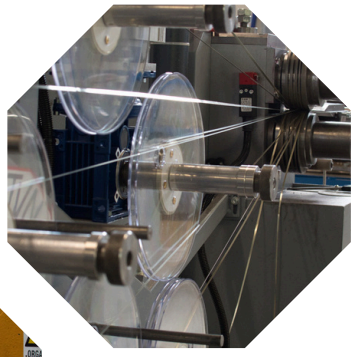
THESSCO

INDUSTRIAL & BRAZING

Filler Metals for Brazing

Innovation, Excellence, and Synergy in Metal Processing



A recognized expert in the production of filler metals...

THESSCO is one of the most important and historical global suppliers of filler metals and industrial silver-based products.

Our mission is to offer complementary product portfolios that cater to overlapping industries, drawing on our expertise in primary metal processing and brazing solutions. We are dedicated to innovation, quality, and customer satisfaction.

THESSCO is part of the Galliani Industrie Group, a European leader in the production of silver, copper, and aluminum alloys, and also part of the British group SolPro.

Our sales and logistics offices are strategically located in Saint-Thibault-des-Vignes, France, enabling us to effectively serve our customers across Europe. Our manufacturing of precious metal alloys occurs at our facility in Italy.

By combining our historical experience with modern production control methods, we ensure that all our products meet the highest quality standards. We supply high-quality products to over 20 countries worldwide, serving essential markets such as HVAC, tooling, aerospace, defence, energy, electrical components, electronics, automotive, medical devices, and construction.

We are committed to maintaining the highest quality standards in our products and services to maximize customer satisfaction. With state-of-the-art equipment and a highly skilled workforce, we continually monitor and enhance our entire production process.

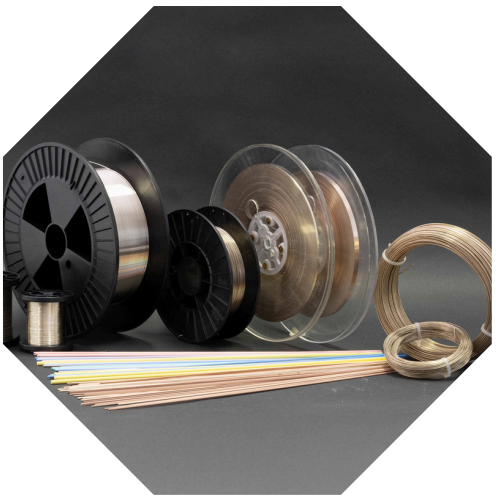
Our in-house chemical and metallurgical laboratories ensure that all Thessco alloys comply with international standards. We are certified ISO 9001, and our factories hold both ISO 9001 and ISO 14001 certifications.

THESSCO is equipped to develop and utilize specific alloys to tackle your brazing challenges. Our knowledge and experience guarantee quality results.

THESSCO
INDUSTRIAL & BRAZING

ISO 9001
apave Certification

Silver Brazing Alloys



THESSCO's cadmium-free silver brazing alloys offer excellent fluidity, low melting points, and narrow melting ranges, making them suitable for various industrial applications. They create strong, clean joints across different metals including iron, carbon steel, stainless steel, copper and nickel.

To ensure optimal performance, it is important to use the appropriate flux and to pre-clean the joints by degreasing and removing dust.

They are available in several formats — rods, rings and preform, foils and wire — to meet any specific brazing requirement.

	Nominal Composition				Melting Range In °C		Thessco	ISO 17672	Comments
Grade	Silver	Copper	Zinc	Tin	Solidus	Liquidis	ISO Ref	Specification	
BE	72	28	-	-	780	780	H12	Ag272	Ideal for furnance brazing under controlled atmosphere or vacuum
CS114	56	22	17	5	620	655	M26T	Ag156	Excellent fluidity for narrow joint intervals
CS111	55	21	22	2	630	660	M25T	Ag155	
CS91	45	27	25.5	2.5	640	680	M15T	Ag145	Economical alloy with good fluidity
CS81	40	30	28	2	650	710	M10T	Ag140	
CS77	38	32	28	2	660	720	M8T	Ag138	Suitable for use in the refrigeration industry and heat exchangers due to their low melting point. Well suited for large gaps
CS71	34	36	27.5	2.5	630	730	M4T	Ag134	
CS61	30	36	32	2	665	755	M0T	Ag130	
CS51	25	40	33	2	680	760	L18T	Ag125	Alloy widely used for steel-copper assemblies

Most alloys are supplied with a silicon content of 0.15 mA. We can also supply silicon-free alloys for specific applications. Available in: rods and wires – from 0.8 mm to 6 mm; laminates – from 0.08 mm to 3 mm thick; powders and pastes. Safety data sheets are available upon request. Alloys containing cadmium may be produced for applications authorized by special permit.

KEY FEATURES

- **Versatile use:** Ideal for a wide variety of brazing applications, from routine maintenance to high-precision industrial production.
- **High joint quality:** Excellent flow and capillary penetration ensure strong joints with outstanding mechanical properties.
- **Strength:** The joints maintain structural integrity under pressure and vibration.
- **Controlled production process:** From melting onwards, every production step is managed internally to guarantee maximum quality.

SECTORS

Designed for companies requiring reliable, high-quality brazing solutions, our alloys are widely used in sectors such as HVAC, mechanics, electronics and infrastructure construction.

Flux Coated Brazing Alloys

Our most sought-after General Purpose Silver Brazing Alloys are also available with a advanced, specially formulated flux coating. This innovative flux coating is designed to achieve optimal fluidity and activity, ensuring superior performance when applied during the brazing process. Compared to traditional bare brazing rods used with a separate flux paste, these flux-coated brazing rods offer significant benefits in consistency, safety, and overall convenience.

We provide a variety of options for the flux coating, including both rigid and flexible formulations to suit the specific requirements of different applications. Additionally, our extensive colour palette allows for easy identification and differentiation during application. For added customization, we can print directly on the rods, enhancing branding and traceability.

Furthermore, we can adjust the flux-to-rod ratios to accommodate a wide range of applications, particularly tailored for the HVAC industry.

Ternary Alloys

Ternary brazing alloys usually have lower fluidity than General Purpose Silver Brazing Alloys. Their higher brazing temperatures also impose greater demands on the flux used with these alloy. As a result, they are typically not provided in a flux-coated form, since premature depletion of the flux can lead to increased cleaning costs after the brazing process.

Moreover, these ternary brazing alloys offer greater strength at temperatures above 200°C making them suitable for applications where this strength is a critical design consideration.

Thessco	Nominal Composition				Melting Range In °C		ISO 17672	Comments
Grade	Silver	Copper	Zinc	Silicon	Solidus	Liquidis	Specification	
T124/H3	63	24	13	-	690	730	-	White alloys with excellent flowability suitable for delicated work
T120/H0	60	26	14	-	695	730	-	
T88/M14	44	30	26	-	675	735	Ag244	High mechanical strength when hot. Recommended for assembling parts subjected to significant stress
M13	43	37	20	-	690	770	-	
T60/M0	30	38	32	-	680	765	Ag230	
T50/L18	25	40	35	-	700	790	Ag225	
T40/L13S	20	44	36	0.15	690	810	-	Economical brazing alloys used particularly in metal fabrication and on stamped steel parts. They replace brazing alloys for delicate assemblies
T28/L7	14	51	35	-	810	835	-	
T24/L5S	12	48	40	0.15	800	830	Ag212	

Available in rods and wires from 0.8mm to 6mm. Laminates from 0.08mm to 3mm thick. Powders and pastes. Safety data sheets available upon request.

Flux

THESSCO fluxes provide effective oxide removal and uniform brazing on various metals and alloys, fully compliant with environmental and safety regulations. A proper combination of flux, filler metal, and metals is vital for strong joints. The flux cleans and protects surfaces, facilitating wetting and flow of the brazing alloy.

Choosing the right flux is essential to avoid issues, as excessive application can lead to oxidation and higher cleaning costs. The flux should be effective at least 50°C below the solidus and 50°C above the liquidus temperatures of the brazing alloy.

Our fluxes are available in powder and paste forms with various packaging options, including customized solutions.

AGECLA ECO GREEN

The new generation of sustainable, high-performance fluxes

The **AGECLA Eco Green** line represents the natural evolution of our fluxes: high performance products developed to meet the most demanding technical requirements while fully complying with environmental and safety regulations.

With this range, THESSCO reaffirms its mission to provide reliable, innovative solutions that combine production efficiency with responsibility towards people and the environment.

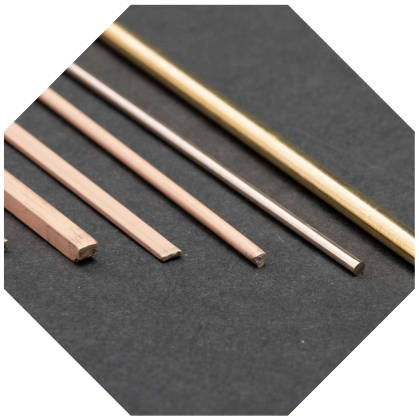
Key Features

- **Eco-friendly formulation:** free from boric acid and with a controlled use of borates that eliminates reprotoxicity.
- **Certified safety:** the products do not carry the H360 and H361 (reprotoxic) risk phrases.
- **REACH compliant:** fully compliant with European health and environmental standards.
- **Maximum versatility:** available in powder, paste, and flux coated rods, to suit all process requirements.

Name	Comments	EN 18496 Standard	Colour	Operating Temperature °C	Form
For Brazing Silver & Copper					
U1R ECOGREEN	Copper alloys, steels, stainless steel without CMR	FH10	White	500 - 800	Paste
U25R ECOGREEN	Copper alloys, steels, stainless steel without CMR	FH10	White	500 - 800	Powder
U1R	Copper alloys, steels, stainless steels	FH10	White	500 - 800	Paste
U25R	Copper alloys, steels, stainless steels	FH10	White	500 - 750	Powder
U	Very good adhesion on vertical surfaces - steels, brass, copper alloys	FH10	White	600 - 800	Powder
UR (Distributable)	Copper and nickel alloys - suitable for induction	FH10	White	550 - 880	Paste
For Brazing Brass					
H35R	Braze welding of brass. Very good vertical resistance	FH20	White	700 - 1000	Powder
H35RP	Braze welding of brass and silver steels - very good vertical resistance	FH20	White	700 - 1000	Paste
For Soft Soldering Brazing					
FL06	Zinc-free - for furnace and flame soldering		Clear	280 - 450	Liquid
F670	Soft soldering of stainless steel		Clear	180 - 400	Liquid

Copper Phosphorus Brazing Alloy

Our copper phosphorus alloys are ideal for sanitary and plumbing applications due to their resistance to dezincification, as they do not contain zinc. Copper-phosphorus-silver and copper-phosphorus brazing alloys are perfect for copper-to-copper assemblies without the need for flux. The high phosphorus content allows for excellent capillary penetration and controlled fluidity, although these alloys may be less ductile.



For improved mechanical strength or vibration resistance, alloys with lower phosphorus content like Phos 5, Phos 2, or Phos OR are recommended. Tin-containing alloys such as Phos OT offer controlled fluidity and low melting points, producing aesthetically pleasing joints.

Phosphorus-containing alloys should not be used with nickel or ferrous alloys to avoid brittle joints. These alloys can also braze high-copper alloys with appropriate flux.

	Nominal Composition				Melting Range In °C		Operating Temp °C	ISO 17672	Comments
Grade	Silver	Copper	Phos	Other	Solidus	Liquidis		Specification	
Phos 15	15	80	5	-	645	800	700	CuP284	
Phos 6	6	86.8	7.2	-	643	813	720	CuP283	Alloys used solely for brazing copper and some copper alloys.
Phos 5	5	89	6	-	645	815	710	CuP281	Self-fluxing property only in Cu/Cu brazing applications.
Phos 2	2	91.7	6.3	-	645	825	740	CuP279	Characteristics improved by the presence of silver.
Phos 0	-	92.2	7.8	-	710	770	720	CuP182	Alloys to be avoided for joining ferrous metals, nickel, and nickel alloys.
Phos OL	-	93	7	-	710	820	730	CuP180	
Phos OR	-	93.8	6.2	-	710	890	760	CuP179	
Phos OA	-	92	6	Sb 2	690	825	740	CuP389	
Phos OT	-	86.2	6.8	Sn 7	650	700	700	CuP386	

Available in rods and wires from 0.8mm to 6mm. Laminated from 0.08mm to 3mm thick. Safety data sheets are available upon request.

KEY FEATURES

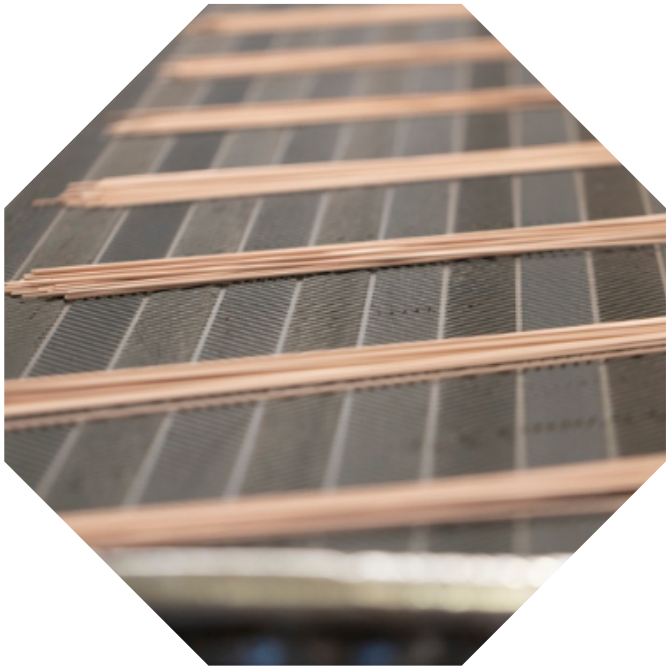
- **Excellent thermal conductivity:** Allows rapid and efficient brazing with a quick heating system, optimising processing time.
- **Versatile application:** Suitable not only for copper, but also for brass and bronze when used together with flux, ensuring clean and strong joints.
- **Dezincification prevention:** The zinc-free composition prevents material degradation, ensuring long-lasting integrity.

SECTORS

These alloys are ideal for companies operating in the HVAC sector that require safe, durable and resistant sanitary installations, particularly in environments with demanding hygiene and maintenance standards.

PHOS TECH Range

Advanced Brazing Alloy Technology



THESSCO has developed an innovative class of brazing alloys that outperforms conventional materials, ensuring cleaner, stronger and more reliable joints. The special formulation of **PHOS TECH** alloys provides the "no sparkling" effect, improving operator control and enhancing the deoxidizing power of phosphorus. The result is a cleaner, more stable brazing process with joints free from porosity. These alloys all comply with the ISO 17672 standard.

For applications requiring higher fluidity, the **PHOS TECH PLUS** version offers an increased phosphorus content for enhanced flow and capillary action.

KEY FEATURES

- Improved resistance to overheating
- Eliminates the risk of porosity
- Provides a "no-sparkling" effect
- Enhances the deoxidizing power of phosphorus

	Nominal Composition			Melting Range In °C		Operating Temperature in °C	ISO 1762
Product	**Silver**	**Copper**	**Phos**	**Solidus**	**Liquidis**		
Phos Tech F600*	-	94	6	710	890	760	CuP 179
Phos Tech F700*	-	93	7	710	820	730	CuP 180
Phos Tech F800*	-	92	8	710	770	720	CuP 182
Phos F1300	1	92.5	6.5	645	810	710	-
Phos Tech F2600*	2	91.7	6.3	645	825	740	CuP 279
Phos Tech F5600*	5	89	6	645	815	710	CuP 281
Phos Tech F1500*	15	80	5	645	800	700	CuP 284

*Also available in PHOS TECH PLUS version (can vary from ISO 17672 STD)

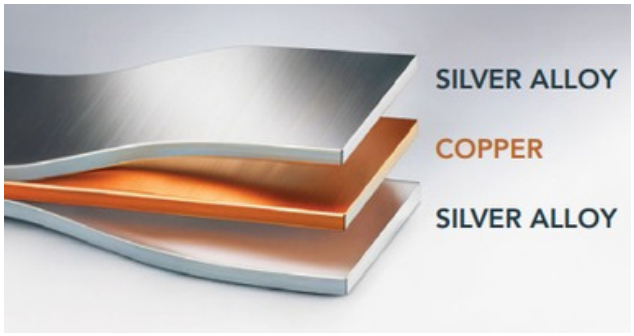
Tooling Advanced Brazing Solutions

A world leader in the production of brazing alloys for Tungsten Carbides

THESSCO offer innovative solutions for hard metal brazing, tailoring our alloys to meet the specific needs of cutting tools for highly specialized sectors such as mining and the processing of stone and wood.

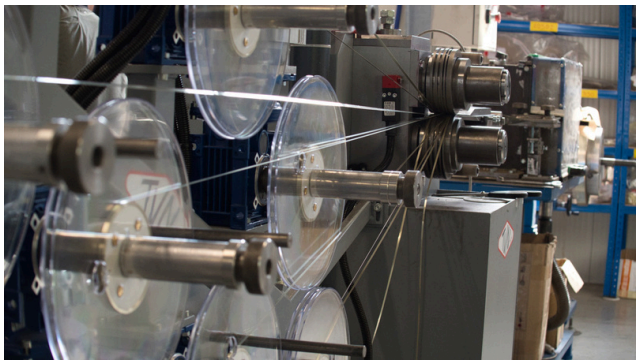
TRIFOIL Tri-Tech

Ideal for brazing saw teeth and other cutting tool components, this innovative laminate composed of two layers of silver alloys and a central layer of copper specifically design for brazing tungsten carbides to steel in cutting tools, as it compensates for internal stresses caused by the different thermal coefficient of expansion during cooling.



Silver Base Alloys

Perfect for low-temperature brazing, these alloys are ideal for joining a wide range of metals, including iron, carbon steel, and stainless steel, ensuring high-quality joints with excellent pressure and vibration resistance.



Why Choose Our Products

- Mechanical excellence due to alloys enriched with Nickel and Manganese
- Superior capillary penetration ability
- A wide range of alloys available
- Optimized solutions for each customer's manufacturing process
- Specialized technical support

Main Applications

Our alloys are used in a variety of applications, especially in the cutting tool sector

Mining Tools
Drill Tools

Cutting Blades
For Stone and Wood

Band Saws
Gang Saw Blades

Tooling Advanced Brazing Solutions

Alloys

Alloy	Ag %	Cu %	Zn %	Sn %	Others %	Melting Range °C	Operating Temp°C	AWS A5.8	DIN 8513	EN 17672
CW76TRD/Cu	38	26	25.3	-	Mn 7.2 Ni 3.5	680 - 700	700	-	-	-
T80Ni	40	30	28	-	Ni 2	670 - 780	780	BAg-4	-	Ag 440
CS81	40	30	28	2	-	650 - 710	690	BAg-28	L-Ag40Sn	Ag 140
T86	43	37	20	-	-	690 - 770	760	-	-	-
T88	44	30	26	-	-	675 - 735	730	-	L-Ag44	Ag 244
T90	45	30	25	-	-	660 - 740	730	BAg-5	-	Ag 245
CS91	45	27	25.5	2.5	-	640 - 680	670	BAg-36	L-Ag45Sn	Ag 145
CW98	49	16	23	-	Mn 7.5 Ni 4.5	670 - 690	690	BAg-22	L-Ag49	Ag 449
CW97TRD/Cu	49	27.5	20.5	-	Mn 2.5 Ni 0.5	670 - 690	690	-	-	-
CW100TRDNi/Cu	50	20	28	-	Ni 2	660 - 705	690	BAg-24	-	Ag 450
CS111	55	21	22	2	-	630 - 660	660	-	L-Ag55Sn*	Ag 155
CS114	56	22	17	5	-	620 - 655	650	BAg-7	L-Ag55Sn*	Ag 156

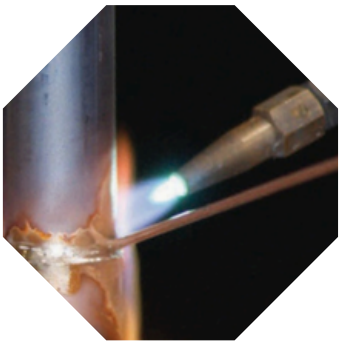
Available format: Foil, Wire, Rod, Flux Coated Rod and Preforms. **Alloys marked in Blue available in TRIFOIL.**

Flux

Flux	Melting Range °C	AWS 5.31	EN ISO 18496	Description
H45	550 - 850	FB3-C	FH 12	Flux for brazing high temperature tools - brown paste
H45R	550 - 850	FB3-C	FH 12	Non-toxic flux for brazing tools - for vending machines - brown paste
DF300	550 - 850	FB3-C	FH 12	Dosable flux for automatic high-temp tool brazing machines - brown paste

Safety data sheets are available upon request.

High Temperature Copper Alloys



These alloys are primarily used in brazing tungsten parts onto steel.
CZ7 is used in the manufacture of drill bits.

Thessco	Nominal Composition					Melting Range In °C		ISO 17672	Comments
Grade	Silver	Tin	Copper	Zinc	Other	Solidus	Liquidis	Specification	Comments
CZ5	1	-	58	bal	Si 0.3	850	870	-	Universal alloys for brazing cast iron, copper and steel
CZ6	-	-	60	bal	Si 0.3	875	895	Cu 470a	
CS7	-	-	59	bal	Si 0.3	870	890	-	

CZ5 is also available in coated solder. Safety data sheets are available upon request.

Soft Soldering Specific Applications

The alloys can be produced in the form of wires, rods, preforms, and also as cored wires (containing 0.5 - 3.5% flux).

ST400 and ST300 are recommended in environments where "fresh" water would cause corrosion on traditional tin-lead joints.

Thessco	Nominal Composition					Melting Range In °C		ISO 17672	Comments
Grade	Silver	Tin	Copper	Zinc	Other	Solidus	Liquidis	Specification	
ST400	4	96	-	-	-	221	224	28	Suitable for stainless steel
ST350	3.5	96.5	-	-	-	221	221	28	Good for narrow joints
ST300	3	97	-	-	-	221	225	29	Lead free alloys for assembly with water
SC300	-	97	3	-	-	230	250	24	Better resistance to temperature
SC1000	-	90	10	-	-	221	295	-	
SL4000	-	60	-	-	Pb40	183	190	2	Properties for filling wide joints
SL300	-	97	-	-	Pb3	-	-	-	Not applicable for sanitary use

Other materials are available; please consult your sales office. Safety data sheets are available upon request.

Silver-Based Industrial Products

The THESSCO group also manufactures silver, copper, and aluminum products in various forms for diverse industrial applications:

- Silver-based electrical contact materials
- Silver laminates and plates – Wide variety of dimensions
- Silver wires and silver alloys
- Silver and copper laminates for fuse applications
- Multi-metal copper and silver laminate with multiple tracks
- Silver powder – particle size up to 3 mm, individually packaged or in drums
- Silver alloys for water purification
- Silver anodes, plates, gold and silver salts for the electrolytic industry
- Silver tubing
- Alloys for the cutlery industry and high-quality, high-purity alloys
- Metal recycling and refining services

Silver Refining

THESSCO offers advanced solutions for the recovery and refining of silver from production scrap originating from industrial sectors, jewellery manufacturing, and electrical components.

With a dedicated in-house foundry, leveraging re-melting processes and a state-of-the-art chemical laboratory, we ensure maximum value recovery from waste materials.

Our Process

We purchase silver-containing production scrap, which is placed in a crucible and melted at high temperatures. Through the creation of fused ingots, this process allows for subsequent processing steps to recover high-quality silver, ready to be re-introduced into the production cycle.

Benefits for Our Clients

- **Comprehensive Collection and Evaluation Service:** We manage the entire process in-house, providing precious metal assessments at the best market conditions, allowing clients to recover significant value from their waste materials.

- **Rigorous Standards and Transparency:** Each batch undergoes strict quality controls, including dual silver titration analysis to ensure reliable results. Additionally, detailed analyses are performed to detect other elements or impurities.

THESSCO
INDUSTRIAL & BRAZING

Prioritising Innovation, Quality and Safety with Flexible, Reliable and Customizable Solutions

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ISO 9001 apave Certification

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