BRAZING

Filler metals and fluxes

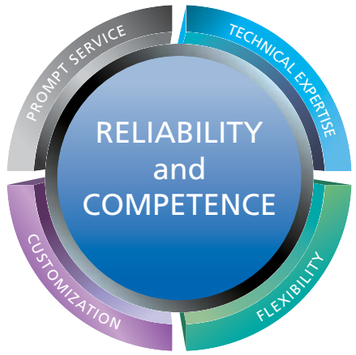
STELLA
WELDING ALLOYS

CATALOGUE

STELLA
WELDING ALLOYS

STELLA srl is an **Italian manufacturer of brazing alloys** specialized in providing complete solutions in Brazing, Soldering and Welding applications. Our headquarters are located in the **north of Italy** from where we supply **Customers** in more than **60 countries worldwide**. With more than **20 years of experience**, we operate in plumbing, heating, air-conditioning and refrigeration, diamond and carbide tipped tools, heat exchangers, electro-mechanical, metal furniture industries and others, being a reliable source for worldwide leader original equipment manufacturers (OEMs). Our Quality System is certified ISO 9001:2008 since 1998.

We offer:
- the most comprehensive and widest range of different products, from general purpose to special applications
- variety of different make-ups, from standard forms to custom engineered forms
- conformity to the main international, technical and environmental standards
- complete source for technical information, consulting and assistance



Our activity is focused on offering
flexibility, **technical support**, **prompt** and **customized service**.

ISO 9001:2008
Certified Company

We operate regularly in:
Italian, English, German, French, Spanish and Russian.

20 YEARS
OF EXPERIENCE

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BRAZING

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(*) Available in European Union countries only for military and aerospace applications (EU Regulation 494/2011).

www.stella-welding.com

OUR CAPABILITIES & SERVICES

BARE RODS

Available in different diameters and cut to different lengths.

COATED RODS

Environmentally friendly flux coated rods. Different ratios of coating available. Different colours available.

WIRE IN COIL

Different physical states available.

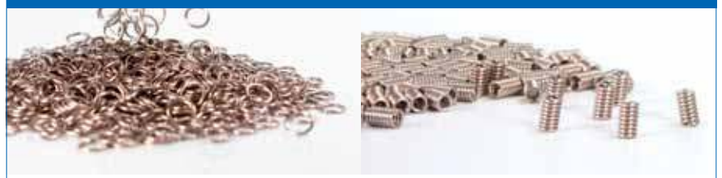
WIRE ON SPOOLS

On different types of spools.
Precision layer available.

STRIPS

Available in a very wide combination of thickness/width in coils and on different types of spools.

RINGS

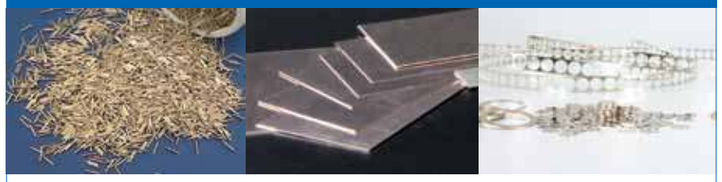


Wide variety of sizes, with open ends or closed ends, single turn, two turns or multiple turns, loose or mounted on tubes.

POWDERS AND PASTES

Powders available in different grain sizes. Pastes available with different combination of binder/flux.

PREFORMS



Wide selection of preforms from wire and strip in various shapes like slugs, shims, discs and washers.

FLUXES

Widest range of formulations.
Thermo-sealed jars for preserving shelf life.

RODS MARKING

Both on bare and on coated rods.

PACKING AND LABELS

Personalized solutions for products packaging and labelling.

LABORATORY TESTING

Sample testing and analysis service to diagnose and resolve operational issues.

SILVER BASED ALLOYS - CADMIUM FREE

The following are general purpose brazing alloys, suitable to join easily a wide range of ferrous and non-ferrous base materials (iron, steel, stainless steel, copper, brass, etc.).
Continuous service operating temperatures of joints brazed with these alloys range up to approx 200 °C.
When joining stainless steel in wet environments, in order to avoid failure of the joint due to interfacial corrosion, it is recommended to use zinc-free alloys (Ag60Sn/1), or alloys with Nickel additions: see page 2.

Available in many different presentation forms (rods, flux-coated rods, wires, strips, rings, preforms, pastes and powders), these alloys are very free flowing, ductile and strong.

Brazing of a brass component

All these alloys do not contain Cadmium, do not present the Health & Safety concerns associated with Cadmium-Bearing Alloys and are compliant with the RoHS regulation. They are divided in two categories: alloys with Tin and alloys without Tin; Tin being used to lower the melting temperature of the alloy.
When brazing in an oxidizing environment (that is: in air), the use of a proper flux is required: see page 12.

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Ag	Cu	Zn	Sn	Si	°C	g/cm³	kg/mm²	ISO 17672	EN 1044	AWS A5.8
ALLOYS WITH TIN											
Ag60Sn	60	23	14	3	-	620-685	9,6	48	-	AG 101	-
Ag60Sn/1	60	30	-	10	-	600-730	9,8	-	Ag 160	AG 402	BAg-18
Ag56Sn	56	22	17	5	-	620-655	9,4	48	Ag 156	AG 102	BAg-7
Ag55Sn	55	21	22	2	-	630-660	9,4	44	Ag 155	AG 103	-
Ag45Sn	45	27	25,5	2,5	-	640-680	9,2	43	Ag 145	AG 104	BAg-36
Ag40Sn	40	30	28	2	-	650-710	9,1	44	Ag 140	AG 105	BAg-28
Ag38Sn	38	32	28	2	-	650-720	9,1	45	Ag 138	-	BAg-34
Ag34Sn	34	36	27,5	2,5	-	630-730	9	48	Ag 134	AG 106	-
Ag30Sn	30	36	32	2	-	665-755	8,8	48	Ag 130	AG 107	-
Ag25Sn	25	40	33	2	-	680-760	8,8	48	Ag 125	AG 108	BAg-37
ALLOYS WITHOUT TIN											
Ag83	83	15	2	-	-	780-830	10,2	-	-	-	-
Ag81	81	13	6	-	-	725-800	10	36	-	-	-
Ag74	74	18	8	-	-	740-780	9,8	41	-	-	-
Ag67,5	67,5	23,5	9	-	-	700-730	9,7	47	-	-	-
Ag65	65	20	15	-	-	670-720	9,6	41	Ag 265	-	BAg-9
Ag60	60	26	14	-	-	695-730	9,5	45	-	AG 202	-
Ag45	45	30	25	-	-	665-745	9,1	42	Ag 245		BAg-5
Ag44	44	30	26	-	-	675-735	9,1	51	Ag 244	AG 203	-
Ag40	40	30	30	-	-	660-720	9,1	46	-	-	-
Ag35	35	32	33	-	-	685-755	9	48	Ag 235	-	BAg-35
Ag33	33	33,5	33,5	-	-	680-750	9	55	-	-	-
Ag30	30	38	32	-	-	680-765	8,9	50	Ag 230	AG 204	BAg-20
Ag25	25	40	35	-	-	700-790	8,8	45	Ag 225	AG 205	-
Ag20	20	44	36	-	0,15	690-810	8,7	43	-	AG 206	-
Ag12	12	48	40	-	0,15	800-830	8,4	48	Ag 212	AG 207	-
Ag5	5	55	40	-	0,15	820-870	8,4	48	Ag 205	AG 208	-

ALLOYS WITH 0,2 % SILICON ARE AVAILABLE

CHARACTERISTICS MAKE-UP

Rods	Ø: 0,5 → 4 mm	Length: 500 / 1.000 mm / Other lengths available
Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 mm / Others diameters available	Length: 500 mm / Different kinds of coating available in various colours
Wires	Ø: 0,25 → 3 mm	Coils and Spools
Strips	Thickness: 0,1→ 1 mm	Width: 1,3 → 80 mm
Powder and Paste	Rings	Preforms from Wire and from Strip

SILVER BASED ALLOYS - SPECIAL APPLICATIONS

The following are alloys that, thanks to the addition of specific elements, or to their particular composition, have improved characteristics that make them suitable for specific applications or to operate in difficult conditions.

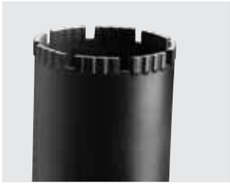
In particular, the addition of Nickel helps in joining difficult-to-braze materials (such as stainless steel, tool steel, tungsten carbide, nickel and nickel alloys, etc.) and improves corrosion resistance.

Manganese helps in brazing carbides.

Alloys without Copper are ammonia resistant.

Alloys without Zinc are suitable for brazing in oven and may be used to join stainless steels in wet conditions to avoid interfacial corrosion problems.

Alloys with Indium are suitable to join pieces that will undergo TiN coating.



CODE	COMPOSITION %							MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Ag	Cu	Zn	Ni	Mn	Sn	In	°C	g/cm³	kg/mm²	ISO 17672	EN 1044	AWS A5.8
ALLOYS WITH NICKEL (FOR STAINLESS STEEL AND HARDMETALS)													
Ag27MnNi	27	38	20	5,5	9,5	-	-	680-830	8,7	-	Ag 427	AG 503	-
Ag38MnNi	38	26	24	4,5	7,5	-	-	650-690	8,9	-	-	-	-
Ag40Ni	40	30	28	2	-	-	-	670-780	8,9	-	Ag 440	-	BAg-4
Ag49MnNi	49	16	23	4,5	7,5	-	-	680-705	8,9	55	Ag 449	AG 502	BAg-22
Ag49MnNi/1	49	27	21	0,5	2,5	-	-	670-690	8,9	-	-	-	-
Ag50Ni	50	20	28	2	-	-	-	660-705	9,0	45	Ag 450	-	BAg-24
Ag54Ni	54	40	5	1	-	-	-	720-855	9,6	-	Ag 454	-	BAg-13
ALLOYS WITHOUT COPPER (AMMONIA RESISTANT)													
Ag72Zn	72	-	28	-	-	-	-	710-730	8,4	44	-	-	-
Ag85Mn	85	-	-	-	15	-	-	960-970	10	-	Ag 485	AG 501	BAg-23
ALLOYS WITHOUT ZINC (SUITABLE FOR BRAZING IN OVEN)													
Ag40Ni/1	40	58	-	2	-	-	-	780-900	9,6	35	-	-	-
Ag60Sn/1	60	30	-	-	-	10	-	600-730	9,8	-	Ag 160	AG 402	BAg-18
Ag72Cu	72	28	-	-	-	-	-	780	10	35	Ag 272	AG 401	BAg-8
Ag72Cu V1*	72	28	-	-	-	-	-	780	10	35	Ag 272 V1	AG 401 V1	BVAg-8 Grade 1
Ag72Cu V2*	72	28	-	-	-	-	-	780	10	35	Ag 272 V2	AG 401 V2	BVAg-8 Grade 2
Ag99,99	99,99	-	-	-	-	-	-	960	10,5	-	-	-	-
ALLOYS WITH INDIUM (FOR TiN COATING)													
Ag56InNi	56	27	-	2,5	-	-	14,5	600-710	9,6	-	-	AG 403	-
Ag64MnNiIn	64	26	-	2	2	-	6	730-780	9,6	-	-	-	-

(*): Vacuum grade

CHARACTERISTICS MAKE-UP

Rods	Ø: 0,5 → 4 mm	Length: 500 / 1.000 mm / Other lengths available
Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 mm / Others diameters available	Length: 500 mm / Different kinds of coating available in various colours
Wires	Ø: 0,25 → 3 mm	Coils and Spools
Strips	Thickness: 0,1 → 1 mm	Width: 1,3 → 80 mm
Powder and Paste	Rings	Preforms from Wire and from Strip

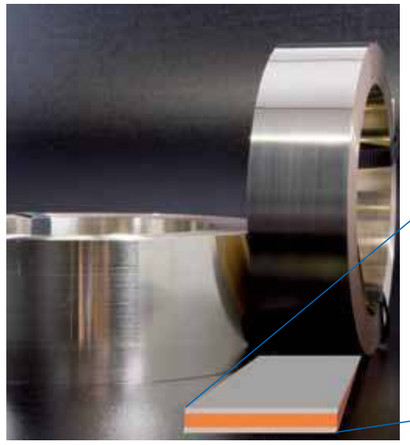
SILVER BASED ALLOYS - TRIMETALS

Trimetals strips consist of two layers of silver brazing alloy clad onto a copper core and are very popular for brazing of carbides onto steel, especially large pieces.

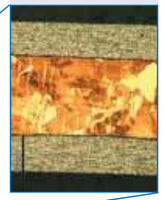
The copper core of the strip absorbs and relieves the stresses caused by the difference in thermal expansion between carbide and base metal, thus helping to prevent cracking.

Higher joint tensile strenghth performances are obtainable with Ag49MnNi/1 TR TOP, thanks to its modified copper central core.

For very large carbide pieces, or very hard carbide types, Ag49MnNi/1 TR 161, with higher copper percentage, is advised for the maximum reduction of internal stresses.



Micrographic image of a trimetal strip cross section



CODE	COMPOSITION % (external layers)					MELTING RANGE SOL - LIQ	DENSITY	JOINT SHEAR STRENGTH*	NOTES
	Ag	Cu	Zn	Ni	Mn	°C	g/cm³	N/mm²	
TRIMETALS (FOR HARDMETALS)									
Ag49MnNi/1 TR	49	27,5	20,5	0,5	2,5	670-690	9,0	150-300	Copper Core - Ratio 1:2:1
Ag49MnNi/1 TR TOP	49	27,5	20,5	0,5	2,5	670-690	9,0	200-300	Modified Copper Core - Ratio 1:2:1
Ag49MnNi/1 TR 161	49	27,5	20,5	0,5	2,5	670-690	9,0	-	Copper Core - Ratio 1:6:1
Ag49MnNi/1 TR 111	49	27,5	20,5	0,5	2,5	670-690	9,0	-	Copper Core - Ratio 1:1:1
Ag40Ni TR	40	30	28	2		670-780	8,9	-	Copper Core - Ratio 1:2:1
Ag38MnNi TR	38	26	24	4,5	7,5	650-690	8,9	-	Copper Core - Ratio 1:2:1

(*): Average value. Actual joint strength is a function of various factors, such as: type of base metals to be joined, joint design, joint clearance, brazing procedure, etc.

OTHER ALLOYS AVAILABLE UPON REQUEST

CHARACTERISTICS MAKE-UP

Strips	Thickness: 0,1 → 1 mm	Width: 1,3 → 80 mm
Preforms from Strip		

COPPER PHOSPHOROUS ALLOYS

The Copper-Phosphorous alloys are extensively used to join copper and copper alloy base metals (brass, bronzes).
They have self-fluxing properties when used on copper and may or may not contain Silver.
A flux is required when joining brass or bronze. Continuous service operating temperatures of joints brazed with these alloys range up to approx 200 °C. Corrosion resistance is satisfactory, except when the joints are exposed to sulfurous environments, especially at elevated temperatures. Copper-Phosphorous alloys should not be used on ferrous, nickel based alloys, or copper-nickel alloys with more of 10% nickel, in order to avoid premature failure of the joint due to the formation of brittle intermetallic phases. They are available in rods, wires, rings, preforms, pastes and powders.
Ag15CuP is also available in strip form.

Brazing of copper return bends

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	FLOW POINT	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Ag	Cu	P	Sn	°C	°C	g/cm³	kg/mm²	ISO 17672	EN 1044	AWS A5.8
COPPER-PHOSPHORUS											
CuP5	-	Bal	5	-	710-925	790	8,1	-	CuP 178	-	-
CuP6	-	Bal	6,3	-	710-890	760	8,1	56	CuP 179	CP 203	-
CuP7	-	Bal	7,3	-	710-820	730	8,1	58	CuP 180	CP 202	BCuP-2
CuP8	-	Bal	7,8	-	710-770	720	8	60	CuP 182	CP 201	-
COPPER-PHOSPHORUS-TIN											
CuP7Sn	-	Bal	7	7	650-700	700	8	60	CuP 386	CP 302	~ BCuP-9
SILVER-COPPER-PHOSPHORUS											
Ag0,4CuP	0,4	Bal	6,6	-	650-810	750	8,2	58	-	-	-
Ag2CuP	2	Bal	6,5	-	645-825	740	8,1	55	CuP 279	CP 105	-
Ag2CuP HP	2	Bal	7	-	643-788	740	8,1	-	CuP 280	-	BCuP-6
Ag5CuP	5	Bal	6	-	645-815	710	8,2	55	CuP 281	CP 104	BCuP-3
Ag5CuP HP	5	Bal	6,75	-	643-771	710	8,2	-	CuP 282	-	BCuP-7
Ag6CuP LP	6	Bal	6,2	-	643-800	720	8,3	-	-	-	-
Ag6CuP	6	Bal	7	-	643-813	720	8,3	55	CuP 283	-	BCuP-4
Ag10CuP	10	Bal	6	-	650-750	720	8,3	65	-	-	-
Ag15CuP	15	Bal	4,9	-	645-800	700	8,4	54	CuP 284	CP 102	BCuP-5
Ag15CuP HP	15	Bal	5,1	-	645-800	700	8,4	54	CuP 284	CP 102	BCuP-5
Ag18CuP LP	18	Bal	6,3	-	643-666	670	8,4	50	CuP 285	-	BCuP-8
Ag18CuP	18	Bal	7	-	645	650	8,4	50	CuP 286	CP 101	-

STABILIZED, NOT SPARKLING ALLOYS ARE ALSO AVAILABLE (PLUS VERSION).
ALLOYS WITH DIFFERENT PHOSPHORUS CONTENT ARE AVAILABLE.

CHARACTERISTICS MAKE-UP

Rods	Ø;□: 1,5 → 4 mm	Length: 500 / 1.000 mm
Coated Rods	Ø: 1,5 - 2 mm	Length: 500 mm
Wires	Ø: 0,5 → 3 mm	Coils and Spools
Strips (Ag15CuP)	Thickness: 0,1 → 1 mm	Width: 1,3 → 120 mm
Powder and Paste	Rings	Preforms from Wire and from Strip

BRASS AND COPPER BASED ALLOYS

This group includes four different categories of high-temp brazing alloys:

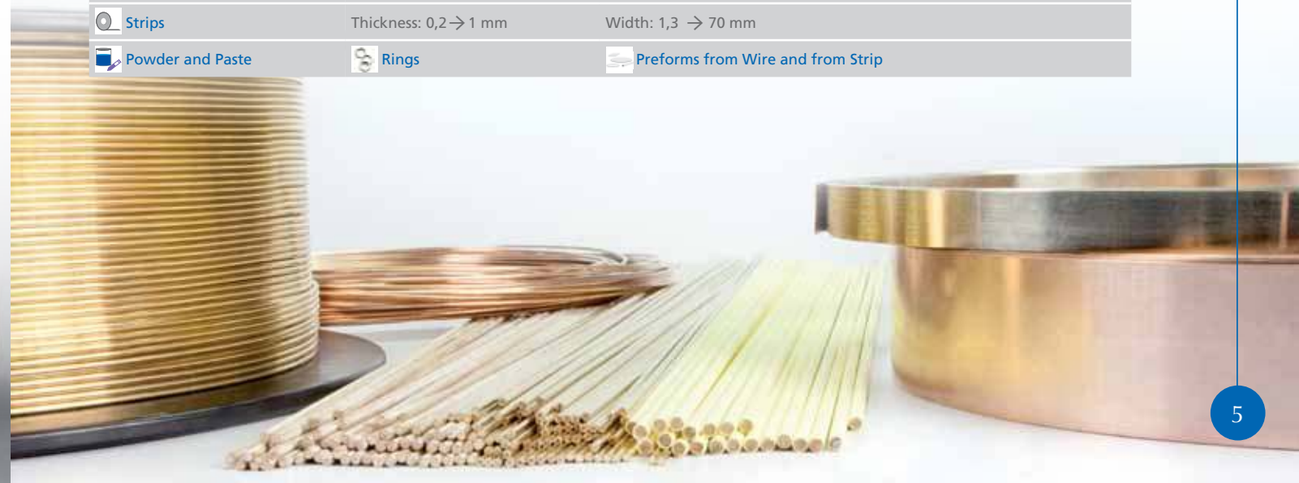
- General Purpose Brasses
- Brasses with addition of Nickel
- High temperature Copper Alloys for special applications
- Copper for furnace brazing

All these alloys are economical to use and can be generally supplied in a variety of forms (rods, wires, strips, preforms, powder and pastes). General purpose brasses can be used for brazing and for the Oxy-Fuel Gas Braze-Welding process, with liquid flux spread through the torch flame.

CODE	COMPOSITION %								MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Cu	Zn	Ag	Ni	Mn	Sn	Si	Other	°C	g/cm³	kg/mm²	ISO 17672	EN 1044	AWS A5.8
GENERAL PURPOSE BRASSES														
Cu60Zn	60	Bal	-	-	-	-	0,3	-	875-895	8,4	40	Cu 470a	CU 301	-
Cu59ZnSn	59	Bal	-	-	-	0,4	0,3	-	875-895	8,4	45	Cu 470	CU 302	RBCuZn-A
Cu59ZnMn	60	Bal	-	-	0,15	-	0,3	-	870-900	8,4	45	Cu 670	CU 303	-
Cu59ZnSnMn	59	Bal	-	-	0,7	0,4	0,3	-	870-890	8,4	45	~ Cu 471	~ CU 304	~ RBCuZn-C
Cu59ZnAg	59	Bal	1	-	0,1	0,1	0,1	-	860-890	8,4	45	-	-	-
BRASSES WITH NICKEL														
Cu48ZnNi10	48	Bal		10	-	-	0,3	-	890-920	8,7	54	Cu 773	CU 305	RBCuZn-D
Cu48ZnNi9Ag	48	Bal	1	9	-	-	0,2	-	890-920	8,7	54	-	-	-
Cu53ZnNi6	53	Bal		6	-	-	0,2	-	900-920	8,5	49	-	-	-
HIGH TEMPERATURE COPPER ALLOYS														
Cu97Ni3B	97	-	-	3	-	-	-	B 0,03	1085-1100	8,9	-	Cu 186	CU 105	-
Cu87MnCo3	87	-	-	-	10	-	-	Co 3	980-1030	8,7	-	-	-	-
Cu86MnNi2	86	-	-	2	12	-	-	-	960-990	8,8	-	Cu 595	-	-
Cu85MnNi3	85	-	-	3	12	-	-	-	960-990	8,8	-	Cu 595	-	-
Cu67MnNi9	67	-	-	9	24	-	-	-	950-955	8,2	-	-	-	-
Cu58ZnMnCo2	57,5	Bal	-	-	2	-	-	Co 2	880-930	8,2	-	-	-	-
Cu55ZnMn4Ni6	55	Bal	-	6	4	-	0,3	-	880-920	8,9	-	-	-	-
CuMn38Ni9,5	52,5	-	-	9,5	38	-	-	-	880-925	7,7	-	-	-	-
COPPER (FURNACE BRAZING)														
OF-Cu	≥ 99,95	-	-	-	-	-	-	-	1085	8,9	-	Cu 102	CU 102	BCu-3
ETP-Cu	≥ 99,90	-	-	-	-	-	-	-	1085	8,9	-	Cu 110	CU 101	BCu-1b
DHP-Cu	99,90	-	-	-	-	-	-	P<0,075	1085	8,9	-	Cu 141	~ CU 104	BCu-1

CHARACTERISTICS MAKE-UP

Rods	Ø: 1,5 → 10 mm	Length: 500 / 1.000 mm / Other lengths available
Coated / Micro Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 - 4 mm	Length: 500 mm / Different kinds of coating available in various colours
Wires	Ø: 1 → 6 mm	Coils and Spools
Strips	Thickness: 0,2 → 1 mm	Width: 1,3 → 70 mm
Powder and Paste	Rings	Preforms from Wire and from Strip



SILVER BASED ALLOYS - CADMIUM BEARING

The brazing alloys presented in this page are very versatile, high-strength, free-flowing and exhibit the lowest melting points of all silver based alloys.
They can be used to join a wide range of base materials.
Continuous service operating temperatures of joints brazed with these alloys range up to approx 200 °C.
Because of the presence of Zinc and Cadmium, and the possible failure of the joint due to the mechanism of interfacial corrosion, these alloys are not recommended for the joining of stainless steels in wet conditions; in these conditions, zinc free and cadmium free alloys, or alloys with nickel additions are preferred: see page 2.
Since Cadmium and its oxides are toxic, special safety precautions must be followed during brazing operations (e.g. mechanical ventilation and/or respiratory mask).
The use of these alloys in applications where food, beverages and/or human health in general is involved, is forbidden.

AVAILABLE IN EUROPEAN UNION COUNTRIES ONLY FOR MILITARY AND AEROSPACE APPLICATIONS (EU COMMISSION REGULATION NO. 494/2011): PLEASE CONTACT OUR TECHNICAL AND COMMERCIAL STAFF TO GET AN ADVICE ON SELECTING THE MOST APPROPRIATE CADMIUM-FREE SUBSTITUTES.

CODE	COMPOSITION %						MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Ag	Cu	Zn	Cd	Si	Ni	°C	g/cm³	kg/mm²	ISO 17672	EN 1044	AWS A5.8
Ag50CdNi	50	15,5	15,5	16	-	3	635-655	9,5	45	Ag 351	AG 351	BAg-3
Ag50Cd	50	15,5	16,5	18	-	-	625-635	9,5	43	Ag 350	AG 301	BAg-1a
Ag45Cd	45	15	16	24	-	-	605-620	9,4	43	Ag 345	AG 302	BAg-1
Ag42Cd	42	17	16	25	-	-	605-620	9,4	42	-	AG 303	-
Ag40Cd	40	19	21	20	-	-	595-630	9,3	42	Ag 340	AG 304	-
Ag38Cd	38	20	22	20	-	-	610-650	9,2	40	-	-	-
Ag34Cd	34	22	24	20	-	-	610-670	9,1	40	~ Ag 335	~ AG 305	~ BAg-2
Ag30Cd	30	28	21	21	-	-	600-690	9,1	38	Ag 330	AG 306	~ BAg-2a
Ag25Cd	25	30	27,5	17,5	-	-	605-720	8,8	40	Ag 326	AG 307	BAg-33
Ag21Cd	21	35	27	17	0,5	-	620-730	8,7	42	-	AG 308	-
Ag20Cd	20	40	25	15	-	-	620-750	8,7	40	-	AG 309	-
Ag19Cd	19	39	28	14	-	-	630-730	8,8	40	-	-	-
Ag17Cd	17	41	26	16	-	-	620-760	8,7	42	-	-	-
Ag13Cd	13	44	33	10	-	-	605-795	8,7	42	-	-	-

ALLOYS WITH 0,2 % SILICON ARE AVAILABLE

CHARACTERISTICS MAKE-UP

Rods	Ø: 0,5 → 4 mm	Length: 500 / 1.000 mm / Other lengths available
Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 mm / Others diameters available	Length: 500 mm / Different kinds of coating available in various colours
Wires	Ø: 0,25 → 3 mm	Coils and Spools
Strips	Thickness: 0,1 → 1 mm	Width: 1,3 → 80 mm
Rings	Preforms from Wire and from Strip	

ALUMINIUM AND ZINC-ALUMINIUM ALLOYS

Alloys based on Aluminium and/or Zinc for brazing of Aluminium.
Continuous service operating temperatures of joints brazed with Al/Si alloys range up to approx 150 °C.
Zinc-Aluminum alloys are also suitable for copper-aluminium and brass-aluminium joints.

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	CORRESPONDING STANDARDS		
	Al	Si	Mg	Mn	Zn	°C	ISO 17672	EN 1044	AWS A5.8
ALUMINIUM ALLOYS									
Al99,5	99,5	-	-	-	-	647-658	-	SG-Al99,5 (DIN 1732)	1050 (AWS A5.10)
Al99,5 FC	99,5	-	-	-	-	647-658	-	SG-Al99,5 (DIN 1732)	1050 (AWS A5.10)
ALUMINIUM-SILICON ALLOYS									
AlSi5	Bal	5	-	-	-	575-630	Al 105	AL 101	4043 (AWS A5.10)
AlSi5 FC	Bal	4	-	-	-	575-630	~ Al 105	~ AL 101	~ 4043 (AWS A5.10)
AlSi12	Bal	12	-	-	-	575-585	Al 112	AL 104	BAlSi-4
AlSi12 FC-NC	Bal	12	-	-	-	575-585	Al 112	AL 104	BAlSi-4
ZINC-ALUMINIUM ALLOYS									
AlZn98	2	-	-	-	98	420-480	-	-	-
AlZn98 FC-NC	2	-	-	-	98	420-480	-	-	-
AlZn98 FG-NC	2	-	-	-	98	420-480	-	-	-
AlZn85	15	-	-	-	85	380-405	-	-	-
AlZn78	22	-	-	-	78	415-475	-	-	-
AlZn78 FC-NC	22	-	-	-	78	415-475	-	-	-
AlZn78 FG-NC	22	-	-	-	78	415-475	-	-	-

FC: Flux Cored FG: Flux Grooved NC: Non-Corrosive Flux

SELF FLUXING ROD FOR LOW TEMPERATURE JOINING AND REPAIR OF ALUMINIUM

ST 380 AL	-	-	-	-	-	380	-	-	-

CHARACTERISTICS MAKE-UP

Rods	Ø: 1,6 → 5 mm	Length: 500 / 1.000 mm
Wires	Ø: 0,8 → 3,2 mm	On Spools DIN 300 and DIN 100
Flux-cored rods & wires	Ø: 2 → 5 mm	
Flux-grooved rods & wires	Ø: 1,6 → 2 mm	
Powder and Paste		AlSi12 - AlZn98
Rings		

SOFT SOLDERS

Alloys based on Tin for Soft-Soldering.
Lead bearing alloys have particular Health and Safety limitations in applications and uses.
Lead-free alloys, compliant to RoHS regulation, are available. Available as ingots, bars, sticks, wires and flux-cored wires.

Flux cored wires are available with different cores for various applications:

- General purpose soldering
- Soldering of stainless steel
- Soldering of aluminium
- Electromechanics
- Electrical Engineering
- Electronics (no clean)
- Others

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	CORRESPONDING STANDARDS	
	Sn	Pb	Ag	Other	°C	ISO 9453	EN 29453
TIN							
Sn100	99,9	-	-	-	232	-	-
TIN -COPPER							
SnCu97/3	97	-	-	Cu 3	230-250	No. 402	S-Sn97Cu3
Sn99Cu1	99,3	-	-	Cu 0,7	227	No. 401	S-Sn99Cu1
TIN - SILVER							
Ag2Sn	98	-	2	-	221-225	-	-
Ag3,5Sn	96,5	-	3,5	-	221	No. 703	S-Sn97Ag3
Ag5Sn	95	-	5	-	221-235	No. 704	-
Ag10Sn	90	-	10	-	221-300	-	-
TIN - SILVER - COPPER							
Ag1SnCu4	95,6	-	0,4	Cu 4	225-258	-	-
Ag3SnCu0,5	96,5	-	3	Cu 0,5	217-220	No. 711	-
Sn99Cu1Ag	99	-	0,3	Cu 0,7	217-227	-	-
TIN - SILVER - LEAD							
Ag1,4SnPb	63	35,6	1,4	-	178	-	-
Ag1,5SnPb	5	93,5	1,5	-	296-301	-	-
TIN - ANTIMONY							
SnSb95/5	95	-	-	Sb 5	230-240	No. 201	S-Sn95Sb5
TIN - LEAD							
SnPb80/20	80	20	-	-	183-205	-	-
SnPb63/37	63	37	-	-	183	No. 101	S-Sn63Pb37
SnPb60/40	60	40	-	-	183-190	No. 103	S-Sn60Pb40
SnPb50/50	50	50	-	-	183-215	No. 111	S-Pb50Sn50
SnPb40/60	40	60	-	-	183-235	No. 114	S-Pb60Sn40
SnPb33/67	33	67	-	-	183-242	-	-
SnPb30/70	30	70	-	-	183-255	No. 116	S-Pb70Sn30
SnPb8/92	8	92	-	-	280-305	-	S-Pb92Sn8
TIN - LEAD - COPPER							
Sn60Pb38Cu2	60	38	-	Cu 2	183-190	No. 161	S-Sn60Pb38Cu2
TIN - ZINC							
SnZn80/20	80	-	-	Zn 20	200-288	-	-
LEAD							
Pb100	-	99,9	-	-	327	-	-

OTHER ALLOYS AVAILABLE UPON REQUEST

(*) TYPE OF CORING

TYPE	EN 29454-1	APPLICATION
SN1	3.1.1	For Stainless Steel
SN35	2.1.2	For Aluminium
SN6	2.1.3	For Electromechanics
SN61	2.1.2	General Use
SN7	1.1.2	Electrical Engineering
SN71	1.1.3	For Electronics - NO CLEAN
SN72	1.1.1	Colophony

CHARACTERISTICS MAKE-UP

Ingots, bars and sticks		
Solid Wires	Ø: 0,5 → 3 mm	
Flux-cored wires	Ø: 0,8 → 3 mm	Different kinds of coring available (*see table)
Strips		
Powder and Paste	Rings	Preforms from Wire and from Strip

NICKEL BASED ALLOYS

These brazing alloys are generally used when specifications require good corrosion resistance and/or extreme service temperature (both high and subzero) properties.
Ideal for brazing of stainless steels and nickel based alloys.
They find numerous applications in the manufacturing of heat exchangers, diamond tools, and high-tech sectors such as aerospace industry.
Brazing is performed under a protective, reducing atmosphere, or in vacuum.

Vacuum Brazing of Diamond

Amorphous Brazing Foil

CODE	COMPOSITION %									MELTING RANGE SOL - LIQ	CORRESPONDING STANDARDS	
	Ni	Cr	Fe	Si	B	C	P	Mn	Cu	°C	ISO 17672	AWS A5.8
Ni1	Bal	14	4,5	4,5	3,1	0,7	-	-	-	977-1038	-	BNi-1
Ni1a	Bal	14	4,5	4,5	3,1	-	-	-	-	977-1077	Ni 610	BNi-1a
Ni2	Bal	7	3	4,1	3	-	-	-	-	971-999	Ni 620	BNi-2
Ni3	Bal	-	-	4,5	2,9	-	-	-	-	982-1037	Ni 630	BNi-3
Ni4	Bal	-	-	3,5	1,9	-	-	-	-	982-1066	Ni 631	BNi-4
Ni5	Bal	19	-	10	-	-	-	-	-	1080-1135	Ni 650	BNi-5
Ni6	Bal	-	-	-	-	-	11	-	-	875-875	Ni 700	BNi-6
Ni7	Bal	14	-	-	-	-	10	-	-	890-890	Ni 710	BNi-7
Ni8	Bal	-	-	7	-	-	-	23	4,5	982-1010	Ni 800	BNi-8
Ni9	Bal	15	-	-	3,6	-	-	-	-	1055	Ni 612	BNi-9

AVAILABLE AS POWDER AND PASTE
SOME OF THESE ALLOYS ARE ALSO AVAILABLE AS AMORPHOUS BRAZING FOILS
SOME OF THESE ALLOYS ARE ALSO AVAILABLE AS RINGS

PARTICLE SIZE COMPARISON TABLE

PARTICLE SIZE			MESH		
MICRONS [µ]	MILLIMITRES [mm]	INCHES	US STANDARD MESH [No.] (*)	TYLER STANDARD MESH	BRITISH STANDARD MESH
33	0,0330	0,0013	425	-	-
38	0,0380	0,0015	400	-	-
45	0,0450	0,0018	325	325	-
53	0,0530	0,0021	270	270	300
63	0,0630	0,0025	230	250	-
75	0,0750	0,0030	200	200	-
90	0,0900	0,0035	170	170	170
106	0,1060	0,0042	140	150	150
125	0,1250	0,0049	120	115	120
150	0,1500	0,0059	100	-	-
180	0,1800	0,0071	80	-	85
212	0,2120	0,0083	70	-	72
250	0,2500	0,0098	60	-	-
300	0,3000	0,0118	50	-	-
350	0,3500	0,0138	45	42	44
420	0,4200	0,0165	40	-	-
500	0,5000	0,0197	35	-	30
600	0,6000	0,0236	30	28	-
710	0,7100	0,0280	25	20	-
850	0,8500	0,0335	20	-	-

(*): a "+" sign before the sieve mesh number indicates that the particles are retained by the sieve.
a "-" sign before the sieve mesh number indicates that the particles pass through the sieve. For instance if the particle size of a powder is described as -140 +325 mesh, then 90% or more of the powder will pass through a 140 mesh sieve (particles smaller than 106 µ) and will be retained by a 325 mesh sieve (particles larger than 45 µ). If a powder is described as -100 mesh, then 90% or more of the powder will pass through a 100 mesh sieve (particles smaller than 150 µ).

POWDERS & PASTES

A wide range of filler metals in powder and paste is available.
Brazing is performed in air, under protective atmosphere, or in vacuum, by flame, induction or in furnace.
Powders are available in different grain sizes, from coarse to fine.
Pastes can be supplied with and without flux, with various binders and with different metal content percentages, in order to fulfill the most demanding applications.
To select the most appropriate brazing paste, many factors have to be taken into account, such as: type and dimensions of pieces, materials to be joined, heating method, type of atmosphere, etc.
Consequently technical testing is generally required to select the most appropriate paste for the specific customer application.

PASTES SELECTION CHART

	AVAILABLE ALLOYS	AVAILABLE MAKE UP			
SILVER BASED ALLOYS	Ag-Cu; Ag-Cu-Sn; Ag-Cu-Zn; Ag-Cu-Zn-Sn; Ag-Cu-Zn-Ni; Ag-Cu-Zn-Mn-Ni	Powder	Paste		
			Torch	Induction	Furnace
ACTIVE BRAZING ALLOYS	Ag-Cu-Ti; Ni1; Ni1a; Ni2	Powder	Paste		
			-	Induction	Furnace
COPPER-PHOSPHOROUS ALLOYS	Cu-P; Cu-P-Sn; Ag-Cu-P	Powder	Paste		
			Torch	Induction	Furnace
COPPER	Cu	-	Paste		
			-	-	Furnace
BRONZE	CuSn6 - CuSn8 - CuSn12	Powder	Paste		
			-	-	Furnace
COPPER BASED	Cu-Zn; Cu-Zn-Ni; Cu-Mn-Ni	Powder	Paste		
			Torch	Induction	Furnace
ALUMINIUM	Al-Si; Al-Zn	Powder	Paste		
			Torch	Induction	Furnace
SOFT SOLDERS	Sn; Ag-Sn; Sn-Cu; Sn-Pb	Powder	Paste, with following flux types: 3.1.1.C (general purpose) 2.1.2.C (for aluminium) 1.1.2 (colophony)		

FLUXES

Our range:

- Fluxes for Silver Based Alloys
- Fluxes for Brass and Copper Based Alloys
- Liquid Fluxes for Braze-Welding
- Fluxes for Aluminium alloys
- Fluxes for Soft Soldering alloys

Available in different presentations, such as:
Powder, Paste and Liquid form.

FLUXES FOR SILVER BASED ALLOYS

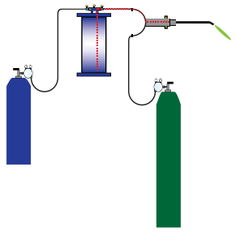
CODE	ACTIVITY RANGE	MAKE-UP		STANDARD	DESCRIPTION
	°C	Powder	Paste	EN 1045	
FLUX AG1	550-800	✓	✓	FH 10	General purpose
FLUX AG3	600-850	✓	✓	FH 10	For high temperatures
FLUX AG4	550-850	✓	✓	FH 10	General purpose - Very wide range of temperatures
FLUX AG5	700-1000	✓	✓	FH 20	For very high temperatures
FLUX AG6	550-850	✓	-	FH 11	For Aluminium Bronze
FLUX AG7	550-800	✓	✓	FH 10	General purpose. Also for Stainless Steel.
FLUX AG8	550-850	-	✓	FH 12	For Stainless Steel and Hard Metal - Brown paste
FLUX AG11	550-800	-	✓	FH 10	General purpose. Also for Stainless Steel - For use with automatic dispensing machines
FLUX AG12	550-850	-	✓	FH 12	For Stainless Steel and Hard Metal - For use with automatic dispensing machines
ANTIFLUX	-	-	✓	-	Prevents wetting of brazing alloy

FLUXES FOR BRASS AND COPPER BASED ALLOYS

CODE	ACTIVITY RANGE	MAKE-UP		STANDARD	DESCRIPTION
	°C	Powder	Paste	EN 1045	
FLUX BR1	800-1000	✓	✓	FH 21	Brazing with Brass
FLUX BR4	700-1200	✓	✓	FH 21	For high temperatures
FLUX BR7	760-1200	-	✓	FH 21	For very high temperatures

LIQUID FLUXES FOR BRAZING AND FOR BRAZE-WELDING

CODE	ACTIVITY RANGE	STANDARD	DESCRIPTION
	°C	EN 1045	
FLUX LI1	550-1100	FH 21	For Brazing with Vaporizer systems. Medium Concentration
FLUX LI2	550-1100	FH 21	For Brazing with Vaporizer systems. Medium-High Concentration
FLUX LI3	550-1100	FH 21	For Brazing with Vaporizer systems. High Concentration
FLUX LI1 ECO	550-1100	FH 21	Non-toxic formulation. Medium concentration
FLUX LI2 ECO	550-1100	FH 21	Non-toxic formulation. Medium-High concentration
FLUX LI3 ECO	550-1100	FH 21	Non-toxic formulation. High concentration



FLUXES FOR ALUMINIUM

CODE	ACTIVITY RANGE	MAKE-UP		STANDARD	DESCRIPTION
	°C	Powder	Paste	EN 1045	
FLUX AL1/d	550-650	✓	✓	FL 10	Corrosive flux for flame brazing
FLUX AL1 NC	550-650	✓	✓	FL 20	Non-corrosive flux for flame, induction and furnace (C.A.B.) brazing
FLUX AL3	550-650	✓	-	FL 10	Autogenous welding of pure aluminium
FLUX AL4	550-650	✓	-	FL 10	Autogenous welding of Al-Si and Al-Mg alloys
FLUX AL6	440-470	-	✓	-	Non-corrosive flux for brazing with Zinc-Aluminium alloys

FLUXES FOR SOFT SOLDERS

CODE	MAKE-UP		STANDARD		DESCRIPTION
	Paste	Liquid	DIN 8511	EN 29454-1	
FLUX SN1	✓	✓	F - SW12	3.1.1.A/C	General purpose
FLUX SN2	-	✓	F - SW11	3.2.2.A	For Stainless Steel
FLUX SN6	-	✓	F - SW24	2.1.3.A	For Electromechanics
FLUX SN35	-	✓	-	2.1.2.A	For aluminium and low-alloyed aluminium alloys

OTHER PACKAGES AVAILABLE UPON REQUEST

Powder:	Packages of: 0,1 - 0,25 - 0,5 - 1 - 10 - 20 kg
Paste:	Packages of: 0,1 - 0,25 - 0,5 - 1 - 1,5 - 10 - 20 kg
Liquid:	Packages of: 0,25 - 0,5 - 1 - 5 - 10 - 25 lt • Drums of 60 - 200 lt (LI1 - LI2 - LI3)

INFILTRATION BINDERS

Copper based alloys to be used as infiltration binders for the production of mining and exploration tools, drill heads, diamond bits.
These alloys are melted and infiltrated onto a matrix of hard materials in powder form, creating an hard, abrasive, and wear resistant component.
These materials are available as cubes, slugs and grains.

CODE	COMPOSITION %				
	Cu	Zn	Ni	Mn	Sn
IB-CuMn24	Bal.	8	15	24	-
IB-CuMn20	Bal.	-	10	20	-
IB-CuSn19	Bal.	-	1,5	0,3	19
IB-CuNi10	Bal.	-	10,1	5,7	6

OTHER ALLOYS AVAILABLE UPON REQUEST

CONTACT MATERIALS

CODE	COMPOSITION % (Ag is balance)	MELTING POINT	DENSITY	ELECTRICAL CONDUCTIVITY	MECHANICAL PROPERTIES (RECRYSTALLIZED STATE)		
		°C	g/cm³	MS/m	Rm [MPa]	A [%]	$HV_{0,2}$
Ag99,9	Ag 99,9 min.	960	10,5	60	155-215	40	30
AgNi0,15	Ni 0,10—0,20	960	10,5	57	185-255	30	40
AgNi10	Ni 10,0	960	10,4	48	200-250	20	50
AgNi20	Ni 20,0	960	10,3	46	270-300	15	60
AgCu8	Cu 7,4—8,4	900-940	10,3	50	225-325	25	60
AgCd8	Cd 7,0—9,0	890-910	10,4	25	195-295	35	35
AgCd13	Cd 12,0—14,0	830-850	10,3	20	215-315	35	40
AgCuO10	CuO 10,0	960	10,2	45	225-325	15	60
AgCdO10	CdO 10,0	960	10,3	49	225-325	15	60
AgCdO15	CdO 15,0	960	10,2	45	225-325	15	80
$AgSnO_2$ (Bi_2O_3)	SnO_2 10,0	960	9,8	45	270	10	100

- Wires
- Strips
- Solid and bimetallic contact rivets
- Solid and bimetallic contact discs

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