PANORAMA **OF BRAZING PRODUCTS**

- Complete programme (CuP, CuP-Ag, Ag, Brass, Al, etc.)
- State of art manufacturing process
- The only brazing foundry in France
- Development of products as per the customer specifications

Selectarc®

SELECTARC® is the French manufacturer of welding and brazing filler metals, which it develops, manufactures, preconizes and distributes in France and abroad.

With over 200 years' experience in metallurgy, SELECTARC® is recognised as the reference for assembly, repair and hardfacing in all industrial environments.

SELECTARC® has two production sites in France near Belfort (90) and Besançon (25), a logistics platform, an R&D centre and support functions at its head office.

SELECTARC®'s offering covers all welding and brazing requirements, particularly in strategic and demanding sectors such as nuclear, defence, naval, aeronautical, railway, HVAC and Oil & Gas.

Backed by a distribution network and five subsidiaries and partners, our group is present worldwide.

SELECTARC® stands out for the quality of its products and solutions, its capacity for innovation and customisation, and the great flexibility offered by its unique manufacturing processes.

CONTENTS

VIEW OUR FULL RANGE ON:
www.selectarc.com

All technical data sheets and MSDS are available on:
www.selectarc.com/en

Since 1948, the group's brazing division has been developing brazing consumables and is the inventor of Copper-Phosphorus. SELECTARC® has built up recognised expertise, making it one of the major players in industry and distribution in Europe and internationally.

Our foundry is located in Roche lez Beaupré (25) in 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 each batch testing, including Thermique Spectrometric analysis, dimensional check and brazing performance.

MADE IN FRANCE

ISO 9001

SALES DEPARTMENT:
sales@selectarc.com
INFORMATION :
info@selectarc.com

www.selectarc.com

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

INNOVATION IN PRODUCTION

★ CONTROL OF THE ENTIRE MANUFACTURING PROCESS: **full control of the manufacturing cycle right 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 alloys are guaranteed within ± 3 °C by means of thermal analysis performed while 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.**

HIGH FLEXIBILITY OF MANUFACTURING PROCESSES

Whether it is a standard or customized lengths or 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..., are made available** *(see p.54-55).*

PRODUCT INNOVATION R&D - LABORATORY

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 customers:

★ **Meet specific requirements, study customer specifications, integrate customer constraints (quality, productivity, implementation requirements, etc.) and develop alloys and product shapes adapted to the specific need 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 rejections, are on top priority.**

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

★ TUBULAR BRAZING WIRE (TBW): **a unique innovative technology patented 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** *(More informations p 36 and the full advantages of these products are described in the brochure "Tubular Brazing Wire-TBW" at: www.selectarc.com/documents-pour-le-brasage.htm).*

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

SERVICES

Quick response, state of art manufacturing, laboratory brazing tests, technical and technical-sales training.

View our full range on www.selectarc.com

OUR INDUSTRY FOCUS:

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

All technical data sheets and MSDS are available on: www.selectarc.com/en

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.

Selection of process:
- 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.

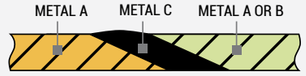
BRAZE-WELDING

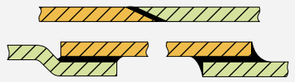
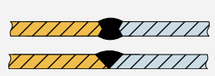
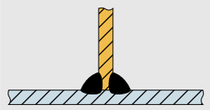
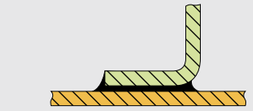
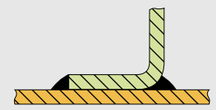
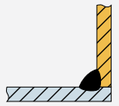
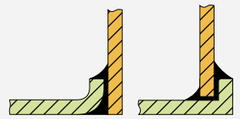
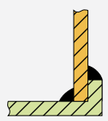
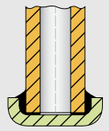
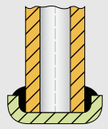
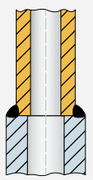
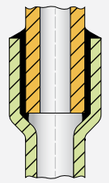
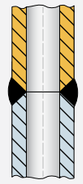
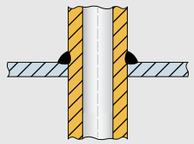
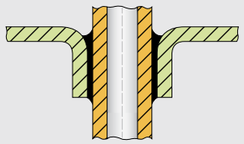
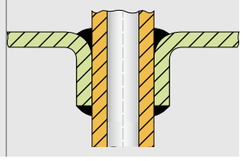
Braze-welding is a hard brazing method whereby the braze-welded joint is butt welded by a method that is similar to fusion welding, but without capillary action as in brazing, and without melting the base metals.

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 better performance than the permissible speed of autogenous welding for certain Thicknesses.

JOINT PREPARATION TECHNIQUES
FOR 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 JOINTS	WELDED JOINTS	BRAZED JOINTS	BRAZE-WELDED JOINTS
▪ **SQUARE BUTT JOINT**			
▪ **T-JOINT**			
▪ **FILLET 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 brazing temperatures. The temperature required for joining parts using brazing is usually 450 °C to 1150 °C, which is much lower than the temperatures required for welding.
- The problems encountered when welding construction Steel with a high content of Carbon, Nitrogen, Phosphorus and Sulphur, or are completely unknown Steel and can be brazed without any problem. There are no traces of oxide scale (Calamine) on the bead surface.

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

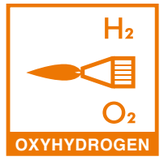
- Induction brazing is a method mainly used in automation and/or for joints where a precise and fast heating method is sought.

AERO-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 of joint.

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.



OXY-HYDROGEN FLAME

- Oxy-hydrogen flame is a mixture of two gases, Oxygen and Hydrogen generated by electrolyzing distilled water.
- This flame is suitable for most of the brazing applications.

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 air, 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	3 100
Oxy-propylene flame	2 870
Oxy-propane flame	2 830
Oxy-domestic gas flame	2 800
Oxy-hydrogen flame	2 800
Oxy-natural gas flame	2 770
Air-acetylene flame	2 400
Air-propane flame	1 980
Air-natural gas flame	1 750

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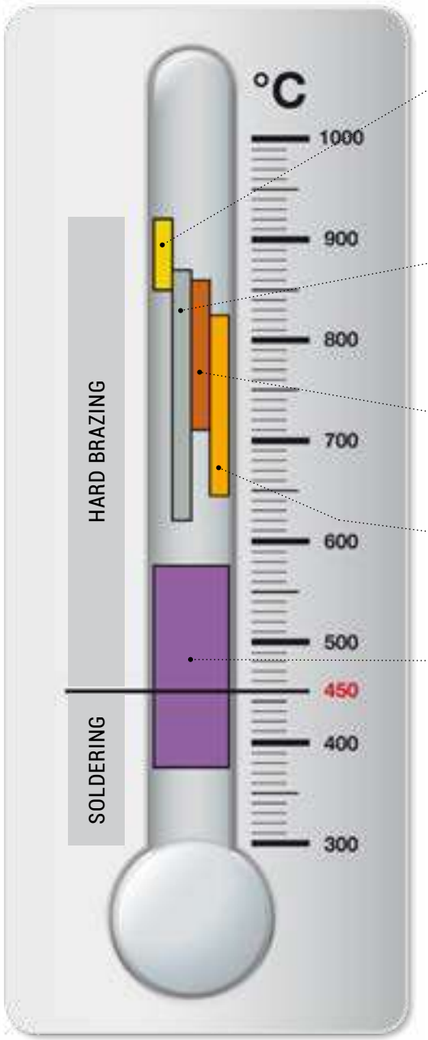
OVERVIEW

TEMPERATURE RANGES OF OUR BRAZING ALLOYS



NICKEL SILVER ALLOYS

■ TEMPERATURES BETWEEN 850-920 °C

NICROX, 506, SUPER-NICROX

BRASS

CUPROX®, SUPER-CUPROX

SILVER ALLOYS

■ TEMPERATURES BETWEEN 620-870 °C

BRAZARGENT® 15xx	BETWEEN 735-870 °C
BRAZARGENT® 34 GAZ	BETWEEN 630-730 °C
BRAZARGENT® 5056	BETWEEN 620-655 °C

CuP ALLOYS

■ TEMPERATURES BETWEEN 710-860 °C

PHOSBRAZ®...

CuP-Ag ALLOYS

■ TEMPERATURES BETWEEN 643-825 °C

PHOSBRAZ®, AG...

ALUMINIUM ALLOYS

■ TEMPERATURES BETWEEN 377-585 °C

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

- **Brazing:** brazing process 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:** joining process where the melting temperature (liquidus) of the filler metal is lower than 450 °C (filler metal: Lead + Tin, Tin + Silver).

MADE IN FRANCE

Selectarc®

DISCOVER
OUR FULL RANGE
AN ALTERNATIVE TO 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) No. 494/2011) AND THEIR USE IS NO LONGER ALLOWED.

CRITERIA FOR SELECTING A FILLER METAL SUBSTITUTE

1. 1st choice: An alloy gives performance/behaviour 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	650-720
■ 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 information/details, please contact our Technical Department: ***brazing@selectarc.com***

View our full range on www.selectarc.com

STANDARDS & CLASSIFICATION

MADE IN FRANCE

The ATG brand
Filler alloys and brazing fluxes used for bonding natural gas and propane piping require the approval of CERTIGAZ (Mandated agency for ATG brand management). Products that meet these criterias are identified by the above symbol.

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 - Fitting	710-860	CuP 179	-	L-Cu P6	p 19
	PHOSBRAZ V6	x	Special purpose - Fitting	710-845	CuP 179	-	L-Cu P7	p 19
	PHOSBRAZ P66	x	Intermediate alloy	710-825	CuP 180	-	L-Cu P7	p 19
	PHOSBRAZ P68	x	Intermediate alloy	710-805	CuP 180	-	L-Cu P7	p 19
	PHOSBRAZ M70	x	Capillary brazing	710-805	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	635-675	CuP 385	B Cu-P 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

COPPER-PHOSPHORUS-SILVER 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	700-825	-	-	-	p 25
PHOSBRAZ AG10	x		CuP Ag / 1 % Ag	650-820	-	-	-	p 25
PHOSBRAZ AG20	x		CuP Ag / 2 % Ag	645-825	CuP 279	-	-	p 25
PHOSBRAZ AG20+	x		Copper multipurpose with 2 % Ag	643-788	CuP 280	BCuP-6	-	p 25
PHOSBRAZ AG50	x		CuP Ag / 5 % Ag	645-815	CuP 281	BCuP-3	L-Ag 5 P	p 26
PHOSBRAZ AG50+	x		Special purpose: cold - vibrations with 5 % Ag	643-771	CuP 282	BCuP-7	-	p 26
PHOSBRAZ AG60	x	x	Copper piping / 6 % Ag, + Ni	643-813	CuP 283a	-	-	p 26
PHOSBRAZ AG61	x		Copper piping / 6 % Ag - AWS	643-813	CuP 283	BCuP-4	-	p 26
PHOSBRAZ AG100	x	x	Copper-Brass joints / 10 % Ag	650-750	-	-	-	p 26
PHOSBRAZ AG150	x		Copper-Brass joints / 15 % Ag	645-800	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 ATG Certification No.1530	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 with 1 % Ag	850-870	-	-	-	p 28
506	x	x	Braze-welding alloy with Nickel	890-900	-	-	-	p 29
NICROX 49 C1	x	x	High strength braze-welding	890-920	Cu 773	RB Cu Zn-D	L CuNi10Zn42	p 29
SUPER-NICROX	x	x	High strength braze-welding with 1 % Ag	870-900	-	-	-	p 29

SILVER ALLOYS

	Type	Shape			Main characteristic	Melting range (°C)	Classification			
		Bare	Coated	TBW			EN ISO 17672	AWS A5.8	DIN 8513	
TERNARY ALLOYS	BRAZARGENT 1512 Si	x	x		Ternary alloys / 12 % Ag	800-830	Ag 212	-	L-Ag 12	p 32
	BRAZARGENT 1520 Si	x	x		Economical, all joints (except for Al) / 20 % Ag	690-810	-	-	L-Ag 20	p 32
	BRAZARGENT 1535	x	x		Ternary alloys / 35 % Ag	685-755	Ag 235Si	BAg-35	-	p 32
	BRAZARGENT 1544	x	x		Ternary alloys / 44 % Ag	675-735	Ag 244Si	-	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 125Si	BAg-37	L-Ag 25 Sn	p 33
	BRAZARGENT 5030	x	x	x	Cadmium free / 30 % Ag	665-755	Ag 130Si	-	-	p 33
	BRAZARGENT 5034	x	x	x	Cadmium free / 34 % Ag	630-730	Ag 134Si	-	L-Ag 34 Sn	p 33
	BRAZARGENT 5038	x	x	x	Cadmium free / 38 % Ag	650-720	Ag 138Si	BAg-34	-	p 34
	BRAZARGENT 5040	x	x	x	Universal Ag brazing alloy (except for Al) / 40 % Ag	650-710	Ag 140Si	BAg-28	-	p 34
	BRAZARGENT 5045	x	x	x	Cadmium free / 45 % Ag	640-680	Ag 145Si	~BAg-36	L-Ag 45 Sn	p 34
	BRAZARGENT 5055	x	x		Cadmium free / 55 % Ag	630-660	Ag 155Si	-	L-Ag 55 Sn	p 34
	BRAZARGENT 5056	x	x	x	Superior physical properties / 56 % Ag	620-655	Ag 156Si	BAg-7	-	p 35
	BRAZARGENT 34 GAZ ATG Certification No. 1614	x			Combustible gas installations / 34 % Ag	630-730	Ag 134 according to ATG B.524-3 certification			p 35
	BRAZARGENT 3049+	x	x		High strength	680-705	Ag 449Si	BAg-22	L-Ag 49	p 35
	BRAZARGENT 3050	x	x	x	Cadmium free / 50 % Ag, 2 % Ni	660-705	Ag 450Si	BAg-24	-	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	DIN 1707-100 / S-Zn 98 Al 2	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 alloy)	385-420	98 % Zn - 2 % Al	DIN 1707-100 / S-Zn 98 Al 2	p 37
	HARASIL NC 12* TBW			x	Al / Al joints (flux and alloy)	575-585	88 % Al - 12 % Si	Al 112	p 37
	TBM 12 NCs*		x		Al / Al joints (flux and metal mix)	550-585	88 % Al - 12 % Si	Al 112	p 37
	TBM 12 NCs 20*		x		Al / Al joints (flux and metal mix)	550-585	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	x		For Silver brazing / Boric acid-free flux	500-800	FH10	p 38
AGFLUX (Paste) ATG Certification No.1530 and No. 1614		x	For Silver brazing / Boric acid-free flux	500-800	FH10	p 38
AG ACTIVE PASTE		x	For brazing copper, Brass, Steels, stainless steels and Ni base alloys, acid boric free	580-880	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
PHOS FLUX (L)	x		Liquide flux for joining copper and copper alloys	550-880	FH10	p 39

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STANDARDS & CLASSIFICATION

HOW TO CHOOSE?

PRODUCTS SELECTION
ACCORDING TO THE BASE METALS

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

WE CAN DEVELOP 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 AGFLUX, flux coated rods or TBW.
Ref.: embedded flux of self-fluxing alloy.

COPPER-PHOSPHORUS ALLOYS

+ 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 brazing of fluid carvying copper piping systems.

PHOSBRAZ ® is a registered trademark designating the most comprehensive range of Phosphorus alloys of Selectarc.
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.

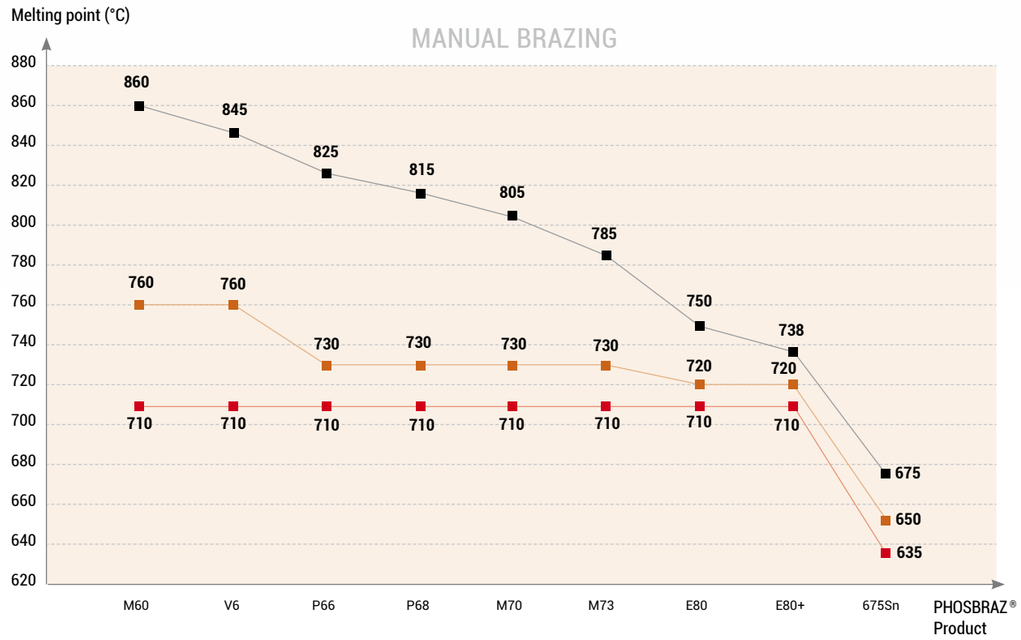
SELECTION GUIDE

PHOSBRAZ M60	PHOSBRAZ M73	PHOSBRAZ E80+
★ Semi-fluide alloys ★ Large clearances up to 2 mm	★ Standard fluidity ★ Standard clearances	★ High fluidity ★ Very tight clearances

SELECTION CRITERIA BASED ON 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	💧💧💧💧	This alloy 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 FLUIDITY	💧💧	Brazing of joints in position.
PHOSBRAZ M60 PHOSBRAZ V6	SEMI-FLUIDE	💧	Recommended for tube-assembly with wide gap.

SELECTION CRITERIA: MELTING POINT / WORKING TEMPERATURE

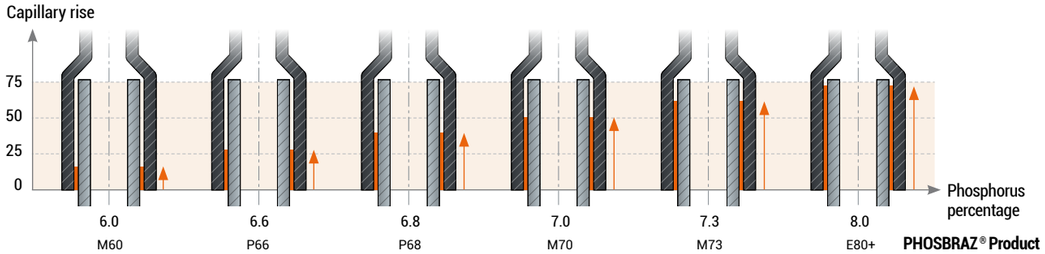


	Type	Technical characteristics: Solidus (°C)	Liquidus (°C)	Working temperature (°C)	Rm (MPa)	A (%)	Chemical composition: P (%)	Sn (%)	Cu (%)
MANUAL BRAZING	PHOSBRAZ M60	710	860	760	550	6	6	-	Balance
	PHOSBRAZ V6	710	845	760	550	5	6.3	-	Balance
	PHOSBRAZ P66	710	825	730	500	4	6.6	-	Balance
	PHOSBRAZ P68	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	450	2	8	-	Balance
	PHOSBRAZ 675Sn	635	675	650	350	2	6.75	7	Balance

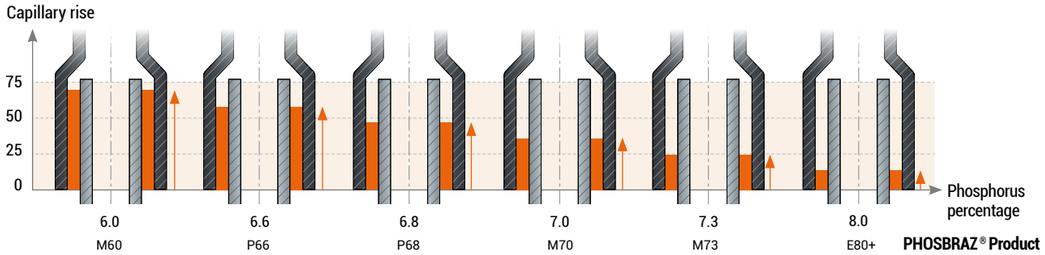
SCHEMATIC REPRESENTATION OF THE CAPILLARY ACTION OF PHOSBRAZ® (CuP) ALLOYS

Capillarity characterises the overall phenomena defining the behaviour of liquids in very narrow gaps 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.

COPPER-PHOSPHORUS ALLOYS

MANUAL BRAZING

PHOSBRAZ M60

SPECIAL PURPOSE - FITTING

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8.1					

PHOSBRAZ M60 with 6 % Phosphorus is a thick alloy that allows brazing of components 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 - FITTING

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8.1					

PHOSBRAZ V6 with 6.3 % Phosphorus is a thick alloy, which can therefore be used for fitting 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)	Alloy composition (%)		Physical properties		Type	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	-						d (g/cm³)	8.1					

PHOSBRAZ P66 with 6.8 % Phosphorus 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)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

PHOSBRAZ P68, with 6.8 % Phosphorus 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.**

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COPPER-PHOSPHORUS ALLOYS

PHOSBRAZ M70

CAPILLARY BRAZING

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

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

▪ **APPLICATIONS: Copper-Copper and Copper-Brass connections. Plumbing, heating systems.**

PHOSBRAZ M73

CONTROLLED FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

PHOSBRAZ M73 with 7.3 % Phosphorus 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 & connections, Water heaters and Cooling systems. Plumbing, heating systems.**

PHOSBRAZ E80

HIGH FLUIDITY

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

PHOSBRAZ E80 with 7.8 % Phosphorus 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	720	P	8	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus	738		Cu	Balance	A (%)	2					
DIN 8513	L-Cu P8						d (g/cm³)	8					

PHOSBRAZ E80+ with 8 % Phosphorus is a very high fluidity alloy enabling to work on joints with clearances below 0.5 mm using relatively low brazing temperatures even 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 385	Solidus	635	650	P	6.75	Rm (MPa)	350	Bare	✓	✓	✓	✓
AWS A5.8	B CuP-9	Liquidus	675		Sn	6.7	A (%)	2					
DIN 8513	-				Cu	Balance	d (g/cm³)	8					

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

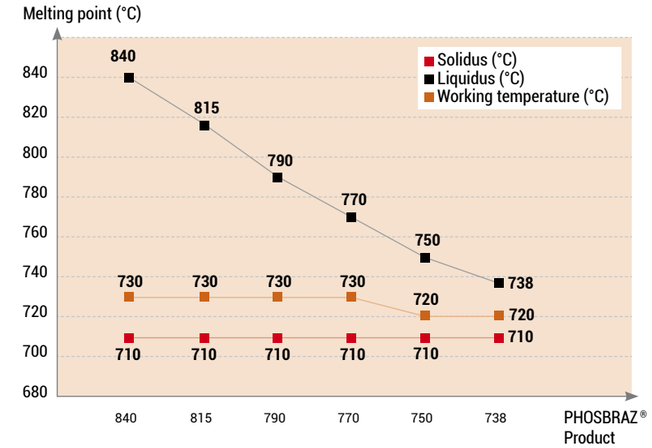
▪ **APPLICATIONS: Copper-Copper and Copper-Brass connections. Plumbing.**

RoHS 2002/95/EC

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 LIQUIDATION PHENOMENON DURING THE RISE IN TEMPERATURE.

SELECTION CRITERIA: MELTING POINT / WORKING TEMPERATURE



	Type	Technical characteristics: Solidus (°C)	Liquidus (°C)	Working temperature (°C)	Rm (MPa)	A (%)	Chemical composition: P (%)	Cu (%)
OVEN BRAZING	PHOSBRAZ 840	710	840	730	520	5	6.3	Balance
	PHOSBRAZ 815	710	815	730	450	4	6.8	Balance
	PHOSBRAZ 790	710	790	730	450	4	7.3	Balance
	PHOSBRAZ 770	710	770	730	450	4	7.5	Balance
	PHOSBRAZ 750	710	750	720	400	2	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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 179	Solidus	710	730	P	6.3	Rm (MPa)	520	Bare	-	-	-	✓
AWS A5.8	-	Liquidus	840		Cu	Balance	A (%)	5					
DIN 8513	L-Cu P6						d (g/cm³)	8.1					

This alloy was developed for oven brazing while ensuring the absence of liquidation phenomena, being therefore suitable for slow increases in temperature. Self-fluxing on Copper. The accuracy of the melting point 840 °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)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

Alloy developed for oven brazing, ensuring the absence of liquidation phenomena. Self-fluxing on Copper. Melting point: 815 °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)	Alloy composition (%)		Physical properties		Type	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	790		Cu	Balance	A (%)	4					
DIN 8513	L-Cu P7						d (g/cm³)	8					

This alloy is developed for oven brazing ensuring the absence of liquidation 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)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

This alloy is developed for oven brazing ensuring the absence of liquidation 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 182	Solidus	710	720	P	7.8	Rm (MPa)	400	Bare	-	-	-	✓
AWS A5.8	-	Liquidus	750		Cu	Balance	A (%)	3					
DIN 8513	L-Cu P8						d (g/cm³)	8					

This alloy was developed for oven brazing ensuring the absence of liquidation 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)	Alloy composition (%)		Physical properties		Type	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/cm³)	8					

This alloy was developed for oven brazing ensuring the absence of liquidation 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.**

AVAILABILITY OF CuP ALLOYS IN DIFFERENT TYPES AND SIZES

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 25 % (Other types may be provided on request.)		

COPPER-PHOSPHORUS-SILVER ALLOYS

+ PRODUCT ADVANTAGES: Addition of Silver to Copper-Phosphorus alloys helps to reduce the melting point. This addition also refines the grain structure, improves the electrical conductivity and increases the ductility of the alloy.

▪ Applications: Brazing of Electrical motors, Air condition, etc.

RoHS 2002/95/EC

SELECTION GUIDE

PHOSBRAZ AG20+
- ★ Multipurpose
- ★ Economical

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

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

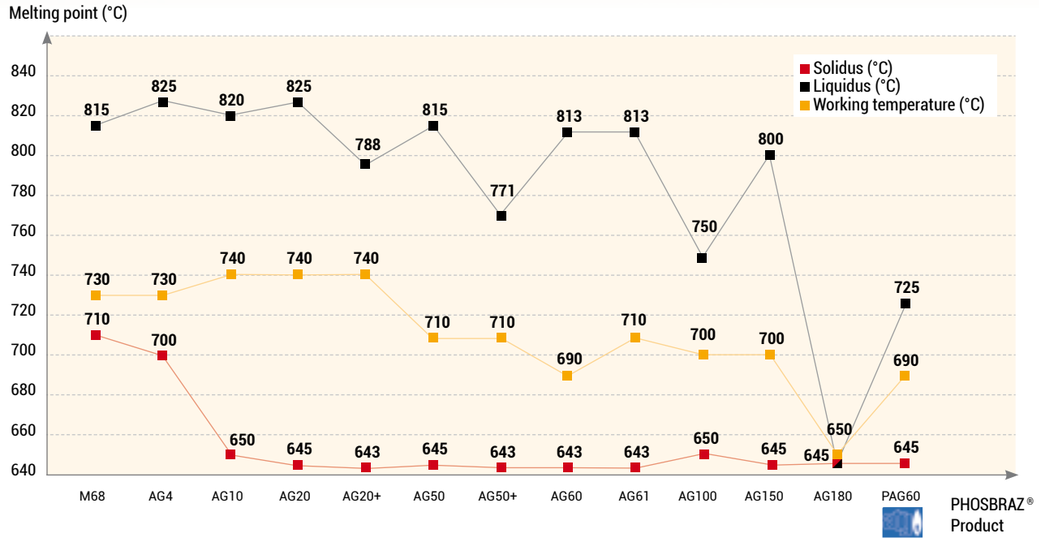
PHOSBRAZ AG150
- ★ Electrical connections
- ★ Standard to large clearances

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 condition).
PHOSBRAZ M68 PHOSBRAZ AG4 PHOSBRAZ AG10 PHOSBRAZ AG20 PHOSBRAZ AG50 PHOSBRAZ AG150	**AVERAGE FLUIDITY**	💧💧	Standard clearances. AG150 is suitable for use for connections requiring good electrical conductivity.

SELECTION CRITERIA - 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	700	825	730	500	6	6.5	0.4	-	Balance
PHOSBRAZ AG10	650	820	740	550	6	6.7	1	-	Balance
PHOSBRAZ AG20	645	825	740	550	6	6.6	2	-	Balance
PHOSBRAZ AG20+	643	788	740	550	6	7	2	-	Balance
PHOSBRAZ AG50	645	815	710	650	8	6	5	-	Balance
PHOSBRAZ AG50+	643	771	710	600	7	6.6	5	-	Balance
PHOSBRAZ AG60	643	813	690	450	4	7.3	6	0.1	Balance
PHOSBRAZ AG61	643	813	710	450	4	7.3	6	-	Balance
PHOSBRAZ AG100	650	750	700	650	8	6.2	10	-	Balance
PHOSBRAZ AG150	645	800	700	530	10	5	15	-	Balance
PHOSBRAZ AG180	645	645	650	480	10	7	18	-	Balance
PHOSBRAZ PAG 60 ATG Certification No.1530	645	725	690	450	4	7.3	6	0.1	Balance

COPPER-PHOSPHORUS-SILVER ALLOYS

PHOSBRAZ M68 — CuP Ag / 0,2 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 3677	-	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/cm³)	8.1					

The PHOSBRAZ M68 is a CuP alloy containing 0.2 % Silver, which has it slightly better fluidity compared to PHOSBRAZ P68.
▪ **APPLICATIONS: Recommended for brazing Copper 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	-	Solidus	700	730	P	6.5	Rm (MPa)	500	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	825		Ag	0.4	A (%)	6					
DIN 8513	-				Cu	Balance	d (g/cm³)	8.1					

The PHOSBRAZ AG4 is a CuP alloy containing 0.4 % Silver, which has it slightly better fluidity compared to PHOSBRAZ M68.
▪ **APPLICATIONS: Recommended for brazing Copper 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 3677	-	Solidus	650	740	P	6.7	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	B Cu93 P	Liquidus	820		Ag	1	A (%)	6					
DIN 8513	Ag 710-815				Cu	Balance	d (g/cm³)	8.1					

The PHOSBRAZ AG10 is a CuP 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 279	Solidus	645	740	P	6.6	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	-	Liquidus	825		Ag	2	A (%)	6					
DIN 8513	-				Cu	Balance	d (g/cm³)	8.1					

The PHOSBRAZ AG20 is a CuP 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 280	Solidus	643	740	P	7	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	BCuP-6	Liquidus	788		Ag	2	A (%)	6					
DIN 8513	-				Cu	Balance	d (g/cm³)	8.1					

The PHOSBRAZ AG20+ is a CuP 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.**

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COPPER-PHOSPHORUS-SILVER ALLOYS

PHOSBRAZ AG50

CuP Ag / 5 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 281	Solidus	645	710	P	6	Rm (MPa)	650	Bare	✓	✓	-	-
AWS A5.8	BCuP-3	Liquidus	815		Ag	5	A (%)	8					
DIN 8513	L-Ag 5 P				Cu	Balance	d (g/cm³)	8.2					

The PHOSBRAZ AG50 is a CuP 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 282	Solidus	643	710	P	6.6	Rm (MPa)	550	Bare	✓	✓	-	-
AWS A5.8	BCuP-7	Liquidus	771		Ag	5	A (%)	7					
DIN 8513	-				Cu	Balance	d (g/cm³)	8.2					

The PHOSBRAZ AG50+ is a CuP 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

COPPER PIPING / 6 % Ag + Ni

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 283a	Solidus	643	690	P	7.3	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	-	Liquidus	813		Ag	6	A (%)	4	Coated	✓	✓	✓	-
DIN 8513	-				Ni	0.1	d (g/cm³)	8.2					
					Cu	Balance							

The PHOSBRAZ AG60 is a Copper-Phosphorus alloy containing 6 % Silver, Nickel added (for refining the texture), recommended for brazing of copper pipes.
▪ **APPLICATIONS: Copper piping and combustible gas installations.**

PHOSBRAZ AG61

COPPER PIPING / 6 % Ag - AWS

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 283	Solidus	643	710	P	7.3	Rm (MPa)	450	Bare	✓	✓	✓	-
AWS A5.8	BCuP-4	Liquidus	813		Ag	6	A (%)	4					
DIN 8513	-				Cu	Balance	d (g/cm³)	8.2					

The PHOSBRAZ AG61 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

COPPER-BRASS JOINTS / 10 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8.3					

The PHOSBRAZ AG100 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 alloy (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.**

COPPER-PHOSPHORUS-SILVER ALLOYS

PHOSBRAZ AG150

COPPER-BRASS JOINTS / 15 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	CuP 284	Solidus	645	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/cm³)	8.4					

The Phosbraz AG150 is CuP alloy 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)	Alloy composition (%)		Physical properties		Type	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/cm³)	8.4					

The PHOSBRAZ AG180 is CuP alloy 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.1530

COMBUSTIBLE GAS INSTALLATIONS / 6 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	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/cm³)	8.2					
					Cu	Balance							

PAG 60 certified by **CERTIGAZ** in conjunction with AGFLUX (paste) under reference ATG 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.**

AVAILABILITY OF CuP-Ag ALLOYS IN DIFERENT TYPES AND SIZES

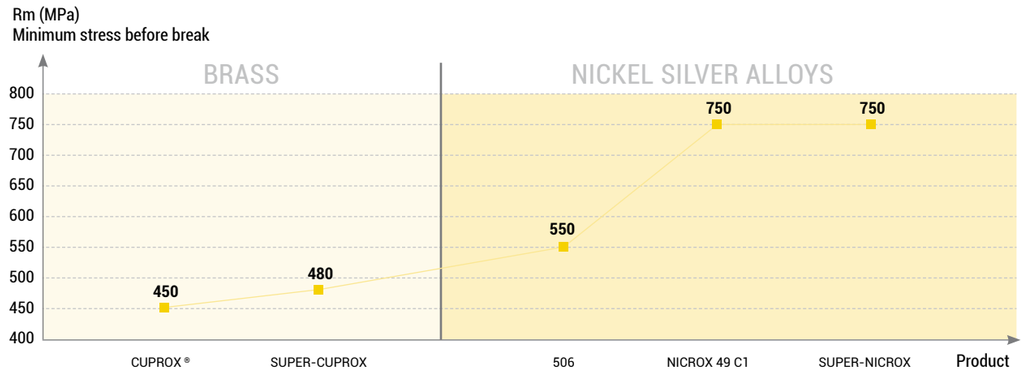
Reference	Diameter (mm)	Length (mm)	Weight (kg)
▪ **BARE RODS**	1,5 → 3,0	500	1 - 5
▪ **FLUX COATED RODS**	1,5 → 3,0	500 - 1000	1 - 5
▪ **WIRE (SPOOL, COIL)**	1,5 → 3,0	spools (precision wound)	15 (+/- 0,1 kg)
		coils	20 (+/- 1 kg) (Other weights can be provided on request.)
▪ **RINGS AND PREFORMS**	Dimensions and quantities may be provided on request.		
▪ **COATING TYPE**	Standard 30 % (Other types may be provided on request.)		

All technical data sheets and MSDS are available on: www.selectarc.com/en

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, aesthetically appealing results, their ease of application and excellent cost-effectiveness, make them suitable for use in several industrial applications, such as: manufacturing of bicycle frames, metal furniture and delicate work such as, especially involving galvanised steels.

SELECTION CRITERIA - MECHANICAL STRENGTH



CUPROX

BONDING AND REPAIR OF STAINLESS STEEL, COPPER OR CAST IRON

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	~Cu 471	Solidus	870	Cu	60	Rm (MPa)	450	Bare	✓	✓	✓	✓
AWS A5.8	~RCu-Zn C	Liquidus	890	Zn	Balance	A (%)	35	Coated	✓	-	-	-
DIN 8513	L CuZn40			Miscellaneous materials	Si, Mn, Sn	d (g/cm³)	8.4					

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 flux addition.
If needed it should be used in conjunction with POLYFLUX.
▪ **APPLICATIONS: Locksmithing and automatic workshops on turntables.**

SUPER-CUPROX

BRAZE-WELDING ALLOY / 1 % Ag

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 3677	B Cu 59 Zn Ag Si 850-870	Solidus	850	Cu	58	Rm (MPa)	480	Bare	✓	✓	✓	✓
		Liquidus	870	Ag	1	A (%)	30	Coated	✓	-	-	-
				Zn	Balance	d (g/cm³)	8.5					
				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 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 flux addition.
If needed it should be used in conjunction with POLYFLUX
▪ **APPLICATIONS: Locksmithing and automatic workshops on turntables.**

506

BRAZE-WELDING ALLOY WITH NICKEL

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 3677	B Cu 50 Zn Ni Si 890-900	Solidus	890	Cu	51	Rm (MPa)	550	Bare	✓	✓	✓	✓
		Liquidus	900	Ni	6	A (%)	30	Coated	✓	-	-	-
				Zn	Balance	d (g/cm³)	8.5					
				Miscellaneous materials	Si							

Alloy 506 is a braze-welding alloy with 6 % Nickel, which 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 flux addition.
If needed it should be used in conjunction with POLYFLUX.
▪ **APPLICATIONS: Mainly in locksmithing, manufacturing of office equipment or bicycle frames.**

NICROX 49 C1

HIGH STRENGTH BRAZE-WELDING

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Cu 773	Solidus	890	Cu	48	Rm (MPa)	750	Bare	✓	✓	✓	✓
AWS A5.8	RB Cu Zn-D	Liquidus	920	Ni	10	A (%)	25	Coated	✓	-	-	-
DIN 8513	L CuNi10Zn42			Zn	Balance	d (g/cm³)	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 flux addition.
If needed it should be used in conjunction with 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)		Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 3677	B Cu 48 Zn Ni Ag Si 870-900	Solidus	870	Cu	48	Rm (MPa)	750	Bare	✓	✓	-	✓
		Liquidus	900	Ni	9	A (%)	25	Coated	✓	-	-	-
				Ag	1	d (g/cm³)	8.7					
				Zn	Balance							
				Miscellaneous materials	Si, Mn, Sn							

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

AVAILABILITY OF BRAZE WELDING ALLOYS IN DIFFERENT TYPES AND SIZES

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.)		

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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 alloys are recommended for all brazing methods. The use of flux is indispensible when brazing in open air. The coated BRAZARGENT® rods simplify the brazing, without the need to manually control flux addition.

Selectarc 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 ALLOYS
COMPRISES OF TWO LARGE PRODUCTS FAMILIES

1 TERNARY ALLOYS

Our BRAZARGENT® "Series 15" product range comprises ternary alloys (containing Silver, Copper and Zinc) with a melting temperature above 675 °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 675 °C,
- Enables brazing parts with large joining tolerances,
- Provides good filling of larger joint gap.

2 QUATERNARY ALLOYS WITH TIN/NICKEL

Our BRAZARGENT® "Serie 50" and "Serie 30" range of products are quaternary range of alloys containing Silver, Copper, Zinc and Tin/Nickel. 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, aerospace industry, food industry, medical gas supply piping, etc.

Our range of BRAZARGENT® quaternary alloys:

- Gives 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,
- Recommended for manufacturing and in Maintenance & Repair.

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!

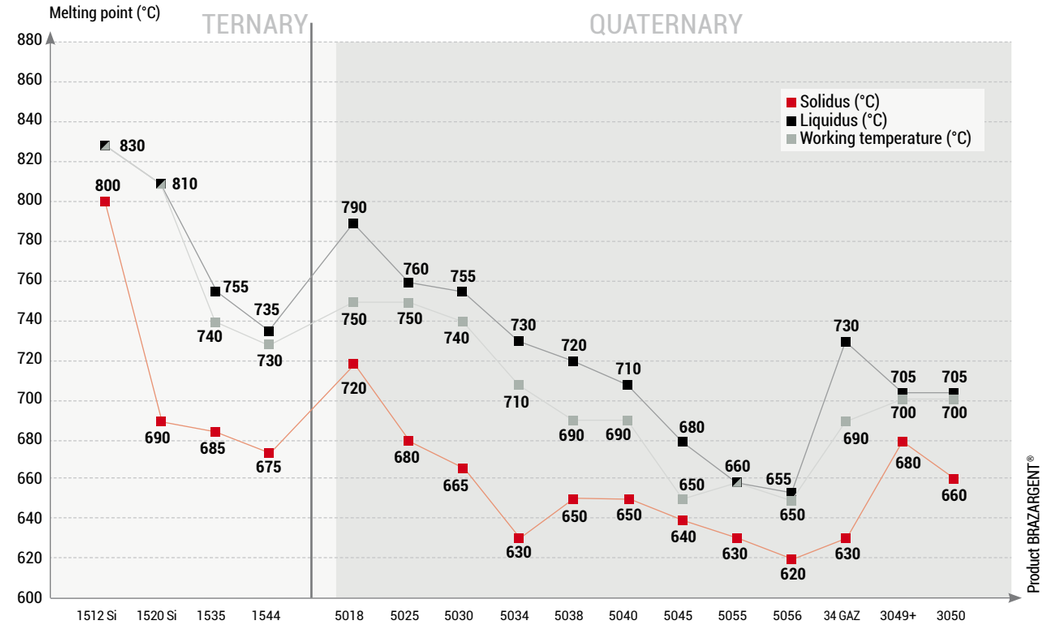
BY MAKING THE RIGHT CHOICE OF COATING YOU CAN MAKE SAVINGS AND PROTECT THE ENVIRONMENT!

FOR FLUX COATED RODS	
Coating percentage (%)	Coating type
10	Very thin
25	Thin
30	Standard
40	Thick

10 % - Very thin
25 % - Thin
30 % - Standard
40 % - Thick

Other ratios available on request

SELECTION CRITERIA - 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 1512 Si	800	830	830	390	17.0	12.0	48.0	40.0	-	-	0.2	-
	BRAZARGENT 1520 Si	690	810	810	400	20.0	20.0	44.0	36.0	-	-	0.2	-
	BRAZARGENT 1535	685	755	740	420	22.0	35.0	32.0	33.0	-	-	-	-
	BRAZARGENT 1544	675	735	730	400	25.0	44.0	30.0	26.0	-	-	-	-
QUATERNARY	BRAZARGENT 5018	720	790	750	450	15.0	18.0	47.0	33.0	2.0	-	-	-
	BRAZARGENT 5025	680	760	750	510	18.0	25.0	40.0	33.0	2.0	-	-	-
	BRAZARGENT 5030	665	755	740	500	18.0	30.0	36.0	32.0	2.0	-	-	-
	BRAZARGENT 5034	630	730	710	500	18.0	34.0	36.0	28.0	2.0	-	-	-
	BRAZARGENT 5038	650	720	690	520	18.0	38.0	32.0	28.0	2.0	-	-	-
	BRAZARGENT 5040	650	710	690	500	17.0	40.0	30.0	28.0	2.0	-	-	-
	BRAZARGENT 5045	640	680	650	500	14.0	45.0	27.0	25.5	2.5	-	-	-
	BRAZARGENT 5055	630	660	660	510	11.0	55.0	21.0	22.0	2.0	-	-	-
	BRAZARGENT 5056	620	655	650	470	18.0	56.0	22.5	17.5	5.0	-	-	-
	BRAZARGENT 34 GAZ ATG Certification No.1614	630	730	690	500	20.0	34.0	36.0	27.5	2.5	-	-	-
	BRAZARGENT 3049+	680	705	700	500	-	49.0	16.0	23.0	-	7.5	-	4.4
	BRAZARGENT 3050	660	705	700	500	20.0	50.0	20.0	28.0	-	-	-	2.0

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1 TERNARY ALLOYS

BRAZARGENT 1512 Si

TERNARY ALLOY / 12 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 212	Solidus	800	830	Ag	12.0	Rm (MPa)	390	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	830		Cu	48.0	A (%)	17	Coated	✓	-	✓	-
DIN 8513	L-Ag 12				Zn	39.7	d (g/cm³)	8.4					
					Si	0.2							

Ternary alloy containing Copper, Zinc, Silver (12%) and Silicon. Silver and Zinc contents lowers the melting point. This viscous alloy is suitable to join most Ferrous and Non-Ferrous metals with the notable exception of Aluminium and Magnesium. Use in conjunction with BORINOX or POLYFLUX or in the form of flux coated rods.

▪ **APPLICATIONS : Refrigeration and air conditioning industry, Plumbing Technology.**

BRAZARGENT 1520 Si

ECONOMICAL - ALL JOINTS (EXCEPT FOR ALUMINIUM) / 20 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 220	Solidus	690	810	Ag	20.0	Rm (MPa)	400	Bare	✓	✓	-	✓
AWS A5.8	-	Liquidus	810		Cu	44.0	A (%)	20	Coated	✓	-	-	-
DIN 8513	L-Ag 20				Zn	35.8	d (g/cm³)	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 (reheating) 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 AGFLUX 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 235Si	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/cm³)	9.0					

Ternary alloy containing 35 % Silver with standard fluidity. To be used bare in conjunction with AGFLUX 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 244Si	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/cm³)	8.9					

Ternary alloy containing 44 % Silver. Higher elongation than BRAZARGENT 1520 Si. To be used in conjunction with AGFLUX 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)	Alloy composition (%)		Physical properties		Type	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	47.0	A (%)	15	Coated	✓	-	✓	-
DIN 8513	-				Zn	33.0	d (g/cm³)	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 AGFLUX 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 125Si	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/cm³)	8.5					
					Sn	1.8							

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 AGFLUX 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 130Si	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	31.5	d (g/cm³)	8.8					
					Sn	2.3							

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

▪ **APPLICATIONS: Brazing of Steel, Copper or Brass parts that have no particular specifications or restrictions.**

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

BRAZARGENT 5034

CADMIUM-FREE / 34 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 134Si	Solidus	630	710	Ag	34.0	Rm (MPa)	500	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	730		Cu	36.0	A (%)	20	Coated	✓	-	✓	-
DIN 8513	L-Ag 34 Sn				Zn	28.0	d (g/cm³)	8.9	TBW	✓	✓	✓	✓
					Sn	2.0							

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 AGFLUX, 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.**

BRAZARGENT 5038

CADMIUM-FREE / 38 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 138Si	Solidus	650	690	Ag	38.0	Rm (MPa)	520	Bare	✓	✓	✓	✓
AWS A5.8	BAg-34	Liquidus	720		Cu	32.0	A (%)	18	Coated	✓	-	✓	-
DIN 8513	-				Zn	28.0	d (g/cm³)	8.8	TBW	✓	✓	✓	✓
					Sn	2.0							

Quaternary alloy containing 38 % Silver with good fluidity. To be used bare in conjunction with AGFLUX 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 ALLOY (EXCEPT FOR ALUMINIUM) / 40 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 140Si	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	-				Zn	28.0	d (g/cm³)	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 AGFLUX, 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 145Si	Solidus	640	650	Ag	45.0	Rm (MPa)	500	Bare	✓	✓	✓	✓
AWS A5.8	BAg-36	Liquidus	680		Cu	27.0	A (%)	14	Coated	✓	-	✓	-
DIN 8513	L-Ag 45 Sn				Zn	25.5	d (g/cm³)	9.1	TBW	✓	✓	✓	✓
					Sn	2.5							

Quaternary alloy containing 45 % Silver. BRAZARGENT 5045 is the standard brazing alloy. 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 AGFLUX, 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)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 155Si	Solidus	630	660	Ag	55.0	Rm (MPa)	510	Bare	✓	✓	✓	✓
AWS A5.8	-	Liquidus	660		Cu	21.0	A (%)	11	Coated	✓	-	✓	-
DIN 8513	L-Ag 55 Sn				Zn	22.0	d (g/cm³)	9.2					
					Sn	2.0							

Quaternary alloy containing 55 % Silver. To be used bare in conjunction with AGFLUX 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 PHYSICAL PROPERTIES - CADMIUM-FREE / 56 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 156Si	Solidus	620	650	Ag	56.0	Rm (MPa)	470	Bare	✓	✓	✓	✓
AWS A5.8	BAg-7	Liquidus	655		Cu	22.0	A (%)	18	Coated	✓	-	✓	-
DIN 8513	-				Zn	17.0	d (g/cm³)	9.5	TBW	✓	✓	✓	✓
					Sn	4.9							

Quaternary alloy containing 56 % Silver, used for joints that must meet strict safety requirements. This grade has the lowest melting point in the BRAZARGENT® series. 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 AGFLUX, or in the form of flux coated rods or TBW.
▪ **APPLICATIONS: Food industry, medical instruments, cooling systems, compressors, special joints, jewellery, etc.**

BRAZARGENT 34 GAZ

No.1614

COMBUSTIBLE GAS INSTALLATIONS - CADMIUM-FREE / 34 % Ag

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 134 according to ATG B.524-3 certification	Solidus	630	690	Ag	34.0	Rm (MPa)	500	Bare (Ø 2 x 500mm)	✓	✓	✓	✓
AWS A5.8		Liquidus	730		Cu	36.0	A (%)	20					
DIN 8513					Zn	27.5	d (g/cm³)	8.9	Wire Ø 1.6 et 2.0 mm				
					Sn	2.5			Preforms				

Quaternary alloy containing 34 % Silver, certified by **CERTIGAZ** in conjunction with AGFLUX (paste) under reference ATG 1614. 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+

HIGH STRENGTH

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 449Si	Solidus	680	700	Ag	49.0	Rm (MPa)	500	Bare	✓	✓	✓	✓
AWS A5.8	BAg-22	Liquidus	705		Cu	16.0	A (%)	-	Coated	✓	-	✓	✓
DIN 8513	L-Ag 49				Zn	23.0	d (g/cm³)	8.9					
					Mn	7.5							
					Ni	4.5							

BRAZARGENT 3049+ is 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 AGFLUX.
▪ **APPLICATIONS: Inserts, cutting tools, drilling bits, etc.**

BRAZARGENT 3050

CADMIUM-FREE / 50 % Ag, 2% Ni

Classification		Melting point (°C)		Working temperature (°C)	Alloy composition (%)		Physical properties		Type	Recommended heating method			
EN ISO 17672	Ag 450Si	Solidus	660	695	Ag	50.0	Rm (MPa)	540	Bare	✓	✓	✓	✓
AWS A5.8	BAg-24	Liquidus	705		Cu	20.0	A (%)	20	Coated	✓	-	✓	-
DIN 8513	-				Zn	28.0	d (g/cm³)	9	TBW	✓	✓	✓	✓
					Ni	1.9							

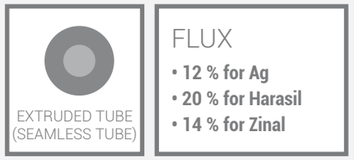
BRAZARGENT 3050 is a low melting silver based brazing alloy with Nickel (Ni) improves wettability for Tungsten carbide and material difficult to wet, such as Molybdenum, Tantalum and Chromium. Also Improves joining strength. For use in conjunction with AGFLUX or BORINOX Flux.
▪ **APPLICATIONS: E.g. Cutting tools, Medical, Dental and hospital applications, in Electric and Automotive industry, Plumbing.**

AVAILABILITY OF BRAZARGENT® PRODUCTS (ternary & quaternary alloys) IN DIFFERENT TYPES AND SIZES

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 30 % (Other types may be provided on request.)		

OVERVIEW

WHAT IS TUBULAR BRAZING WIRE?




ART COMING OF FLUX FROM THE TUBE


FLUX START MELTING


BRAZING COMPLETED WITHOUT OVER-SPILLAGE

TUBULAR BRAZING WIRE (TBW)

▪ TBW is a brazing flux cored wire, used for manual as well as automatic brazing. This is a unique patented process. The flux is filled in the extruded seamless tube ensuring a constant alloy to flux ratio. This filled tube is drawn to lower diameter in steps.

MAIN FEATURES

Easy to use: 2 in 1 product, no additional fluxing

TBW is a cost economic solution compare to conventional brazing products:
- less alloy consumption : optimum usage of alloy and limit over-flow,
- higher productivity : consistent quality and mechanized brazing,
- less rejection: better visibility during operation,
- less post-braze cleaning: less residue due to optimum flux ratio,
- less inventory: no need of paste appliance and more storage space,
- less consumable wastage: no coating fragility.

User friendly:
- Less fatigue: less fumes, no fluxing.
- Better operator safety: no splashing.

Health safety:
- No physical contact with the flux/coating.
- Environmental friendly: conform to REACH/ECHA and RoHS.
- Higher shelf-life even in tropical climates.

Available in different Forms (Rods, Spools, Rings, Preforms...)

PRODUCT RANGE

Product name	% Ag	Alloy	NF EN ISO 17672 2016	AWS A5.8 2015	Temperatur Range (°C)
BRAZARGENT 5034 TBW	34	Cu-Ag-Zn-Sn	Ag 134Si	-	630-730
BRAZARGENT 5038 TBW	38	Cu-Ag-Zn-Sn	Ag 138Si	BAg-34	650-720
BRAZARGENT 5040 TBW	40	Cu-Ag-Zn-Sn	Ag 140Si	BAg-28	650-710
BRAZARGENT 5045 TBW	45	Cu-Ag-Zn-Sn	Ag 145Si	BAg-36	640-680
BRAZARGENT 5056 TBW	56	Cu-Ag-Zn-Sn	Ag 156Si	BAg-7	620-655
BRAZARGENT 3050 TBW	50	Cu-Ag-Zn-Ni	Ag 450Si	BAg-24	660-705
HARASIL NC 12 TBW	-	Al-Si (88:12)	Al112		575-585
ZINAL 4 TBW	-	Zn-Al (98:2)	DIN 1707-100 : S-Zn 98 Al 2		382-420


SPOOL


RODS


RINGS


PACKING

DIMENSIONS AND DIFFERENT FORMS AVAILABLE

Rod = Diam x Length (mm)	Wire diameter (mm)	Interior ring diameter (Id, mm)	Weight per spool (D100, D200, D300...)	Coils (Dimensions, Weight)
1.00 to 5.00 x 500 / 1000	0.80 to 3.00	2.00 to 20.00 or more	0.500 to 10 kg/spool	On request.

Note: Customized alloys wire sizes and pre-forms can be manufactured 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)		Alloy composition (%)		Physical properties		Type	Recommended heating method
DIN 1707-100	S-Zn 98 Al 2	Solidus	377	Zn	98.0	Rm (MPa)	104	Bare	✓ ✓ ✓ ✓
AWS A5.8	-	Liquidus	385	Al	2.0	A (%)	-		
DIN 8513	-					d (g/cm³)	6.90		

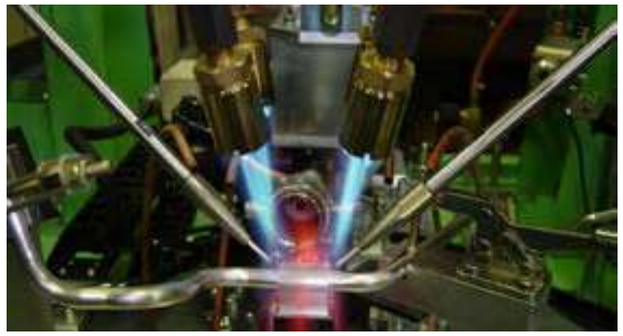
ZINAL 4 is a Zinc and Aluminium alloy. It is primarily designed for brazing Magnesium-free Aluminium with other metals, typically Aluminium/Copper. To be used with our ALUNOX NCs flux (non-corrosive).
▪ APPLICATIONS: Heat exchangers, household appliances, Steel-Aluminium and galvanised Steel-Aluminium electrical connections.

AL12

Al / Al JOINTS

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method
EN ISO 17672	Al 112	Solidus	575	Si	12.0	Rm (MPa)	140	Bare	✓ ✓ ✓ ✓
AWS A5.8	BAlSi-4	Liquidus	585	Al	88.0	A (%)	20		
DIN 8513	L-AlSi 12					d (g/cm³)	2.65		

AlSi12 Aluminium alloy. To be used with fluxes ALUNOX NC (non-corrosive) or FLUX-ODAL (corrosive).
▪ APPLICATIONS: Automotive air conditioning, heat exchangers, household appliances.



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TBW

TBM™

TBW / TBM™ WIRES

ZINAL 4 TBW

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

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method
DIN 1707-100	S-Zn 98 Al 2	Solidus	385	Zn	98.0	Rm (MPa)	104	TBW	✓ ✓ ✓ ✓
AWS A5.8	-	Liquidus	420	Al	2.0	A (%)	-		
DIN 8513	-					d (g/cm³)	6.90		

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 at core. 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, Copper to Aluminium.**

HARASIL NC 12 TBW

Al / Al JOINTS (FLUX AND ALLOY)

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method
EN ISO 17672	Al 112	Solidus	575	Si	12.0	Rm (MPa)	140	TBW	✓ ✓ ✓ ✓
AWS A5.8	BAlSi-4	Liquidus	585	Al	88.0	A (%)	20		
DIN 8513	L-AlSi 12					d (g/cm³)	2.65		

Alloy designed for brazing Magnesium-free Aluminium parts. Tubular wire with incorporated non-corrosive flux at core. 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)		Alloy composition (%)		Physical properties		Type	Recommended heating method
EN ISO 17672	Al 112	Solidus	550	Si	12.0	Rm (MPa)	140	Mix	✓ ✓ ✓ ✓
AWS A5.8	BAlSi-4	Liquidus	585	Al	88.0	A (%)	20		
DIN 8513	L-AlSi 12					d (g/cm³)	2.65		

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.**

TBM 12 NCs 20

Al / Al JOINTS

Classification		Melting point (°C)		Alloy composition (%)		Physical properties		Type	Recommended heating method
EN ISO 17672	Al 112	Solidus	550	Si	12.0	Rm (MPa)	140	Mix	✓ ✓ ✓ ✓
AWS A5.8	BAlSi-4	Liquidus	585	Al	88.0	A (%)	20		
DIN 8513	L-AlSi 12					d (g/cm³)	2.65		

Alloy designated for the brazing of magnesium bearing aluminium-alloy (Mg < 1.2%). Non-corrosive flux mixed inside the metal, melting point: 575-585 °C.

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

AVAILABILITY OF ALUMINIUM ALLOYS (Al-Si / Zn-Al) IN DIFFERENT TYPES AND SIZES

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 of alloy guides the operator for introduction of the filler rods at brazing joint. 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.1614

FOR SILVER BRAZING / BORIC ACID-FREE FLUX

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Form	Recommended heating method
EN 1045	FH10	Paste	Solidus	450	Plastic jar (with child safety mechanism and tactile indicator)	60-200-400-1000	Paste	✓ ✓ ✓ ✓
		Powder	Liquidus	800		200-400-1000	Powder	✓ ✓ ✓ ✓

This flux to 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 (available in 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.**

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 34 GAZ alloy under ATG registration number 1614.

AG ACTIVE PASTE

FOR STEEL BRAZING

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Form	Recommended heating method
EN 1045	FH10	Paste	Solidus	550	Plastic jar (with child safety mechanism and tactile indicator)	500-1000	Paste	✓ ✓ ✓ ✓
			Liquidus	880				

This flux is ready to use. A stream of strong brazing for Copper Stainless Steel and nickel alloys. Paste composed of mixture of Complex Fluoroborates ensuring very good protection of brazing component at high temperature. **Boric acid-free flux**.

▪ **APPLICATIONS: It used in a wide variety of joining applications for many different finished products including applications Switchgears, Farm machinery, Heat Exchanger, Heating equipment, Plumbing Fixtures, Refrigeration and Air conditioning, Ship Repair, Steel Furniture.**

BORINOX

FOR STEEL BRAZING

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Form	Recommended heating method
EN 1045	FH10	Paste	Solidus	500	Plastic jar (with child safety mechanism and tactile indicator)	400	Paste	✓ ✓ ✓ ✓
AWS A5.3	I F83-F	Powder	Liquidus	800		200-500-1000	Powder	✓ ✓ ✓ ✓

This multipurpose flux may be used in the form of paste or powder with all our BRAZARGENT® brazing filler metals with melting temperatures between 500-800 °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)	Form	Recommended heating method
EN 1045	FH20	Paste	Solidus	800	Plastic jar (with child safety mechanism and tactile indicator)	400	Paste	✓ ✓ ✓ ✓
		Powder	Liquidus	1000		150-200-1000	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® and NICROX.**

BRAZING FLUXES

FLUX-ODAL

FOR ALUMINIUM

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Form	Recommended heating method			
EN 1045	FL10	Powder	Solidus	450	Plastic jar (with child safety mechanism and tactile indicator)	200-500	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)	Form	Recommended heating method			
EN 1045	FL20	Powder	Solidus	560	Plastic jar (with child safety mechanism and tactile indicator)	200-1000	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

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Form	Recommended heating method			
EN 1045	FL20	Powder	Solidus	400	Plastic jar (with child safety mechanism and tactile indicator)	200-1000	Paste	✓	✓	✓	✓
			Liquidus	450			Powder	✓	✓	✓	✓

Non-corrosive pickling flux for Magnesium-free Aluminium alloys.

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

PHOS FLUX (L)

FOR COPPER / LIQUID FLUX

Classification		Type	Melting point (°C)		Packaging	Weight (g)	Form	Recommended heating method			
EN 1045	FH10	Liquid	Solidus	580	Plastic jar (with child safety mechanism and tactile indicator)	0.5 - 1 - 5 - 10	Liquid	✓	✓	✓	✓
			Liquidus	880							

PHOS FLUX (L) ready to use transparent liquid Flux for Copper & Copper Alloys joining. The liquid composed of mixture of Complex borates and fluorine Salts. Give a very good protection of brazing component at high temperature.

▪ **APPLICATIONS: Heat Exchanger, Heating equipment, Plumbing Fixtures, Refrigeration and Air conditioning.**

STANDARDS PACKAGING OF BRAZING FLUXES

Reference	Shape (powder)	Shape (paste)	Weight (g)
PHOSBRAZ FLUX	x		60 - 200
		x	60 - 200
AGFLUX (N°1530 N°1614)	x		80 - 200 - 1000
		x	60 - 200 - 1000
AG ACTIVE PASTE		x	200 -500 - 1000
BORINOX	x		200 - 500 - 1000
		x	400
POLYFLUX	x		200 - 1000
		x	300 - 1000
FLUX-ODAL	x		200 - 500
ALUNOX NC	x		200
ALUNOX NCs	x		200
CUPRO FLUX	x		150
		x	300
PHOS FLUX (L)	Sur demande		

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 used fluxes and their corrosive or non-corrosive residues, it is recommended to clean workpieces by:

- By submerging in hot water for about half an hour,
- Mechanical cleaning,
- Using a 10 % sodium hydroxide solution.

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

APPLICATIONS

Selectarc®

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

HEATING AND VENTILATION

DOMESTIC AND INDUSTRIAL APPLIANCES

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.

DOMESTIC AND INDUSTRIAL APPLIANCES

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.

All technical data sheets and MSDS are available on: www.selectarc.com/en

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APPLICATIONS

PLUMBING AND SANITARY FACILITIES

MAIN APPLICATIONS

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

MEASURING AND CONTROL DEVICES

MAIN APPLICATIONS

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

RENEWABLE ENERGY, SOLAR PANELS

MAIN APPLICATIONS

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

ELECTRO-MECHANICAL CONSTRUCTIONS

MAIN APPLICATIONS

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

TUBULAR STRUCTURES

MAIN APPLICATIONS

- Metal structures,
- Eyeglass frames / spectacles,
- Bicycle frames,
- Metal furnitures, etc.

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Selectarc®

SELECTION GUIDE

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, in conjunction with flux, flux coated, or TBW.

	Reference	Areas of application								
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	✓			✓					

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	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.1530)	For all pipelines and gas								
BRASS	CUPROX	✓	✓		✓		✓			✓
	SUPER-CUPROX	✓	✓		✓		✓			✓
	506									✓
	NICROX 49 C1	✓			✓		✓			✓
	SUPER-NICROX	✓			✓		✓			✓
SILVER	BRAZARGENT 1512 Si				✓				✓	✓
	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 34 GAZ (No.1614)	For all pipelines and gas								
	BRAZARGENT 3049+						✓			
	BRAZARGENT 3050						✓			
ALUMINIUM	ZINAL 4 / TBW	✓		✓						
	AL12	✓								
	HARASIL NC 12 TBW			✓						
	TBM 12 NCs			✓						
	TBM 12 NCs 20			✓						

All technical data sheets and MSDS are available on: www.selectarc.com/en

PACKAGING

AVAILABLE IN DIFFERENT TYPES, SHAPES & THEIR PACKING

BARE RODS

FLUX COATED RODS

SPOOLS OR COILS

TUBULAR BRAZING WIRE (TBW)

TBM ™

PREFORMS

RINGS

RINGS (ON MANDREL)

BRAZING FLUX

PRINTING

PACKAGING

SERVICE & QUALITY

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, makes procedures and carries out product testing (chemical analysis, thermal analysis and mechanical testing) according to customer requests.

• Customer support

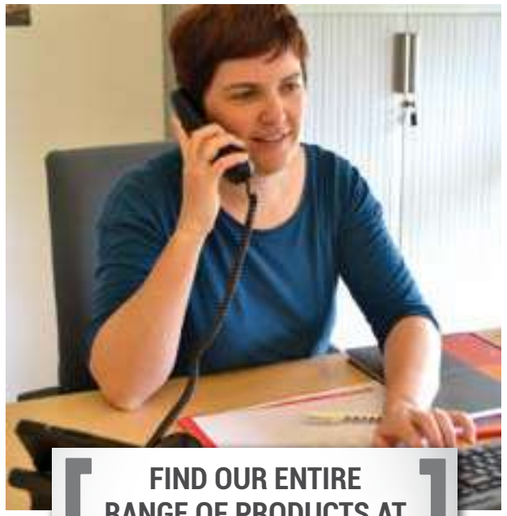
The Sales Department is available for fast response to all requests.

• Specific request

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

QUALITY ASSURANCE

ISO 9001 Certification.



FIND OUR ENTIRE RANGE OF PRODUCTS AT WWW.SELECTARC.COM

FOR ORDERING?
THE STRUCTURE OF OUR PRODUCT CODES!

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

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

1 UNDERSTANDING OUR CATALOGUE REFERENCE FORMAT

		1	2	3	4	5	6	7	8	9
Examples of catalogue reference codes	Product description	Alloy code	Form	ø Wire O.D. (mm)	ø Inner I.D. (mm)	Length (mm)	Colour	Printing	Packaging	Packaging colour
M7B30500R T20O	PHOSBRAZ M70 ▪ bare rod	M7	B	3,0	-	500	R (= pink)	-	T20 (= 5 kg)	O (= orange)
M7 B 30 - 500 R - T20 O										
P60B20500R/F18O	PAG 60 ▪ marked bare rod	P60	B	2,0	-	500	R (= pink)	/F = ATG	T18 (= 1 kg)	O (= orange)
P60 B 20 - 500 R /F T18 O										
CXE20999S T38O	CUPROX ▪ coated rod	CX	E	2,0	-	999 (= 1000)	B (= white)	-	T38 (= 5 kg)	O (= orange)
CX E 20 - 999 B - T38 O										
C5056200RE	BRAZARGENT 5056 ▪ annealed wire coil	5056	C (positioned before the alloy code)	2,0	-	-	N (= natural)	-	-	RE (= annealed)
C 5056 20 - - N - - RE										
C5056200EC	BRAZARGENT 5056 ▪ cold formed wire coil	5056	C (positioned before the alloy code)	2,0	-	-	N (= natural)	-	-	EC (= cold forming)
C 5056 20 - - N - - EC										
5056A30I55N	BRAZARGENT 5056 ▪ rings	5056	A	3,0	55	-	N (= natural)	-	-	-
5056 A 30 55 - N - - -										

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

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

Code alliage	Alliage
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
SCX	SUPER-CUPROX
506	506
NX	NICROX 49 C1
SN	SUPER-NICROX
1512	BRAZARGENT 1512 Si
1520	BRAZARGENT 1520 Si
1535	BRAZARGENT 1535
1544	BRAZARGENT 1544
5018	BRAZARGENT 5018
5025	BRAZARGENT 5025
5030	BRAZARGENT 5030
5034	BRAZARGENT 5034
5034T	BRAZARGENT 5034 TBW
5038	BRAZARGENT 5038
5040	BRAZARGENT 5040
5040T	BRAZARGENT 5040 TBW
5045	BRAZARGENT 5045
5045T	BRAZARGENT 5045 TBW
5055	BRAZARGENT 5055
5056	BRAZARGENT 5056
5056T	BRAZARGENT 5056 TBW
* (Special ref, on request)	BRAZARGENT 34 GAZ
3049+	BRAZARGENT 3049+
3050	BRAZARGENT 3050
3050T	BRAZARGENT 3050 TBW
ZINAL4	ZINAL 4
ZINAL4T	ZINAL 4 TBW
ALSI12	AL12
NC12T	HARASIL NC 12* TBW
TBM12	TBM 12 NCs*
* (Special ref, on request)	TBM 12 NCs 20*
G810	G810
G820	G820
G830	G830
G840	G840
CB	CUBRA
FLAGF/G	AGFLUX (Paste)
FLAGF	AGFLUX (Pulver)
FLACT/G	AG ACTIVE PASTE (Paste)
BORINOXPATE	BORINOX (Paste)
BORINOXPOUDRE	BORINOX (Pulver)
FLPOL/G	POLYFLUX (Paste)
FLPOL/P	POLYFLUX (Pulver)
FLODAL/P	FLUX ODAL (Pulver)
FLALUNC/P	ALUNOX NC (Pulver)
FLALUNCS/P	ALUNOX NCs (Pulver)
FLPHOSL	PHOS FLUX (L) (Liquid)

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
B	White	CUPROX
B	White	SUPER-CUPROX
B	White	506
B	White	NICROX 49 C1
B	White	SUPER-NICROX
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
B	White	BRAZARGENT 5034
B	White	BRAZARGENT 5038
B	White	BRAZARGENT 5040
B	White	BRAZARGENT 5045
B	White	BRAZARGENT 5055
B	White	BRAZARGENT 5056

6 STANDARD BARE COLOURS

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

7 PRINTING

Printing
For ATG 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

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TABLE OF EQUIVALENT

FIND
MATCHING PRODUCTS!

COPPER-PHOSPHORUS ALLOYS

	Type	Classification - Standards: EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	YOUR REFERENCE
MANUAL BRAZING	PHOSBRAZ M60	B Cu 94 P 710-890	CuP 179	CP 203	-	L-Cu P6	
	PHOSBRAZ V6	B Cu 94 P 710-890	CuP 179	CP 203	-	L-Cu P6	
	PHOSBRAZ P66	B Cu 93 P 710-820	CuP 180	CP 202	-	-	
	PHOSBRAZ P68	B Cu 93 P 710-820	CuP 180	CP 202	-	L-Cu P7	
	PHOSBRAZ M70	B Cu 93 P 710-820	CuP 180	CP 202	B Cu-P 2	L-Cu P7	
	PHOSBRAZ M73	B Cu 93 P 710-793	CuP 181	CP 202	B Cu-P 2	L-Cu P7	
	PHOSBRAZ E80	B Cu 92 P 710-770	CuP 182	CP 201	-	L-Cu P8	
	PHOSBRAZ E80+	B Cu 92 P 710-770	CuP 182	CP 201	-	L-Cu P8	
	PHOSBRAZ 675Sn	B Cu 86 Sn Si P 635-675	CuP 385	-	B CuP-9	-	
OVEN BRAZING	PHOSBRAZ 840	B Cu 94 P 710-890	CuP 179	CP 203	-	L-Cu P6	
	PHOSBRAZ 815	B Cu 93 P 710-820	CuP 180	CP 202	-	L-Cu P7	
	PHOSBRAZ 790	B Cu 93 P 710-793	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 710-770	CuP 182	CP 201	-	L-Cu P8	
	PHOSBRAZ 738	B Cu 92 P 710-770	CuP 182	CP 201	-	L-Cu P8	

COPPER-PHOSPHORUS-SILVER ALLOYS

Type	Classification - Standards: EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	YOUR REFERENCE
PHOSBRAZ M68	B Cu 93 P Ag 710-815	-	-	-	-	
PHOSBRAZ AG4	-	-	-	-	-	
PHOSBRAZ AG10	-	-	-	-	-	
PHOSBRAZ AG20	B Cu 91 P Ag 645-825	CuP 279	CP 105	-	-	
PHOSBRAZ AG20+	B Cu 91 P Ag 643-788	CuP 280	-	BCuP-6	-	
PHOSBRAZ AG50	B Cu 89 P Ag 645-815	CuP 281	CP 104	BCuP-3	L-Ag 5 P	
PHOSBRAZ AG50+	B Cu 88 P Ag 643-771	CuP 282	-	BCuP-7	-	
PHOSBRAZ AG60	B Cu 87 P Ag (Ni) 643-771	CuP 283a	CP 103	-	-	
PHOSBRAZ AG61	B Cu 87 P Ag 643-813	CuP 283	-	BCuP-4	-	
PHOSBRAZ AG100	B Cu 84 Ag P 650-750	-	-	-	-	
PHOSBRAZ AG150	B Cu 80 Ag P 645-800	CuP 284	CP102	BCuP-5	L-Ag 15 P	
PHOSBRAZ AG180	B Cu 75 Ag P 645-645	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: EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	YOUR REFERENCE
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	-	-	-	-	

BRAZARGENT®, CUPROX®, PHOSBRAZ®
ARE REGISTERED TRADEMARKS.

The ATG brand
Filler alloys and brazing fluxes used for bonding natural gas and propane piping require the approval of CERTIGAZ (Mandated agency for ATG brand management). Products that meet these criterias are identified by the above symbol.

SILVER ALLOYS

	Type	Classification - Standards: EN ISO 3677	EN ISO 17672	NF EN 1044	AWS A5.8	DIN 8513	YOUR REFERENCE
TERNARY ALLOYS	BRAZARGENT 1512 Si	B Cu 48 Zn Ag (Si) 800-830	Ag 212	AG207	-	L-Ag 12	
	BRAZARGENT 1520 Si	B Cu 46 Zn Ag Si 690-810	Ag 220	~AG206	-	L-Ag 20	
	BRAZARGENT 1535	B Ag 35 Cu Zn 685-755	Ag 235Si	-	BAg-35	-	
	BRAZARGENT 1544	B Ag 44 Cu Zn 675-735	Ag 244Si	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 125Si	AG108	BAg-37	L-Ag 25 Sn	
	BRAZARGENT 5030	B Cu 36 Zn Ag Sn 665-755	Ag 130Si	AG107	-	-	
	BRAZARGENT 5034	B Cu 36 Ag Zn Sn 630-730	Ag 134Si	AG106	-	L-Ag 34 Sn	
	BRAZARGENT 5038	B Ag 38 Cu Zn Sn 650-720	Ag 138Si	-	BAg-34	-	
	BRAZARGENT 5040	B Ag 40 Cu Zn Sn 650-710	Ag 140Si	AG105	BAg-28	-	
	BRAZARGENT 5045	B Ag 45 Cu Zn Sn 640-680	Ag 145Si	AG104	~BAg-36	L-Ag 45 Sn	
	BRAZARGENT 5055	B Ag 55 Zn Cu Sn 630-660	Ag 155Si	AG103	-	L-Ag 55 Sn	
	BRAZARGENT 5056	B Ag 56 Zn Cu Sn 620-655	Ag 156Si	AG102	BAg-7	-	
	BRAZARGENT 34 GAZ	B Cu 36 Ag Zn Sn 630-730	Ag 134 according to ATG B.524-3 certification				
	BRAZARGENT 3049+	B Ag 49 Zn Cu Mn Ni 680-705	Ag 449Si	-	BAg-22	L-Ag 49	
	BRAZARGENT 3050	B Ag 50 Cu Zn Ni 660-705	Ag 450Si		BAg-34	-	

ALUMINIUM ALLOYS

	Type	Classification - Standards: Chemical composition	EN ISO 17672	YOUR REFERENCE
SOLID WIRES	ZINAL 4	98 % Zn - 2 % Al	DIN 1707-100 : S-Zn 98 Al 2	
	AL12	88 % Al - 12 % Si	Al 112	
TBW / TBM WIRES	ZINAL 4 TBW	98 % Zn - 2 % Al	DIN 1707-100 : S-Zn 98 Al 2	
	HARASIL NC 12+ TBW	88 % Al - 12 % Si	Al 112	
	TBM 12 NCs*	88 % Al - 12 % Si	Al 112	
	TBM 12 NCs 20*	88 % Al - 12 % Si	Al 112	

* Non-corrosive flux.

BRAZING FLUXES

Type	Melting range (°C)	Classification - Standards: NF EN 1045	DIN 8511	YOUR REFERENCE
AGFLUX AGFLUX (Paste)	450-800	FH10	F-SH 1	
AG ACTIVE PASTE	550-880	FH10	-	
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	-	
PHOS FLUX (L)	580-880	FH10	-	

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PRODUCT RANGE WITH STANDARD SIZES AND WEIGHT

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 30 % (Other types may be provided on request.)		

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.)		

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 30 % (Other types may be provided on request.)		

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.)

BRAZING FLUXES

Reference	Shape (powder)	Shape (gel)	Weight (g)
PHOSBRAZ FLUX	x		60 - 200
		x	60 - 200
AGFLUX (AGFLUX (gel) N°1530 N°1614)	x		80 - 200 - 1000
		x	60 - 200 - 1000
AG ACTIVE PASTE		x	200 -500 - 1000
BORINOX	x		200 - 500 - 1000
		x	400
POLYFLUX	x		200 - 1000
		x	300 - 1000
FLUX-ODAL	x		200 - 500
ALUNOX NC	x		200
ALUNOX NCs	x		200
CUPRO FLUX	x		150
		x	300
PHOS FLUX (L)	Sur demande		

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 in mm	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 thin
25	Thin
30	Standard
40	Thick

10 % - Very thin
20 % - Thin
30 % - Standard
40 % - Thick

Other ratios available on request

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

GLOSSARY

- **°F = (1,8 X °C) + 32:** Conversion degrees Celsius in degrees Fahrenheit.
- **ALLOY:** An alloy is a combination of several metals or metalloids.
- **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.
- **BASE METALS:** Materials to be joined.
- **BINARY ALLOY:** A binary alloy is a combination of two metals or metalloids.
- **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 base metals being joined. The filler metal penetrates in-between the joined surfaces by capillary action.
- **CAPILLARITY:** Capillarity is 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.
- **COLD FORMING:** Hardening of the structure by mechanical means.
- **DEPTH OF PENETRATION:** Capillary rise of the brazing metal in-between the base metals.
- **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.
- **HARD BRAZING:** Joining at temperatures above 450 °C, including braze-welding.
- **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.
- **LIQUIDUS :** Temperature above which an alloy becomes entirely liquid.
- **PREFORMS:** Product in different shape, such as pins, U-shaped nuggets or rings, etc.
- **QUATERNARY ALLOY:** A quaternary alloy is a combination of four metals or metalloids.
- **QUENCHING:** Cooling, generally produced by quickly reducing the temperature of metals and alloys beyond the critical temperature range in order to harden them.
- **SOLDERING:** Brazing at temperatures below 450 °C.
- **SOLIDUS:** Temperature below which all the components of an alloy are solid.
- **TERNARY ALLOY:** A ternary alloy is a combination of three metals or metalloids.
- **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.

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