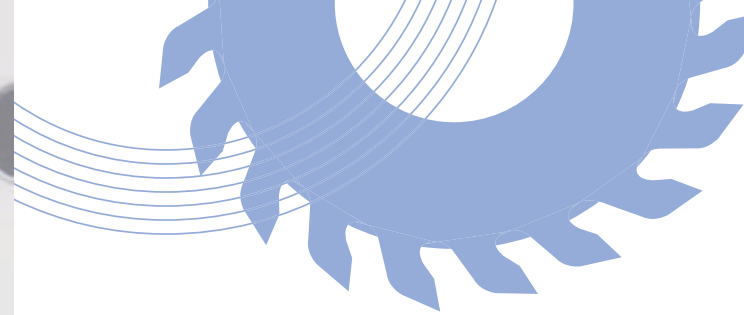


- BRAZING ☐
- SOFT SOLDERING ☐
- WELDING ☐
- FLUXES ☐

STELLA

WELDING ALLOYS

GENERAL CATALOGUE



STELLA

WELDING ALLOYS

STELLA WELDING ALLOYS is a specialized supplier of brazing alloys, fluxes and filler metals for **Brazing**, Soldering and Welding. 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 HVAC&R, 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.

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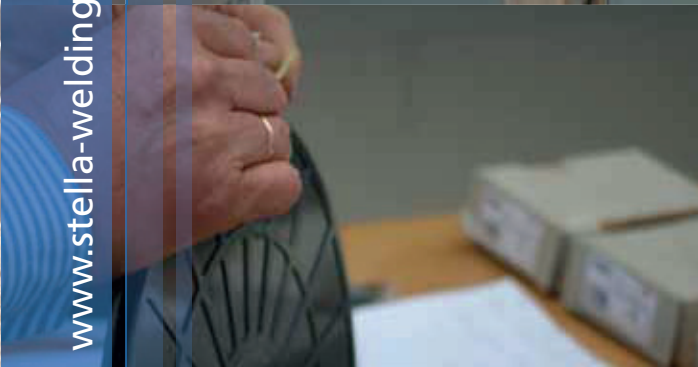
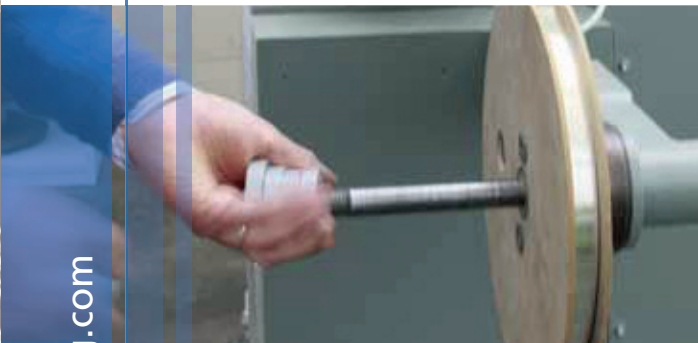
- the most comprehensive and widest range of different alloys and products, from general purpose to special applications
- variety of different make-ups, from standard forms to custom engineered forms
- conformity to the main international, technical and environmental standards
- complete source for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



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



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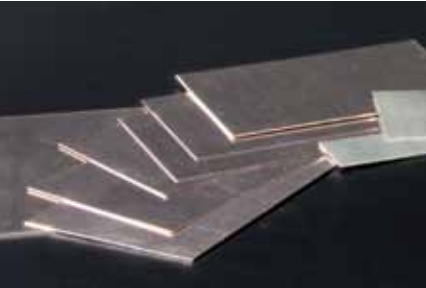
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CHARACTERISTICS MAKE-UP & PREFORMS CAPABILITIES

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RINGS		MULTITURN RINGS		SLUGS	
FLUXES		MARKED RODS		PACKAGING	
SHIMS		DISCS & WASHERS			

Section 1

TECHNICAL CHARTS
BRAZING



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 8.

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.

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 18.



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

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

WITHOUT TIN

Ag60	60	26	14			695-730	9,5	45		AG 202	
Ag45	45	30	25			665-745	9,1		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				
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	

NOTE: ALLOYS WITH 0,2 % SILICON ARE AVAILABLE.

CHARACTERISTICS MAKE-UP

 Rods	Ø: 0,5 → 4 mm	Length: 500 / 1.000 mm
 Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 mm	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 °C	DENSITY g/cm³	TENSILE STRENGTH kg/mm²	CORRESPONDING STANDARDS		
	Ag	Cu	Zn	Ni	Mn	Others				ISO 17672	EN 1044	AWS A5.8

ALLOYS WITH NICKEL

Ag27MnNi	27	38	20	5,5	9,5		680-830	8,7		Ag 427	AG 503	
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

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)

Ag99,99	99,99						960-960	10,5				
Ag60Sn/1	60	30				Sn 10	600-730	9,8		Ag 160	AG 402	
Ag72	72	28					780-780	10	35	Ag 272	AG 401	BAG-8
Ag40Ni/1	40	58		2			780-900	9,6	35			

ALLOYS WITH INDIUM (SUITABLE FOR TIN COATING)

Ag56InNi	56	27		2,5		In 14,5	600-710	9,6			AG 403	
Ag64MnNiIn	64	26		2	2	In 6	730-780	9,6				

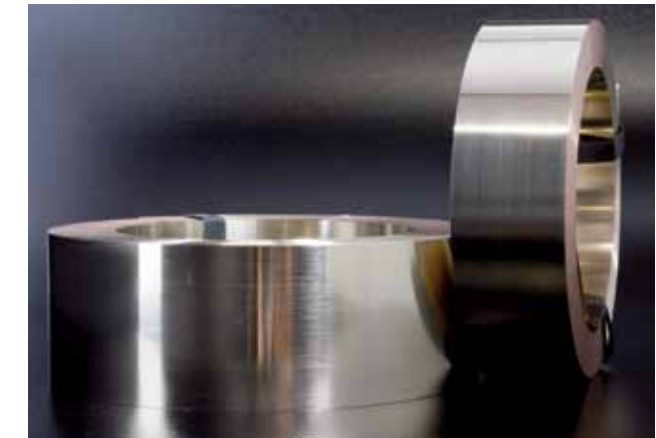
CHARACTERISTICS MAKE-UP

Rods	Ø: 0,5 → 4 mm	Length: 500 / 1.000 mm
Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 mm	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.



CODE	COMPOSITION % (external layers)					MELTING RANGE SOL - LIQ °C	DENSITY g/cm³	NOTES
	Ag	Cu	Zn	Ni	Mn			

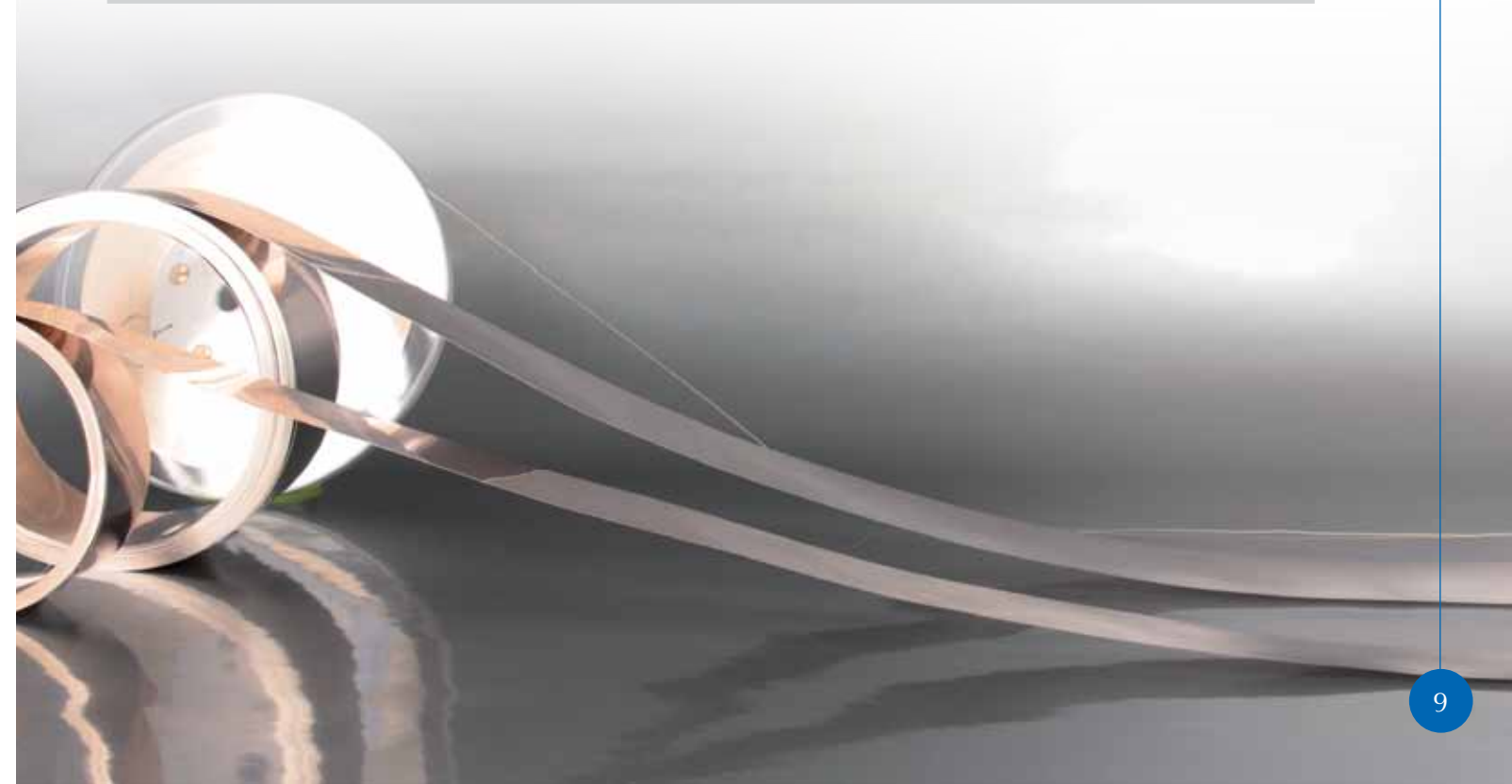
TRIMETALS

Ag49MnNi/1 TR	49	27,5	20,5	0,5	2,5	670-690	9,0	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

NOTE: OTHER ALLOYS AVAILABLE UPON REQUEST.

CHARACTERISTICS MAKE-UP

Strips	Thickness: 0,1 → 1 mm	Width: 1,3 → 80 mm
Preforms 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 8.

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.

CADMIUM BEARING BRAZING ALLOYS HAVE BEEN BANNED IN THE EUROPEAN UNION SINCE DECEMBER 2011 (EU COMMISSION REGULATION NO. 494/2011) AND THEIR USAGE IS NO MORE ALLOWED: PLEASE CONTACT OUR TECHNICAL AND COMMERCIAL STAFF TO GET AN ADVICE ON SELECTING THE MOST APPROPRIATE CADMIUM-FREE SUBSTITUTES: see page 47.

CODE	COMPOSITION %						MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Ag	Cu	Zn	Cd	Si	Ni				ISO 17672	EN 1044	AWS A5.8

ALLOYS

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			

TRIMETAL STRIPS (BRAZING OF CARBIDES)

Ag40Cd TR	40	19	21	20			595-630			Trimetal Strip - Copper Core - Ratio 1:2:1		
Ag30Cd TR	30	28	21	21			600-690			Trimetal Strip - Copper Core - Ratio 1:2:1		

CHARACTERISTICS MAKE-UP

Rods	Ø: 0,5 → 4 mm	Length: 500 / 1.000 mm
Coated Rods	Ø: 1,5 - 2 - 2,5 - 3 mm	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

NOTE: ALLOYS WITH 0,2 % SILICON ARE AVAILABLE

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				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
Cu59ZnSnMn	59	Bal		0,7	0,7	0,4	0,3		870-890	8,4	45	Cu 681	CU 306	RBCuZn-B
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			Cu 186	CU 105	
Cu87MnCo3	87				10			Co 3	980-1030	8,7				
Cu86MnNi2	86			2	12				960-990	8,8				
Cu85MnNi3	85			3	12				960-990	8,8				
Cu67MnNi9	67			9	24				950-955	8,2				
Cu58ZnMnCo2	57,5	38,5			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
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

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.

Ag5CuP and Ag15CuP are also available in strip form.

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	FLOW POINT	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
	Ag	Cu	P	Sn	°C	°C	g/cm ³	kg/mm ²	ISO 17672	EN 1044	AWS A5.8

COPPER-PHOSPHORUS

CuP6		94	6		710-890	760	8,1	56	CuP 179	CP 203	
CuP7		93	7		710-820	730	8,1	58	CuP 180	CP 202	BCuP-2
CuP8		92	8		710-770	720	8	60	CuP 182	CP 201	

COPPER-PHOSPHORUS-TIN

CuP7Sn		86	7	7	650-700	700	8	60	CuP 386	CP 302	~ BCuP-9
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SILVER-COPPER-PHOSPHORUS

Ag0,4CuP	0,4	93	6,6		650-810	750	8,2	58			
Ag2CuP	2	91,5	6,5		645-825	740	8,1	55	CuP 279	CP 105	~ BCuP-6
Ag5CuP	5	89	6		645-815	710	8,2	55	CuP 281	CP 104	BCuP-3
Ag6CuP	6	87	7		643-813	720	8,3	55	CuP 283		BCuP-4
Ag10CuP	10	84	6		650-750	720	8,3	65			
Ag15CuP	15	80	5		645-800	700	8,4	54	CuP 284	CP 102	BCuP-5
Ag18CuP	18	75,5	6,5		643-666	670	8,4	50	CuP 285		

NOTE: 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 (Ag5CuP and Ag15CuP)	Thickness: 0,1 → 1 mm	Width: 1,3 → 120 mm
 Powder and Paste	 Rings	 Preforms from Wire and from Strip

ALUMINIUM & 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 °C	CORRESPONDING STANDARDS		
	Al	Si	Mg	Mn	Zn		ISO 17672	EN 1044	AWS A5.8

ALUMINIUM

Al99,5	Bal	0,3	0,03	0,03		647-658	SG-Al99,5 (DIN 1732)		1050 (AWS A5.10)
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ALUMINIUM-SILICON

AlSi5	Bal	5				575-630	Al 105	AL 101	4043 (AWS A5.10)
AlSi12	Bal	12				575-585	Al 112	AL 104	BAISI-4

ZINC-ALUMINIUM

AlZn98	2				98	430-440			
AlZn78	22				78	441-471			



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	Only AlSi12 - AlZn98 - AlZn78
Powder and Paste		AlSi12 - AlZn98
Rings		

SOFT SOLDERS

Alloys based on Tin for Soft-Soldering.

Lead and Cadmium bearing alloys have particular Health and Safety limitations in applications and uses.

Lead-free and Cadmium-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 °C	CORRESPONDING STANDARDS	
	Sn	Pb	Ag	Cu	Sb	Zn	Cd		DIN 1707	EN 29453

TIN

Sn100	99,9							232		
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TIN-COPPER

SnCu97/3	97			3				230-250	SnCu3	S-Sn97Cu3
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TIN-SILVER

Ag2Sn	98		2					221-225		
Ag3,5Sn	96,5		3,5					221		S-Sn97Ag3
Ag5Sn	95		5					221-235	SnAg5	
Ag10Sn	90		10					221-300		

TIN-SILVER-COPPER

Ag1SnCu4	95,6		0,4	4				225-258		
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TIN-SILVER-LEAD

Ag1,4SnPb	63	35,6	1,4					178	Sn63PbAg	
Ag1,5SnPb	5	93,5	1,5					296-301		

TIN-ANTIMONY

SnSb95/5	95				5			230-240	SnSb5	S-Sn95Sb5
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TIN-LEAD

SnPb80/20	80	20						183-205	Sn80Pb20	
SnPb63/37	63	37						183	Sn63Pb	S-Sn63Pb37
SnPb60/40	60	40						183-190	Sn60Pb	S-Sn60Pb40
SnPb50/50	50	50						183-215	Sn50Pb	S-Pb50Sn50
SnPb40/60	40	60						183-235	Pb60Sn	S-Pb60Sn40
SnPb33/67	33	67						183-242	PbSn33	
SnPb30/70	30	70						183-255	PbSn30	S-Pb70Sn30
SnPb8/92	8	92						280-305		S-Pb92Sn8

LEAD

Pb100		99,9						327		
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CD-BEARING

Cd82Zn16Ag			2			16	82	270-280	Cd82Zn16Ag2	
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CHARACTERISTICS MAKE-UP

Cast ingots, bars and sticks		
Solid Wires	Ø: 0,5 → 3 mm	
Flux-cored wires	Ø: 0,8 → 3 mm	
Strips		
Powder and Paste	Rings	Preforms from Wire and from Strip

BRAZING 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.



SELECTION CHART

	AVAILABLE ALLOYS		AVAILABLE MAKE UP		
● SILVER BASED ALLOYS	See pages: 7 - 8	Powder	Paste		
			Torch	Induction	Furnace
● COPPER-PHOSPHOROUS ALLOYS	See page: 12	Powder	Paste		
			Torch	Induction	Furnace
● COPPER	Copper / Copper-cuprous oxide		Paste		
					Furnace
● BRONZE	CuSn6 - CuSn8 - CuSn12	Powder	Paste		
					Furnace
● COPPER BASED	Cu60Zn - Cu48ZnNi10 Cu87MnNi3	Powder	Paste		
			Torch	Induction	Furnace
● ALUMINIUM	AlSi12 - AlZn98	Powder	Paste		
			Torch	Induction	Furnace
● SOFT SOLDER	Ag/Sn - SnCu97/3 Sn/Pb alloys	Powder	Paste, with following flux types: General purpose: 3.1.1.C For aluminium: 2.1.2.C		

NICKEL BASED ALLOYS

CODE	COMPOSITION %									MELTING RANGE SOL - LIQ °C	CORRESPONDING STANDARDS	
	Ni	Cr	Fe	Si	B	C	P	Mn	Cu		ISO 17672	AWS A5.8
Ni1	Bal	14	4,5	4,5	3,1	0,7				1021-1052		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					1021-1052	Ni 612	BNi-9



PARTICLE SIZE COMPARISON TABLE

PARTICLE SIZE			MESH		
MICRONS [μ]	MILLIMETRES [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).

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:

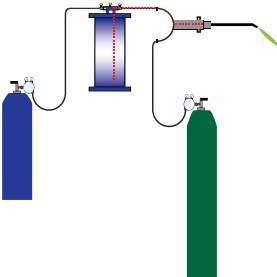
CODE	ACTIVITY RANGE	MAKE-UP		STANDARD	DESCRIPTION
	°C	Powder	Paste	EN 1045	
FLUX AG1	550-800	✓	✓	FH 10	General purpose
FLUX AG3	600-850	✓	✓	FH 10	For high temperatures
FLUX AG4	550-850	✓	✓	FH 10	General purpose - Very wide range of temperatures
FLUX AG5	700-1000	✓	✓	FH 20	For very high temperatures
FLUX 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 BR5	1000-1300	✓	✓	FH 30	For very 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
FLUX LI2 ECO	550-1100	FH 21	Non - toxic formulation
FLUX LI3 ECO	550-1100	FH 21	Non - toxic formulation



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 - SW25	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)

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 ₂ O ₃)	SnO ₂ 10,0	960	9,8	45	270	10	100

Wires

Strips

Solid and bimetallic contact rivets

Solid and bimetallic contact discs



Section 2

TECHNICAL CHARTS WELDING



ALUMINIUM AND MAGNESIUM BASED ALLOYS FOR WELDING

Alloys based on aluminium and magnesium, suitable for the TIG/MIG techniques.
Used to join aluminium and magnesium base metals.
Some alloys are also suitable for the brazing technique.

CODE	COMPOSITION %						CORRESPONDING STANDARDS	
	Al	Si	Mg	Mn	Zn	Zr	DIN 1732	AWS A5.10

ALUMINIUM:

Al99,8	Bal	0,2	0,02	0,02			SG-Al99,8	1080
Al99,5	Bal	0,3	0,03	0,03			SG-Al99,5	1050

ALUMINIUM-SILICON:

AlSi5	Bal	5	0,05	0,05			SG-AlSi5	4043
AlSi12	Bal	12	0,05	0,15			SG-AlSi12	4047

ALUMINIUM-MAGNESIUM:

AlMg4,5Mn	Bal	0,2	4,5	0,5-1			SG-AlMg4,5Mn	5183
AlMg4,5MnZr	Bal	<0,4	4,5-5,2	0,7-1,1	<0,25	0,1-0,2	SG-AlMg4,5MnZr	5087
AlMg5	Bal	0,2	5	0,05-2			SG-AlMg5	5356
AlMg5Mn	Bal	0,3	5	0,6-1			SG-AlMg5	5556
AlMg3	Bal	0,4	3	0,5			SG-AlMg3	5754

MAGNESIUM:

MgAl6Zn	6		Bal		1		AZ61A (AWS A5.19)
MgAl9Zn	9		Bal		2		AZ92A (AWS A5.19)

CHARACTERISTICS MAKE-UP

 Rods	Ø: 1,2 → 5 mm	Length: 1.000 mm
 Wires	Ø: 0,8 → 3,2 mm	On Spools DIN 300, DIN 200, and DIN 100
 Flux-cored rods & wires	Ø: 2 → 5 mm	Only Al99,5 - AlSi5 - AlSi12
 Rings		



COPPER BASED ALLOYS FOR WELDING

Alloys based on copper suitable for the TIG / MIG techniques.
Supplied as rods and wires, some alloys are also suitable for the brazing technique.

CODE	COMPOSITION %									MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	BRINELL HARDNESS	CORRESPONDING STANDARDS	
	Cu	Fe	Ag	Ni	Al	Mn	Sn	Si	Others	°C	g/cm³	kg/mm²	HB 2,5	DIN 1733	AWS A5.7
Cu99,9	99,9								P 0,05	1080	8,9	22	50	SF-Cu (DIN 1787)	
CuSn	Bal					X	0,8	X		1020-1050	8,9	22	60	SG-CuSn	ERCu
CuAg	Bal		1			X				1070-1080	8,9	20	60	SG-CuAg	
CuSi2Mn	Bal					1	X	1,8		1030-1050	8,7	28	62		
CuSi3	Bal					1		3		965-1035	8,5	35	80	SG-CuSi3	ERCuSi-A
CuSn6	Bal						6		P 0,25	910-1040	8,7	26	80	SG-CuSn6	ERCuSn-A
CuSn8	Bal						8		P 0,1	875-1025	8,8	26	80	SG-CuSn6	ERCuSn-C
CuSn12	Bal						13		P 0,2	825-990	8,6	32	120	SG-CuSn12	
CuAl8	Bal				8					1030-1040	7,7	43	100	SG-CuAl8	ERCuAl-A1
CuAl8Ni2	Bal	2		2	8	2				1030-1050	7,5	53	140	SG-CuAl8Ni2	
CuAl9Fe	Bal	1,2			9,5					1030-1040	7,6	50	140	SG-CuAl10Fe	ERCuAl-A2
CuMn13Al8	Bal	2,5		2,5	8	13				945-985	7,4	90	290	SG-CuMn13Al7	ERCuMnNiAl
CuNi10Fe	Bal	1,5		10,5		1			Ti 0,4	1100-1145	8,9	30	80	SG-CuNi10Fe	
CuNi30Fe	Bal	0,5		31		1			Ti 0,4	1180-1240	8,9	42	115	SG-CuNi30Fe	ERCuNi

CHARACTERISTICS MAKE-UP

 Rods	Ø: 1 → 6 mm	Length: 1.000 mm
 Wires	Ø: 0,8 → 2,4 mm	On Spools DIN 300 and DIN 100
 Rings		
 Preforms		Preforms from Wire and Strip



LOW ALLOYED STEEL WELDING WIRE

Low alloyed steels for gas welding and for the TIG / MIG techniques.

AUTOGENOUS WELDING WIRE

CODE	COMPOSITION %					TENSILE STRENGTH	CORRESPONDING STANDARDS		
	C	Si	Mn	Mo	Cr	kg/mm²	DIN 8554	EN 12536	Werkstoff Nr.
G I	0,08	0,1	0,5			38	G I	0 - I	10.324
G II	0,15	0,2	0,9			42	G II	0 - II	10.492
G III	0,09	0,1	1,1		0,4	44	G III	0 -III	16.215
G IV	0,13	0,15	1	0,5		48	G IV	0 - IV	15.424

MILD STEEL WIRE - MIG/MAG - TIG

CODE	COMPOSITION %									TENSILE STRENGTH	CORRESPONDING STANDARDS			
	C	Si	Mn	Mo	Cr	Ni	V	Cu	kg/mm²	DIN 8559	EN	AWS A5.28	Werkstoff Nr.	
70 S3	0,06-0,14	0,5-0,8	0,9-1,3						46	SG 1		ER-70 S3		
70 S6	0,06-0,14	0,7-0,8	1,3-1,6						56	SG 2		ER-70 S6		
70 S7	0,06-0,14	0,8-1,2	1,6-1,9						58	SG 3		ER-70 S7		
80 S	0,1	0,5	1,1			0,9		0,4	58		Mn3Ni1Cu	(ER-80 S)		
80 SG	0,1	0,6	1,1	0,5					62		G/W MoSi	ER-80 S-G	15.424	
80 SG Ni	0,09	0,6	1,4			0,9		≤ 0,4	61		G3 Ni1	ER-80 S-G		
80 SG NiCr	0,08	0,6	1,3		0,2	0,8		≤ 0,4	59		~ G3 Ni1	ER-80 S-G		
80 SB2	0,1	0,6	1,1	0,5	1,1				64		G/W CrMo1Si	ER-80 S-B2	17.339	
80 SB3	0,07	0,7	1,1	1	2,8				64		G/W CrMo2Si	ER-80 S-B3	17.384	
90 SG	0,08	0,6	1,8	0,3		0,9			65-80		Mn3Ni1Mo	ER-90 S-G		
90 SB3	0,08	0,6	0,65	1	2,5				59			ER-90 S-B3		
100 SG	0,09	0,7	1,7	0,3	0,6	0,5		≤ 0,3	70		Mn3NiCrMo	ER-100 S-G		
110 SG	0,1	0,6	1,7	0,25	0,3	1,5	0,1		77		Mn3Ni1CrMo	ER-110 S-G		
120 SG	0,1	0,8	1,8	0,6	0,35	2,25			94		Mn4Ni2CrMo	ER-120 S-G		

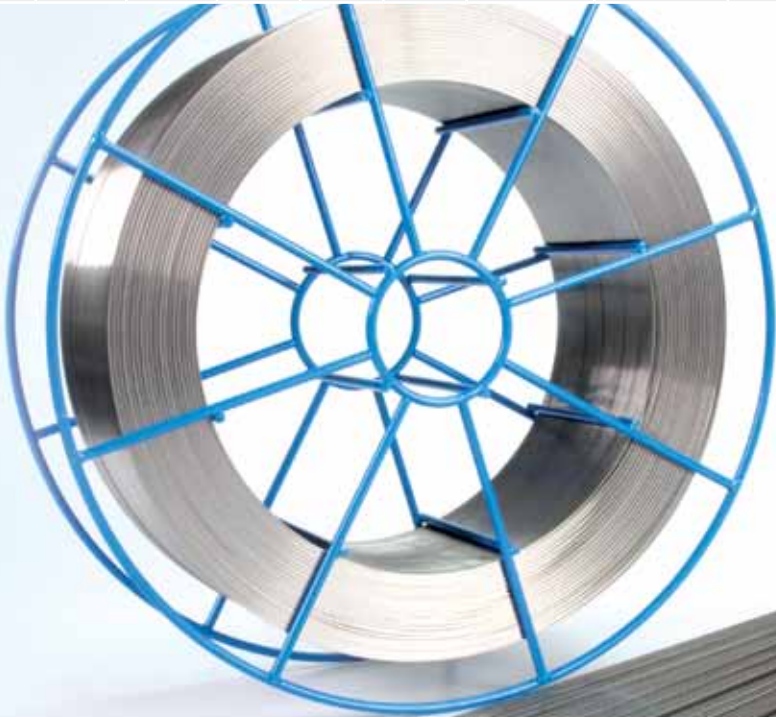
CHARACTERISTICS MAKE-UP

Rods	Ø: 1 → 6 mm	Length: 1.000 mm
Wires	Ø: 0,8 → 2,4 mm	On Spools DIN 300

STAINLESS STEEL

Stainless steel rods and wires for TIG / MIG techniques.

CODE	COMPOSITION % (SINGLE VALUE MEANS MAX VALUE)								CORRESPONDING STANDARDS		
	C	Si	Mn	Cr	Ni	Mo	Cu	Others	Werkstoff Nr.	EN 12072	AWS A5.9
307	0,04-0,14	0,65	3,3-4,8	19,5-22	8-10,7	0,5-1,5	0,75		1.4370		ER 307
308 L	0,03	0,65	1-2,5	19-21	9-11	0,3	0,3		1.4316	19 9 L	ER 308 L
308 Si	0,08	0,65-1	1-2,5	19,5-22	9-11	0,75	0,75				ER 308 Si
308 LSi	0,03	0,65-1,2	1-2,5	19-21	9-11	0,3	0,3		(1.4316)	19 9 L Si	ER 308 L Si
309 L	0,03	0,65	1-2,5	22-25	11-14	0,3	0,3		1.4332	23 12 L	ER 309 L
309 LSi	0,03	0,65-1,2	1-2,5	22-25	11-14	0,3	0,3		(1.4332)	23 12 L Si	ER 309 L Si
309 LMo	0,03	1	1-2,5	21-25	11-15,5	2-3,5	0,3			23 12 2 L	ER 309 L Mo
310	0,08-0,15	2	1-2,5	24-27	18-22	0,3	0,3		1.4842	25 20	ER 310
312	0,15	1	1-2,5	28-32	8-12	0,3	0,3		1.4337	29 9	ER 312
316	0,08	0,3-0,65	1-2,5	18-20	11-14	2-3	0,75				ER 316
316 L	0,03	0,65	1-2,5	18-20	11-14	2,5-3	0,3		1.4430	19 12 3 L	ER 316 L
316 LSi	0,03	0,65-1,2	1-2,5	18-20	11-14	2,5-3	0,3		(1.4430)	19 12 3 L Si	ER 316 L Si
317 L	0,03	0,65	1-2,5	18,5-20,5	13-15	3-4	0,75			(18 15 3 L)	ER 317 L
318	0,08	0,65	1-2,5	18-20	11-14	2,5-3	0,3	10xC to 1,0	1.4576	19 12 3 Nb	ER 318
347 Si	0,08	0,65-1,2	1-2,5	19-21	9-11	0,3	1,3	10xC to 1,0	(1.4551)	19 9 Nb Si	ER 347 Si
410 NiMo	0,06	0,5	0,6	11-12,5	4-5	0,4-0,7	0,75				ER 410 NiMo



CHARACTERISTICS MAKE-UP

Rods	Ø: 1 → 3,2 mm	Length: 1.000 mm
Wires	Ø: 0,8 → 2,4 mm	On Spools DIN 300

OTHER

NICKEL ALLOYS Nickel alloy rods and wires for the TIG / MIG techniques.

CODE	COMPOSITION %														STANDARD
	Ni	C	Mn	Si	Cr	Fe	Nb	Mo	Ti	Cu	Co	Va	W	Al	AWS A5.14
NiCr-3	Bal	<0,02	3,2	0,2	20,5	0,2	2,7								ER NiCr-3
NiCrMo-3	≥55	0,1	1	0,75	21,5	7	3,5	9		0,5					ER NiCrMo-3
NiCrMo-4	Bal	0,02	1	0,2	15,5	5,5		16		0,5	2,5	0,35	4		ER NiCrMo-4
NiCrMo-10	Bal	0,02	1	0,2	21	4		13,5		0,5	2,5	0,35	3		ER NiCrMo-10
NiCu-7	65	0,15	4	1,5		2,5			1	Bal				0,75	ER NiCu-7
Ni-1	≥92	0,1	0,75	1,25		0,75			2,5	0,25				1	ER Ni-1

CHARACTERISTICS MAKE-UP

 Rods	Ø: 1 → 3,2 mm	Length: 1.000 mm
 Wires	Ø: 0,8 → 2,4 mm	On Spools DIN 300

CAST IRON Rod for oxy-acetylene welding and repair of cast iron. Used for foundry defect healing.

CODE	COMPOSITION %						STANDARD
	Fe	C	Si	Mn	Ni	Cu	
FeC	Bal	3,3	3,2	0,6	0,5	0,1	G FeC-1

SEAMLESS FLUX AND METAL CORED WIRE for reconstruction, hardfacing and maintenance

CODE	COMPOSITION %								HARDNESS	STANDARD
	C	Si	Mn	Cr	Mo	V	W	Fe	HRc	DIN 8555
HARD 60A	0,45	3	0,4	9				Bal	57—62	MSG 6—GT—60—GP
HARD 60B	0,5	1,3	1,3	5,5	1,3	0,3	1,3	Bal	57—62	MSG 3—GF—60—GPZ
HARD 60C	0,5	0,6	1,5	5,5	0,6			Bal	57—62	MSG 6—GF—60—GP
BC	0,06	0,5	1,3							E70T5(M)H4 (AWS A5.20)

TUNGSTEN COMPOSITE RODS

Crushed sintered tungsten carbide particles in a high nickel content brass matrix. Used to protect the surface and increase the cutting ability of down-hole tools subject to abrasive wear.

CODE		COMPOSITION %				MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	CORRESPONDING STANDARDS		
		Cu	Zn	Ni	Si	°C	g/cm³	kg/mm²	ISO 17672	EN 1044	AWS A5.8-04
Tungsten	Matrix	48	Bal	10	X	890-920	8,7	54	Cu 773	CU 305	RBCuZn-D
Composite Rod	Coating	Crushed Sintered Tungsten Carbide Particles									

ELECTRODES:

- Rutile and cellulosic electrodes • Basic electrodes for low-alloyed steels
- Basic electrodes for steels resistant to high temperatures
- Basic electrodes with high tensile strength
- Basic electrodes for steels resistant to low temperatures
- Electrodes for welding and repair of stainless steels
- Eletrodes for cast iron repair • Nickel based electrodes
- Aluminium electrodes • Bronze electrodes
- Electrodes for surcharge • Electrodes for general maintenance
- Electrodes for Cement Plants and Quarries



APPLICATION CHARTS



CARBIDE AND DIAMOND TIPPED TOOLS

Brazing alloys, with and without silver, for manufacturing of: tungsten carbide tipped tools, diamond tipped tools, wood-working tools, tools for working and cutting of stone, cement, asphalt, saw blades, plastic materials crushers, mining and drilling tools, knives and tools for paper cutting, surgical instruments, plowshares, knives for cardboard, plastic, leather, etc.



BRAZING ALLOYS WITH SILVER

CODE	COMPOSITION %								MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Si	Ni	Mn	In	°C	g/cm ³	kg/mm ²	ISO 17672	

ALLOYS

Ag20	20	44	36		0,15				690-810	8,7	43		Alloys with nickel and manganese give excellent wetting results when joining carbides. Ag49MnNi is recommended for high temperature service conditions.
Ag27MnNi	27	38	20			5,5	9,5		680-830	8,7		Ag 427	
Ag40Sn	40	30	28	2					650-710	9,1	44	Ag 140	
Ag40Ni	40	30	28			2			670-780	8,9		Ag 440	
Ag44	44	30	26						675-735	9,1	51	Ag 244	
Ag45Sn	45	27	25,5	2,5					640-680	9	43	Ag 145	
Ag49MnNi	49	16	23			4,5	7,5		680-705	8,9	55	Ag 449	
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	
Ag55Sn	55	21	22	2					630-660	9,4	44	Ag 155	
Ag56Sn	56	22	17	5					620-655	9,4	48	Ag 156	Ag55Sn and Ag56Sn exhibit the lowest brazing temperatures.
Ag56InNi	56	27				2,5		14,5	600-710	9,6			Suitable for brazing pieces that will be subject to TiN coating.
Ag64MnNiIn	64	26				2	2	6	730-780	9,6			
Ag72	72	28							780-780	10	35	Ag 272	Furnace brazing of diamond wire beads.

TRIMETALS

Ag49MnNi/1 TR	49	27,5	20,5			0,5	2,5		670-690	9,0			Three layer trimetal strips with copper central core. Excellent for brazing hard metal and carbides, preventing post-braze cracking and absorb in-service impact loads.
Ag49MnNi/1 TR 161	49	27,5	20,5			0,5	2,5		670-690	9,0			
Ag49MnNi/1 TR 111	49	27,5	20,5			0,5	2,5		670-690	9,0			
Ag40Ni TR	40	30	28			2			670-780	8,9		Ag 440	
Ag38MnNi TR	38	26	24			4,5	7,5		650-690	8,9			

FLUXES

FLUX AG3	For high brazing temperatures.
FLUX AG35	For very high brazing temperatures.
FLUX AG4	General purpose.
FLUX AG7	General purpose. Also for Stainless Steel.
FLUX AG8	For Stainless Steel and Hard Metal. Extended high temperature activity life. Brown paste. To be used with automatic distribution systems.
FLUX AG11	General purpose. Also for Stainless Steel. To be used with automatic distribution systems.
FLUX AG12	For Stainless Steel and Hard Metal. Extended high temperature activity life. Brown paste. To be used with automatic distribution systems.

BRAZING ALLOYS WITHOUT SILVER

CODE	COMPOSITION %								MELTING RANGE SOL - LIQ	DENSITY	TENSILE STRENGTH	STANDARD	NOTES
	Cu	Zn	Ag	Ni	Mn	Sn	Si	Other	°C	g/cm ³	kg/mm ²	ISO 17672	

ALLOYS

Cu60Zn	60	Bal					0,3		875-895	8,4	40	Cu 470a	Brass. High temperature brazing.
Cu59ZnSn	59	Bal				0,4	0,3		875-895	8,4	45	Cu 470	
Cu48ZnNi10	48	Bal		10			0,3		890-920	8,7	54	Cu 773	Brasses with nickel addition. High temperature brazing, improved brazed joint mechanical properties.
Cu48ZnNi9Ag	48	Bal	1	9			0,2		890-920	8,7	54		
Cu53ZnNi6	53	Bal		6			0,2		900-920	8,5	49		
Cu97Ni3B	97			3				B 0,03	1085-1100			Cu 186	Very high temperature brazing of steels, hard metal and carbides. Alloys especially suited to the brazing of rock-drilling tools.
Cu87MnCo3	87				10			Co 3	980-1030	8,7			
Cu86MnNi2	86			2	12				960-990	8,8			
Cu85MnNi3	85			3	12				960-990	8,8			
Cu67MnNi9	67			9	24				950-955	8,2			
Cu58ZnMnCo2	57,5	38,5			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			Pure copper for protective atmosphere furnace brazing.
OF-Cu	99,95								1085	8,9		Cu 102	
ETP-Cu	99,90								1085	8,9		Cu 110	

FLUXES

FLUX BR1	Brazing with brass filler metals.
FLUX BR7	For very high temperatures.

NICKEL ALLOYS FOR VACUUM BRAZING

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ni	Cr	Fe	B	C	°C	AWS A5.8	

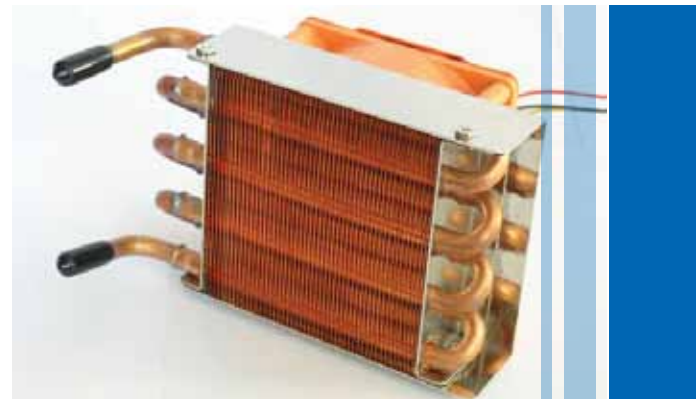
ALLOYS

Ni1	Bal	14	4,5	3,1	0,7	1021-1052	BNi-1	Nickel based alloys in powder and paste. Vacuum brazing of diamond and carbide grits on steel supports.
Ni1a	Bal	14	4,5	3,1		977-1077	BNi-1a	
Ni2	Bal	7	3	3		971-999	BNi-2	



HEAT EXCHANGERS
INDUSTRIAL AND HOME REFRIGERATORS
UNITS AND COMPONENTS

Brazing alloys for manufacturing of:
heat-exchangers, engine radiators, home and industrial
refrigerators, air conditioners, wall boilers, gas boilers,
electric home appliances, coils, condensers, evaporators,
compressors for cooling, refrigerated cabinets, etc.



COPPER-PHOSPHOROUS ALLOYS

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	FLOW POINT	STANDARD	NOTES
	Ag	Cu	P	Sn	°C	°C	ISO 17672	

ALLOYS

CuP6		94	6		710-890	760	CuP 179	RoHS Compliant alloys. For copper-copper and copper-brass joints. For joining copper to copper no flux is necessary. These alloys are not suitable for joining ferrous materials, steels and nickel alloys. They are also not suitable to be used in sulfur containing atmospheres. Particularly good and clean joints can be obtained by using these alloys along with liquid flux (LI1/LI2) spread through the torch flame by vaporizer systems. Alloys with Silver are recommended for joints subject to vibrations. These alloys are available as rods, flux-coated rods, wires and rings.
CuP7		93	7		710-820	730	CuP 180	
CuP8		92	8		710-770	720	CuP 182	
CuP7Sn		86	7	7	650-700	700	CuP 386	
Ag2CuP	2	91,5	6,5		645-825	740	CuP 279	
Ag5CuP	5	89	6		645-815	710	CuP 281	
Ag15CuP	15	80	5		645-800	700	CuP 284	

FLUXES

FLUX AG4	General purpose. For copper-brass joints.
FLUX LI1	Liquid flux. For brazing with vaporizer systems. Medium concentration.
FLUX LI2	Liquid flux. For brazing with vaporizer systems. Medium-high concentration.



SILVER BASED ALLOYS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Other	°C	ISO 17672	

ALLOYS

Ag12	12	48	40		Si 0,15	800-830	Ag 212	All the alloys in this table are cadmium-free and RoHS Compliant. They are suitable to join a wide range of ferrous and non ferrous metals (copper, brass, bronze, steel, stainless steel, nickel alloys, etc.), with the exception of aluminium and magnesium. Available as rods, flux coated rods, wires and rings (dimensions according to customer's need).
Ag20	20	44	36		Si 0,15	690-810		
Ag25Sn	25	40	33	2		680-760	Ag 125	
Ag30Sn	30	36	32	2		630-730	Ag 130	
Ag34Sn	34	36	27,5	2,5		665-755	Ag 134	
Ag35	35	32	33			685-755	Ag 235	
Ag40Sn	40	30	28	2		650-710	Ag 140	
Ag45Sn	45	27	25,5	2,5		640-680	Ag 145	
Ag55Sn	55	21	22	2		630-660	Ag 155	
Ag56Sn	56	22	17	5		620-655	Ag 156	
Ag60Sn/1	60	30		10		600-730	Ag 160	Suitable for stainless steel in wet conditions / moisture rich environments.
Ag72Zn	72		28			710-730		Alloys without copper, ammonia resistant. Ag85Mn is also suitable for stainless steel in wet conditions / moisture rich environments.
Ag85Mn	85				Mn 15	960-970	Ag 485	

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperature.
FLUX AG7	General purpose. Also for stainless steel.

BRASS

CODE	COMPOSITION %							MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Cu	Zn	Ag	Ni	Mn	Sn	Si	°C	ISO 17672	

ALLOYS

Cu60Zn	60	Bal				0,3	875-895	Cu 470a	Brasses for high temperature brazing. RoHS Compliant alloys. Available as rods, flux-coated rods, wires and rings. Cu59ZnAg is suitable for galvanizing steel.	
Cu59ZnSn	59	Bal				0,4	0,3	875-895		Cu 470
Cu59ZnAg	59	Bal	1		0,1	0,1	0,1	860-890		
Cu48ZnNi10	48	Bal		10			0,3	890-920		Cu 773

FLUXES

FLUX BR1	Brazing with brass filler metals.
FLUX LI2	Liquid flux. For brazing with vaporizer systems. Medium-high concentration.
FLUX LI3	Liquid flux. For brazing with vaporizer systems. High concentration.

ALUMINIUM AND ZINC-ALUMINIUM ALLOYS

CODE	COMPOSITION %			MELTING RANGE SOL - LIQ	NOTES
	Al	Si	Zn	°C	

ALLOYS

AlSi12	88	12		575-585	Brazing of aluminium.
AlZn78	22		78	441-471	For copper-aluminium and brass-aluminium joints.
AlZn98	2		98	430-440	Also available as flux-cored rod and wires (non-corrosive flux).

FLUXES

FLUX AL1/d	Corrosive flux for flame brazing with AlSi12.
FLUX AL6	Non corrosive flux for brazing with Zinc-Aluminium alloys.

HEATING, COOLING AND AIR CONDITIONING - INSTALLATION AND SERVICING

Brazing alloys for manufacturing, installation and servicing of:
refrigerating plants, air conditioning plants, heating plants, water, gas and steam distribution piping, floor heating piping, manifolds, etc.



COPPER-PHOSPHOROUS ALLOYS

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	FLOW POINT	STANDARD	NOTES
	Ag	Cu	P	Sn	°C	°C	ISO 17672	

ALLOYS

CuP6		94	6		710-890	760	CuP 179	RoHS Compliant alloys. For copper-copper and copper-brass joints. For joining copper to copper no flux is necessary. These alloys are not suitable for joining ferrous materials, steels and nickel alloys. They are also not suitable to be used in sulfur containing atmospheres. Alloys with Silver are recommended for joints subject to vibrations. These alloys are available as rods, flux-coated rods, wires and rings.
CuP7		93	7		710-820	730	CuP 180	
CuP8		92	8		710-770	720	CuP 182	
CuP7Sn		86	7	7	650-700	700	CuP 386	
Ag2CuP	2	91,5	6,5		645-825	740	CuP 279	
Ag5CuP	5	89	6		645-815	710	CuP 281	
Ag15CuP	15	80	5		645-800	700	CuP 284	

FLUXES

FLUX AG4	General purpose. For copper-brass joints.
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SOFT SOLDERS

CODE	COMPOSITION %			MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Sn	Cu	Ag	°C	EN 29453	

ALLOYS

SnCu97/3	97	3		230-250	S-Sn97Cu3	Lead-free, RoHS compliant alloys. Suitable for potable water and alimentary products.
Ag3,5Sn	96,5		3,5	221	S-Sn97Ag3	
Ag5Sn	95		5	221-235		

FLUXES

FLUX SN1	General purpose. Available in liquid and in paste.
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SILVER BASED ALLOYS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Other	°C	ISO 17672	

ALLOYS

Ag12	12	48	40		Si 0,15	800-830	Ag 212	All the alloys in this table are cadmium-free and RoHS Compliant. They are suitable to join a wide range of ferrous and non ferrous metals (copper, brass, bronze, steel, stainless steel, nickel alloys, etc.), with the exception of aluminium and magnesium. Available as rods, flux coated rods, wires and rings (dimensions according to customer's need).
Ag20	20	44	36		Si 0,15	690-810		
Ag25Sn	25	40	33	2		680-760	Ag 125	
Ag30Sn	30	36	32	2		665-755	Ag 130	
Ag34Sn	34	36	27,5	2,5		630-730	Ag 134	
Ag35	35	32	33			685-755	Ag 235	
Ag40Sn	40	30	28	2		650-710	Ag 140	
Ag45Sn	45	27	25,5	2,5		640-680	Ag 145	
Ag55Sn	55	21	22	2		630-660	Ag 155	
Ag56Sn	56	22	17	5		620-655	Ag 156	
Ag60Sn/1	60	30		10		600-730	Ag 160	Suitable for stainless steel in wet conditions / moisture rich environments.
Ag72Zn	72		28			710-730		Alloys without copper, ammonia resistant. Ag85Mn is also suitable for stainless steel in wet conditions / moisture rich environments.
Ag85Mn	85				Mn 15	960-970	Ag 485	

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.

ALUMINIUM AND ZINC-ALUMINIUM ALLOYS

CODE	COMPOSITION %			MELTING RANGE SOL - LIQ	NOTES
	Al	Si	Zn	°C	

ALLOYS

AlSi12	88	12		575-585	Brazing of aluminium.
AlZn78	22		78	441-471	For copper-aluminium and brass-aluminium joints. Also available as flux-cored rods and wires (non-corrosive flux).
AlZn98	2		98	430-440	

FLUXES

FLUX AL1/d	Corrosive flux for flame brazing with AlSi12.
FLUX AL6	Non corrosive flux for brazing with Zinc-Aluminium alloys.



MEASUREMENT AND REGULATION DEVICES

Brazing alloys for manufacturing of:
measure instruments, thermostats, pressure switches, manometers, hygrometers, etc.

COPPER-PHOSPHOROUS ALLOYS

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	FLOW POINT	STANDARD	NOTES
	Ag	Cu	P	Sn	°C	°C	ISO 17672	

ALLOYS

CuP7Sn		86	7	7	650-700	700	CuP 386	RoHS compliant alloys. For copper-copper and copper-brass joints.
Ag5CuP	5	89	6		645-815	710	CuP 281	
Ag15CuP	15	80	5		645-800	700	CuP 284	

FLUXES

FLUX AG4	General purpose. For copper-brass joints.
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SILVER BASED ALLOYS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Ni	°C	ISO 17672	

ALLOYS

Ag40Ni	40	30	28		2	670-780	Ag 427	Alloys suitable for stainless steel in wet conditions. Ag40Ni/1 is also suitable for brazing in oven.	RoHS compliant alloys.
Ag40Ni/1	40	58			2	780-900			
Ag40Sn	40	30	28	2		650-710	Ag 140		
Ag44	44	30	26			675-735	Ag 244		
Ag45Sn	45	27	25,5	2,5		640-680	Ag 145		
Ag50Ni	50	20	28		2	660-705	Ag 450	Suitable for stainless steel in wet conditions.	
Ag55Sn	55	21	22	2		630-660	Ag 155		
Ag56Sn	56	22	17	5		620-655	Ag 156		
Ag60	60	26	14			695-730			
Ag60Sn	60	23	14	3		620-685			
Ag60Sn/1	60	30		10		600-730	Ag 160		
Ag72	72	28				780-780	Ag 272	Alloys suitable for brazing in oven. Ag60Sn/1 is also suitable for stainless steel in wet conditions.	

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperature.
FLUX AG7	General purpose. Also for stainless steel.

SOFT SOLDERS

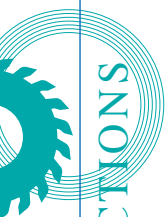
CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Sn	Cu	Ag	Pb	°C	EN 29453	

ALLOYS

SnPb40/60	40			60	183-235	S-Pb60Sn40	RoHS compliant alloys.
SnPb60/40	60			40	183-190	S-Sn60Pb40	
SnCu97/3	97	3			230-250	S-Sn97Cu3	
Ag3,5Sn	96,5		3,5		221	S-Sn97Ag3	
Ag5Sn	95		5		221-235		
Ag10Sn	90		10		221-300		

FLUXES

FLUX SN1	General purpose. Available in liquid and in paste.
FLUX SN2	For stainless steel.



ELECTROMECHANICAL CONSTRUCTIONS

Brazing alloys for manufacturing of:
electromechanical constructions, power generators, transformers, electrical motors, heating elements, electrical contacts, disconnecting switches, relays, etc.

SILVER BASED ALLOYS

CODE	COMPOSITION %						MELTING RANGE SOL - LIQ °C	STANDARD ISO 17672	NOTES
	Ag	Cu	Zn	Sn	Ni	Other			

ALLOYS

Ag20	20	44	36			Si 0,15	690-810		RoHS compliant alloys.
Ag34Sn	34	36	27,5	2,5			630-730	Ag 134	
Ag40Ni	40	30	28		2		670-780	Ag 427	
Ag40Ni/1	40	58			2		780-900		
Ag40Sn	40	30	28	2			650-710	Ag 140	
Ag44	44	30	26				675-735	Ag 244	
Ag45Sn	45	27	25,5	2,5			640-680	Ag 145	
Ag49MnNi	49	16	23		4,5	Mn 7,5	680-705	Ag 449	
Ag49MnNi/1 TR	49	27,5	20,5		0,5	Mn 2,5	670-690		
Ag50Ni	50	20	28		2		660-705	Ag 450	
Ag55Sn	55	21	22	2			630-660	Ag 155	
Ag56Sn	56	22	17	5			620-655	Ag 156	
Ag60	60	26	14				695-730		
Ag60Sn	60	23	14	3			620-685		
Ag60Sn/1	60	30		10			600-730	Ag 160	
Ag72	72	28					780-780	Ag 272	

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.
FLUX AG8	For stainless steel and for Hard metal.

SOFT SOLDERS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ °C
	Sn	Pb	Ag	Cd	Zn	

ALLOYS

Ag1,5SnPb	5	93,5	1,5			296-301
Cd82Zn16Ag			2	82	16	270-280

FLUXES

FLUX SN6	Liquid
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COPPER-PHOSPHOROUS ALLOYS

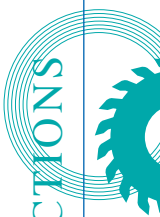
CODE	COMPOSITION %				MELTING RANGE SOL - LIQ °C	FLOW POINT °C	STANDARD ISO 17672	NOTES
	Ag	Cu	P	Sn				

ALLOYS

CuP7Sn		86	7	7	650-700	700	CuP 386	RoHS compliant alloys. For copper-copper and copper-brass joints.
Ag2CuP	2	91,5	6,5		645-825	740	CuP 279	
Ag5CuP	5	89	6		645-815	710	CuP 281	
Ag15CuP	15	80	5		645-800	700	CuP 284	

FLUXES

FLUX AG4	General purpose. For copper-brass joints.
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TUBULAR CONSTRUCTIONS

Brazing alloys for manufacturing of:
metal furniture, bicycles and motor-bicycles frames , etc.



SILVER BASED ALLOYS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Si	°C	ISO 17672	

ALLOYS

Ag5	5	55	40		0,15	820-870	Ag 205	All alloys in this table are cadmium-free and RoHS Compliant. Available as rods, flux coated rods, wires and rings (dimensions according to customer's need).
Ag12	12	48	40		0,15	800-830	Ag 212	
Ag20	20	44	36		0,15	690-810		
Ag25Sn	25	40	33	2		680-760	Ag 125	
Ag34Sn	34	36	27,5	2,5		630-730	Ag 134	
Ag40Sn	40	30	28	2		650-710	Ag140	
Ag45Sn	45	27	25,5	2,5		640-680	Ag 145	
Ag55Sn	55	21	22	2		630-660	Ag 155	

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.

COPPER ALLOYS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	TENSILE STRENGTH	STANDARD	NOTES
	Cu	Sn	Si	Mn	Ag	°C	kg/mm ²	DIN 1787 / DIN 1733	

ALLOYS

Cu99,9	99,9					1083	22	SF-Cu	
CuSn	Bal	0,8	x	x		1020-1050	22	SG-CuSn	
CuAg	Bal			x	1	1070-1080	20	SG-CuAg	
CuSi3	Bal		3	1		965-1035	35	SG-CuSi3	

BRASS

CODE	COMPOSITION %							MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Cu	Zn	Ag	Ni	Mn	Sn	Si	°C	ISO 17672	

ALLOYS

Cu60Zn	60	Bal					0,3	875-895	Cu 470a	Brasses for high temperature brazing. RoHS Compliant alloys. Available as rods, flux-coated rods, wires and rings. Cu59ZnAg is suitable for galvanized steel.
Cu59ZnSn	59	Bal				0,4	0,3	875-895	Cu 470	
Cu59ZnSnMn	59	Bal		0,7	0,7	0,4	0,3	870-890	Cu 681	
Cu59ZnAg	59	Bal	1		0,1	0,1	0,1	860-890		
Cu48ZnNi10	48	Bal		10			0,3	890-920	Cu 773	
Cu48ZnNi9Ag	48	Bal	1	9			0,2	890-920		

FLUXES

FLUX BR1	Brazing with brass filler metals.
FLUX LI1	Liquid flux. For brazing with vaporizer systems. Medium concentration.
FLUX LI2	Liquid flux. For brazing with vaporizer systems. Medium - high concentration.
FLUX LI3	Liquid flux. For brazing with vaporizer systems. High concentration.

ALUMINIUM

CODE	COMPOSITON %						STANDARD	NOTES
	Al	Si	Mg	Mn	Zn	Zr	AWS A5.10	

ALLOYS

AlSi12	Bal	12	0,05	0,15			4047	Also for brazing.
AlMg4,5Mn	Bal	0,2	4,5	0,5-1			5183	
AlMg4,5MnZr	Bal	< 0,4	4,5-5,2	0,7-1,1	< 0,25	0,1-0,2	5087	
AlMg5	Bal	0,2	5	0,05-2			5356	



LAMPS - LIGHTING FIXTURES

Brazing alloys for manufacturing of: lamps and chandeliers, metal accessories for interior design, metal art items, brass musical instruments etc.



SILVER BASED ALLOYS

CODE	COMPOSITION %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Si	°C	ISO 17672	

ALLOYS

Ag5	5	55	40		0,15	820-870	Ag 205	Colour similar to brass.	RoHS compliant alloys.
Ag12	12	48	40		0,15	800-830	Ag 212		
Ag20	20	44	36		0,15	690-810			
Ag25Sn	25	40	33	2		680-760	Ag 125		
Ag34Sn	34	36	27,5	2,5		630-730	Ag 134		
Ag40Sn	40	30	28	2		650-710	Ag140		
Ag45Sn	45	27	25,5	2,5		640-680	Ag 145		
Ag55Sn	55	21	22	2		630-660	Ag 155		
Ag60Sn	60	23	14	3		620-685			

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.

SOFT SOLDERS

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Sn	Pb	Ag		°C	EN 29453	

ALLOYS

SnPb60/40	60	40			183-190	S-Sn60Pb40	Fillet colour similar to stainless steel.
Ag3,5Sn	96,5		3,5		221	S-Sn97Ag3	
Ag55Sn	95		5		221-235		

FLUXES

FLUX SN1	General purpose.
FLUX SN2	For stainless steel.

BRASS

CODE	COMPOSITION %							MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Cu	Zn	Ag	Ni	Mn	Sn	Si	°C	ISO 17672	

ALLOYS

Cu60Zn	60	Bal					0,3	875-895	Cu 470a	Brasses for high temperature brazing. RoHS Compliant alloys. Available as rods, flux-coated rods, wires and rings. Cu59ZnAg is suitable for galvanized steel.
Cu59ZnSn	59	Bal				0,4	0,3	875-895	Cu 470	
Cu59ZnAg	59	Bal	1		0,1	0,1	0,1	860-890		
Cu48ZnNi10	48	Bal		10			0,3	890-920	Cu 773	
Cu48ZnNi9Ag	48	Bal	1	9			0,2	890-920		

FLUXES

FLUX BR1	Brazing with brass filler metals.
FLUX LI2	Liquid flux. For brazing with vaporizer systems. Medium-high concentration.
FLUX LI3	Liquid flux. For brazing with vaporizer systems. High concentration.



RADIATORS AND TOWEL WARMERS

Brazing alloys for manufacturing of:
radiators, towel warmers, etc.



SILVER BASED ALLOYS

CODE	COMPOSITON %					MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Si	°C		

ALLOYS

Ag12	12	48	40		0,15	800-830	Ag 212	All the alloys in this table are cadmium-free and RoHS Compliant. Available as rods, flux coated rods, wires and rings (dimensions according to customer's need).
Ag20	20	44	36		0,15	690-810		
Ag25Sn	25	40	33	2		680-760	Ag 125	
Ag30Sn	30	36	32	2		665-755	Ag 130	
Ag34Sn	34	36	27,5	2,5		630-730	Ag 134	
Ag40Sn	40	30	28	2		650-710	Ag140	
Ag45Sn	45	27	25,5	2,5		640-680	Ag 145	
Ag55Sn	55	21	22	2		630-660	Ag 155	

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.

BRASS

CODE	COMPOSITON %							MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Cu	Zn	Ag	Ni	Mn	Sn	Si	°C		

ALLOYS

Cu60Zn	60	Bal					0,3	875-895	Cu 470a	Brasses for high temperature brazing. RoHS Compliant alloys. Available as rods, flux-coated rods, wires and rings. Cu59ZnAg is suitable for galvanized steel.
Cu59ZnSn	59	Bal				0,4	0,3	875-895	Cu 470	
Cu59ZnSnMn	59	Bal		0,7	0,7	0,4	0,3	870-890	Cu681	
Cu59ZnAg	59	Bal	1		0,1	0,1	0,1	860-890		

FLUXES

FLUX BR1	Brazing with brass filler metals.
FLUX LI2	Liquid flux. For brazing with vaporizer systems. Medium-high concentration.
FLUX LI3	Liquid flux. For brazing with vaporizer systems. High concentration.

COPPER & BRONZE PASTE

CODE	COMPOSITON %		MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Cu	Sn	°C		

ALLOYS

Cu99,9	99,9		1085	Cu 110	Copper paste for furnace brazing.
CuSn8	92	8	870-1020		Bronze pastes for furnace brazing.
CuSn12	88	12	825-990	Cu 925	

SILVERWARE & JEWELLERY

Brazing alloys for manufacturing of:
metal frames, buckles, hinges and locks, metal buttons, ironmongery, silverware and bijouterie, tea pots etc.

HARD SOLDERS

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	MELTING RANGE						
	Ag	Cu	Zn	Sn	°C		600 °C		700 °C		800 °C	

ALLOYS

Ag74	74	18	8		740-780	740 — 780						
Ag67,5	67,5	23,5	9		700-730	700 — 730						
Ag60	60	26	14		695-730	695 — 730						
Ag60Sn	60	23	14	3	620-685	620 — 685						
Ag55Sn	55	21	22	2	630-660	630 — 660						
Ag56Sn	56	22	17	5	620-655	620 — 655						

FLUXES

FLUX AG1	General purpose.
FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.



SOFT SOLDERS

CODE	COMPOSITION %				MELTING RANGE SOL - LIQ	NOTES						
	Ag	Sn	Pb	Sb	°C		100 °C		200 °C		300 °C	

ALLOYS

Ag10Sn	10	90			221-300	221 — 300						
SnSb95/5	95			5	230-240	230 — 240						
Ag5Sn	5	95			221-235	221 — 235						
Ag3,5Sn	3,5	96,5			221	221 — 221						
SnPb6040		60	40		183-190	183 — 190						

FLUXES

FLUX SN1	General purpose.
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GLASSES - SPECTACLE FRAMES

Brazing alloys for manufacturing of: spectacle frames, hinges for glasses.

CODE	COMPOSITION %						MELTING RANGE SOL - LIQ	STANDARD	NOTES
	Ag	Cu	Zn	Sn	Ni	Mn	°C	ISO 17672	

ALLOYS

Ag40Ni	40	30	28		2		670-780	Ag 427	Alloys suitable for stainless steel in wet conditions. Ag40Ni/1 is also suitable for brazing in oven.	Also available as flat wires: thickness: 0,1 - 0,12 - 0,15 - 0,2 mm width: 1,2 - 1,3 - 1,5 - 1,7 - 2,0 mm.
Ag40Ni/1	40	58			2		780-900			
Ag44	44	30	26				675-735	Ag 244		
Ag45Sn	45	27	25,5	2,5			640-680	Ag 145		
Ag49MnNi	49	16	23		4,5	7,5	680-705	Ag 449	For Hard Metal.	
Ag50Ni	50	20	28		2		660-705	Ag 450	Suitable for stainless steel in wet conditions.	
Ag55Sn	55	21	22	2			630-660	Ag 155		
Ag56Sn	56	22	17	5			620-655	Ag 156		
Ag60	60	26	14				695-730			
Ag60Sn	60	23	14	3			620-685			
Ag60Sn/1	60	30		10			600-730	Ag 160		
Ag72	72	28					780-780	Ag 272	Alloys suitable for brazing in oven. Ag60Sn/1 is also suitable for stainless steel in wet conditions.	

FLUXES

FLUX AG4	General purpose. Wider range of working temperatures.
FLUX AG7	General purpose. Also for stainless steel.
FLUX AG8	For stainless steel and for Hard Metal.



COPPER-PHOSPHOROUS ALLOYS

CODE	COMPOSITION %			MELTING RANGE SOL - LIQ	FLOW POINT	STANDARD
	Ag	Cu	P	°C	°C	ISO 17672

ALLOYS

Ag15CuP	15	80	5	645-800	700	CuP 284
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FLUXES

FLUX AG4	General purpose. For copper-brass joints.
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BAN OF CADMIUM IN BRAZING FILLER METALS
RECOMMENDED ALTERNATIVES

Cadmium bearing brazing alloys have been banned in the European Union since december 2011 (EU Commission Regulation no. 494/2011) and their usage is no more allowed.

A full line of cadmium-free alternative alloys is available.

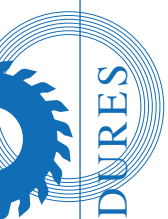
Please see the attached table that provides you a guidance in the process of selecting the proper alternatives:

CD-CONTAINING ALLOY		CD-FREE ALTERNATIVE ALLOY			
ALLOY	MELT. RANGE (°C)	BEST EQUIVALENT	MELT. RANGE (°C)	POSSIBLE EQUIVALENT	MELT. RANGE (°C)
Ag13Cd	605-795	Ag20	690-810		
Ag17Cd	620-760	Ag20	690-810		
Ag19Cd	630-730	Ag25Sn	680-760		
Ag20Cd	620-750	Ag25Sn	680-760	Ag20	690-810
Ag21Cd	620-730	Ag30Sn	665-755	Ag25Sn	680-760
Ag25Cd	605-710	Ag34Sn	630-730	Ag30Sn	665-755
Ag30Cd	610-690	Ag40Sn	650-710	Ag34Sn	630-730
Ag34Cd	610-670	Ag45Sn	640-680	Ag38Sn	650-720
Ag38Cd	610-650	Ag45Sn	640-680	Ag40Sn	650-710
Ag40Cd	595-630	Ag55Sn / Ag56Sn	630-660 / 620-655	Ag45Sn	640-680
Ag42Cd	605-620	Ag56Sn / Ag55Sn	620-655 / 630-660	Ag45Sn	640-680
Ag45Cd	605-630	Ag56Sn	620-655	Ag55Sn	630-660
Ag50Cd	620-640	Ag56Sn	620-655	Ag55Sn	630-660
Ag50CdNi	635-690	Ag49MnNi	680-705		

Cadmium-free alloys are available in a wide range of compositions for different applications. They are free-flowing, ductile and strong and generally require higher brazing temperatures than do cadmium-bearing alloys.

Should you need further advice, information, or technical data, please feel free to contact us: our commercial and technical staff will help you select the most appropriate cadmium-free substitutes.





STEPS FOR A SUCCESSFUL BRAZING

1. Ventilation

Ensure there is sufficient ventilation: brazing operations should never be undertaken in confined areas or if there is not enough ventilation.

2. Joint gap

Ensure that, at brazing temperature, the brazing joint will have the proper clearance (for "in air" brazing with flux, proper gaps range normally from 0,05 to 0,20 mm).

3. Pre-braze cleaning

Carefully and thoroughly clean the pieces to be brazed: joint surfaces must be free from any contaminant, such as oil, lubricants, dust, grease, etc.

4. Fluxing

Apply a proper quantity of flux on the pieces in order to protect the joint surfaces from oxidation (note: when brazing copper to copper with copper-phosphorous alloys, no flux is necessary).

5. Assembly and fixturing

Assemble the pieces and ensure that they will maintain position and alignment during brazing (fixturing may be needed).

6. Heating

Heat evenly and uniformly the joint area, insisting more on heavier sections. Do not try to melt the filler alloy by directly directing the flame on the rod.

7. Brazing

As soon as the pieces reach the brazing temperature, feed the rod in the joint area and let it melt and flow. Capillary action will draw the molten alloy inside of the joint. Avoid overheating, which might lead to damaged or deformed pieces, unsound joints, and emission of harmful fumes.

8. Post-braze cleaning

After brazing, allow the pieces to cool down and remove flux residues by washing in warm water, brushing, or other methods (chemical pickling, ultrasounds, etc.).



STELLA

WELDING ALLOYS



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