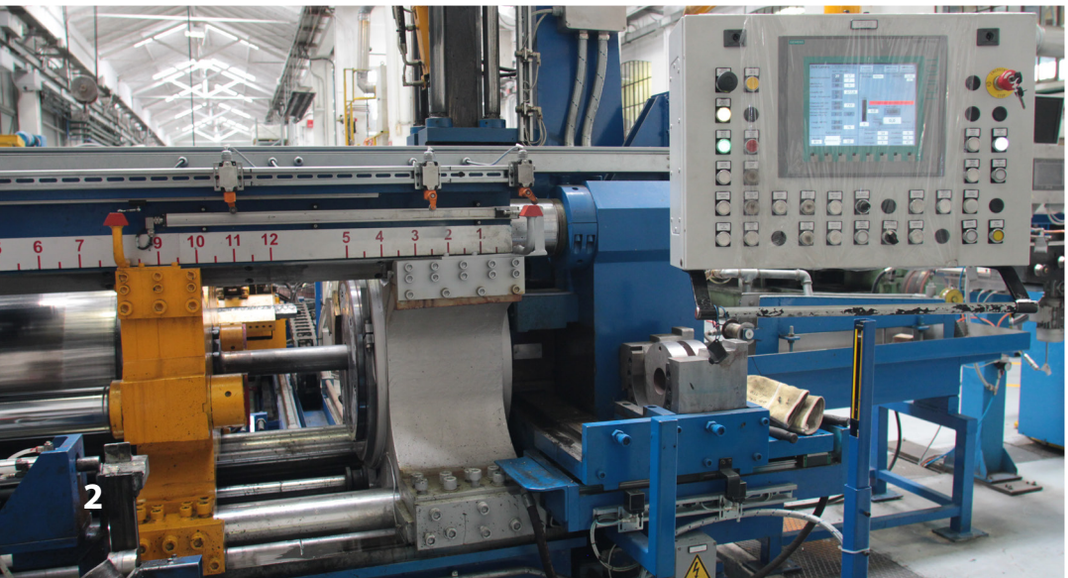
PIETRO GALLIANI BRAZING S.p.A.

Fusing Great Products with Great Service

PRODUCT CATALOGUE

100% Made in Italy

A range of products to suit all your needs



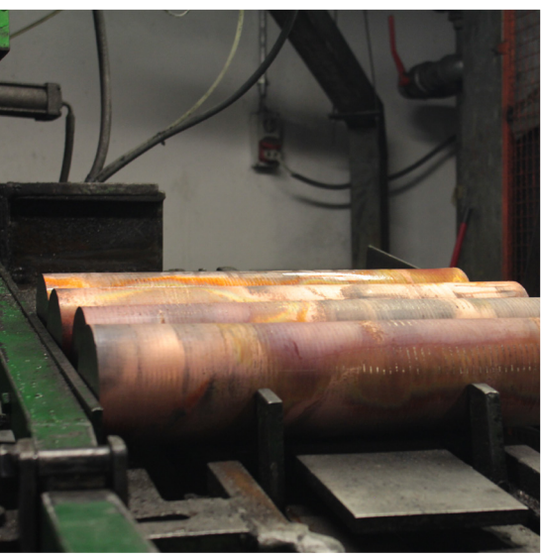
About Us

About Us

Pietro Galliani Brazing S.p.A (PGB) has been working in the field of metal processing for more than 100 years. PGB is located in Vergato, Italy, about 50kms south of Bologna. PGB has been a European leader in the production of brazing products since 1995.

Our Customer Focus

Our mission is to help our customers optimise their brazing processes. We achieve this mission by understanding the current and future needs of our customers and developing, producing and marketing the right products and services for them.



Our Beliefs

We believe Europe is a strategic region for the production of our products. Unlike most of our competitors we have not out-sourced our production to China or other "low cost" regions. We believe that efficient production, fast service, excellent quality and qualified personnel will give us a distinct advantage over our competitors. In the past 2 years PGB has invested millions of Euros in its factory in Italy, and continues to modernize its processes and invest in R&D.

Making the right choice

General specifications for correct application

Properties of the joint

Brazing is characterised by the concept of capillarity that is the ability of the brazing alloy to run into the air space of the joint. For correct filling of the joint the properties of the base metals and the brazing alloy must be considered. The distance between the surfaces to be joined has to be determined at the brazing temperature.
For an optimal resistance of the brazed joint a good rule to adopt, for flat surfaces, is an overlap equivalent to about 3 times the smaller thickness of the above mentioned surfaces of a minimum of 5 mm.

Choice of the brazing alloy

Is made on the basis of the material to be joined and economic considerations (% of silver) related to the level of difficulty of the application which generally, is directly proportional to the melting range of the alloy.

Preparation of the joint

Before the brazing, the surfaces to be joined should be cleaned by removing grease, using solvents or hot water, and oxides using mechanical brushing.

Application of flux

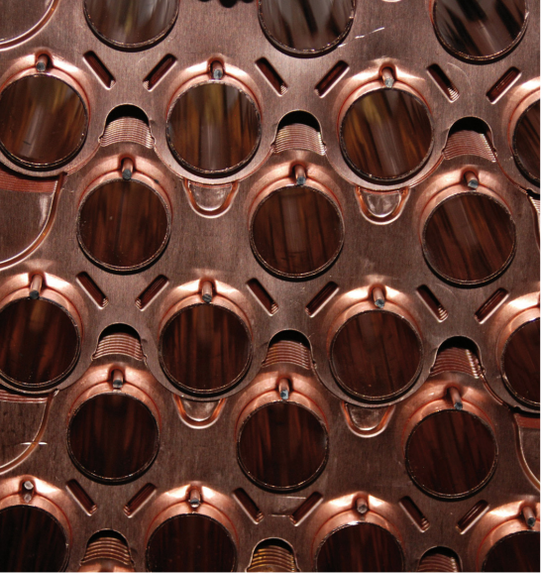
The choice of flux is as important as that of the alloy. The flux applied to the surfaces to be joined should melt and become active at a temperature lower than that of the melting point of the alloy.
Its activity should continue for the whole brazing cycle removing the oxides from the two metals or preventing their formation.

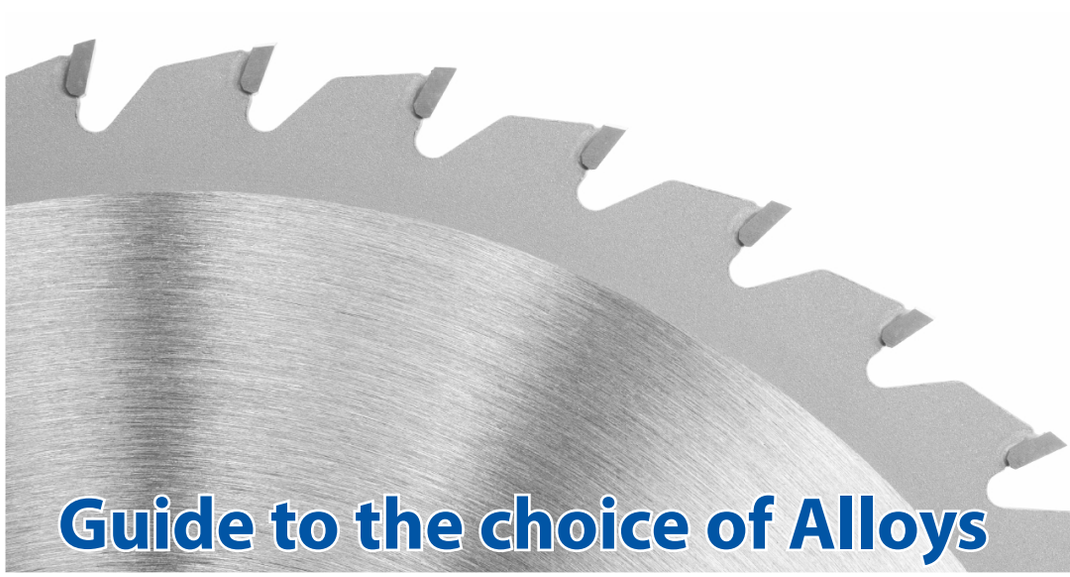
Heating of the joint and application of the alloy

The heating can be carried out using a torch fed by fuels such as acetylene, propane or natural gas, or by using induction or resistance electrical systems.
The purpose is to heat uniformly the joint at the right brazing temperature depending on the chosen alloy and its properties, which determine the optimal heating ratio. The alloy should normally be applied only when the temperature required is reached for rapid melting and fast distribution along all the surfaces of the joint by capillary attraction.
The melted alloy always flows towards the hottest part of the joint, this to be obtained possibly by an indirect flame in case of the use of a torch.

Removing of residual flux

Once the solidification of the brazing alloy has taken place, the joint can be cooled down in water to remove the remaining flux being careful not to damage the brazed elements.





Guide to the choice of Alloys

Alloys with tin

Are susceptible to rapid cooling especially those with components very different to each other.

Alloys with silicium

Not recommended on junctions exposed to impacts, vibrations, fatigue stresses because the silicon can make very brittle intermetallic compounds.

Alloys for salty environments

Are those of a high content of silver (>40%) with or without tin. In these alloys, particularly requested for ship and marine construction, the loss of zinc by galvanic process is reduced.

Alloys for step by step brazing

Normally are those with a narrow melting range. They are chosen with melting point progressively lower to avoid phenomena of re-melting of the adjacent joints, previously made.

Nickel and its alloys

Are materials susceptible to cracks during the brazing, caused by intergranular penetration or stress. It is advisable that the alloys have a low quantity of zinc and high brazing temperature.

Alloys for tungsten carbides

These are alloys specifically designed for tungsten carbide. The presence of nickel and manganese increases the wetting difficulty of these materials. Preferable are alloys with a low melting point for small carbides. Particularly indicated the compound alloys (triple metal sheets), with an interconnected layer of copper able to absorb shock and vibrations. The carbides have very low expansion coefficients and different to the metals of the supports, therefore re-heating has to be carried out slowly and uniformly to avoid cracks. Rapid cooling after brazing should be avoided.

Alloys for stainless steel

Their choice should consider the operating condition with particular reference to the presence of humidity or water. In fact in these cases failures can occur for interface corrosion alloy-stainless steel.
Particularly susceptible are steels without nickel, with a low content of nickel and from the series 400-410-420-430, unlike austenitic steel of the series 300 which are the most resistant.

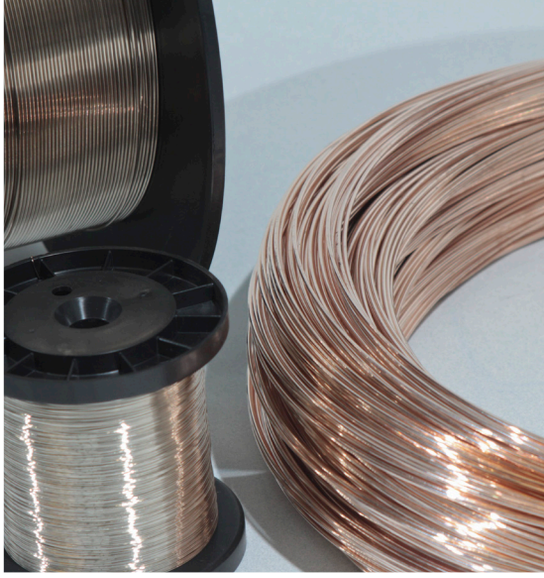
Copper Alloys

Indicated for copper brazing and, with the use of flux, its alloys (bronze, brass). The best results are obtained by narrow clearances. Due to the high conductivity it is advisable to heat rapidly with the torch. Not suitable on ferrous and stainless materials as they can form brittle inter-metallic compounds.

With refined copper containing dissolved oxides it is the best to use a neutral or slightly oxidizing flame to avoid the formation of cavities caused by reduction of oxides, as hydrogen embrittlement.

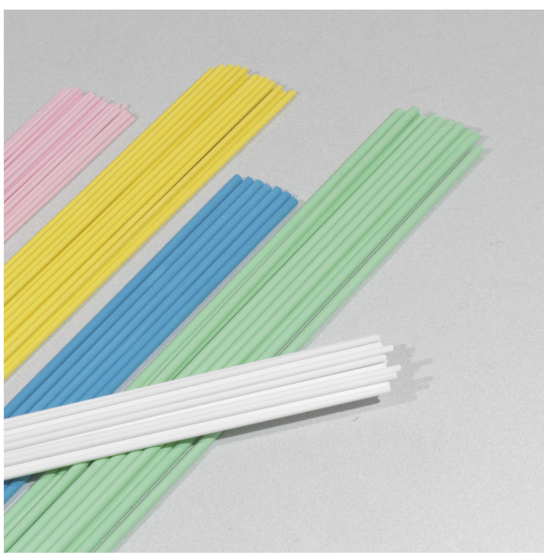
Alloys with phosphor should be avoided in presence of gases containing high levels of sulphur. They are successfully used in sanitary and medical piping because they do not contain zinc and they do not run the risk of galvanic dezincification.

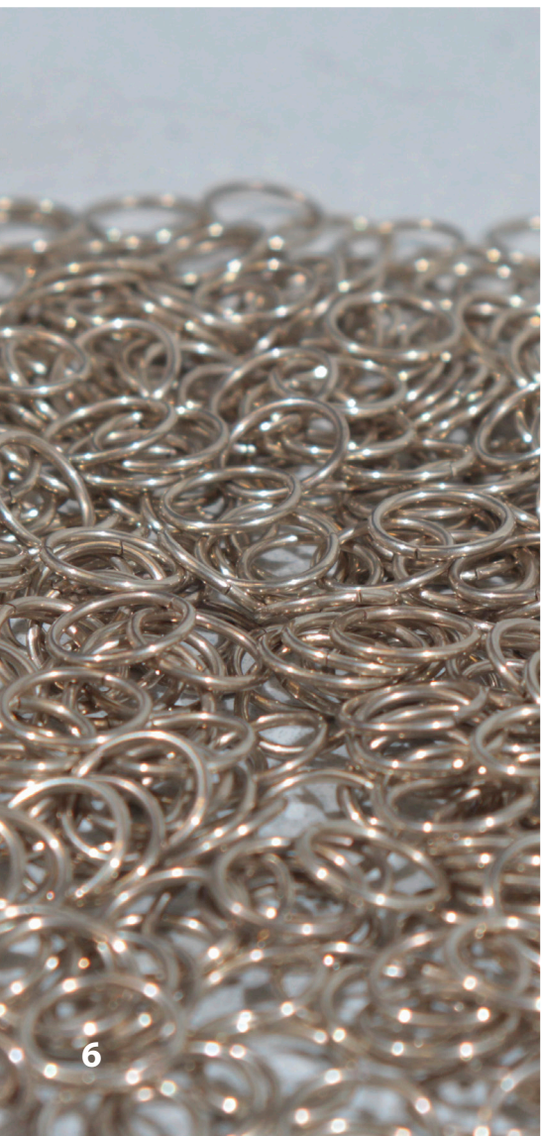
Product Range & Our Services



Product Range

- Bare Rods
- Coated Rods
- Wires (Coils & Spools)
- Coated Wires
- Foils
- Rings
- Preforms
- Powders
- Pastes





Our Services

- Fast Delivery from Ready Stock
- Customized Packaging and Labelling
- Technical Support
- Training

GalFlo™

GalFlo™ Products are the result of decades of research and development.

Each product is guaranteed to be made of high quality materials and undergoes stringent quality controls. All the products are manufactured in accordance with European Standards EN 1044-1045 or American Standards AWS A5.8.

Pietro Galliani Brazing S.p.A prides itself on having one of the most comprehensive product ranges in Europe.

We produce over 1000 different products and continuously to create new and innovative solutions every month.

Our range of products include rods, wires, foils, fluxes, rings, pastes, powders and flux-coated and coated wires and rods.

NEW!

CleanTech™

CLEANTECH™ – ADVANCED FLUX SYSTEM

CleanTech™ is the newest development in fluxes. Our CleanTech™ range of fluxes has eliminated toxic components, while at the same time improving the brazing quality.

CleanTech™ is cleaner for the environment and for your parts.

Non-toxic & Boric Acid-Free fluxes !

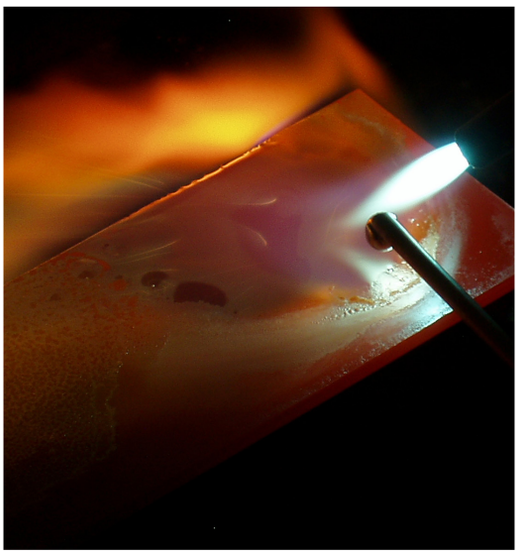
NEW!

NanoTech™

NANOTECH™ – NEW & IMPROVED COPPER PHOSPHORUS ALLOY

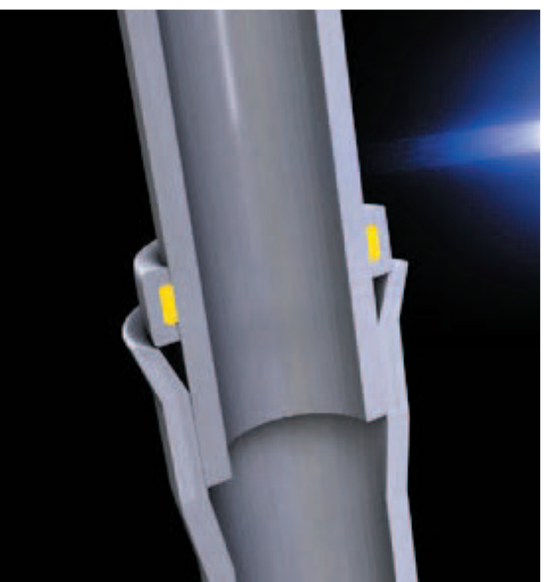
NanoTech™ is a new alloy that does not foam or lose phosphorus during brazing which leads to fewer leaks.
The content of Phosphorus is perfectly controlled and dispersed in the alloy as nano-spheres.

This means more fluidity – improved capillarity – better wetting and fewer leaks !



NEW!

ZincAl™

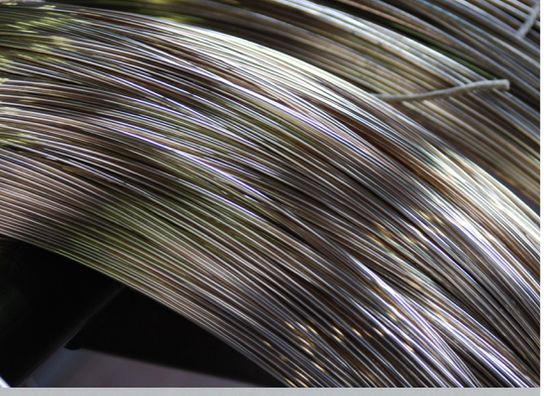


ZINCAL™ IS A REVOLUTIONARY ZN AL ALLOY THAT GIVES YOU PERFECT RESULTS EVERY TIME.

With ZN AL 22 it has never been so easy to braze aluminium.
This product combines a low temperature alloy, with an excellent non-toxic flux and is great for automotive and refrigeration applications.

Silver Alloys without Cadmium

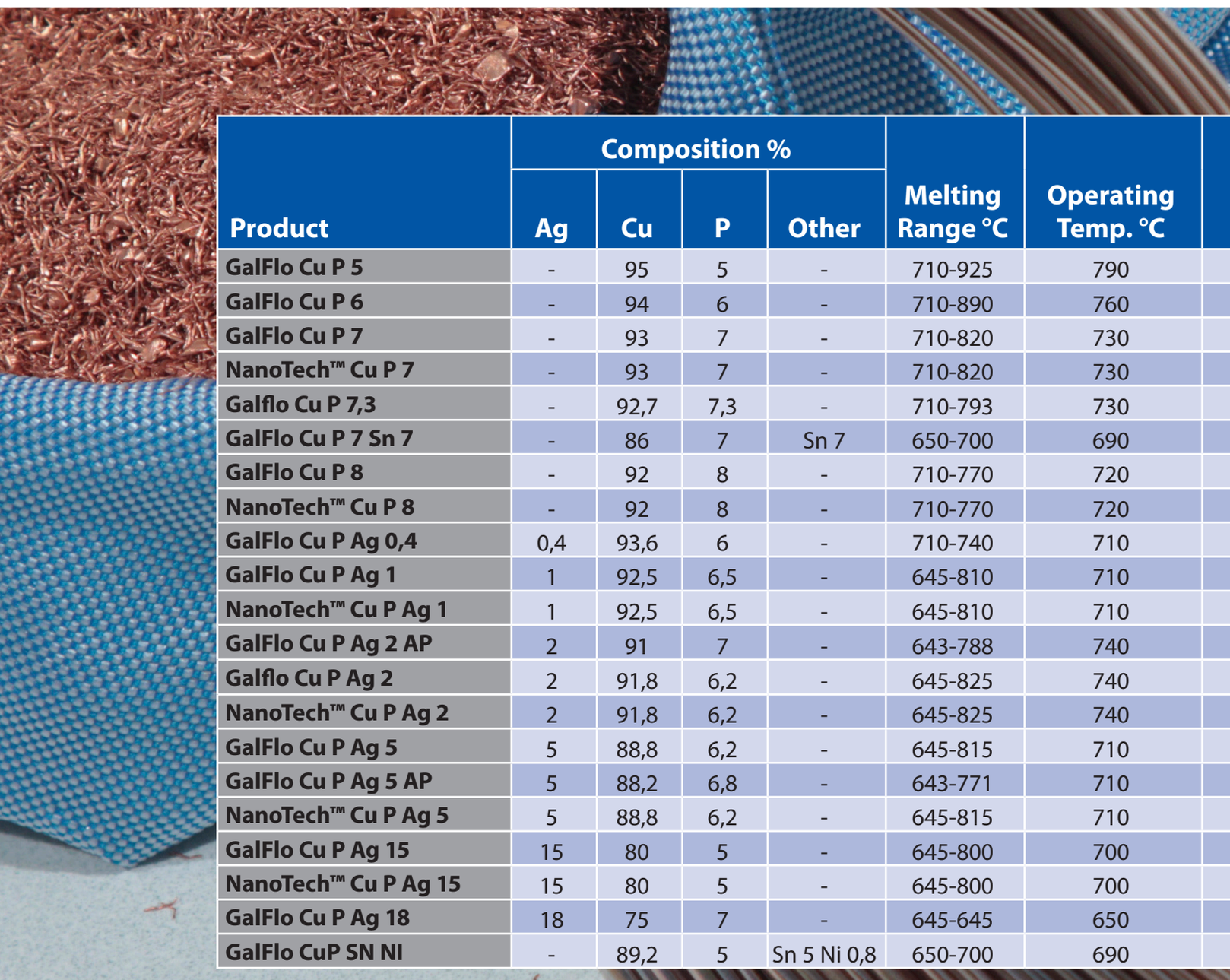
Product	Composition %					Melting Range °C	Operating Temp. °C
	Ag	Cu	Zn	Sn	Other		
Flow 03	1	60	39	-	-	890-900	900
Flow 07	5	55	40	-	-	820-870	860
Flow 14	12	48	40	-	-	800-830	830
Flow 18	16	50	34	-	-	790-830	820
Flow 24	20	44	36	-	-	690-810	810
Flow 30	25	41	34	-	-	700-790	780
Flow 30 Sn	25	40	33	2	-	680-760	750
Flow 40	30	38	32	-	-	680-765	750
Flow 40 Sn	30	36	32	2	-	685-755	740
Flow 44	33	34	33	-	-	700-740	730
Flow 48 Sn	34	36	27	3	-	630-730	710
Flow 50	35	32	33	-	-	685-755	740
Flow 56 Sn	38	31	29	2	-	650-720	710
Flow 60 Ni	40	30	28	-	Ni 2	670-780	780
Flow 60 Sn	40	30	28	2	-	650-710	690
Flow 63	43	37	20	-	-	690-770	760
Flow 64	44	30	26	-	-	675-735	730
Flow 65	45	30	25	-	-	665-745	730
Flow 65 Sn	45	27	25	3	-	640-680	670
Flow 70 Ni Mn	49	16	23	-	Mn 7,5 Ni 4,5	680-705	690
Flow 70 Ni Mn L	49	27,5	20,5	-	Mn 2,5 Ni 0,5	670-690	690
Flow 80 Ni	50	20	28	-	Ni 2	660-705	740
Flow 85 Sn	55	21	22	2	-	630-660	660
Flow 86 Sn	56	22	17	5	-	620-655	650
Flow 90 A Sn	60	30	-	10	-	600-730	720
Flow 90 Sn	60	23	14	3	-	620-685	680
Flow 95	65	20	15	-	-	670-720	710
Flow 102	72	28	-	-	-	780	780



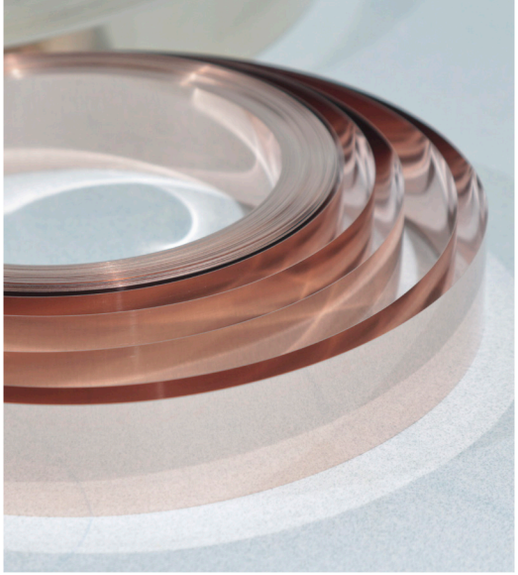
Density g/cm3	Tensile Strength N/mm2	Recommended Flux	International Norms					
			AWS A5.8	EN 1044	DIN 8513	NFA 81-362	BS 1845	EN 17672
8,4	370	CleanTech™ Bronze	-	-	-	-	-	-
8,4	350	CleanTech™ Bronze	-	AG 208	L-Ag5	05 A1	-	Ag 205
8,5	410	CleanTech™ XHT	-	AG 207	L-Ag12	-	-	Ag 212
8,6	505	CleanTech™ XHT	-	-	-	-	-	-
8,7	380	CleanTech™ XHT	-	AG 206	L-Ag20	20 A1	-	-
8,8	380	CleanTech™ XHT	-	AG 205	L-Ag25	25 A1	-	Ag 225
8,7	420	CleanTech™ SHT	BAg-37	AG 108	L-Ag25 Sn	25 A2	-	Ag 125
8,9	380	CleanTech™ SHT	BAg-20	AG 204	L-Ag30	-	-	Ag 230
8,8	380	CleanTech™ SHT	-	AG 107	L-Ag30 Sn	-	Ag 21	Ag 130
8,9	535	CleanTech™ SHT	-	-	-	-	-	-
9	360	CleanTech™ SHT	-	AG 106	L-Ag34 Sn	-	-	Ag 134
9	430	CleanTech™ SHT	BAg-35	-	-	-	-	Ag 235
8,8	430	CleanTech™ SHT	BAg-34	-	-	-	-	Ag 138
8,9	350	CleanTech™ SHT	BAg-4	-	-	-	-	Ag 440
9,1	430	CleanTech™ SHT	BAg-28	AG 105	L-Ag40 Sn	-	Ag 20	Ag 140
9,1	400	CleanTech™ SHT	-	-	-	-	Ag 5	-
9,1	400	CleanTech™ SHT	-	AG 203	L-Ag44	44 A1	-	Ag 244
9,2	410	CleanTech™ SHT	BAg-5	-	-	45 A2	-	Ag 245
9,2	350	CleanTech™ SHT	BAg-36	AG 104	L-Ag45 Sn	-	-	Ag 145
8,9	300	CleanTech™ XHT	BAg-22	AG 502	L-Ag49	-	Ag 18	Ag 449
8,9	300	CleanTech™ XHT	-	-	-	-	-	-
9	450	CleanTech™ XHT	BAg-24	-	-	-	-	Ag 450
9,5	350	CleanTech™ XLT	-	AG 103	L-Ag55 Sn °	-	Ag 14	Ag 155
9,5	350	CleanTech™ XLT	BAg-7	AG 102	-	56 A1	-	Ag 156
9,8	390	CleanTech™ XLT	BAg-18	AG 402	-	60 A1	-	Ag 160
9,6	420	CleanTech™ XHT	-	AG 101	L-Ag60 Sn	-	-	-
9,6	400	CleanTech™ XHT	BAg-9	-	-	-	-	Ag 265
10	390	CleanTech™ XHT	BAg-8	AG 401	-	72 A1	Ag 7	Ag 272

° Equivalent

Copper Phosphorus & Silver Alloys



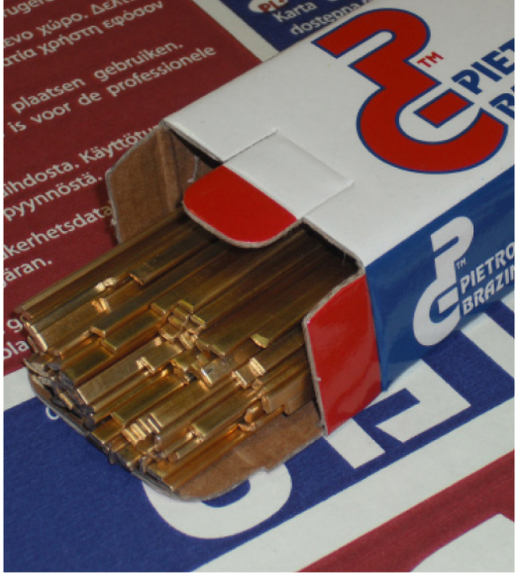
Product	Composition %				Melting Range °C	Operating Temp. °C
	Ag	Cu	P	Other		
GalFlo Cu P 5	-	95	5	-	710-925	790
GalFlo Cu P 6	-	94	6	-	710-890	760
GalFlo Cu P 7	-	93	7	-	710-820	730
NanoTech™ Cu P 7	-	93	7	-	710-820	730
Galflo Cu P 7,3	-	92,7	7,3	-	710-793	730
GalFlo Cu P 7 Sn 7	-	86	7	Sn 7	650-700	690
GalFlo Cu P 8	-	92	8	-	710-770	720
NanoTech™ Cu P 8	-	92	8	-	710-770	720
GalFlo Cu P Ag 0,4	0,4	93,6	6	-	710-740	710
GalFlo Cu P Ag 1	1	92,5	6,5	-	645-810	710
NanoTech™ Cu P Ag 1	1	92,5	6,5	-	645-810	710
GalFlo Cu P Ag 2 AP	2	91	7	-	643-788	740
Galflo Cu P Ag 2	2	91,8	6,2	-	645-825	740
NanoTech™ Cu P Ag 2	2	91,8	6,2	-	645-825	740
GalFlo Cu P Ag 5	5	88,8	6,2	-	645-815	710
GalFlo Cu P Ag 5 AP	5	88,2	6,8	-	643-771	710
NanoTech™ Cu P Ag 5	5	88,8	6,2	-	645-815	710
GalFlo Cu P Ag 15	15	80	5	-	645-800	700
NanoTech™ Cu P Ag 15	15	80	5	-	645-800	700
GalFlo Cu P Ag 18	18	75	7	-	645-645	650
GalFlo CuP SN NI	-	89,2	5	Sn 5 Ni 0,8	650-700	690



Density g/cm3	Tensile Strength N/mm2	International Norms					
		AWS A5.8	EN 1044	DIN 8513	NFA 81-362	BS 1845	EN 17672
8,2	250	-	-	-	-	-	CuP 178
8,1	250	-	CP 203	L-CuP6	-	CP 6	CuP 179
8,05	250	BCuP-2	CP 202	L-CuP7	07B1	CP 3	CuP 180
8,05	250	BCuP-2	CP 202 °	L-CuP7 °	07B1 °	CP 3	CuP 180
8,05	250	-	-	-	-	-	CuP 181
8	250	-	CP 302	-	-	-	CuP 386
8	250	-	CP 201	L-CuP8	08B1	-	CuP 182
8	250	-	CP 201 °	L-CuP8 °	08B1 °	-	CuP 182
8,1	250	-	-	-	-	-	-
8,1	250	-	-	-	07B2	-	-
8,1	250	-	-	-	07B2 °	-	-
8,1	250	-	-	-	-	-	CuP 280
8,1	250	BCuP-6	CP 105	L-Ag 2 P	06B1	CP 2	CuP 279
8,1	250	BCuP-6 °	CP 105 °	L-Ag 2 P °	06B1 °	CP 2	CuP 279
8,2	250	BCuP-3	CP 104	L-Ag 5 P	06B2	CP 4	CuP 281
8,2	250	-	-	-	-	-	CuP 282
8,2	250	BCuP-3 °	CP 104 °	L-Ag 5 P °	06B2 °	CP 4	CuP 281
8,4	250	BCuP-5	CP 102	L-Ag 15 P	05 B 1	CP 1	CuP 284
8,4	250	BCuP-5	CP 102 °	L-Ag 15 P	05 B 1	CP 1	CuP 284
8,6	250	-	CP 101	-	07B4	-	CuP 286
8,0	250	-	-	-	-	-	-

° Equivalent

Brasses

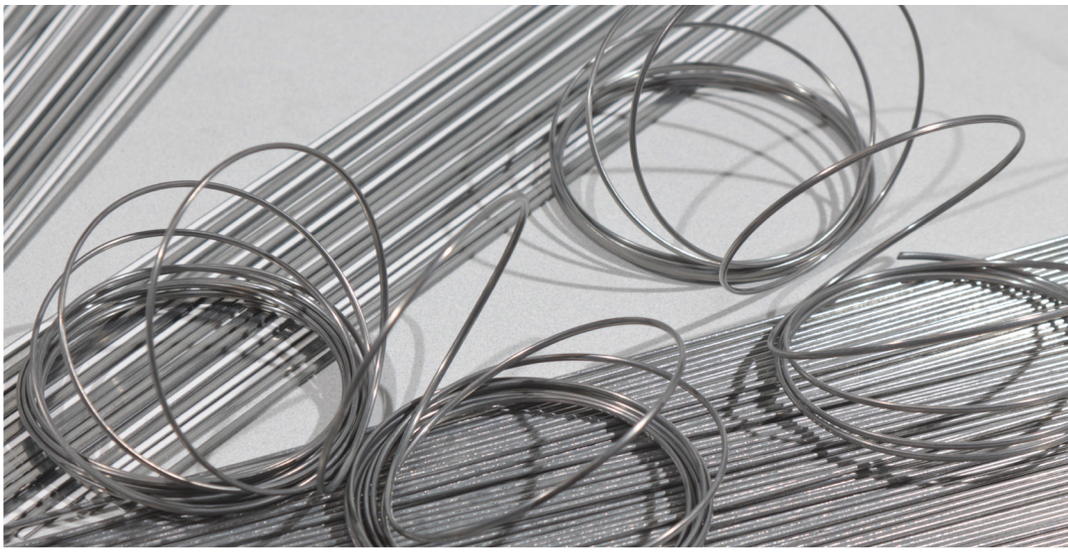


Product	Composition %					Melting Range °C	Operating Temp. °C	
	Cu	Zn	Ni	Si	Other			
GalFlo OT Ni 10	48	41,8	10	0,2	-	890-920	910	
GalFlo OT Ni 6	53	40,3	6,3	0,2	Mn0,2	870-910	910	
GalFlo OT Si	59,5	40,25	-	0,25	-	880-890	900	
GalFlo OT Si Sn Mn	59	39,25	-	0,15	Mn0,8 - Sn0,8	870-900	890	
GalFlo OT Si Sn	59	39,75	-	0,25	Sn 1	875-895	900	
OT Si Sm Mn Ni	58	39,6	0,5	0,15	Mn 0,8 - Sn 0,95	870-890	900	

Aluminium

Product	Composition %				Melting Range °C	Operating Temp. °C	
	Al	Si	Zn	Ag			
GalFlo Al Si 5	95	5	-	-	570-620	590	
GalFlo Al Si 12	88	12	-	-	576-582	580	
GalFlo ZincAl 2	2	-	98	-	375-388	380	
GalFlo ZincAl 22	22	-	78	-	440-470	450	

Density g/cm3	Tensile Strength N/ mm2	International Norms					
		AWS A5.8	EN 1044	DIN 8513	BS 1845	NFA 81-363	EN 17672
8,7	480	RBCuZn D	CU 305	L-CuNi10Zn42	CZ 8	49 C1	Cu 773
9	420	-	-	-	-	-	-
8,4	370	-	CU 301	L-CuZn40	CZ6	60C1	Cu 470a
8,4	380	RBCuZnC	-	L-CuZn39Sn	CZ 7A	60C2	-
8,4	400	RBCuZn A	CU 302	-	-	-	-
8,4	400	-	CU 306	-	-	-	Cu 680



Density g/cm3	Tensile Strength N/ mm2	International Norms					
		AWS A5.8	EN 1044	ISO 3677	BS 1845	NFA 81-363	UNI ISO 17672
2,7	105	BAlSi-5	AL 101	B-AL95Si-570/620	B/SB AL95Si	-	Al 105
2,65	125	BAlSi-12	AL 104	B-AL88Si-575/585	B/SB AL88Si	-	Al 112
7,04	-	-	-	-	-	-	-
6,47	-	-	-	-	-	-	-

° Equivalent

Fluxes, Gasflux & Soft Solders

Soft Solders

Product	Ag	Sn	Pb	Melting Range °C	DIN 1707 BS-219 EN 29453 ISO 9453	NFA 81 - 362	ASTM B321 - 96at
Elettristan 50	-	50	50	183-216	S - Pb 50 Sn 50	50 E1	50A
Elettristan 60	-	60	40	183-189	S - Sn 60 Pb 40	60 E1	60A
Elettristan Ag 3,5	3,5	96,5	-	221-223	S - Sn 97 Ag 3*	96 E1 *	-
Elettristan Ag 5	5	95	-	221-235	S - Sn 96 Ag 4*	94 E1 *	-
Meccanistan 50	-	50	50	183-216	S - Pb 50 Sn 50	50 E1	50A
Meccanistan 60	-	60	40	183-238	S - Sn 60 Pb 40	60 E1	60A
Meccanistan Ag 3,5	3,5	96,5	-	221-223	S - Sn 97 Ag 3*	96 E1 *	-
Meccanistan Ag 5	5	95	-	221-235	S - Sn 96 Ag 4*	94 E1 *	-
Nodistan 50	-	50	50	183-216	S - Pb 50 Sn 50	50 E1	50A
Nodistan 60	-	60	40	183-189	S - Sn 60 Pb 40	60 E1	60A
Nodistan Ag 3,5	3,5	96,5	-	221-223	S - Sn 97 Ag 3*	96 E1 *	-
Nodistan Ag 5	5	95	-	221-235	S - Sn 96 Ag 4*	94 E1 *	-

** Similar*

GasFlux

Product	Activity Range C°	Operating Temp. °C	Description
GalFlux GF "ECO" 88	800-1000	900	Eco High Concentration Flux
GalFlux GF "ECO" MEDIUM	800-1000	900	Eco Medium Concentration Flux
GalFlux GF "ECO" LOW	800-1000	900	Eco Low Concentration Flux
GalFlux GF "ECO" EXTRA LOW	800-1000	900	Eco Extra low Concentration Flux
GalFlux GF P1	800-1000	900	Standard Low Concentration Flux
GalFlux GF P2	800-1000	900	Standard Med. Concentration Flux
GalFlux GF P3	800-1000	900	Standard High Concentration Flux

Fluxes

Product	Activity Range C°	AWS-5.31	EN 1045	Description
Standard Fluxes				
GalFlux XLT PW /PS/AF	450-800	FB3-F	FH 10	Low Temperature Standard Flux
GalFlux SHT PW /PS/AF	550-800	FB3-F	FH 10	Medium Temperature Standard Flux
GalFlux S PLUS PW /PS	500-800	FB3-F	FH 10	Medium Temperature Standard Flux
GalFlux UWR PW/PS	500-800	FB3-F	FH 10	High Temperature Flux for Brazing Tools
GalFlux UW PS/AF	550-800	FB3-F	FH 10	High temperature Flux for Brazing Tools in White Paste
GalFlux UB PS/AF	550-800	FB3-C	FH 12	High temperature Flux for Brazing Tools in Brown Paste
GalFlux Bronze PW	800-1000	FB3-J	FH 21	High temperature Standard Flux for Brass
GalFlux NanoTech™ PS	450-800		FH 10	NanoTech™ Special Flux
CleanTech™ Series Fluxes				
CleanTech™ XLT PW /PS/AF	450-800	FB3-F	FH 10	Low temperature Non-toxic Flux
CleanTech™ SHT PW /PS/AF	450-800	FB3-F	FH 10	Medium temperature Non-toxic Flux
CleanTech™ XHT PW /PS/AF	500-850	FB3-F	FH 10	High temperature Non-toxic Flux
CleanTech™ X85 PS/AF	500-990	FB3-C	FH 10	Non-toxic Brown Flux for Tool Production for Dispensers
CleanTech™ Bronze PW /PS/AF	800-1000	FB3-J	FH 21	High temperature Non-toxic Flux for Brass
Fluxes for Aluminium				
GalFlux AlCor 101 PS/PW/AF	520-660	FB3-C	FL 10	Flux for Aluminium, Corrosive
GalFlux AlNc 101 PS/PW	570-660		FL 20	Flux for Aluminium, Non-corrosive
GalFlux ZnNc PS/PW/AF	430-480		FL 20	Flux for Aluminium, Non-corrosive

Distribution

Pietro Galliani Brazing products are available in many countries around the world.

We are a global player with a local approach. We stock our products on virtually every continent and have local partners to help transmit our technology and to provide support to customers around the globe.

Take advantage of our global presence, by having excellent service and high quality products in all of your factories.
Please, contact us for more information about the nearest Pietro Galliani Brazing agent to you.

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The information contained in this catalogue is purely indicative.

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