



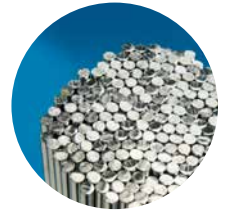
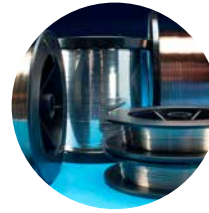
Welding & Brazing for  
Critical Applications

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# Welding & Brazing

## For Critical Applications

### Our Heritage, Base and Global Presence

Established in 1985 as Vacuum Brazing Consultants Ltd, today **VBC Group** is headquartered in Loughborough, East Midlands at the heart of the UK's aerospace industry. VBC Group's scope of supply now covers a worldwide customer base in the field of welding, brazing and allied technologies.

### Specialists in Advanced Welding and Brazing

VBC Group is a global supplier of premium quality welding wire, brazing alloys and associated products. We are specialists in supporting quality-critical and high-tech applications such as aerospace, electronic components, oil and gas, power generation as well as emerging technologies.

### Our Mission Statement

We are committed to providing complete and bespoke joining solutions for advanced materials. We aim to meet our customers' individual needs with attention to detail and quality products. At VBC we strive to positively influence our industry, the environment and wider community.



# Market Sectors

## Aerospace Components



## Aviation MRO



## Hard Materials



# Our Key Benefits



## Welding and Brazing Products

VBC Group holds a unique position as a supplier of both welding and brazing products. We have in-depth knowledge and expertise in the use of these products. This enables our customers to buy their joining products from a single specialist source and make efficiency savings.



## Industry Leading Quality

VBC Group carries Aerospace Standard AS9100 approval. Our quality system is based on this demanding standard which underpins all of our activities. Our customers can be confident that VBC Group has the quality credentials to meet their requirements.



## Expert Technical Support

VBC Group has the expertise to provide technical support for our products and the processes they are used in. Our customers can be certain that if they need advice on techniques, more detailed technical support or a full consultancy package then VBC Group can provide it.

## Power Generation



## Medical & Scientific



## Emerging Technologies



### Individualised Customer Service

Whether your requirement is for a single box of welding rods or a complex portfolio of 100s of products VBC Group customer service team will provide you with individualised customer support. With an on-time delivery rate of above 99.5% you can be sure of excellent service.



### Knowledge of Critical Applications

We can help customers in many areas of joining technology including welding metallurgy, vacuum brazing processes (including honeycomb brazing), precious metal filler metals, brazing, including active brazing, of ceramics and man-made hard materials such as WC, PCD, CBN, diamond.



### Bespoke Products and Services

VBC are flexible and responsive in our approach to customer requirements. We can provide services around our core product range such as flagging of rods, wire drawing, photo-etching, refining and pre-form manufacture. We also manufacture bespoke aerospace-grade brazing pastes.









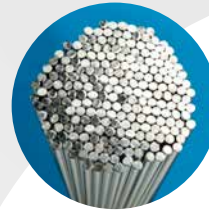
# Welding Products

VBC Group is a provider of premium-quality welding rods and associated products. Our welding products meet the requirements of the most stringent aerospace quality approvals giving superior performance in the most demanding of applications.

We have the capability to supply over 200 different types of welding wire. A wide range of welding wires from these product families are held in stock at our facility. Bespoke flagging of rods is available on all welding wire products.

## Pura-weld™ Welding Product Range

Welding Alloys	Pura-weld™ Titanium Welding Alloys	Pura-weld™ Stainless Steel Welding Alloys				
	Pura-weld™ Aluminium Welding Alloys	Pura-weld™ Cobalt Welding Alloys				
	Pura-weld™ Nickel Welding Alloys	Welding Alloys for Shape Metal Deposition				
Associated Welding Products	Weld Inserts	Deep-Penetration Welding Flux				
	Tungsten Electrodes	Locking Wire				
	Micro Laser Welding Wire	Other Welding Alloy Product Groups				
Welding Product Forms	 Rods	 Wire	 Paste	 Powder	 Rings	 Electrodes



## Metallurgical Support

With the development of new alloys for demanding applications comes a requirement for advice on the correct joining materials. VBC can provide detailed metallurgical advice on the most compatible welding wire for newly developed alloys.

## Advice on standards

We are able to recommend the correct current standard or provide metallurgical advice on an alternative welding wire that will be compatible if no standard exists.

## Standards

VBC welding alloy wires can be released to internationally recognised ISO standards as well as the AWS, and AMS standards. We can also release welding wire to other national standards.

## Specifications

VBC carries approval from a number of the prime aerospace suppliers. We also have numerous other customer approvals from a range of industries.

## Product Availability

Filler wires are available in various lengths of straight rods as well as coil and spool form in various sized reels. Welding filler wires are available in standard wire diameters or non-standard diameters which can be manufactured to order.

## Standard Diameter Wires

Standard Diameter Wires

0.8mm through to 3.2mm


Non-Standard Diameter Wires

0.45, 0.5, 0.6, 0.7, 0.9, 1.0 & 1.14mm


## Welding Wire Products

There are over 200 welding alloy references in VBC Group's product portfolio. Some of the most commonly requested alloys are shown in this section.


### Pura-weld™ Titanium Welding Alloys

Key Products	Trade Name	Specification	MSRR	Key Points	Forms
Pura-weld™ 0073	6Al-4V Ti	AMS 4954	9500/73	There are 15 alloys in VBC's Ti-Weld range of ultra-pure titanium welding filler metals.	
Pura-weld™ 0070	CP Ti	AMS 4951	9500/70		
Pura-weld™ 0075	IMI829		9500/75		
Pura-weld™ 0076	IMI685		9500/76		
Pura-weld™ 0078	6Al-4V Ti ELI	AMS 4956	9500/78		


### Pura-weld™ Stainless Steel Welding Alloys

Pura-weld™ 0002	18-8Nb	AMS 5680*	9500/2	With 45 alloys in VBC's stainless steel welding wire range we offer one of the broadest range of products on the market today.	
Pura-weld™ 0010	JETHETE M190	AMS 5822*	9500/10		
Pura-weld™ 9240	17-4PH	AMS 5825			
Pura-weld™ 0212	312	AMS 5784	9500/212		
Pura-weld™ 0205	410	AMS 5776	9500/205		

### Pura-weld™ Aluminium Welding Alloys

Pura-weld™ 0032	4043/ 4043A	AMS 4190	9500/32	VBC's premium quality aluminium welding products provide a reliable solution for welding lightweight aluminium alloys in a range of applications.	
Pura-weld™ 0045	2319	AMS 4191	9500/45		
Pura-weld™ 0038	5356A		9500/38		
Pura-weld™ 0033	3103 NG3		9500/33		
Pura-weld™ 0035	4145 Alcubraz™	AMS 4184	9500/35		

### Pura-weld™ Cobalt Welding Alloys


Pura-weld™ 0226	CM64 (PWA 694)	B50TF55	9500/226	These cobalt welding alloys are used for welding cobalt superalloys in gas turbine applications where high temperature strength, resistance to oxidation and wear resistance are required.	
Pura-weld™ 0023	L605 (HS 25)	AMS 5796	9500/23		
Pura-weld™ 0248	PWA 795 (PMET 972)		9500/248		
Pura-weld™ 0025	HS31 / Stellite 31	AMS 5789	9500/25		
Pura-weld™ 0015	HS 12 (HIGH C)		9500/15		

\* Composition is similar to the indicated standard.







## Pura-weld™ Nickel Welding Alloys

Key Products	Trade Name	Specification	MSRR	Key Points	Forms
Pura-weld™ 0237	625	AMS 5837	9500/237	VBC's nickel superalloy welding wires are used in high temperature and strength applications such as gas and land based turbine engine components. There are around 50 alloy references in the VBC Group range.	
Pura-weld™ 0220	718	AMS 5832	9500/220		
Pura-weld™ 0003	NC 80/20	AMS 5676	9500/3		
Pura-weld™ 0213	Hastelloy™ W	AMS 5786	9500/213		
Pura-weld™ 0016	C263	AMS 5966	9500/16		
Pura-weld™ 0215	Hastelloy™ X	AMS 5798	9500/215		
Pura-weld™ 0247	Rene™ 142 / PMET 842	B50TF274	9500/247		
Pura-weld™ 0227	901	AMS 5830*	9500/227		
Pura-weld™ 0009	FM 92	AMS 5675	9500/9		
Pura-weld™ 0202	Waspalloy™	AMS 5828	9500/202		
Pura-weld™ 0004	Nimonic™ 90	AMS 5829	9500/4		

## Other Welding Alloy Product Groups

Key Products	Key Points	Forms
Pura-weld™ Mild Steel Welding Alloys	VBC Group are able to supply the complete range of welding filler materials including iron, copper, magnesium and zirconium welding materials.	
Pura-weld™ Copper Welding Alloys		
Pura-weld™ Magnesium Welding Alloys		
Zirconium Welding Alloys		

## Welding Alloys for Shape Metal Deposition

Key Products	Trade Name	Specification	MSRR	Key Points	Forms
Pura-weld™ 0073	6Al-4V Ti	AMS 4954	9500/73	VBC supply products that are suitable for Shape Metal Deposition, a form of additive layer manufacturing pioneered by the aerospace industry. VBC Group are able to supply precision ultra-pure welding wires for this emerging process.	
Nickel Superalloys					
Aluminium Alloys					

## Associated Welding Products

VBC offer a range of associated welding products, some of which are detailed here. Please refer to our sales team for more details or for other welding products.

### Weld Inserts

Weld inserts provide the highest quality root pass for welds that require radiography and have also gained acceptance in commercial applications. They are available as rings supplied in standard pipe sizes or as wire on coil, to AWS style A, B or C.



### Deep-Penetration Welding Flux

We are able to offer a range of weld fluxes when welding titanium, nickel and stainless alloys. These fluxes are specially formulated to enhance weld bead penetration.



### Tungsten Electrodes

We are able to source the seven types and five industry-standard diameters. Our tungsten will meet the AWS (American Welding Society) specifications and package labels feature important safety information.



### Locking Wire

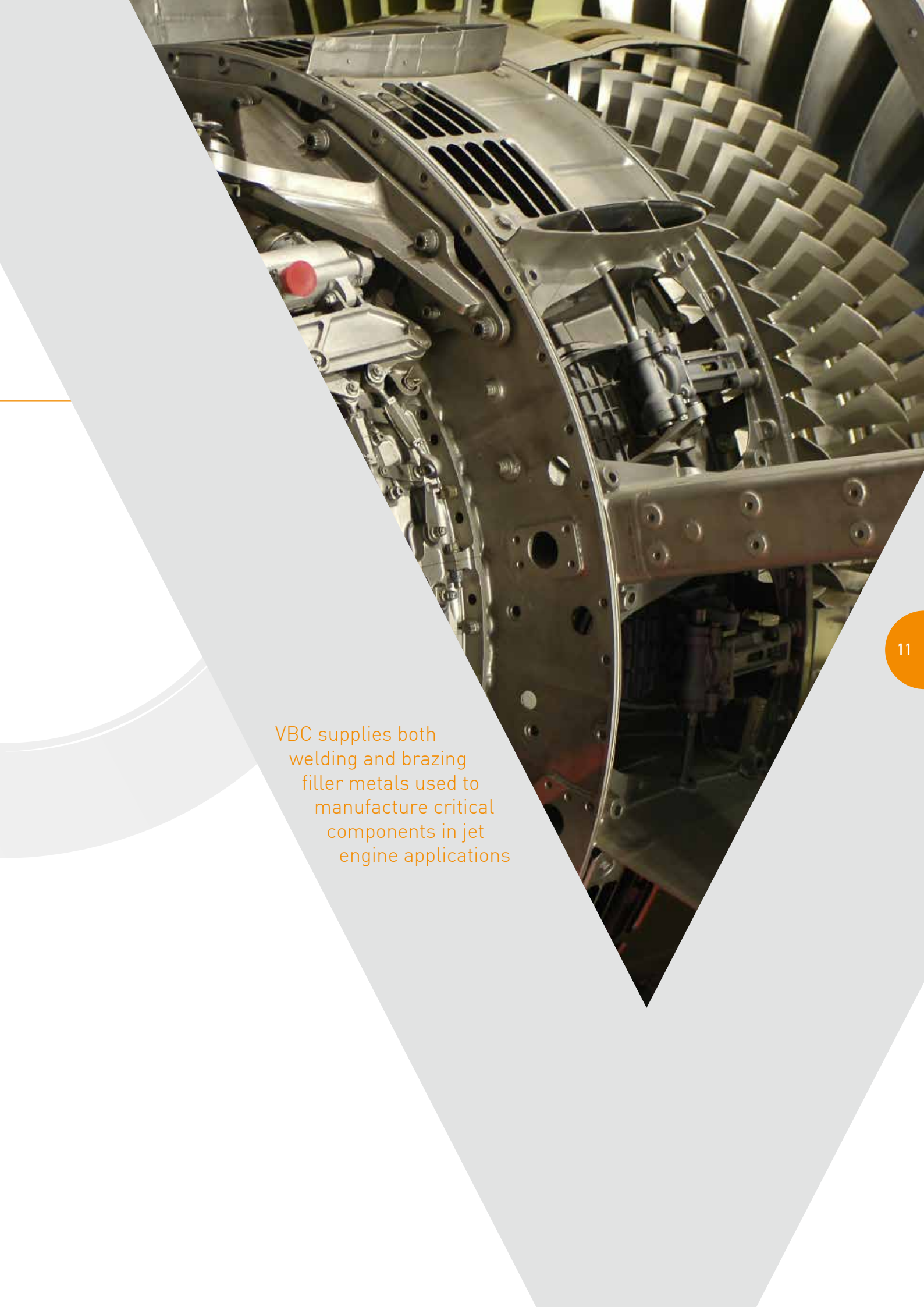
Extensively used to secure components which are subject to vibration in critical environments. Manufactured from a wide range of materials and certified to international specifications.



### Micro Laser Welding Wire

VBC provides ultra fine diameter welding wire, typically between 0.3 - 0.6mm diameter, in a wide range of alloys

















VBC supplies both  
welding and brazing  
filler metals used to  
manufacture critical  
components in jet  
engine applications

# Brazing Products

Our product portfolio covers the complete range of brazing materials available today. Meta-braze™ brazing products are VBC Group's own premium brand of brazing products.

VBC Group is a provider of the leading brands of brazing filler metals and associated brazing products such as stop off compounds, binders and fluxes. We also have manufacturing capability for bespoke brazing pastes, predominantly producing aerospace nickel brazing pastes.

## Meta-braze™ Brazing Product Range







Brazing Alloys	Meta-braze™ Nickel Brazing Alloys	Meta-braze™ Active Brazing Alloys				
	Meta-braze™ Gold Brazing Alloys	Meta-braze™ Silver/Copper Phos Brazing Alloys				
	Meta-braze™ Palladium Brazing Alloys	Meta-braze™ Copper Brazing Alloys				
	Meta-braze™ Silver Brazing Alloys (V1 grade)	Meta-braze™ Aluminium Brazing Alloys				
Associated Brazing Products	Meta-braze™ Brazing Flux	Stop off Compounds				
	Paste Dispensing Consumables	Pre-Sintered Pre-forms (PSPs)				
	Metallic Honeycomb					
Brazing Product Forms	 Disc	 Foil	 Paste	 Braze Paste	 Pen	 Powder
	 Rings	 Coated Rods	 Rods	 Tapes	 Washers	 Wire

For more information on products and specifications visit [www.vbcgroup.com](http://www.vbcgroup.com)














## Meta-braze™ Nickel Brazing Alloys

Key Products	Trade-names	Specification	MSRR	Key Points	Forms
<b>Meta-braze™ 4775</b>	Nicrobraz®125	AMS 4775	9500/103	Over 35 different grades of nickel brazing products are available. They are supplied in aerospace quality as powders or pastes.	     
<b>Meta-braze™ 4776M</b>	Amdry™915	AMS 4776	9500/705		
<b>Meta-braze™ 4777</b>	Nicrobraz® LM	AMS 4777	9500/97		
<b>Meta-braze™ 4778</b>	Nicrobraz®130	AMS 4778	9500/114		
<b>Meta-braze™ 4779</b>	Nicrobraz®135	AMS 4779	9500/700		
<b>Meta-braze™ 4782</b>	Nicrobraz®30	AMS 4782	9500/116	Nickel braze tapes and melt spun / amorphous foils can be made into pre-formed shapes.	
<b>Meta-braze™ 4310</b>	Nicrobraz®10	AWS A5.8 BNi-6	9500/707		
<b>Meta-braze™ 4720</b>	Nicrobraz®170	AWS A5.8 BNi-10		Several proprietary gap filling and thermal spray powder products are available.	
<b>Meta-braze™ 6002</b>	MarM 002	VBC Proprietary	9500/246		
<b>Meta-braze™ 6001</b>	WG1	VBC Proprietary			
<b>Meta-braze™ 4313</b>	Nicrogap™108	OMAT 3/109	9500/711		














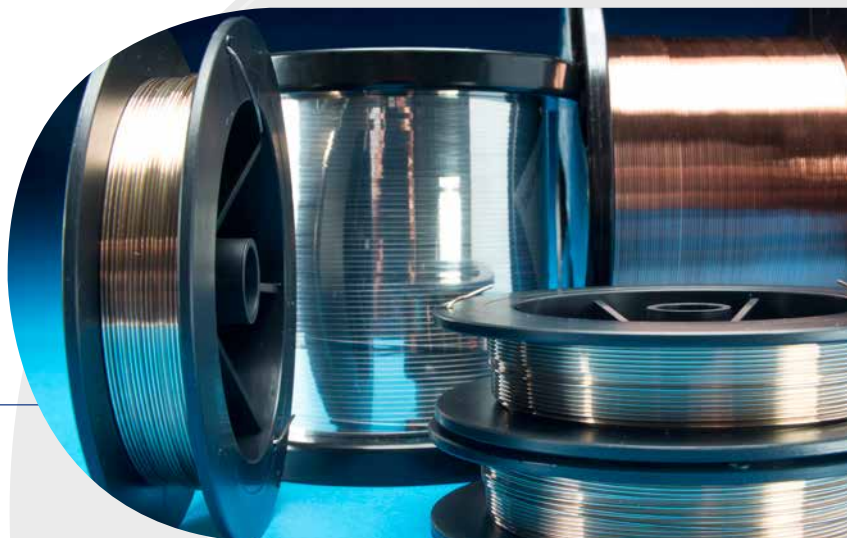
# Brazing Products

## Meta-braze™ Gold Brazing Alloys




Key Products	Trade-names	Specification	ISO 17672	EN 1044	Key Points	Forms
<b>Meta-braze™ 4059</b>	Palnicorum®10	Proprietary			There are a large number of specialised gold-containing filler metals in VBC's product range.	  
<b>Meta-braze™ 4061</b>	Palniro®1	AMS 4784	Au507			
<b>Meta-braze™ 4062</b>	Palniro®7	AMS 4786	Au700			
<b>Meta-braze™ 4070</b>	30%Au/70%Cu	9500/710	Au295	AU104	Gold imparts increased strength and oxidation resistance at elevated temperature and enhances resistance to chemical attack.	  
<b>Meta-braze™ 4071</b>	35%Au/65%Cu	AWS A5.8 BVAu-9	Au354			
<b>Meta-braze™ 4073</b>	50%Au/50%Cu	AWS A5.8 BVAu-10	Au503			
<b>Meta-braze™ 4074</b>	62%Au/38%Cu		Au625 V1	AU102	High purity vacuum grade gold brazing filler metals are suitable for vacuum tube devices.	  
<b>Meta-braze™ 4902</b>	80%Au/20%Cu	AWS A5.8 BAu-2	Au800			
<b>Meta-braze™ 4082</b>	Nicoro®	AWS A5.8 BAu-3	Au351			
<b>Meta-braze™ 4083</b>	Nicoro® 80					
<b>Meta-braze™ 4084</b>	Nioro®	AMS 4787 9500/118	Au827 V1	AU105		

## Meta-braze™ Palladium and Silver Brazing Alloys







Key Products	Trade-names	Specification	ISO 17672	EN 1044	Key Points	Forms
<b>Meta-braze™ 4010</b>	Cusil®	AWS A5.8 BAg-8	Ag272 V1	AG401	These alloys can be made to V1 or vacuum tube grade making them suitable for service in vacuum tube devices.	 
<b>Meta-braze™ 4020</b>	Nicutil® 3	AWS A5.8 BAg-8b				
<b>Meta-braze™ 4031</b>	Incutil®10				Palladium in brazing alloys imparts increased strength, oxidation resistance at elevated temperature and resistance to chemical attack. Palladium-nickel alloys also show improved wetting, strength and bonding characteristics on tungsten carbide.	  
<b>Meta-braze™ 4050</b>	Palcusil®5	AWS A5.8 BAg-30	Pd287 V1	PD106		
<b>Meta-braze™ 4051</b>	Palcusil®10	AWS A5.8 BAg-31	Pd387 V1	PD105		
<b>Meta-braze™ 4052</b>	Palcusil®15		Pd481 V1	PD103	Palladium-nickel alloys also show improved wetting, strength and bonding characteristics on tungsten carbide.	  
<b>Meta-braze™ 4054</b>	Palcusil®25	AWS A5.8 BAg-32	Pd587 V1	PD101		
<b>Meta-braze™ 4064</b>	18%Pd/ 82%Cu		Pd483 V1	PD203		
<b>Meta-braze™ 4055</b>	Palco®	AWS A5.8 BPd-1				  
<b>Meta-braze™ 4056</b>	Palni®	Proprietary	Pd647 V1	PD201		
<b>Meta-braze™ 4731</b>	Palnisi 47™	Proprietary				












## Active Braze Products

Key Products	Trade-names	Specification	Key Points	Forms
Meta-braze™ 4033	Incusil ABA®	Proprietary	Active braze alloys contain an element (usually titanium) which enables it to wet and bond with certain ceramics. This allows direct brazing onto ceramics eliminating several costly steps metallising the ceramic. ABAs open up the opportunity to braze newly developed man-made hard materials and ceramics.	  
Meta-braze™ 4011	Cusil ABA®	Proprietary		
Meta-braze™ 4025	Ticusil®	Proprietary		
Meta-braze™ 4027	Ticuni-60®	AWS A5.8 BTi-2		
Meta-braze™ 4028	Ticuni®	AWS A5.8 BTi-1		
Meta-braze™ 4029	Tini-67™	Proprietary		
Meta-braze™ 4002	Copper ABA®	Proprietary		

## Copper and Aluminium Brazing Alloys

Key Products	Specification	Key Points	Forms
Meta-braze™ 4004	ISO 17672:Cu186	Copper alloys for furnace brazing in paste and solid preforms.	 
Meta-braze™ 4001	ISO 17672:Cu110		
Meta-braze™ 4405	B-Cu58ZnMnCo-890/930	Specialised 'bronze' or copper alloys for brazing tungsten carbide for mining, drilling, cutting and wear parts.	 
Meta-braze™ 4090	AMS 4764		
Meta-braze™ 4403	ISO 17672:Cu595	For aluminium air-conditioning/heat-exchanger components.	 
Meta-braze™ 6994	AWS BAlSi-4 AA 4047		

## Silver and Silver / Copper Phos Brazing Alloys




Key Products	ISO 17672	MSRR	Key Points	Forms
Meta-braze™ 156	Ag156	9500/708	VBC Group's Meta-braze™ range of products covers the key industrial silver brazing alloys used today.	 
Meta-braze™ 155	Ag155			
Meta-braze™ 140	Ag140	9500/93	Meta-braze™ products come from European and US quality-orientated mill sources that have been audited to VBC's exacting standards.	 
Meta-braze™ 125	Ag125			
Meta-braze™ 024	Proprietary			
Meta-braze™ 449	Ag449		Meta-braze™ alloys conform to the current version of ISO 17672: Brazing Filler Metals.	 
Meta-braze™ 450	Ag450			
Meta-braze™ 049T	Proprietary			
Meta-braze™ 284	CuP284			 
Meta-braze™ 281	CuP281			
Meta-braze™ 279	CuP279			
Meta-braze™ 181	CuP181			

## Associated Brazing Products

### Brazing Flux

Key Products	Specification	Key Points
Meta-braze™ LT Flux Powder	EN1045 FH10	Meta-braze™ LT brazing fluxes are designed for low temperature silver brazing in air. Meta-braze™ BM flux is suitable for use on tungsten carbide applications. Meta-braze™ HT is suitable for use with high temperature copper brazing alloys.
Meta-braze™ LT Flux Paste	EN1045 FH10	
Meta-braze™ BM Flux Powder	EN1045 FH12	
Meta-braze™ HT Flux Powder	EN1045 FH21	

### Stop off Compounds

Key Products	Key Points	Product Forms
Green Stop-off™	A variety of leading brand stop off compounds are available. They should be selected according to the parent metals being brazed and the form in which the product will be applied. These parting compounds prevent flow of molten filler metal into areas where it is not needed.	  
White Stop-off™		
Blue Stop-off™		
Red Stop-off™		
StopYt™ various forms available		

### Brazing Paste Dispensing Systems and Consumables

Key Products	Product Forms	Key Points
Dispensing Unit	Supplied as a kit	Pneumatic dispensing control units are simple to use and enable repeatable application of paste deposits. Needles of differing gauges also control deposit size.
Paste cartridges, needles and tips.	Packs of 10 Bags of 200	

### Pre-Sintered Pre-forms (PSPs)

Key Products	Product Forms	Key Points
Made from customized blends of superalloy and braze powders	Available in a plate form or specific shape.	PSPs are used to restore and repair cracks on worn jet engine components for aerospace and industrial applications, such as high pressure, gas turbine vanes.

### Metallic Honeycomb for Gas Turbine Engine Seals

Key Products	Product Forms	Key Points
Honeycomb from Haynes™ 214, Hastelloy™ X	Segments and rings (straight and chamfer), annular segments, multi-stepped cross sections and net-shaped components.	VBC can supply metallic honeycomb which is approved by the major aero engine OEM's. It is available in ready to braze form with pre-loaded tape applied. Technical consultancy is available in this area of technology.

Ultra high purity brazing products, supplied by VBC Group, are used for components in medical imaging and treatment equipment



## Technical Services

### Technical Product Support

At VBC Group we are committed to fully supporting the products and services we provide with technical back-up, utilising our specialists.

This includes:

- The fundamental principals
- Advice on joining techniques and heating methods
- Joining audits
- Metallurgical advice
- Brazing training courses
- Problem solving

### Consultancy

Unlike many providers we have the capability to offer consultancy services. We have particular strengths in the following areas:

- Vacuum brazing processes
- Honeycomb brazing consultancy
- Brazing of poly-crystalline diamond (PCD), other man-made hard materials and ceramics
- Welding and brazing support on specifications and filler metal selection

## Quality Credentials

### ISO 9001 & AS 9100 Quality Management System



VBC Group operates a mature quality system (approved since 1994).

We are certified to

ISO 9001:2008 and AS 9100:2009 (Rev C).

### Customer Approvals

We release welding and brazing products to AMS, AWS and ISO standards. In addition we hold numerous customer approvals and can release products to aerospace specifications.

VBC are Tier 1 suppliers to Rolls-Royce OEM worldwide. We are listed for new build under MSRR9500 and for repair in the OMat (Rolls-Royce Overhaul Materials) and repair manual as authorised vendor UK 314.

### Our Commitment to Quality

We understand the importance of continuous improvement and are committed to satisfying all customers' quality expectations.

Our quality system is based on the demanding standards of aerospace and we pass this onto all of our customers regardless of their size, market sector or location.





# Global Supply Capability

## Global Distribution

From our base in Loughbrough, UK VBC Group supplies global customers in over 40 countries worldwide. Working with distributors, agents and with direct supply we aim to meet our customer requirements wherever their business is located.

## Headquarters

VBC Group  
Castle Business Park  
Pavilion Way  
Loughbrough  
Leicestershire  
LE11 5GW  
UK

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North America

Europe, The Middle East and Africa

Latin America and the Caribbean

Asia - Pacific

## Supply Partnerships

We have long-standing supplier partnerships with mill sources that are world-leading producers in their respective fields. Our supply base is entirely located in the USA and Europe meaning that our customers can feel confident in our product quality.

## Supply-chain Compliance

We only work with suppliers who comply with the current legislation necessary for operating in international markets. Our supply partners demonstrate high standards of corporate social responsibility and environmental policies.





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