		200

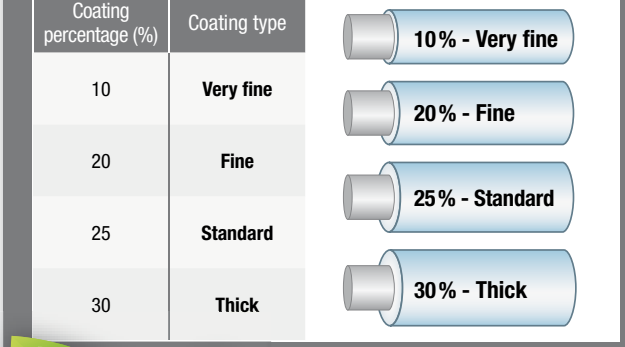
For further information on other brazing fluxes, their packaging and minimum order quantities, **please contact our Sales Department.**

DIAMETER CONVERSION

1" = 1 inch = 25,4mm		
ø inmm	ø in fractions of inches	ø in inch
0.6	1/44	0.0236
0.8	1/32	0.0315
1.0	1/26	0.0393
1.2	3/64	0.0472
1.6	1/16	0.0629
2.0	5/64	0.0781
2.4	3/32	0.0945
3.2	1/8	0.1259
4.0	5/32	0.1574
4.572	6/32	0.1800
5.208	7/32	0.2000
9.144	11/32	0.3600

TYPE OF COATING FOR FLUX COATED RODS

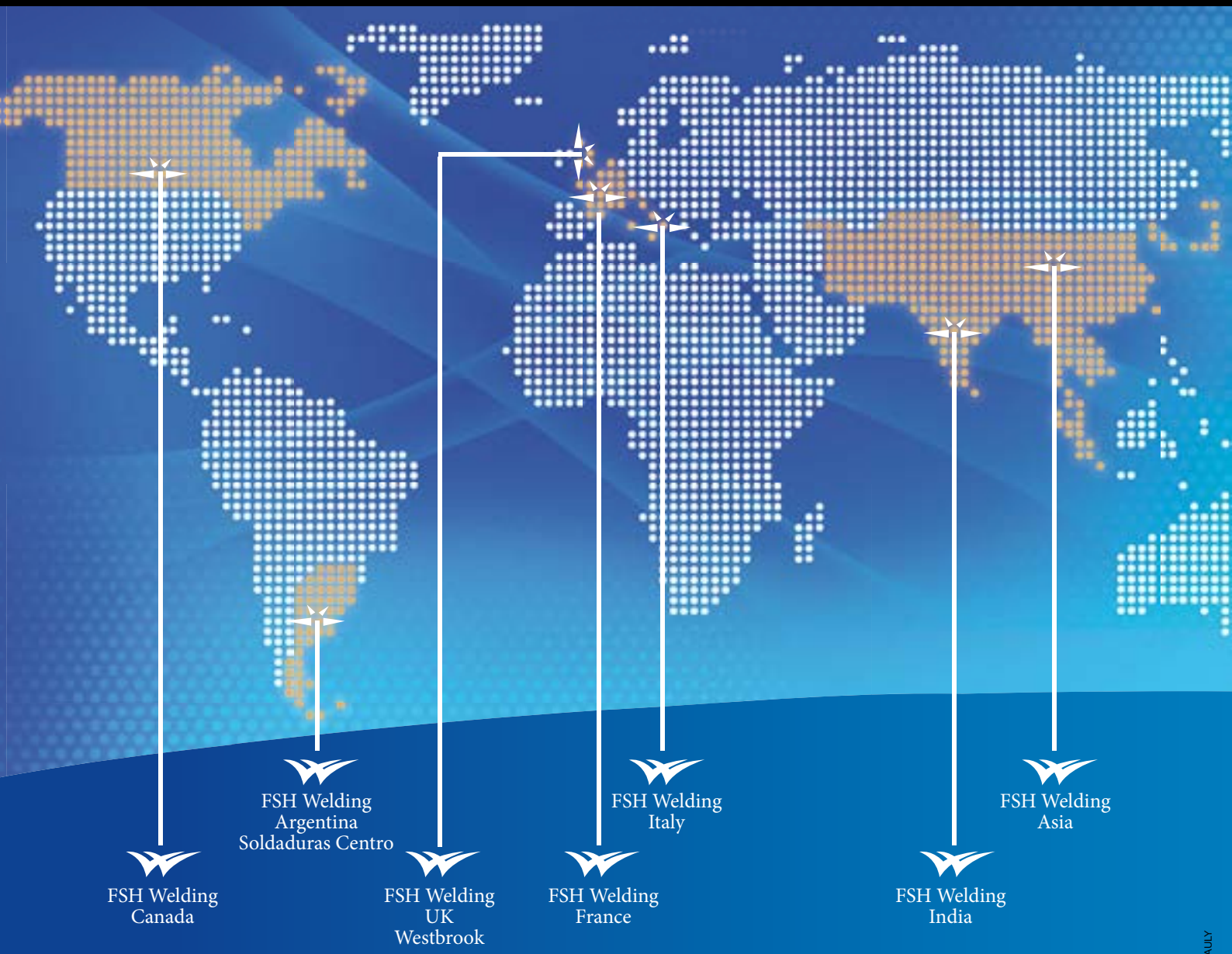
Coating percentage (%)	Coating type
10	Very fine
20	Fine
25	Standard
30	Thick



BY MAKING THE RIGHT CHOICE OF COATING YOU CAN ACHIEVE SAVINGS AND PROTECT THE ENVIRONMENT!

GLOSSARY

- **ALLOY:** An alloy is a combination of several metals or metalloids.
- **BINARY ALLOY:** A binary alloy is a combination of two metals or metalloids.
- **TERNARY ALLOY:** A ternary alloy is a combination of three metals or metalloids.
- **QUATERNARY ALLOY:** A quaternary alloy is a combination of four metals.
- **BRAZING:** Brazing is a joining method that creates metallic continuity of the base metals by means of a filler metal whose melting point (liquidus) is lower than that of the metals being joined. The filler metal penetrates in-between the joined surfaces by capillary action.
- **HARD BRAZING:** Brazing at temperatures above 450 °C, including braze-welding.
- **SOLDERING:** Brazing at temperatures below 450 °C.
- **CAPILLARITY:** Capillarity characterises the overall phenomena defining the behaviour of liquids in very narrow tubes, and, more generally, situations where a separation surface meets a solid wall.
- **INDUCTION HEATING:** Induction heating is a method that consists in heating a conductive material by electromagnetic induction. Foucault currents are generated at the core of the material, and their resistivity produces heat.
- **QUENCHING:** Cooling, generally produced by quickly reducing the temperature of metals and alloys beyond the critical temperature range in order to harden them.
- **COLD FORMING:** Hardening of the structure by mechanical means.
- **FLUX:** Flux is used during brazing to remove oxides, protect surfaces and perform wetting of the joining areas. Excess flux must be cleaned after the joint has been completed. The presence of flux on the joined parts may lead to corrosion.
- **LIQUIDUS :** Temperature above which an alloy becomes entirely liquid.
- **BASE METALS:** Materials to be joined.
- **WETTING:** The wetting of a liquid (melted filler metal) on a solid (the parts to be joined) is the degree of spread of the liquid on the solid.
- **PREFORMS:** Different product forms, such as pins, U-shaped brackets or rings.
- **DEPTH OF PENETRATION:** Capillary rise of the brazing metal in-between the base metals.
- **ANNEALING:** Annealing is a heat treatment that alters the microstructure of a material causing changes in properties, such as strength and hardness. This procedure allows reaching equilibrium by heating a material, maintaining it at a suitable temperature and then cooling it very slowly. It is used for softening the material, relieving its internal stresses, refining its structure and improving its cold working properties.
- **SOLIDUS:** Temperature below which all the components of an alloy are solid.



Our factories
of manufacturing in France:

SELECTARC WELDING

SELECTARC BRAZING

FSHWG: French industrial group specialized in the manufacture and marketing of innovative welding and brazing consumables (brazing alloys, electrodes for arc welding, TIG & MIG wires, flux cored wires and fluxes).
With 2 production facilities in France, a its own distribution network across all continents and experience over two hundred years, FSH Welding Group offers one of the broadest ranges of consumables and welding services for all types of applications (energy, transportation, petrochemicals, HVAC, M&R, ...) under the brand Selectarc.

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Selectarc

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