



# Welding and Brazing Products

Technical Information

[www.vbcgroup.com](http://www.vbcgroup.com)

# VBC welding and vacuum brazing products



The VBC Group is a market-leading global distributor of premium welding wire and brazing alloys. Holding extensive stocks of the most comprehensive range of products, we can offer often unrivalled delivery times, as well as quality of product and customer service.

From our headquarters in Loughborough (UK), we are able to offer a worldwide support network for both commercial and technical services.

VBC core competencies include expertise in the fields of precious metal applications, aerospace, land based turbines, welding, induction brazing and vacuum brazing of all types of products.

We have the expertise to technically support our products which we do free of charge. Our technical team covers knowledge and application of precious metal, nickel based, honeycomb seal segments and aerospace welding support.

## VBC Group – The Solution Provider

We do much more than simply produce and sell alloys for brazing and welding. We are solution providers for our customers and our technical team are always at hand to assist you in your processes.

Our team supports all customers worldwide who use VBC materials with technical, metallurgy and commercial application advice for both welding and brazing. We support all customers with the greatest of confidentiality and usually work within Non-Disclosure Agreements.

We believe in forming long term relationships with our customers to ensure that they receive the highest level of service at all times.

If you have a new job that is unfamiliar, or perhaps pushing your current capabilities please let our team of experts provide support and consultancy to guide and train your staff.

This support is available in the form of phone calls to our Technical Team co-ordinator, via email ([tech@vbcgroup.com](mailto:tech@vbcgroup.com)) or when the need arises, an on-site visit.

## What we offer:

### Site Visits

- When required for problem solving, consultancy or training and commercial purposes.

### Expertise

- Vacuum brazing process consultancy support
- Honeycomb vacuum brazing consultancy support
- Induction Brazing of Poly-Crystalline Diamond (PCD) and other materials consultancy support
- Welding Support on cross referencing specifications
- Filler metal selection
- Pre-Sintered Preforms (PSP's)

### Product Support

- All our products are fully supported technically by our team of experts

### Borofuse Hardening

- The Borofuse process is a unique and proprietary process whereby hardness can be significantly increased

### Brazing Training Courses

- Hands on and classroom based training courses tailored to meet your requirements
- Includes, part specific training, preparation of parts prior to brazing, honeycomb brazing, design considerations and more

Please refer to our website for more details on all of the above - [www.vbcgroup.com](http://www.vbcgroup.com)

## Welding (pg 4-12) and Brazing Materials (pg 13-22)

### Quality

Buying from VBC means fast deliveries, a consistently high and reliable product quality with unrivalled customer service and support. The majority of our alloys go into electronics, aerospace, defence, oil and gas, medical devices and other demanding applications.

Our rigorous quality standards including AS9100 and ISO 9001 ensure that all our products meet the highest standards including traceability, cleanliness and composition.

Our welding wires are available in diameters from 0.8mm through to 3.2mm as well as some non-standard sizes such as 0.60mm, 0.90mm & 1.0mm.

VBC Group operates a mature quality system incorporating a policy of continuous improvement that has been approved since 1994. It is currently certified to ISO 9001:2008 and also to the Aerospace Standard AS 9100:2009 (Rev C).

Our quality system is based on the demanding standards of aerospace and we pass this onto all of our customers regardless of market sector – whether it be aerospace, automotive, space, defence, power generation, oil and gas drilling, sensors, ceramics or nuclear.

We supply speciality gold, silver and palladium bearing braze alloys as well as nickel, copper and aluminium based brazing filler metals in all commercially available forms. We can meet the demanding specifications of AWS, BS EN ISO to the V1 grade and hold Aerospace specifications such as AMS, MSRR and GE B50.

We are Tier 1 suppliers to Rolls Royce OEM worldwide.

VBC products are approved by Rolls-Royce and listed for new build under MSRR9500, and for repair also listed in the OMat (Rolls Royce Overhaul Materials) product specification and repair manual as authorised vendor UK 314.

Our quality system is based on the demanding standards of aerospace and we pass this onto all of our customers regardless of market sector – whether it be aerospace, automotive, space, defence, power generation, earth drilling, sensors, heavy electrical ceramics or nuclear.

Quality is fundamental to our business and we are proud to have an on-time delivery rate of above 99%.

Please see [website](#) for a current copy of our certificate

# Stainless

Stainless steel is available in a range of different compositions offering a range of properties to suit a wide variety of applications. Chromium is the key element which imparts the corrosion resistance properties to Stainless Steel, and then Nickel, Manganese, Carbon and others each add to the strength and high temperature characteristics. It is widely used for chemical tanks and pipelines and as an aerospace structural alloy.

The correct selection of the appropriate filler metal is essential to ensure a strong, defect free weld.

Alloy	Alternative	Fe	Ni	Cr	Mzn	C	Ti	Mo	Si	Cu	Others
VBC ALLOY 0002	18-8 Nb	Bal	8.5	18.25	1.25	0.08		1.0 max	0.6		1.0Nb
Specifications List: AMS 5680(Ref) AMS 5790(Ref) MSRR 9500/2 MSRR 6677 Omat 306											
VBC ALLOY 0005	FIW	Bal	1.0 max	11.3	1.0 max	0.05 max			1.0 max		
Specifications List: MSRR 9500/5											
VBC ALLOY 0006	318 S96	Bal	12.5	19	1.75	0.08 max		2.5	0.45		1.0Nb
Specifications List: MSRR 9500/6 Omat 3/59 BS 2901 Pt 2 1983 318 S96 BS EN ISO 14343:2009 318											
VBC ALLOY 0007	310 (25/20 Nb)	Bal	21.25	26.5	1.75	0.1		0.5 max	0.45		1.0Nb-0.5Cu max
Specifications List: AMS 5694 MSRR 9500/7 Omat 3/104 BS 2901 Pt 2 1983 310 S98 BS EN ISO 14343:2009 310											
VBC ALLOY 0010	Jethete M190 VM	Bal	2.75	11.75	0.85	0.13		1.75			0.33V-1.65Co
Specifications List: AMS 5822 MSRR 9500/10 Omat 3/54 UNS Number 541780											
VBC ALLOY 0024	FV520B	Bal	5.4	13.95	1.0 max	0.07 max		1.6	0.6 max	1.6	0.25Nb
Specifications List: (AMS 5825) (AMS 5803) (AMS 5826) MSRR 9500/24 MSRR 6537 BS S143											
VBC ALLOY 0205	410	Bal	0.75 max	12.5	1.0 max	0.13		0.5 max	1.0 max	0.5 max	
Specifications List: AMS 5776 MSRR 9500/205 AWS A5.9 ER410 ASTM A313 UNS Number S41001											
VBC ALLOY 0207	347 (18-11)	Bal	11	18.5	1.5	0.07 max		0.75 max	0.65	0.75 max	1.0Nb
Specifications List: AMS 5680 MSRR 9500/207 JIS SUS 347 UNS S34781											
VBC ALLOY 0208	316	Bal	12.5	19	1.75	0.08 max		2.5	0.48	0.75 max	
Specifications List: AMS 5692 MSRR 9500/208 AWS A5.9 ER316 ASTM A313 UNS S31680											
VBC ALLOY 0210	AM350	Bal	4.5	15.5	0.88	0.13		2.88	0.5 max	0.5 max	0.10N
Specifications List: AMS 5780 MSRR 9500/210 AISI 634 UNS S35500											

Alloy	Alternative	Fe	Ni	Cr	Mn	C	Ti	Mo	Si	Cu	Others
VBC ALLOY 0211	349	Bal	8.5	20.5	1.5	0.1	0.2	0.5	0.6	0.5 max	1.50W-1.20Nb
Specifications List: AMS 5782 MSRR 9500/211 AISI 652 ASTM 619 UNS S63199											
VBC ALLOY 0212	312	Bal	9.5	29	1.5	0.12		0.5 max	0.75 max	0.5 max	
Specifications List: AMS 5784 MSRR 9500/212 Omat 3/163 AWS A5.9 ER312 UNS S64299											
VBC ALLOY 0233	A286 (Air Melted)	Bal	25.5	14.75	2.0 max	0.08 max	2.23	1.25	1.0 max		1.0Co max-0.35Al max-0.30V-0.007B
Specifications List: AMS 5804 MSRR 9500/233 UNS S66286 UNS K66286											
VBC ALLOY 0238	Nitronic 35 (W)	Bal	5	18	12	0.05 max			0.1 max	0.5 max	0.20N
Specifications List: MSRR 9500/238											
VBC ALLOY 9240	17-4PH (AM)	Bal	4.8	16.4	0.5				0.75 max	3.6	0.22Nb+Ta
Specifications List: AMS 5656 AWS A5.9 ER219 UNS S21904											
VBC ALLOY 0251	17-7PH	Bal	7.13	16.63	1.0 max	0.09 max			0.5 max		1Al
Specifications List: AMS 5824 MSRR 9500/251 AISI 631 UNS S17780											
VBC ALLOY 9040	Nitronic 40	Bal	6.5	20.25	9	0.04 max			1.0 max		0.28N
Specifications List: AMS 5656 AWS A5.9 ER219 UNS S21904											
VBC ALLOY 9041	410 Modified	Bal	0.75 max	12	0.6 max	0.13		0.2 max	0.5 max	0.5 max	
Specifications List: AMS 5821 UNS S41081											
VBC ALLOY 9050	Nitronic 50	Bal	12.5	22	5	0.06 max		2.25	1.0 max		0.30N-0.20V
Specifications List: AMS 5764 AWS A5.9 ER209 W N. 1.3964 UNS S20910											
VBC ALLOY 9060	Nitronic 60	Bal	8.5	17	8	0.1 max		0.75 max	4	0.75 max	0.13N
Specifications List: AMS 5848 (AMS 5656) (AMS 5764) AWS A5.9 ER218 UNS S21800											
VBC ALLOY 9138	13-8 Mo	Bal	8	12.75	0.1 max	0.05 max		2.25	0.1 max		1.13Al
Specifications List: AMS 5840 UNS S13889											
VBC ALLOY 9155	15-5PH	Bal	4.5	14.85	1.0 max	0.07 max			1.0 max	3.5	0.45Nb
Specifications List: AMS 5826 (AMS 5659) UNS S15500											
VBC ALLOY 9157	15-7 Alloy	Bal	7.13	14.63	1.0 max	0.09 max		2.38	0.5 max		1Al
Specifications List: AMS 5812 AISI 632 UNS S15789											

Alloy	Alternative	Fe	Ni	Cr	Mn	C	Ti	Mo	Si	Cu	Others
VBC ALLOY 9199	NAG 19/9	Bal	10	19.5	1.13	0.03		1.38	0.55		1.38W-0.43Nb+Ta
Specifications List: AWS A5.9M : ER308L BS EN 12072:2000 W 19 9 L ASME SFA 5.9 : ER308L											
VBC ALLOY 9205	S205	Bal	8.25	18	1.25				0.6		
Specifications List: BS 2S 205:2004											
VBC ALLOY 9216	316H	Bal	12.5	17.5	1	0.06		2.25	0.48		
Specifications List: AWS A5.9-93 ER316H BS 2901 PT2(316S96) UNS S31609											
VBC ALLOY 9225	2205	Bal	5.5	22	2 max	0.03 max		3.2	1.0 max		0.18N
Specifications List: AWS A5.22 E2209Ti-4 W.Nr 1.4462 UNS S31803											
VBC ALLOY 9259	DUPLEX 25.9.4.N L	Bal	9.25	25.5	0.9	0.02		3.5	0.6	0.7	0.25N
Specifications List: AWS A5.4 E2594-16 ASTM A890 BS EN 1600 E 25 9 N L B											
VBC ALLOY 9302	302 LOCKING WIRE	Bal	9	18	2.0 max	0.12 max			1.0 max		
Specifications List: BS 1554 302 S31											
VBC ALLOY 9304	304	Bal	9.5	19	2.0 max	0.08 max		0.75 max	1.0 max	0.75 max	
Specifications List: AMS 5697 AISI 304L ASTM A580-98 / F0019 ISS 1 UNS S30400											
VBC ALLOY 9305	305	Bal	11.5	18	2.0 max	0.08 max		0.75 max	1.0 max	0.75 max	
Specifications List: AMS 5686 ASME SA-240 ASTM A 240 UNS S30500											
VBC ALLOY 9308	308L	Bal	10	20.75	1.75	0.02			0.48		
Specifications List: BS 2901 PT2:1990 308S92											
VBC ALLOY 9309	309L	Bal	13.5	23.5	1.75	0.03 max		2.5	0.48	0.5 max	0.5Nb max
Specifications List: BS 2901 PT2:1990 309S96											
VBC ALLOY 9316	316L	Bal	12.5	19	1.75	0.03 max		2.5	0.48		
Specifications List: AMS 5692 AWS A5.9 ER 316L BS 2901 Pt 2:1983 316S92 BS EN ISO 14343:2009 316L											
VBC ALLOY 9320	320	Bal	34	20	2.5 Max	0.07 max		2.5		3.5	
Specifications List: AWS 5.9 ER320L BS EN ISO 14343:2009 320											
VBC ALLOY 9321	321	Bal	10.5	18	2.0 max	0.08 max	0.4	0.75 max	0.7	0.75 max	0.1 N max
Specifications List: AMS 5689 BS 1449:1991 321S31 UNS S32100											
VBC ALLOY 9322	ER320 LR	Bal	35	20	2.0 max	0.07 max		2.5	1.0 max	3.5	0.30Nb
Specifications List: AWS A5.9-93 ER320LR ASTM B 473 UNS N08020											

Alloy	Alternative	Fe	Ni	Cr	Mn	C	Ti	Mo	Si	Cu	Others
VBC ALLOY 9329	ER329	Bal	8.75	23	1.5	0.03 max		3.25	0.45	0.5 max	0.14N
Specifications List: AWS A5.9 ER2209 DUPLEX BS 2901 Pt 2 1983 22.8.3S92 BS EN 12072 2 9 3 N L											
VBC ALLOY 9347	347 FLUX CORE	Bal	10	20	1.75	0.08 max		0.5 max	0.45	0.5 max	0.50Nb+Ta
Specifications List: AWS A5.22-95 : E347TO-4											
VBC ALLOY 9388	308 HC	Bal	10	20.75	1.75	0.06			0.48		
Specifications List: AWS A5.9 ER308/308H											
VBC ALLOY 9399	309 HC	Bal	13	24	1.75	0.06			0.45		
Specifications List: [BS 2901 Pt 2 1983 309S96]											
VBC ALLOY 9420	420	Bal	0.5 max	13	1.0 max	0.35		0.5 max	1.0 max	0.5 max	
Specifications List: AMS 5621 AWS A5.9 ER420 SAE 51420 UNS S42000 UNS S51420											
VBC ALLOY 9430	430	Bal	0.5 max	17	0.65	0.1 max			0.4 max		
Specifications List: UNS S43000											
VBC ALLOY 9556	HS556	Bal	20.75	22	1.25	0.1		3.25	0.5		2.75W-0.78Ta-0.2N-0.05La-0.05Zr-18.5Co-0.3Al
Specifications List: AMS 5831 UNS R30556											
VBC ALLOY 9922	DUPLEX 2205	Bal	5.5	22	2.0 max	0.03 max		3			1.4N
Specifications List: UNS S31808											

# Titanium

Titanium alloys are lightweight and have very high tensile strength at elevated temperatures. In addition they have excellent corrosion resistance properties. Due to this unique combination of properties they are widely used for aerospace and space applications and high end sporting equipment.

The oxide layer which imparts such good corrosion resistance to Titanium is a barrier to effective welding and as such the correct use of shielding gas is of key importance to ensure a quality weld. Selecting the most suitable filler metal is equally important

Alloy	Alternative	Ti	Sn	V	Al	Mo	Others
VBC ALLOY 0064	8-1-1 Ti	bal		1	7.9	1	
Specifications List: AMS 4955 AWS A5.16 ER Ti-8Al-1Mo-1V UNS R54810							
VBC ALLOY 0070	GRADE 2 Ti (CP-Commercially Pure)	bal					
Specifications List: AMS 4951 MSRR 9500/70 Omat 366A AWS A5.16 ER Ti-1 & 2 UNS R50550							
VBC ALLOY 0072	230 Ti	bal					2.5Cu
Specifications List: MSRR 9500/72 MSRR 8602 Omat 3/55 BS 2TA22:1973							
VBC ALLOY 0073	6Al-4V Ti	bal		4	6.1		0.3Fe max
Specifications List: AMS 4954 MSRR 9500/73 MSRR 8632 Omat 3/145A AWS A5.16 ER Ti-5 AWS A5.A6 ER Ti 6-Al-4V BS 2TA10:1973 UNS R56400							
VBC ALLOY 0074	6-2-4-2 Ti	bal	2		6	2	0.1Si max-0.1Fe max-0.1Cu max
Specifications List: AMS 4952 MSRR 9500/74 MSRR 8661 Omat 3/250 UNS R54620							
VBC ALLOY 0075	Titanium 829	bal	3.5		5.5		0.35Si
Specifications List: MSRR 9500/75 MSRR 8648 Omat 3/217 IMI 829							
VBC ALLOY 0076	Titanium 685	bal			6	0.5	0.25Si-0.20_max
Specifications List: MSRR 9500/76 MSRR 8611 Omat 3/200 IMI 685							
VBC ALLOY 0077	Titanium 834	bal	4		5.7		0.4Si-0.06C
Specifications List: MSRR 9500/77 MSRR 8679 IMI 834 T-A6EZ r4Nb.							
VBC ALLOY 0078	6Al-4V Ti ELI	bal		4	6.1		controlled interstitials
Specifications List: AMS 4956 MSRR 9500/78 Omat 3/145A AWS A5.16 ER Ti-5 ELI UNS R56402							
VBC ALLOY 0079	15-3-3-3 Ti	bal	3	15	3		3Cr
Specifications List: AMS 4914 UNS R58153							
VBC ALLOY 9007	GRADE 7 Ti	bal					0.19Pd-0.120_
Specifications List: ASTM B863-99A UNS R52400							
VBC ALLOY 9012	GRADE 12 Ti	bal				0.3	0.75Ni-0.120_
Specifications List: AWS A5.16-90 ERTi12 UNS R53400							

Alloy	Alternative	Ti	Sn	V	Al	Mo	Others
VBC ALLOY 9021	BETA 21S-Ti	bal			3	15	2.0Si
Specifications List: AMS 4897							
VBC ALLOY 9679	Titanium 679	bal	11.0		2.3	1.0	0.30Si
Specifications List: MSRR 8612 Omat 3/231A IMI 679							
VBC ALLOY 9689	Gr 9 Ti	bal		2.5	3.0		0.120²
Specifications List: AMS 4943 AMS 4944 AMS 4945 AMS 4989 WNr. 3.7194 WNr. 3.7195 UNS R56320							

# Nickel

Thanks to its unique properties, including high temperature strength and corrosion resistance, Nickel and its alloys are used in a wide variety of applications ranging from aircraft gas turbine engines and land based turbines. The affinity of Nickel to alloy with most metals has been used to great effect to provide us with an extensive range of alloys.

The correct selection of the shielding gas and appropriate filler metal is essential to ensure a strong, defect free weld.

Alloy	Alternative	Ni	Cr	Co	C	Fe	Ti	Al	Mo	W	Others
VBC Alloy 0003	NC 80/20 (Nimonic 75)	bal	19.5		<0.1	0.5 max					1.2Mn max-0.5Si max
Specifications List: AMS 5835 MSRR 9500/3 Omat 305D AWS A5.14/5.14M:2005 ERNiCr-6 BS EN ISO 18274:2010 N6076/ NiCr20 BS 2901 Pt5 1993 NA 34 DIN 1736:1985 2.4639 UNS Number N06003											
VBC Alloy 0004	Nimonic 90	bal	19.5	18			2.5	1.5			1.0Mn max-1.0Si max
Specifications List: AMS 5829 MSRR 9500/4 Omat 312 [BS EN ISO 18274:2010 NiCr20Co18Ti3/Ni 7090] [BS 2901 Pt5 1993 NA 36] [DIN 1736:1985 2.4632]											
VBC Alloy 0009	FM 92	bal	15.5	with Ni	0.1 max	10 max	3				2.38Mn-0.35Si max-0.5Cu max
Specifications List: AMS 5675 MSRR 9500/9 Omat 314 AWS A5.14/5.14M:2005 ERNiCrFe-6 BS EN ISO 18274:2010 NiCr15Ti3Mn/Ni 7092 BS2901-5:1990 NA39 UNS Number N06076 JIS YNiCrFe-6											
VBC Alloy 0016	Nimonic C263	bal	20	20	0.06	0.7 max	2.15	0.45	5.85		0.6Mn max-0.4Si max-0.2Cu max
Specifications List: AMS 5966 AMS 5872 MSRR 9500/16 Omat 3/62 BS EN ISO 18274:2010 NiCr20Co20Mo6Ti2/Ni7263 BS2901-5:1990 NA38 DIN 1736:1985 2.4650											
VBC Alloy 0017	C242 (MSRR7044)	bal	21.5	10.28	0.31	0.75 max			10.5		0.33Mn-0.33Si
Specifications List: MSRR 9500/17 Omat 334											
VBC Alloy 0200	PE11	39.5	18		0.05	bal	2.3	0.8	5.25		0.03Zr
Specifications List: MSRR 9500/200 Omat 3/96 MSRR 7181											
VBC Alloy 0201	PK33	bal	18	14	0.07 max	1.0 max	2.25	2.1	7		
Specifications List: MSRR 9500/201 Omat 3/98 DTD 5057 MSRR 7195											
VBC Alloy 0202	Waspaloy	bal	19.5	13.5	0.06	2.0 max	3.13	1.4	4.25		0.007B
Specifications List: AMS 5828 MSRR 9500/202 MSRR 7034 Omat 3/99											
VBC Alloy 0206	FM 62	bal	15.5	1.0max	0.08	8					2.25Nb+Ta-1.0Mn max
Specifications List: AMS 5679 MSRR 9500/206 Omat 3/218 AWS A5.14/5.14M:2005 ERNiCrFe-5 BS EN ISO 18274:2010 NiCr16Fe8Nb/Ni 6062 UNS Number N06062 JIS YNiCrFe-5											

Alloy	Alternative	Ni	Cr	Co	C	Fe	Ti	Al	Mo	W	Others
VBC Alloy 0209	X750 (FM69)	bal	15.5	1.0 max	0.08	7	2.38	0.7			0.95Nb+Ta
Specifications List: AMS 5778 MSRR 9500/209 Omat 3/167 AWS A5.14/5.14M:2005 ERNiCrFe-8 BS EN ISO 18274:2010 NiCr15Fe7Nb/Ni 7069 [DIN 1736:1985 2.4669] UNS Number N07069											
VBC Alloy 0213	Hastelloy W	bal	5	2.5 max		5.5			24.5		1.0Mn max-1.0Si max
Specifications List: AMS 5786 MSRR 9500/213 Omat 3/333 AWS A5.14/5.14M:2005 ERNiMo-3 BS EN ISO 18274:2010 NiMo25Cr5Fe5/Ni 1004 UNS Number N10004 JIS YNiMo-3											
VBC Alloy 0215	Hastelloy X	bal	21.75	1.5	0.1	18.5			9	0.6	1.0Mn max-1.0Si max
Specifications List: AMS 5798 MSRR 9500/215 Omat 3/165 AWS A5.14/5.14M:2005 ERNiMo-2 BS EN ISO 18274:2010 NiCr21Fe18Mo9/Ni 6002 BS2901-5:1990 NA40 [DIN 1736:1985 2.4613] JIS YNiMo-2											
VBC Alloy 0216	FM 82	bal	20			3.0 max					3.0Mn-2.50Nb+Ta
Specifications List: AMS 5836 MSRR 9500/216 Omat 3/170 AWS A5.14/5.14M:2005 ERNiCr-3 BS EN ISO 18274:2010 NiCr20Mn3Nb/Ni6082 BS2901-5:1990 NA35 DIN 1736:1985 2.4806 UNS Number N06082 JIS YNiCr-3											
VBC Alloy 0220	IN 718	52.5	19			bal	0.65	0.5	3.05		5.13Nb
Specifications List: AMS 5832 MSRR 9500/220 Omat 3/206 AWS A5.14/5.14M:2005 ERNiFeCr-2 BS EN ISO 18274:2010 NiFe19Cr19Nb5Mo5/Ni 7718 BS2901-5:1990 NA51 DIN 1736:1985 2.4667 UNS Number N07718											
VBC Alloy 0221	FM61	bal				1.0 max	2.75	1.5 max			1.0Mn max
Specifications List: MSRR 9500/221 AWS A5.14/5.14M:2005 ERNi-1 BS EN ISO 18274:2010 NiTi3/Ni2061 BS2901-5:1990 NA32 DIN 1736:1985 2.4155 UNS Number N02061 JIS YNi-1											
VBC Alloy 0227	IN 901	42.5	12.5	1.0 max	0.05	bal	2.7	0.35 max	6		1.0 Mn max-0.02B
Specifications List: AMS 5830 [AMS 5660] MSRR 9500/227 MSRR 7031 Omat 3/203 DIN 1736:1985 2.4662 UNS Number N09901											
VBC Alloy 0229	Hastelloy B (contact VBC)	bal	1	2.5	0.05	5			28		1.0Si-1.0Mn-0.3V
Specifications List: AMS 5396 MSRR 9500/229											
VBC Alloy 0231	Hastelloy B2 (contact VBC)	bal	1	1	0.02	2			28		1.0Mn-0.1Si
Specifications List: MSRR 9500/231											
VBC Alloy 0237	IN 625	bal	21.5	1.0 max	0.1 max	5.0 max	0.4 max	0.4 max	9		3.65Nb+Ta
Specifications List: AMS 5837 MSRR 9500/237 AWS A5.14/5.14M:2005 ERNiCrMo-3 BS EN ISO 18274:2010 NiCr22Mo9Nb/Ni 6625 BS2901-5:1990 NA43 DIN 1736:1985 2.4831 UNS Number N06625 JIS YNiCrMo-3											
VBC Alloy 9686	Inconel 686, IN686, Inco 686	Bal	21						16.3	3.9	0.65Mn-0.48Si-0.06La
Specifications List: UNS N06686 AWS A5.14 ERNiCrMo-14 Filler Metal 686CPT AWS A5.11 ENiCrMo-14 DIN 17744											
VBC Alloy 0239	Hastelloy S	bal	15.75					0.3	15.25	1.0max	0.65Mn-0.48Si-0.06La
Specifications List: AMS 5838 MSRR 9500/239 UNS Number N06635											

# Nickel (continued)

Alloy	Alternative	Ni	Cr	Co	C	Fe	Ti	Al	Mo	W	Others
VBC Alloy 0241	RENE 41	bal	19	11	0.12 max	5.0 max	3.15	1.5	9.75		0.007B
Specifications List: AMS 5800 AMS 5712 MSRR 9500/241 UNS Number N07041											
VBC Alloy 0246	MARM002 (Powder & Wire)	bal	9	10	0.15		1.5	5.5		10	1.5Hf
Specifications List: MSRR 9500/246 MSRR 7210											
VBC Alloy 0247	Rene 142 (Powder & Wire)	bal	6.8	12	0.12			6.1	1.5	4.9	2.8Re-1.5Hf-0.02Zr-0.015B
Specifications List: MSRR 9500/247 GE 50TF274											
VBC Alloy 0250	HS 230	bal	22	5.0 max	0.1	3.0 max		0.3	2	14	0.5Mn-0.40Si-0.02La-0.015B
Specifications List: AMS 5839 MSRR 9500/250 AWS A5.14/5.14M:2005 ERNiCrWMo-1 BS EN ISO 18274:2010 Ni6231/NiCr22W14Mo2 DIN 1736:1985 2.4733											
VBC Alloy 8010	ELECTRODE ENiMo-7	bal				1.5			28		1.5Mn
Specifications List: AWS A5.11 ENiMo-7 UNS Number W80665											
VBC Alloy 9022	C22	56	22	2.5 max	0.01 max	3			13	3	0.08Si-0.5Mn-0.35V max
Specifications List: AWS A5.14/5.14M:2005 ERNiCrMo-10 BS EN ISO 18274:2010 NiCr21Mo13Fe4W3/Ni 6022 DIN 1736:1985 2.4602 UNS Number N06022											
VBC Alloy 9052	FM 52	bal	29.75		0.04 max	9	1.0 max	1.10 max	0.5 max		1.0Mn max-0.3Cu max-0.5Si max
Specifications List: AWS A5.14/5.14M:2005 ERNiCrFe-7 BS EN ISO 18274:2010 NiCr30Fe9/Ni 6052 (DIN 1736:1985 2.4642) UNS Number N06052											
VBC Alloy 9055	NI55-FE	55			0.03	bal					0.8Mn-0.1Si
Specifications List: AWS A5.15 ERNiFe-C1											
VBC Alloy 9067	FM 67	30.5		with Ni	0.04 max	0.58	0.35				Cu Balance-0.25Si max
Specifications List: AWS A5.7 ER CuNi BS EN ISO SCu 7158 CuNi30 BS 2901 C18 DIN 1733 SG-CuNi30Fe (2.0837) UNS Number C71581 ASME II Part C SFA-5.7											
VBC Alloy 9080	RENE 80	bal	14	9.5	0.17		5	3	4	4	0.0015B-0.03Zr
Specifications List: GE B50TF259											
VBC Alloy 9142	RENE 142, Polymet 842	bal	6.8	12	0.12			6.1	1.5	4.9	2.80Re-1.20Hf
Specifications List: GE B50TF274											
VBC Alloy 9200	NI 200	bal		with Ni							controlled residuals
Specifications List: W.Nr 2.4060/2.4066 UNS Number N02200											

Alloy	Alternative	Ni	Cr	Co	C	Fe	Ti	Al	Mo	W	Others
VBC Alloy 9214	HS 214	bal	16		0.05	3		4.5	0.5 max		0.01Y-0.2Si max-0.1Zr max
Specifications List: DIN 17744 2.4646											
VBC Alloy 9230	HS 230W	bal	22	5.0 max	0.07	3.0 max		0.3	2	14	0.5Mn-0.4Si-0.002B
Specifications List: AMS 5839 AWS A5.14/5.14M:2005 ERNiCrWMo-1 BS EN ISO 18274:2010 Ni6231/NiCr22W14Mo2 DIN 1736:1985 DIN 2.4733 UNS Number N06231											
VBC Alloy 9231	Hastelloy B3	bal	1.5	3 max	0.01 max	1.5	0.2Ti	0.5 max	28.5	3 max	3.0Mn max-0.1Si max
Specifications List: AWS A5.14/5.14M:2005 ERNiMo-10 BS EN ISO 18274:2010 NiMo30Cr/Ni 1067 (DIN 1736:1985 2.4600) UNS Number N10675											
VBC Alloy 9247	MARM 247	bal	8.2	10	0.16		1	5.6	0.7	10	1.50Hf
Specifications List: EMS 55447											
VBC Alloy 9276	C276	bal	15.5			5.5			16	3.75	
Specifications List: AWS A5.14/5.14M:2005 ERNiCrMo-4W.NR 2.4819 BS EN ISO 18274:2010 NiMo16Cr15Fe6W4/Ni 6276 BS2901-5:1990 NA48 DIN 1736:1985 2.4886 UNS Number N10276 JIS YNiCrMo-4											
VBC Alloy 9600	IN 600	bal	15.5	1.0 max		8					1.0Nb max
Specifications List: AMS 5687 W.NR 2.4816 UNS Number N06600											
VBC Alloy 9601	IN 601	60.5	23		0.05	bal		1.4			0.5Mn-0.2Si-0.5Cu
Specifications List: AMS 5715 AMS 5870 UNS Number N06601 Werkstoff Nr. 2.4851											
VBC Alloy 9615	NiCr 60/15 BRIGHTRAY B	57.00+	16	with Ni	0.15 max	bal					1.18Si-1.0Mn max
Specifications List: W.Nr 2.4867 UNS Number N06004											
VBC Alloy 9617	IN 617	bal	22	12.5	0.1	3.0 max	0.6 max	1.15	9		0.006B max
Specifications List: AMS 5887 AWS A5.14/5.14M:2005 ERNiCrCoMo-1 BS EN ISO 18274:2010 NiCr22Co12Mo9/Ni 6617 BS2901-5:1990 NA50 DIN 1736:1985 2.4627 UNS Number N06617											
VBC Alloy 9660	MONEL 60	65.5			0.15 max	2.5 max	2.25				1.25Si max-4.0Mn max-Cu Balance
Specifications List: BS EN ISO 18274:2010 NiCu30Mn3Ti/Ni 2061 BS2901-5:1990 NA33 AWS A5.14/5.14M:2005 ERNiCu-7 DIN 1736:1985 2.4377 UNS Number N04060 JIS YNiCu-7											
VBC Alloy 9665	FM 65	42	21.5		0.05 max	22.00 min	0.9	0.2 max	3		1.0Mn max-2.25Cu-0.5Si
Specifications List: AWS A5.14/5.14M:2005 ERNiFeCr-1 BS EN ISO 18274:2010 NiFe30Cr21Mo3/Ni 8065 BS2901-5:1990 NA41 (DIN 1736:1985 2.4858) UNS Number N08065 JIS YNiFeCr-1											
VBC Alloy 9738	IN 738 (Powder & Wire)	bal	16	8.5	0.17	0.5 max	3.4	3.4	1.8	2.6	0.90Nb-0.06Zr
Specifications List: GE B50TF191 PWA 1451											
VBC Alloy 9939	IN 939 (Powder & Wire)	bal	22.5	19	0.15		3.7	1.9		2	1.0Nb-0.10Zr
Specifications List: GE B50TF250											
VBC Alloy 0029	PE16	43.5	16.5		0.06	bal	1.2	1.2	3.3		0.03Zr
Specifications List: MSRR 9500/29 Omat 3/164 BS2901-5:1990 NA42											
VBC Alloy 9282	Haynes 282 HS282	Bal	20	10	0.06	1.5 max		1.5	8.5		0.3Mn max-0.005B



# Iron

The versatility of Iron as a base metal when alloyed with other elements gives it wide range of properties which means it is used in a wide variety of applications from construction to aerospace. When the further refinement of these properties by heat treatment is added in to the mix steel can truly be considered one of the most versatile alloys available.

Whether you are welding stainless steel for use in a chemical piping system or a Nickel-Iron Superalloy turbine blade, the VBC Group technical team are on hand to advise you on the best welding filler wire.

Alloy	Alternative	Fe	Ni	Cr	Co	C	Mo	Mn	Si	Others
VBC Alloy 9013	H13 Tool Steel	bal		5		0.4	1.3	0.4		1.0V
Specifications List: AMS 6408 BS 4659 BH 13 JIS SKD 61 AISI 13 UNS T20813 ASTM A681 GX40CrMoV5-1 SAE J437 SAE J438 SAE J467 WN 1.2344										
VBC Alloy 9031	A31	bal				0.09	0.5	1.85	0.7	
Specifications List: AWS ER80S-D2 BS 2901 PT1:1983 A31 W4Mo										
VBC Alloy 9032	A32	bal		1.3			0.55	1	0.55	
Specifications List: AWS ER80S-B2 BS 2901 PT1:1983 A32 WN 1.7357 WCRMo1Si										
VBC Alloy 0001	Fortiweld	bal				0.12	0.5	0.58		0.003B
Specifications List: MSRR 9500/1 Omat 332 DTD 740 DTD 5062										
VBC Alloy 0021	3% Nickel Steel	bal	3	0.15		0.3		0.55	0.23	
Specifications List: MSRR 9500/21 Omat 359 BS 1453 A4										
VBC Alloy 0022	LC Mild Steel	bal	0.13			0.05		0.3		
Specifications List: AMS 5030 MSRR 9500/22 AWS A5.2 RG 45 AISI 1006 BS 1453 A1										
VBC Alloy 0214	N-155	bal	20	21.25	19.75	0.1 max	3	1.5	1.0 max	2.5W-1.0Nb-0.15N
Specifications List: AMS 5794 MSRR 9500/214 Omat 3/166 AISI 661 UNS R30155										
VBC Alloy 0217	Carbon Mo Steel	bal	0.2 max	0.2 max		0.08		1.05	0.38	0.55Mo
Specifications List: MSRR 9500/217 BS 1453 A6 (AWS ER80S-D2)										
VBC Alloy 0218	Mn Mo Steel	bal				0.28		1.45	0.4	
Specifications List: MSRR 9500/218 Omat 3/168 AWS ER80S-D2 AWS RG65										
VBC Alloy 0219	Mild Steel	bal				0.12 max		1.25	0.6	0.4Cu
Specifications List: MSRR 9500/219 Omat 3/169 AWS A5.18/A5.18M: 2005 ER70S-2										
VBC Alloy 0230	2.5 Cr Mo Steel	bal		2.35		0.12 max	1	1	0.55	0.4Cu max
Specifications List: MSRR 9500/230 AWS A5.28 ER90S-B3 BS 2901 A33 ASME SF A5.28 nuclear grade										

Alloy	Alternative	Fe	Ni	Cr	Co	C	Mo	Mn	Si	Others
VBC Alloy 0232	Mild Steel	bal				0.12 max		1.25	0.95	0.4Cu max
Specifications List: MSRR 9500/232 AWS A5.18/A5.18M: 2005 ER70S-6										
VBC Alloy 0242	Mild Steel (Low Temp Capability)	bal				0.28		1	0.3	Controlled Ni,Cr,Mo,V residuals
Specifications List: MSRR 9500/242 AWS A5.4 E7018-1H8 BS 639 E51-54B(H) ASTM A573 Grade 70										
VBC Alloy 9003	SMV3S	bal		5		0.38	1.3	0.3	0.9	0.50V
Specifications List: X38CrMoV5-1Z38CDV5 DIN 1.2343 AISI H11 JIS SKD6										
VBC Alloy 9005	MV5S	bal		5		0.5	1.3			1.30W-0.30V
Specifications List: EN X50CrMoWV5										
VBC Alloy 9065	R65	bal						1.25	0.4	
Specifications List: AWS A5.2										
VBC Alloy 9090	MS1	bal				0.04		1.2	0.5	0.1Ti-0.1Al
Specifications List: AWS A5.30-97										
VBC Alloy 9100	ER100S-1	bal	2			0.07	0.5	1.5	0.25	
Specifications List: ER100S-1A5.28										
VBC Alloy 9120	Turbaloy 120	bal	1.8	0.2		0.1	0.43	1.6	0.4	
Specifications List: AWS A5.28 ER 120S-1										
VBC Alloy 9236	Invar 36 Nilo 36 Pernifer 36 Super Invar	Bal	36			0.2		0.4		1.5Nb
Specifications List: UNS K93600 UNS K93601 W. Nr. 1.3912 ASTM B-753 ASTM F-1684 MIL-I-23011										
VBC Alloy 9160	R60	bal						1.15	0.23	
Specifications List: AWS A5.2-92 R60										
VBC Alloy 9222	M-2 TOOL STEEL	bal	0.3	0.32		0.85	5.1	0.3	0.3	6.30W-2.0V-0.25Cu
Specifications List: UNS T11302										
VBC Alloy 9233	A286 COIL/ BAR & FORGINGS	bal	25.5	14.95			1.25			2.13Ti-0.30V-0.006B
Specifications List: AMS 5734										
VBC Alloy 9250	MAR 250	bal	18		8		4.9			0.4Ti-0.2Al
Specifications List: AMS 6501 PWA736 UNS K92890										
VBC Alloy 9300	300M	bal	1.83	0.83		0.43	0.4	0.75	1.63	0.075V
Specifications List: AMS 6419 AISI 4340 UNS K44220										
VBC Alloy 9413	4130 (Vacuum Grade)	bal		0.95		0.31	0.2			
Specifications List: AMS 6457 AISI 4130										
VBC Alloy 9415	15CDV6	bal		1.38		0.15	0.9	0.95		0.25V
Specifications List: W.Nr 1.7734 AIR 9160 CGT1000										

# Iron (continued)

Alloy	Alternative	Fe	Ni	Cr	Co	C	Mo	Mn	Si	Others
VBC Alloy 9434	4340	bal	1.83	0.8		0.38	0.25	0.75	0.25	
Specifications List: AMS 6456 AISI 4340 ASTM A547										
VBC Alloy 9452	4140	bal		1		0.41	0.2	0.88	0.25	
Specifications List: AMS 6452 AISI 4140 UNS G41406										
VBC Alloy 9502	502 / 502L	bal		5.25		0.1 max	0.55	0.6	0.4	
Specifications List: AMS 6466 BS 2901 A34 EN 10204 A5.9										
VBC Alloy 9515	515	bal		1.35		0.1	0.53	0.55	0.55	
Specifications List: AWS A5.25 ER 80S-B2 W.No 1.7357 BS 2901 Part 1 A32										
VBC Alloy 9521	ER90S-B3 (521)	bal		2.5		0.1	1.05	0.55	0.55	
Specifications List: MSRR 9500/230 BS 2901 Part A 33 AWS A5.28 ER 90S-B3										
VBC Alloy 9613	6130	bal		0.95		0.31		0.75	0.25	0.20V
Specifications List: AMS 6461 AISI 6130 UNS K13148										
VBC Alloy 9645	CHROMALLOY	bal		1		0.21	1	0.5	0.75	0.12V
Specifications List: AMS 6459 UNS K22720										
VBC Alloy 9700	ER70S-2							1.15	0.55	0.1Ti-0.07Zr-0.1Al
Specifications List: AWS A5.18 ER70S-2										
VBC Alloy 9703	ER70S-3	bal				0.11		1.15	0.6	
Specifications List: AWS A5.18M-01 ER70S-3 EN ISO 14341-B										
VBC Alloy 9706	ER70S-6	bal				0.11		1.63	0.98	
Specifications List: AWS A5.18M-01 ER70S-6 EN ISO 14341-B										
VBC Alloy 9722	17-22AS	bal		1.25		0.31	0.5	0.55	0.65	0.30V
Specifications List: AMS 6458 UNS K23015										
VBC Alloy 9817	Greek Ascaloy	bal	2	13		0.18				3.0W
Specifications List: AMS 5817 AISI 616 UNS S41800										
VBC Alloy 9909	IN909	bal	37.5		14				0.38	4.75Nb-1.55Ti
Specifications List: AMS 5802 GE B50T F215 UNS N19907										
VBC Alloy 9920	P20 (AISI 4130)	bal		0.95		0.31	0.2	0.5	0.25	
Specifications List: AISI 4130 UNS G41300 ASTM A29										
VBC Alloy 9942	HP9-4-20 (VM)	bal	10	0.98	3.75	0.16	0.45	0.48	0.2	0.08V
Specifications List: AMS 6468 UNS K91461										
VBC Alloy 9960	HF600	bal		2.5		0.48		2.58	0.77	
VBC Alloy 9980	ER80S-NI	bal	0.80-3.75*	0.04		0.11		1.02	0.58	* range depending upon N1, N2 or N3
Specifications List: AWS A5.28 ER80S-Ni3 AWS A5.28 ER55S-Ni3 EN ISO 636 B-W55 WN71										
VBC Alloy 9982	ER80S-D2	bal				0.1	0.5	1.85	0.65	
Specifications List: AWS ER80S-D2 ASME SFA 5.28 UNS K10945										
VBC Alloy 9986	ER80S-B6	bal		5.8		0.08	0.55	0.55	0.4	
Specifications List: AWS A5.28 ER80S-B6 ASME SFA 5.28										
VBC Alloy 9999	ER90S-B9	bal	0.63	8.75		0.1	0.95	0.6	0.23	0.20V
Specifications List: AWS A5.28 ER90S B9										

# Cobalt

Cobalt Superalloys are used in turbine blades for Gas Turbine engines due to their high temperature strength, oxidation resistance and wear resistance. Welding cobalt alloys should not be difficult once the correct method and filler wire is used. To avoid crack susceptible microstructures a compatible filler metal should be selected, this is especially important when welding dissimilar base metals.

Alloy	Alternative	Co	Ni	Cr	C	W	Others
VBC ALLOY 0015	Stellite 12, HS 12 (High C)	bal		29	1.83	9	
Specifications List: MSRR 9500/15 Omat 311 AWS A5.13							
VBC ALLOY 0019	Stellite 6, HS 6	bal		28	1.15	4.5	
Specifications List: AMS 5788 MSRR 9500/19 Omat 358 AWS A5.13/A5.13M RCoCrA UNS Number R30006							
VBC ALLOY 0023	L605 (HS 25)	bal	10	20	0.1	15	1.50Mn-1.0Si max- 3.0Fe max
Specifications List: AMS 5796 MSRR 9500/23 Omat 3/64 AWS A5.13/A5.13M RCoCrA UNS Number R30605							
VBC ALLOY 0025	HS31, Stellite 31	bal	10.5	25.5	0.5	7.5	2.0Fe max-1.0Mn max-1.0Si max
Specifications List: AMS 5789 MSRR 9500/25 Omat 3/83A UNS Number R30031							
VBC ALLOY 0226	CM 64, PWA 694, Stellite 694, Amdry 314, Polymet 694	bal	5	28	0.85	19.5	1.0V-0.05B-3.0Fe max-1.0Si max-1.0Mn max
Specifications List: MSRR 9500/226 Omat 3/82 GE B50TF55 PWA 694							
VBC ALLOY 0228	HS 12 (ECoCr-B)	bal	3.0 max	28.5	1.35	8	3.0Fe max-2.0Si max-1.0Mn max-1.0Mo max
Specifications List: MSRR 9500/228 AWS A5.10/A5.10M:1999 A5.13-80 RCoCr-B							
VBC ALLOY 0248	Merl 72, Polymet 772	bal	15	20	0.35	9	0.2Ti-4.4Al-3.0Ta-1.0Hf-N<0.03
Specifications List: MSRR 9500/248 PWA 795							
VBC ALLOY 9018	MARM 918	bal	20	20	0.07		7.5Ta-0.5Fe max-0.20Si max
Specifications List: AMS 5814 AMS 5809 GE B50T824							
VBC ALLOY 9414	Turbaloy 414	bal	10.5	29.5	0.25	7	1.0Si-1.0Mn-2Fe
Specifications List: (AMS 5789) B50 A823 FSX414 LC							
VBC ALLOY 9509	MARM 509 (Powder & Wire)	bal	10	23.5	0.6	7	0.2Ti-3.50Ta-0.40Zr
Specifications List: GE B50TF89							
VBC ALLOY 9800	T800	bal		17.5	0.04		3.5Si-29Mo
Specifications List: GE B50TF193 SNECMA DMR 34071							
VBC Alloy 9210	Alloy 21	bal		28	0.2		5.0Mo
Specifications List: AWS A5.21 ERCoCr-E							

# Aluminium

Aluminium and its alloys are used extensively as a lightweight and corrosion resistant material for applications as diverse as aerospace, cycles and marine use. It has a low melting point and so is readily welded. Care must be taken to choose the correct shielding gas and alloy composition to avoid post weld cracking.

Alloy	Alternative	Al	Si	Mn	Cr	Cu	Mg	Ti	Others
VBC ALLOY 0030	AL	bal	9			3.5			10.5Zn
Specifications List: MSRR 9500/30 Omat 354 AWS A5.10/A5.10M:1999									
VBC ALLOY 0031	4047	bal	12	0.15 max		0.30 max	0.10 max	0.15 max	0.6Fe max-0.2Zn max-0.0008Be
Specifications List: AMS 4185 MSRR 9500/31 AWS A5.10/A5.10M:1999 ER 4047 R4047 BS 2901-4:1990 4047A BS EN ISO 18273:2004 AlSi12 4047 4047A UNS Number A94047 AA4047									
VBC ALLOY 0032	4043	bal	5.25	0.15 max		0.30 max	0.20 max	0.15 max	0.6Fe max-0.1Zr max-0.0008Be max
Specifications List: AMS 4190 MSRR 9500/32 Omat 310 & 310A AWS A5.10/A5.10M:1999 ER4043 R4043 BS 2901-4:1990 4043A BS EN ISO 18273:2004 Al 4043A UNS Number A94043 AA 4043									
VBC ALLOY 0033	3103, NG3	bal	0.50 max	1.2	0.10 max	0.1 max	0.30 max	plus Zr 0.10 max	0.7Fe max-0.20 max-0.0008Be max
Specifications List: MSRR 9500/33 Omat 361A BS 2901-4:1990 3103 BS EN ISO 18273:2004 AlMn1 3103									
VBC ALLOY 0034	RR250	bal	0.30 max	0.25		5		0.2	0.25Sb-0.25Co-1Ni-0.50Fe max-0.4Co+Sb
Specifications List: MSRR 9500/34 Omat 335A									
VBC ALLOY 0035	4145 AlcuBraze	bal	10			4			
Specifications List: AMS 4184 MSRR 9500/35 Omat 337 AWS A5.8 BAISI-3 AWS A5.10/A5.10M:1999 ER4145 R4145 BS 1845 4145A BS EN ISO 18273:2004 AlSi10Cu4 Al4145 UNS Number A94145 AA4145									
VBC ALLOY 0038	5056A (5356) (contact VBC)	bal	0.25 max	0.13	0.13	0.10 max	5	0.13	0.40Fe max-0.10Zn max-0.0008Be max
Specifications List: MSRR 9500/38 Omat 3/61 3/61A AWS A5.10/A5.10M:1999 ER5356 R5356 BS 2901-4:1990 5356 BS EN ISO 18273:2004 AlMg5Cr(A) Al5356 UNS Number 95356 AA5356									
VBC ALLOY 0041	99.5Al (1050A)	bal	0.25 max	0.05 max		0.05 max	0.05 max	0.05 max	0.40Fe max-0.07Zn max-0.0008Be max
Specifications List: MSRR 9500/41 BS 2901-4:1990 1050A UNS Number A91050 AA1050									
VBC ALLOY 0043	BSL51 (contact VBC)	bal							Use VBC Alloy 0043
Specifications List: MSRR 9500/43									
VBC ALLOY 0044	5556A	bal	0.25 max	0.8	0.13	0.10 max	5.25	0.13	0.40Fe max-0.20Zn max-0.0008Be max
Specifications List: MSRR 9500/44 AWS A5.10/A5.10M:1999 ER5556 R5556 BS 2901-4:1990 5556A BS EN ISO 18273:2004 AlMg5Mn Al 5556A UNS Number A95556 AA5556									

Alloy	Alternative	Al	Si	Mn	Cr	Cu	Mg	Ti	Others
VBC ALLOY 0045	2319	bal		0.3		6.3		0.15	0.18Zr-0.10V
Specifications List: AMS 4191 MSRR 9500/45 Omat 3/264 AA2319									
VBC ALLOY 0046	A356 LM8 (contact VBC)	bal							Two standards exist, contact VBC
Specifications List: AMS 4181 MSRR 9500/46 AWS A5.10/A5.10M:1999 ER4008 R4008 UNS Number A94008 AA4008									
VBC ALLOY 9009	C355	bal	5			1.25	0.5		
Specifications List: AMS 4245 AWS A5.10/A5.10M:1999 R-C355.0 ER4009 UNS Number A03550									
VBC ALLOY 9047	A357	bal	7				0.53		
Specifications List: AMS 4246 AWS A5.10/A5.10M:1999 R4011 BS EN ISO 18273:2004 Al 4011 AlSi7Mg0.5Ti UNS Number A94011 AA4011									
VBC ALLOY 9110	ER1100	bal				0.13			
Specifications List: AMS 4180 AWS A5.10/A5.10M:1999 ER1100 R1100 BS EN ISO 18273:2004 Al 1100 Al99.0Cu UNS Number A91100 AA1100									
VBC ALLOY 9464	4643	bal	4.1				0.2		
Specifications List: AMS 4189 BS EN ISO 18273:2004 Al 4643 AlSi4Mg AWS A5.10/A5.10M:1999 ER4643 R4643 UNS Number A94643 AA4643									
VBC ALLOY 9518	5183	bal		0.75	0.15		4.75		
Specifications List: AWS A5.10-99 ER 5183 R5183 BS 2901-4:1990 5183 BS EN ISO 18273:2004 Al 5183 AlMg4.5Mn0.7(A) UNS Number A95183 AA5183									
VBC ALLOY 9554	5554	bal		0.75	0.15		2.7	0.15	
Specifications List: AWS A5.10-99 ER5554 R5554 BS 2901-4:1990 5554 BS EN ISO 18273:2004 Al5554 AlMg2.7Mn UNS Number A95554 AA5554									
VBC ALLOY 9941	Al-Si7Mg (W41)	bal	7				0.63	0.15	
Specifications List: A356.2AlSi7Mg									

## Magnesium

As the lightest structural metal available, Magnesium is primarily used in aircraft and auto-sports applications. It is usually used as a cast alloy containing Zinc, Aluminium and Silicon to give it a range of properties. When carrying out Weld repairs of these castings the correct selection of the shielding gas and appropriate filler metal is essential to ensure a strong, defect free weld.

Alloy	Alternative	Mg	Zn	Mn	Al	Others
VBC Alloy 0050	MgZr (EZ33)	bal	2.5			3.25Ce
<b>Specifications List:</b> AMS 4396 MSRR 9500/50 Omat 308A AWS A5.19 EREZ33A UNS Number 12330						
VBC Alloy 0051	MgAlZn (AZ92)	bal	2	0.15	9	.0005Be
<b>Specifications List:</b> AMS 4395 MSRR 9500/51 Omat 3/58A AWS A5.19 ER AZ92A UNS Number M11922						
VBC Alloy 0052	MgZr RZ5	bal	4.25			1.25RareEarths
<b>Specifications List:</b> AMS 4439 MSRR 9500/52 Omat 3/265 ASTM ZE41A						
VBC Alloy 0053	MgZr 8015	bal	0.7			
<b>Specifications List:</b> AMS 4385 MSRR 9500/53 Omat 3/173 M13310						
VBC Alloy 0054	ZT1 (HK31A)	bal				3.25Th
<b>Specifications List:</b> MSRR 8014						
VBC Alloy 0055	MgZr MSR-B (QE31A)	bal				2.50Ag-2.50RareEarths
<b>Specifications List:</b> AMS 4418 MSRR 9500/55 Omat 3/89A UNS Number M18220						
VBC Alloy 0056	Mg 9Al	bal	0.65	0.28	9.5	
<b>Specifications List:</b> MSRR 9500/56 2901/MAG3						
VBC Alloy 0057	ZE 63 A	bal	5.75			2.50RareEarths
<b>Specifications List:</b> MSRR 9500/57 Omat 343 UNS Number M16630						
VBC Alloy 9101	AZ101	bal	1	0.27	10	0.0005B

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## Copper

Copper and its various alloys, brasses, bronzes and cupronickels present a range of challenges for the welder. Welding of the pure coppers requires some experience because of the difficulty in melting of copper due to its high thermal diffusivity. Each of the copper alloys presents their own difficulties. The correct selection of the shielding gas and appropriate filler metal is essential to ensure a strong, defect free weld.

Alloy	Alternative	Cu	Ni	Zn	Fe	Ti	Others
VBC ALLOY 9067	FM67, Techalloy 413	Bal	30.5		0.58	0.35	1.0Mn
<b>Specifications List:</b> AWS A5.7 ER CuNi BS EN ISO SCu 7158 CuNi30 BS 2901 C18 DIN 1733 SG-CuNi30Fe [2.0837] UNS Number C71581 ASME II Part C SFA-5.7							
VBC ALLOY 9113	C13, CU6810	58		Bal	0.7		0.75Sn-0.25Mn-0.1Si
<b>Specifications List:</b> BS EN 14640 CU 6810 BS EN ISO 24373:2008 Cu 6810 CuZn40Fe1Sn1							
VBC ALLOY 9801	CZ108	63		Bal			
<b>Specifications List:</b> BS CW 508L DIN: CuZn37 UNS Number C27200							
VBC ALLOY 9802	AMPCO 46	Bal	4.75		4		8.75Al-2.0Mn-1.5Si max
<b>Specifications List:</b> AWS A5.7 ERCuNiAl BS 2901 C26 UNS C63280							

## Zirconium

Zirconium is used in the processing industries due to its corrosion resistance properties. These applications include heat exchangers, pressure vessels and associated valves and pumps. Zirconium can be easily welded using gas tungsten arc welding (GTAW).

Care must be taken to ensure cleanliness and good shielding during welding.

Alloy	Alternative	Others
VBC ALLOY 9702	ZIRCONIUM ERZR-2 (ER702)	Zr+Hf 99 MIN (Hf 4.5 Max) O <sup>2</sup> 0.13
<b>Specifications List:</b> A5.24-90 ERZr2		

# Nickel

Nickel based brazing alloys are widely used for their high temperature strength and are therefore used extensively in the aerospace industry by turbine OEM's and MRO's alike. These alloys are supplied in powder, paste, foil and also tape which is essential for honeycomb brazing, an area in which VBC Group have unrivalled expertise.

For precision applications foil can be made into preforms for pre-placement into brazing gaps. Nickel based alloys supplied by VBC Group can be released to Rolls Royce (MSRR), AMS or ISO specifications and others as applicable.

Alloy	Alternative	Liquidus Temperature	Ni	Cr	Si	B	P	C	Fe	Others
VBC ALLOY 6001	WG1	PROPRIETARY								
VBC ALLOY 6005	1005	PROPRIETARY								
VBC ALLOY 6002	MarM 002	Casting Repair	bal	9				0.15		5.5Al-10Co-1.5Hf-2.5Ta-1.5Ti-10W
Specifications List: MSRR7101 MSRR 9500/246										
VBC ALLOY 6048	50%DF4B/50%RENE80	Casting Repair								50/50 BLEND
Specifications List: MSRR 9500/724 Omat 3/225										
VBC ALLOY 6080	Rene 80	Casting Repair	bal	14		0.015		0.17		9.5Co-5.0Ti-4.0Mo-4.0W-3.0Al
Specifications List: General Electric B50TF183										
VBC ALLOY 4313	Nicrogap 108	1800	bal	15	0.75	0.2			7	
Specifications List: MSRR 9500/711 Omat 3/109										
VBC ALLOY 6718	Amdry 718B	1230	bal	18.5		2.3		0.05	18	0.5Al-5.0Cb+Ta-3.0Mo-0.9Ti
Specifications List: General Electric B50TF203										
VBC ALLOY 6015	Amdry D-15	1163	bal	15.3		2.3				10.3Co-3.5Ta-3.5Al
Specifications List: General Electric B50TF173										
VBC ALLOY 4302	Nicrobraz 160	1160	bal	11	3.5	2.3		0.5	3.5	
VBC ALLOY 4705	BNi-5a, MBF 50	1024		92.75				2.25	2	controlled impurities
Specifications List: MSRR 9500/722 General Electric B50TF217 Omat 3/303 AWS A5.8 BNi-5a BS EN ISO 17672:2010 Ni 660 ISO 3677 B-Ni73CrSiB-1065/1150 UNS Number N99651 JIS BNI-5A										

Alloy	Alternative	Liquidus Temperature	Ni	Cr	Si	B	P	C	Fe	Others
VBC ALLOY 4742	142, Nicrobraz 3003, Amdry 10333	135	bal	17	9	0.1				
Specifications List: MSRR 9500/730 General Electric B50TF142 PWA 797										
VBC ALLOY 4782	82, Nicrobraz 30, Amdry 100	1135	bal	19	10.13	0.02	0.01	0.03		controlled impurities
Specifications List: AMS 4782 MSRR 9500/116 General Electric B50TF81 Omat 3/117 - 3/117A - 3/117B - 3/117C - 3/117D AWS A5.8 BNi-5 BS EN 1044 Ni105 BS EN ISO 17672:2010 Ni 650 ISO 3677 B-Ni71CrSi-1080/1135 UNS Number N99650 JIS BNI-5										
VBC ALLOY 4776	76, MBF 15, Amdry 915, Icronibsi-14	1127	bal	13	4.25	2.88		0.02	4	
Specifications List: MSRR 9500/705 PWA 996 CPW 494 (Canada) Omat 3/177 - 3/205 - 3/208 - 3/110A										
VBC ALLOY 6004	Amdry DF-4B	1121	bal	14		2.75				10.0Co-3.5Al-2.5Ta-0.1Y
Specifications List: MSRR 9500/724										
VBC ALLOY 6453	Amdry DF-3	1121	bal	20		3				20.0Co-3.0Ta-0.1La
Specifications List: Honeywell EMS 54752										
VBC ALLOY 6003	Amdry BRB	1120	bal	13.5		2.5				9.5Co-4.0Al
VBC ALLOY 4720	Nicrobraz 170	1105	bal	11.5	3.5	2.5	0.01	0.48	3.5	16.0W
Specifications List: PWA 693 AWS A5.8 BNi-10 BS EN 1044 Ni110 BS EN ISO 17672:2010 Ni 670 ISO 3677 B-Ni63WCrFeSiB-970/1105 UNS Number N99622 JIS BNI-10										
VBC ALLOY 4721	Ni111, Nicrobraz 171	1095	bal	10.38	3.8	2.65	0.01	0.4	3.25	12.13W
Specifications List: MSRR 9500/703 Omat 3/105 AWS A5.8 BNi-11 BS EN 1044 Ni111 BS EN ISO 17672:2010 Ni 671 ISO 3677 B-Ni67WCrSiFeB-970/1095 UNS Number N99624 JIS BNI-11										
VBC ALLOY 4722	Nicrobraz 110	1080	bal	7.9	4.2	3.2		0.02		2.5Cu-2.0Mo-2.0Nb
Specifications List: AWS A5.8 BNi-13 BS EN ISO 17672:2010 Ni 810 ISO 3677 B-Ni78CrSiBMoNb-970/1080 UNS Number N99810 JIS BNI-13										
VBC ALLOY 4650	50Ni-50Cu	970	50							50Cu
VBC ALLOY 4776M	Nicrobraz LC	1070	bal	14	4.5	3.13	0.01	0.03	4.5	controlled impurities
Specifications List: AMS 4776 PWA 996 AWS A5.8 BNi-1a BS EN 1044 Ni1A1 BS EN ISO 17672:2010 Ni 610 ISO 3677 B-Ni74CrFeSiB-980/1070 UNS Number N99610 JIS BNI-1A										
VBC ALLOY 4779	79, Nicrobraz 135, Amdry 790	070	bal		3.5	1.85	0.01	0.03	0.8	controlled impurities
Specifications List: AMS 4779 MSRR 9500/700 General Electric B50TF206 Omat 3/88 - 3/88B - 3/88C - 3/88E AWS A5.8 BNi-4 BS EN 1044 Ni104 BS EN ISO 17672:2010 Ni 631 ISO 3677 B-Ni95SiB-980/1070 UNS Number N99640 JIS BNI-4										

# Nickel (continued)

Alloy	Alternative	Liquidus Temperature	Ni	Cr	Si	B	P	C	Fe	Others
VBC ALLOY 4775	Microbraz 125	1060	bal	14	4.5	3.13	0.01	0.75	4.5	controlled impurities
Specifications List: AMS 4775 MSRR 9500/103 Omat 3/182 - 3/182B AWS A5.8 BNI-1 BS EN 1044 NI101 BS EN ISO 17672:2010 Ni 600 UNS Number N99600										
VBC ALLOY 6456	Amdry DF-6A	1060	bal	20		3.1				3.0Ta-0.02Y
VBC ALLOY 4795	95, MBF 80, Microbraz 150, Amdry 775	1055	bal	15		3.63	0.01	0.03	0.75	
Specifications List: MSRR 9500/719 General Electric B50TF207 Omat 3/249 - 3/306 AWS A5.8 BNI-9 BS EN 1044 NI109 BS EN ISO 17672:2010 Ni 612 ISO 3677 B-Ni81CrB-1055 UNS Number N99612 JIS BNI-9										
VBC ALLOY 4778	78, MBF 30, Microbraz 130, Amdry 780	1040	bal		4.5	3.13	0.01	0.03	0.25	controlled impurities
Specifications List: AMS 4778 MSRR 9500/114 General Electric B50TF205 Omat 3/118 - 3/118B - 3/118C AWS A5.8 BNI-3 BS EN 1044 NI103 BS EN ISO 17672:2010 Ni 630 ISO 3677 B-Ni92SiB-980/1040 UNS Number N99630 JIS BNI-3										
VBC ALLOY 4765	Amdry 930	1010	bal		7		0.01	0.03		23.0Mn-4.5Cu
Specifications List: AWS A5.8 BNI-8 BS EN 1044 NI108 BS EN ISO 17672:2010 Ni 800 ISO 3677 B-Ni66MnSiCu-980/1010 UNS Number N99800 JIS BNI-8										
VBC ALLOY 4777	77, MBF 20, Microbraz LM, Amdry 770, Icronibsi-7	1000	bal	7	4.5	3.13	0.01	0.03	3	controlled impurities
Specifications List: AMS 4777 MSRR 9500/97 General Electric B50TF204 PWA 1183 Omat 3/181 - 3/181B - 3/181C AWS A5.8 BNI-2 BS EN 1044 NI102 BS EN ISO 17672:2010 Ni 620 ISO 3677 B-Ni82CrSiBFe-970/1000 UNS Number N99620 JIS BNI-2										
VBC ALLOY 4057	Palnico-30	977	bal	10.5		2.4				30.0Pd
Specifications List: B50TF198										
VBC ALLOY 4058	Palnico-36M	960	bal	10.5	0.5	3				36.0Pd
VBC ALLOY 4304	Ni112, Microbraz 51	950	bal	25	0.05	0.01	10	0.03	0.1	controlled impurities
Specifications List: AWS A5.8 BNI-12 BS EN 1044 NI112 BS EN ISO 17672:2010 Ni 720 ISO 3677 B-Ni65CrP-880/950 UNS Number N99720 JIS BNI-12										

Alloy	Alternative	Liquidus Temperature	Ni	Cr	Si	B	P	C	Fe	Others
VBC ALLOY 4730	Palconisi-5M, MBF-1011	895	bal		5					45.5Pd-5.0Co-4.5Mo
VBC ALLOY 4770	Microbraz 50	890	bal	14	0.05	0.01	10.1	0.03	0.1	
Specifications List: AWS A5.8 BNI-7 BS EN 1044 Ni107 BS EN ISO 17672:2010 Ni 710 ISO 3677 B-Ni76CrP-890 UNS Number N99710 JIS BNI-7										
VBC ALLOY 4310	MBF 60, Microbraz 10	875	bal				11	0.03		0.1Co
Specifications List: MSRR 9500/707 MSRR 9500/727 AWS A5.8 BNI-6 BS EN 1044 Ni106 BS EN ISO 17672:2010 Ni 700 ISO 3677 B-Ni89P-875 UNS Number N99700 JIS BNI-6										
VBC ALLOY 4731	Palnisi-47	851	bal		6					46.7Pd

# Active Brazes

Active braze alloys contain an active element, usually Titanium which allows it to wet ceramics and other materials previously considered very difficult to braze. They have removed the need for metallization of ceramics to allow them to be brazed thus reducing the time and cost of joining these materials. With a wide variety of compositions and melting points there is an active alloy to suit all requirements.

Alloy	Alternative	Liquidus Temperature	Au	Cu	Ni	Ag	V	Ti	Al	Others
VBC ALLOY 4954	Incusil-25 ABA	612		29.1		43.6		3		24.3In
VBC ALLOY 4966	616	710		bal		61.5		2		14.5 In
VBC ALLOY 4033	Incusil-ABA	715		27.25		59		1.25		12.50In
VBC ALLOY 4968	721	780		bal		72		2		
VBC ALLOY 4967	716	795		bal	0.5	71.5		2		
VBC ALLOY 4040	Cusin-1 ABA	806		34.25		63		1.75		1.0Sn
VBC ALLOY 4011	Cusil ABA	815		35.25		63		1.75		
VBC ALLOY 4956	TicuniZr-38	835		15	15			37.5		37.5 Zr
VBC ALLOY 4025	Ticusil	900		26.7		68.8		4.5		
VBC ALLOY 4042	Silver ABA	912		5		92.75		1.25	1	
VBC ALLOY 4027	Ticuni-60	940		15	25			60		
VBC ALLOY 4955	Ag-1Cu-2Zr	950		1		97				2.0Zr
VBC ALLOY 4028	Ticuni	960		15	15			70		
Specifications List: MSRR 9500/706										
VBC ALLOY 4085	Nioro ABA	960	82		15.5		1.75			0.75Mo
VBC ALLOY 4029	Tini 67	980			33			67		
VBC ALLOY 4002	Copper ABA	1024		92.75				2.25	2	3.0Si
VBC ALLOY 4081	Gold ABA	1030	96.4		3			0.6		

# Gold

Gold is unequalled as an element in many braze alloys providing superior corrosion resistance to any other element. It has excellent flow and wetting properties and forms a high strength ductile joint. When alloyed with Copper, Nickel or Palladium the choice of gold bearing alloys is extensive providing a range of properties for use in applications as diverse as Oil & Gas and spacecraft.

These alloys are available in powder, paste, foil, wire and preforms.

Alloy	Alternative	Liquidus Temperature	Au	Cu	Ni	Pd	Ag	Mn	Others
VBC ALLOY 4036	Silcoro-60	845	60	20			20		
VBC ALLOY 4059	Palnicurom-10	1013	25	37	10	15		13	
VBC ALLOY 4060	Palniro-4	1165	30		36	34			
<b>Specifications List:</b> AMS 4785 AWS A5.8 BAu-5 BS EN ISO 17672:2010 Au 300 ISO 3677 B-Ni36PdAu-1135/1166 UNS Number P00300 JIS BAu-5									
VBC ALLOY 4061	Palniro-1	1120	50		25	25			0.06Co
<b>Specifications List:</b> AMS 4784 AWS A5.8 BVAu-7 BS EN ISO 17672:2010 Au 507 ISO 3677 B-Au50NiPd-1102/1121 UNS Number P00507									
VBC ALLOY 4062	Palniro-7	1045	70		22	8			
<b>Specifications List:</b> AMS 4786 AWS A5.8 BAu-6 BS EN ISO 17672:2010 Au 700 ISO 3677 B-Au70NiPd-1007/1046 UNS Number P00700 JIS BAu-6									
VBC ALLOY 4063	Paloro	1240	92			8			
<b>Specifications List:</b> AWS A5.8 BVAu-8 BS EN ISO 17672:2010 Au 927 ISO 3677 B-Au92Pd-1200/1240 UNS Number P00927									
VBC ALLOY 4070	30Au-70Cu	1020	30	70					
<b>Specifications List:</b> MSRR 9500/710 BS EN 1044 Au 104 BS EN ISO 17672:2010 Au 295 ISO 3677 B-Cu70Au-995/1020 UNS Number P00295 JIS BAu-1A									
VBC ALLOY 4071	35Au-65Cu	1010	35	65					
<b>Specifications List:</b> AWS A5.8 BVAu-9 BS EN ISO 17672:2010 Au 354 ISO 3677 B-Cu65Au-990/1020 UNS Number P00354									
VBC ALLOY 4072	37.5Au-62.5Cu	1000	37.5	62.5					
<b>Specifications List:</b> AWS A5.8 BAu-1 BS EN 1044 Au 103 BS EN ISO 17672:2010 Au 375 ISO 3677 B-Cu62Au-980/1000 UNS Number P00375 JIS BAu-1									
VBC ALLOY 4073	50Au-50Cu	970	50	50					
<b>Specifications List:</b> AWS A5.8 BVAu-10 BS EN ISO 17672:2010 Au 503 ISO 3677 B-Au50Cu-955/970 UNS Number P00503 JIS BAu-11									
VBC ALLOY 4074	62.5Au-37.5Cu	940	62.5	37.5					
<b>Specifications List:</b> BS EN 1044 Au 102 BS EN ISO 17672:2010 Au 625 ISO 3677 B-Au62Cu-930/940 UNS Number P00625									
VBC ALLOY 4076	70Au-16Cu-14Ni		70	16	14				

Alloy	Alternative	Liquidus Temperature	Au	Cu	Ni	Pd	Ag	Mn	Others
VBC ALLOY 4078	80Au-19Cu-1Fe	910	80	19					1.0Fe
<b>Specifications List:</b> BS EN 1044 Au 101 BS EN ISO 17672:2010 Au 801 UNS Number P00807 ISO 3677 B-Au80Cu(Fe)-905/910									
VBC ALLOY 4080	Au Pure	1064	99.99						
<b>Specifications List:</b> AMS 7731									
VBC ALLOY 4082	Nicoro	1030	35	62	3				
<b>Specifications List:</b> AWS A5.8 BAu-3 BS EN ISO 17672:2010 Au 351 UNS Number P00350 ISO 3677 B-Cu62AuNi-975/1030 JIS BAu-3									
VBC ALLOY 4083	Nicoro-80	925	81.5	16.5	2				
VBC ALLOY 4084	Nioro	950	82		18				
<b>Specifications List:</b> AMS 4787 MSRR 9500/118 AWS A5.8 BAu-4 BS EN 1044 Au 105 BS EN ISO 17672:2010 Au 827 ISO 3677 B-Au82Ni-950 UNS Number P00827									
VBC ALLOY 4086	Orotin	280	80						20.0Sn
VBC ALLOY 4732	Palnicurom-25	1052	25	31	18	15		11	
VBC ALLOY 4901	Nioro-Ni	1010	73.8		26.2				
VBC ALLOY 4902	80Au-20Cu	890	80	20					
<b>Specifications List:</b> AWS A5.8 BAu-2 BS EN ISO 17672:2010 Au 800 ISO 3677 B-Au80Cu-890 UNS Number P00800 JIS BAu-2									
VBC ALLOY 4905	70Au-30Ni	1050	70		30				
VBC ALLOY 4906	Incuro-20	1025	20	78					2.0In
VBC ALLOY 4907	40Au-60Cu	1000	40	60					
VBC ALLOY 4908	Croniro	1000	72		22				6.0Cr
VBC ALLOY 4911	Incuro-60	900	60	37					3In
VBC ALLOY 4912	Silcoro-75	895	75	20			5		
VBC ALLOY 4913	Georo	361	88						12.0Ge
<b>Specifications List:</b> Omat 3/119 - 3/119A - 3/119B - 3/119D - 3/134 - 3/134A									
VBC ALLOY 6046	RI-46	1004	35	31.5	14	10		9.5	
VBC ALLOY 6049	RI-49	949	31	43.5	9.75	9.75		16	
VBC ALLOY 6050	AU EU	1040	70				30		
VBC ALLOY 6051	Au In 10	730	63	27					10In
VBC ALLOY 6053	Au In 15	1040	61	24					15In

# Palladium

Braze alloy filler metals containing Palladium as one of the principal elements are known for their exceptional strength and oxidation resistance at elevated temperatures. It can be alloyed with many other elements giving it a wide range of brazing temperatures to suit many processes and applications. It is frequently used to braze refractory materials due to the typical operating conditions of these materials.

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Ni	Pd	Au	Mn	Others
VBC ALLOY 4061	Palniro-1	1120			25	25	50		0.06Co
Specifications List: AMS 4784 AWS A5.8 BVAu-7 BS EN ISO 17672:2010 Au 507 ISO 3677 B-Au50NiPd-1102/1121 UNS Number P00507									
VBC ALLOY 4060	Palniro-4	1165			36	34	30		
Specifications List: AMS 4785 AWS A5.8 BAu-5 BS EN ISO 17672:2010 Au 300 ISO 3677 B-Ni36PdAu-1135/1166 UNS Number P00300 JIS BAu-5									
VBC ALLOY 4062	Palniro-7	1037			22	8	70		
Specifications List: AMS 4786 AWS A5.8 BAu-6 BS EN ISO 17672:2010 Au 700 ISO 3677 B-Au70NiPd-1007/1046 UNS Number P00700 JIS BAu-6									
VBC ALLOY 4063	Paloro	1240				8	92		
Specifications List: AWS A5.8 BVAu-8 BS EN ISO 17672:2010 Au 927 ISO 3677 B-Au92Pd-1200/1240 UNS Number P00927									
VBC ALLOY 4055	Palco	1219			0.06	65			Co Bal
Specifications List: AWS A5.8 BVPd-1 UNS Number P03657									
VBC ALLOY 4054	Palcusil-25	950	54	21		25			
Specifications List: AWS A5.8 BVAg-32 BS EN 1044 Pd 101 ISO BS EN 17672:2010 Pd 587 ISO 3677 B-Ag54PdCu-900/950 UNS Number P07587 JIS BPd-6									
VBC ALLOY 4053	Palcusil-20	900	52	28		20			
Specifications List: MSRR 9500/107 BS EN 1044 Pd 102 ISO BS EN 17672:2010 Pd 484 ISO 3677 B-Ag52CuPd-875/900 UNS Number P07484 JIS BPd-5									
VBC ALLOY 4057	Palnico-30	977			56.55	30.5			10.50Cr-2.45B
Specifications List: B50TF198									
VBC ALLOY 4058	Palnico-36M	960			50	36			10.50Cr-3.0B-0.50Si
VBC ALLOY 4059	Palnicurom-10	1013		37	10	15	25	13	
VBC ALLOY 4052	Palcusil-15	900	65	20		15			
Specifications List: BS EN 1044 Pd 103 ISO BS EN 17672:2010 Pd 481 ISO 3677 B-Ag65CuPd-850/900 UNS Number P07481 JIS BPd-4									
VBC ALLOY 4065	Pd 104	860	67.5	22.5		10			
Specifications List: BS EN 1044 Pd 104 ISO BS EN 17672:2010 Pd 388 ISO 3677 B-Ag68CuPd-830/860 UNS Number P07388 JIS BPd-3									

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Ni	Pd	Au	Mn	Others
VBC ALLOY 4051	Palcusil-10	850	58	31.5		10			
Specifications List: AWS A5.8 BVAg-31 BS EN 1044 Pd 105 ISO BS EN 17672:2010 Pd 387 ISO 3677 B-Ag58CuPd-825/850 UNS Number P07387 JIS BPd-2									
VBC ALLOY 4050	Palcusil-5	810	68.5	26.5		5			
Specifications List: AWS A5.8 BVAg-30 BS EN 1044 Pd 106 ISO BS EN 17672:2010 Pd 287 ISO 3677 B-Ag68CuPd-805/810 UNS Number P07287 JIS BPd-1									
VBC ALLOY 4056	Palni	1235			40	60			
Specifications List: BS EN 1044 Pd 201 ISO BS EN 17672:2010 Pd 647 ISO 3677 B-Pd60Ni-1235 UNS Number P07647 JIS BPd-14									
VBC ALLOY 4733	Pd 202	1120	75			20		5	
Specifications List: MSRR 9500/95 BS EN 1044 Pd 202 ISO BS EN 17672:2010 Pd 485 ISO 3677 B-Ag75PdMn-1000/1120 UNS Number P07485 JIS BPd-9									
VBC ALLOY 4064	18Pd-82Cu	1090		82		18			
Specifications List: MSRR 9500/702 BS EN 1044 Pd 203 ISO BS EN 17672:2010 Pd 483 ISO 3677 B-Cu82Pd-1080/1090 UNS Number P07483 JIS BPd-8									
VBC ALLOY 4067	Pd Pure	1555				99.99			
VBC ALLOY 4098	Gapasil-9	880	82			9			9.0Ga
VBC ALLOY 4730	Palconisi-5M	895			40	45.5			5.0Co-5.0Si-4.5Mo
VBC ALLOY 4731	Palnisi-47	851			47.2	46.7			6.1Si
VBC ALLOY 4732	Palnicurom-25	1052		31	18	15	25	11	
VBC ALLOY 4066	Pd 204	1010	95			5			
Specifications List: BS EN 1044 Pd 204 ISO BS EN 17672:2010 Pd 288 ISO 3677 B-Ag95Pd-970/1010 UNS Number P07288 JIS BPd-7									
VBC ALLOY 4734	Palnicusil	1179	48.5	19	10	22.5			
VBC ALLOY 4735	Palmansil-5	1072	75			20		5	
VBC ALLOY 4736	Patsil-10	1070	90			10			
VBC ALLOY 6046	RI-46	1004		31.5	14	10	35	9.5	
VBC ALLOY 6049	RI-49	949		43.5	9.75	9.75	31	16	
VBC ALLOY 6054	PD EU	1225	70			30			



# Silver

Silver is widely used as an element in braze alloys due to its excellent flow properties. It can be brazed by torch, induction, furnace or vacuum furnace and is used in a wide variety of applications including electronics and jewellery. It is also a primary element in many active braze alloys and is therefore used to join ceramics and other difficult to wet materials.

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Ni	Zn	Sn	Mn	Pd	Others
VBC ALLOY 4010	Cusil	780	72	28						
Specifications List: MSRR 9500/108 AWS A5.8 BAg-8 B-Ag72Cu-780 UNS Number P07720 JIS BAg-8 BS EN 1044 Ag 401 BS EN ISO 17672:2010 Ag 272 ISO 3677										
VBC ALLOY 4020	Nicusil-3	795	71.5	28.1	0.75					
VBC ALLOY 4021	Nicusil-8	895	56	42	2					
Specifications List: AMS 4765 MSRR 9500/113 AWS A5.8 BAg-13a BS EN ISO 17672:2010 Ag 456 ISO 3677 B-Ag56CuNi-770/895 UNS Number P07560 JIS BAg-13a										
VBC ALLOY 4022	Nicusiltin-6	800	63	28.5	2.5		6			
Specifications List: AMS 4774 AWS A5.8 BAg-21 BS EN ISO 17672:2010 Ag 463 ISO 3677 B-Ag63CuSn-690/800 UNS Number P07630 JIS BAg-21										
VBC ALLOY 4031	Incusil-10	730	63	27						10.0In
VBC ALLOY 4032	Incusil-15	725	61.5	23.5						15.0In
Specifications List: AWS A5.8 BVAg-29										
VBC ALLOY 4034	Cusiltin-10	730	60	30			10			
Specifications List: AMS 4773 AWS A5.8 BAg-18/BVAg-18 BS EN 1044 Ag 402 BS EN ISO 17672:2010 Ag 160 ISO 3677 B-Ag60CuSn-600/730 UNS Number P07600 JIS BAg-18										
VBC ALLOY 4041	Ag Pure	960	99.99							
Specifications List: AWS A5.8 BAg-0										
VBC ALLOY 4050	Palcusil-5	810	68.5	26.5					5	
Specifications List: AWS A5.8 BVAg-30 BS EN 1044 Pd 106 ISO BS EN 17672:2010 Pd 287 ISO 3677 B-Ag68CuPd-805/810 UNS Number P07287 JIS BPd-1										
VBC ALLOY 4051	Palcusil-10	850	58.5	31.5					10	
Specifications List: AWS A5.8 BVAg-31 BS EN 1044 Pd 105 ISO BS EN 17672:2010 Pd 387 ISO 3677 B-Ag58CuPd-825/850 UNS Number P07387 JIS BPd-2										
VBC ALLOY 4052	Palcusil-15	900	65	20					15	
Specifications List: BS EN 1044 Pd 103 ISO BS EN 17672:2010 Pd 481 ISO 3677 B-Ag65CuPd-850/900 UNS Number P07481 JIS BPd-4										
VBC ALLOY 4053	Palcusil-20	900	52	28					20	
Specifications List: MSRR 9500/107 BS EN 1044 Pd 102 ISO BS EN 17672:2010 Pd 484 ISO 3677 B-Ag52CuPd-875/900 UNS Number P07484 JIS BPd-5										
VBC ALLOY 4054	Palcusil-25	950	54	21					25	
Specifications List: AWS A5.8 BVAg-32 BS EN 1044 Pd 101 ISO BS EN 17672:2010 Pd 587 ISO 3677 B-Ag54PdCu-900/950 UNS Number P07587 JIS BPd-6										

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Ni	Zn	Sn	Mn	Pd	Others
VBC ALLOY 4066	Pd 204	1010	95						5	
Specifications List: BS EN 1044 Pd 204 ISO BS EN 17672:2010 Pd 288 ISO 3677 B-Ag95Pd-970/1010 UNS Number P07288 JIS BPd-7										
VBC ALLOY 4098	Gapasil-9	880	82						9	9.0Ga
VBC ALLOY 4065	Pd 104	860	67.5	22.5					10	
Specifications List: BS EN 1044 Pd 104 ISO BS EN 17672:2010 Pd 388 ISO 3677 B-Ag68CuPd-830/860 UNS Number P07388 JIS BPd-3										
VBC ALLOY 4733	Pd 202	1120	75					5	20	
Specifications List: MSRR 9500/95 BS EN 1044 Pd 202 ISO BS EN 17672:2010 Pd 485 ISO 3677 B-Ag75PdMn-1000/1120 UNS Number P07485 JIS BPd-9										
VBC ALLOY 4734	Palnicusil	1179	48.5	19	10				22.5	
VBC ALLOY 4735	Palmansil-5	1072	75					5	20	
VBC ALLOY 4736	Palsil-10	1070	90						10	
VBC ALLOY 4916	Ag 403	710	56	27.25	2.25					14.5In
Specifications List: BS EN 1044 Ag 403										
VBC ALLOY 4917	Ag 501	970	85						15	
Specifications List: AMS 4766 AWS A5.8 BAg-23 BS EN 1044 Ag 501 BS EN ISO 17672:2010 Ag 485 ISO 3677 B-Ag85Mn-960/970 UNS Number P07850 JIS BAg-23										
VBC ALLOY 4918	BAg-8a	760	71.7	28						0.3Li
Specifications List: AWS A5.8 BAg-8a UNS Number P07723										
VBC ALLOY 4919	BAg-19	891	92.5	7.2						0.23Li
Specifications List: AMS 4767 AWS A5.8 BAg-19 UNS Number P07925										
VBC ALLOY 4920	BVAg-0	962	99.95	0.05						
Specifications List: AWS A5.8 BVAg-0 UNS Number P07017										
VBC ALLOY 5050	50Ag-50Cu	870	50	50						
Specifications List: AWS A5.8 BVAg-6b UNS Number P07507										
VBC ALLOY 4954	655	740	65	28	2			5		
Specifications List: MSRR 9500/110										
VBC ALLOY 4955	M19Z		49	27.5	0.5	20.5		2.5		
Specifications List: MSRR 9500/725										
VBC ALLOY 4956	95Ag-5Al	830	95							5.0Al
VBC ALLOY 4957	90Ag-10Ge	790	90							10.0Ge
VBC ALLOY 4958	Cusiltin-5	760	68	27			5			
VBC ALLOY 4937	BAg-24	715	50	20	2	28				
Specifications List: AWS A5.8 BAg-24 BS EN ISO 17672:2010 Ag 450 ISO 3677 B-Ag50CuZnNi-660/705 UNS Number P07505 JIS BAg-24										
VBC ALLOY 4150	EC 56 Ga	630	56	19		17	3			3Ga
VBC ALLOY 4151	EC 64 In	780	64	26	2			2		6In

# Silver (continued)

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Ni	Zn	Sn	Mn	Pd	Others
VBC ALLOY 4102	Ag 102	655	56	22		17	5			
Specifications List: AMS 4763 AWS A5.8 BAg-7 BS EN 1044 Ag 102 BS EN ISO 17672:2010 Ag 156 ISO 3677 B-Ag56CuZnSn-620/655 UNS Number P07563 JIS BAg-7										
VBC ALLOY 4103	Ag 103	660	55	21		22	2			
Specifications List: MSRR 9500/708 Omat 319E - 319F BS EN 1044 Ag 103 BS EN ISO 17672:2010 Ag 155 ISO 3677 B-Ag55ZnCuSn-630/660 UNS Number P07155 JIS BAg-103										
VBC ALLOY 4104	Ag 104	680	45	27		25.5	2.5			
Specifications List: AWS A5.8 BAg-36 BS EN 1044 Ag 104 BS EN ISO 17672:2010 Ag 145 ISO 3677 B-Ag45CuZnSn-640/680 UNS Number P07145 JIS BAg-7A										
VBC ALLOY 4105	Ag 105	710	40	30		28	2			
Specifications List: AWS A5.8 BAg-28 BS EN 1044 Ag 105 BS EN ISO 17672:2010 Ag 140 ISO 3677 B-Ag40CuZnSn-650/710 UNS Number P07401 JIS BAg-28										
VBC ALLOY 4106	Ag 106	730	34	36		27.5	2.5			
Specifications List: BS EN 1044 Ag 106 BS EN ISO 17672:2010 Ag134 ISO 3677 B-Cu36AgZnSn-630/730 UNS Number P07130 JIS BAg-7B										
VBC ALLOY 4107	Ag 107	755	30	36		32	2			
Specifications List: MSRR 9500/104 BS EN 1044 Ag 107 BS EN ISO 17672:2010 Ag130 ISO 3677 B-Cu36ZnAgSn-665/755 UNS Number P07130										
VBC ALLOY 4117	Ag 205	790	25	40		35				
Specifications List: MSRR 9500/93 BS EN 1044 Ag 205 BS EN ISO 17672:2010 Ag225 ISO 3677 B-Cu36ZnAgSn-700/790 UNS Number P07254 JIS BAg-20A Omat 3/33 - 3/33B										
VBC ALLOY 4120	DHE 310	855	54	40	1	5				
Specifications List: AMS 4772 MSRR 9500/105 Omat 3/220 AWS A5.8 BAg-13 BS EN ISO 17672:2010 Ag 454 ISO 3677 B-Ag54CuZnNi-720/855 UNS Number P07540 JIS BAg-13										
VBC ALLOY 4881	DHE 311	850	25	52.5		22.5				
VBC ALLOY 4922	Ag 108	760	25	40		33	2			
Specifications List: AWS A5.8 BAg-37 BS EN 1044 Ag 108 BS EN ISO 17672:2010 Ag 125 ISO 3677 B-Cu40ZnAgSn-680/760 UNS Number P07125										
VBC ALLOY 4923	Ag 201	730	63	24		13				
Specifications List: BS EN 1044 Ag 201										
VBC ALLOY 4924	Ag 202	730	60	26		14				
Specifications List: BS EN 1044 Ag 202										
VBC ALLOY 4925	Ag 203	735	44	30		26				
Specifications List: BS EN 1044 Ag 203 BS EN ISO 17672:2010 Ag 244 ISO 3677 B-Ag44CuZn-675/735 UNS Number P07453										
VBC ALLOY 4926	Ag 204	765	30	38		32				
Specifications List: AWS A5.8 BAg-20 BS EN 1044 Ag 204 BS EN ISO 17672:2010 Ag 230 ISO 3677 B-Cu38ZnAg-680/765 UNS Number P07301 JIS BAg-20										

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Ni	Zn	Sn	Mn	Pd	Others
VBC ALLOY 4927	Ag 205	790	25	40		35				
Specifications List: BS EN 1044 Ag 205										
VBC ALLOY 4928	Ag 206	810	20	44		36				0.15 Si
Specifications List: BS EN 1044 Ag 206										
VBC ALLOY 4929	Ag 207	830	12	48		40				0.15 Si
Specifications List: BS EN 1044 Ag 207 BS EN ISO 17672:2010 Ag 212 ISO 3677 B-Cu48ZnAg(Sil)-800/830 UNS Number P07212										
VBC ALLOY 4930	Ag 208	870	5	55		40				0.15 Si
Specifications List: BS EN 1044 Ag 208 BS EN ISO 17672:2010 Ag 205 ISO 3677 B-Cu55ZnAg(Sil)-820/870 UNS Number P07205										
VBC ALLOY 4931	Ag 502	705	49	16	4.5	23		7.5		
Specifications List: AWS A5.8 BAg-22 BS EN 1044 Ag 502 BS EN ISO 17672:2010 Ag 449 ISO 3677 B-Ag49ZnCuMnNi-680/705 UNS Number P07490 JIS BAg-22										
VBC ALLOY 4932	Ag 503	830	27	38	5.5	20		9.5		
Specifications List: BS EN 1044 Ag 503 BS EN ISO 17672:2010 Ag 427 ISO 3677 B-Cu38AgZnMnNi-680/830 UNS Number P07427										
VBC ALLOY 4933	BAg-4		40	30	2	28				
Specifications List: AWS A5.8 BAg-4 BS EN ISO 17672:2010 Ag 440 ISO 3677 B-Ag40CuZnNi-670/780 UNS Number P07440 JIS BAg-4										
VBC ALLOY 4934	BAg-6	775	50	34		16				
Specifications List: MSRR 9500/720 AWS A5.8 BAg-6 BS EN ISO 17672:2010 Ag 250 ISO 3677 B-Ag50CuZn-690/775 UNS Number P07503 JIS BAg-6										
VBC ALLOY 4935	BAg-9	720	65	20		15				
Specifications List: AWS A5.8 BAg-9 BS EN ISO 17672:2010 Ag 265 ISO 3677 B-Ag65CuZn-670/720 UNS Number P07650 JIS BAg-9										
VBC ALLOY 4936	BAg-10	740	70	20		10				
Specifications List: AWS A5.8 BAg-10 BS EN ISO 17672:2010 Ag 270 ISO 3677 B-Ag70CuZn-690/740 UNS Number P07700 JIS BAg-10										
VBC ALLOY 4938	BAg-26	800	25	38	2	33		2		
Specifications List: AWS A5.8 BAg-26 BS EN ISO 17672:2010 Ag 425 ISO 3677 B-Cu38ZnAgNiMn-705/800 UNS Number P07250 JIS BAg-26										
VBC ALLOY 4939	BAg-34	720	38	32		28	2			
Specifications List: AMS 4761 AWS A5.8 BAg-34 BS EN ISO 17672:2010 Ag 138 ISO 3677 B-Ag38CuZnSn-650/720 UNS Number P07380 JIS BAg-34										
VBC ALLOY 4940	BAg-35	755	35	32		33				
Specifications List: AWS A5.8 BAg-35 BS EN ISO 17672:2010 Ag 235 ISO 3677 B-Ag35CuZn-685/775 UNS Number P07351 JIS BAg-35										
VBC ALLOY 4941	109	775	43	37		20				
Specifications List: MSRR 9500/109 Omat 3/222										
VBC ALLOY 4942	AMS 4762	727	40	30		30				
Specifications List: AMS 4762										
VBC ALLOY 5678	Ag 101	685	60	23		14	3			
Specifications List: BS EN 1044 Ag 101										

# Copper

Copper and its alloy have been used for brazing since the earliest days of the process and is still the main element in many alloys. Copper is ductile and is regarded as having excellent brazeability and it is these properties that make it useful as a principal component in these braze alloys.

The range of copper bearing braze alloys are used in a wide variety of applications including aerospace, electronics and automotive.

Alloy	Alternative	Liquidus Temperature	Ag	Cu	Zn	Cd	Others
VBC ALLOY 4108	Ag 301	635	50	15.5	16.5	18	
Specifications List: AWS A5.8 BAg-1a BS EN 1044 Ag 301 BS EN ISO 17672:2010 Ag 350 ISO 3677 B-Ag50CdZnCu-620/640 UNS Number P07500 JIS BAg-1A							
VBC ALLOY 4109	Ag 303	620	42	17	16	25	
Specifications List: MSRR 9500/91 BS EN 1044 Ag 303							
VBC ALLOY 4110	Ag 306	690	30	28	21	21	
Specifications List: BS EN 1044 Ag 306 BS EN ISO 17672:2010 Ag 330 ISO 3677 B-Ag30CuCdZn-600/690 UNS Number P07300							
VBC ALLOY 4113	Ag 351	655	50	15.5	15.5	16	3 Ni
Specifications List: AMS 4771 AWS A5.8 BAg-3 BS EN 1044 Ag 351 BS EN ISO 17672:2010 Ag 351 ISO 3677 B-Ag50CdZnCuNi-635/655 UNS Number P07501							
VBC ALLOY 4115	Ag 302	620	45	15	16	24	
Specifications List: AMS 4769 BS EN 1044 Ag 302 AWS A5.8 BAg-1 B-Ag45CdZnCu-605/620 UNS Number P07450 JIS BAg-1							
VBC ALLOY 4118	AMS 4770	635	50	15.5	16.5	18	
Specifications List: AMS 4770							
VBC ALLOY 4944	Ag 304	630	40	19	21	20	
Specifications List: BS EN 1044 Ag 304 BS EN ISO 17672:2010 Ag 340 ISO 3677 B-Ag40ZnCdCu-595/630 UNS Number P07340							
VBC ALLOY 4945	Ag 305	700	35	26	21	18	
Specifications List: AMS 4768 AWS A5.8 BAg-2 BS EN 1044 Ag 305 ISO 3677 B-Ag35CuZnCd-610/700 UNS Number P07350 JIS BAg-2							
VBC ALLOY 4947	Ag 307	720	25	30	27.5	17.5	
Specifications List: AWS A5.8 BAg-33 BS EN 1044 Ag 307 BS EN ISO 17672:2010 Ag 326 ISO 3677 B-Cu30ZnAgCd-605/765 UNS Number P07252							
VBC ALLOY 4948	Ag 308	750	21	35.5	26.5	16.5	0.5 Si
Specifications List: BS EN 1044 Ag 308							
VBC ALLOY 4949	Ag 309	765	20	40	25	15	
Specifications List: BS EN 1044 Ag 309							
VBC ALLOY 4950	BAg-2a	710	30	27	23	20	
Specifications List: AWS A5.8 BAg-2a							
VBC ALLOY 4951	BAg-27	745	25	35	26.5	13.5	
Specifications List: AWS A5.8 BAg-27							
VBC ALLOY 4952	EO Alloy		40	24.5	10	24	1 Sn
Specifications List: MSRR 9500/709							

# Silver Cadmium

Cadmium was once used as a very effective melting point depressant for silver based alloys but due to the awareness of cadmium as a serious risk to health and an EU ban of cadmium containing filler metals under REACH legislation these are no longer available for general use. However there are certain exemptions for aerospace, defence and/or safety applications.

Alloy	Alternative	Liquidus Temperature	Cu	Ni	Mn	Zn	Sn	P	Ag	Others
VBC ALLOY 4004	Cu105	1100	bal	3						0.03Bi
Specifications List: BS EN 1044 CU105 MSRR 9500/119 BS EN ISO 17672:2010 Cu 186 UNS Number C18601 ISO 3677 B-Cu97Ni(B)-1085/1100 Omat 3/132										
VBC ALLOY 4822	Cu106	1080	bal						1	
Specifications List: BS EN 1044 CU106 BS EN ISO 17672:2010 Cu 188 UNS Number C18803 ISO 3677 B-Cu99(Ag)-1070/1080										
VBC ALLOY 4823	Cu201	1040	bal				6.25	0.2		
Specifications List: BS EN 1044 CU201 BS EN ISO 17672:2010 Cu 922 ISO 3677 B-Cu94Sn(p)-910/1040 UNS Number C92201										
VBC ALLOY 4824	Cu202	990	bal				12	0.2		
Specifications List: BS EN 1044 CU202 BS EN ISO 17672:2010 Cu 925 ISO 3677 B-Cu88Sn(P)-825/990 UNS Number C92501										
VBC ALLOY 4875	CP104	815	bal					6	5	
Specifications List: AWS A5.8 BCuP-3 BS EN 1044 CP104 BS EN ISO 17672:2010 CuP 281 ISO 3677 B-Cu89PAg-645/815 UNS Number C55281										
VBC ALLOY 4876	BCuP-4	813	bal					7.25	6	
Specifications List: AWS A5.8 BCuP-4 BS EN ISO 17672:2010 CuP 283 ISO 3677 B-Cu87PAg-643/813 UNS Number C55283 JIS BCuP-4										
VBC ALLOY 4877	CP102	800	bal					5	15	
Specifications List: AWS A5.8 BCuP-5 BS EN 1044 CP102 BS EN ISO 17672:2010 CuP284 ISO 3677 B-Cu80AgP-645/800 UNS Number C55284 JIS BCuP-5										
VBC ALLOY 4879	BCuP-6, Nicro-Braz 5025	788	bal					7	2	
Specifications List: AWS A5.8 BCuP-6 BS EN ISO 17672:2010 CuP 280 ISO 3677 B-Cu91PAg-643/788 UNS Number C55280 JIS BCuP-6										
VBC ALLOY 4880	BCuP-7	771	bal					6.75	5	
Specifications List: AWS A5.8 BCuP-7 BS EN ISO 17672:2010 CuP 282 ISO 3677 B-CuPAg-643/771 UNS Number C55282 JIS BCuP-7										
VBC ALLOY 4881	DHE 311	850	bal			22.5			25	
Specifications List: MSRR 9500/106										
VBC ALLOY 4882	CP101	645	bal					7.05	18	
Specifications List: BS EN 1044 CP101 BS EN ISO 17672:2010 CuP 286 ISO 3677 B-Cu75AgP-645 UNS Number C55385 JIS BCuP-8										

# Copper (continued)

Alloy	Alternative	Liquidus Temperature	Cu	Ni	Mn	Zn	Sn	P	Ag	Others
VBC ALLOY 4883	CP103, Micro-Braz 5027	813	bal	0.1				7.25	6	
<b>Specifications List:</b> BS EN 1044 CP103 BS EN ISO 17672:2010 Cu 283a										
VBC ALLOY 4884	CP105	825	bal					6.3	2	
<b>Specifications List:</b> BS EN 1044 CP105 BS EN ISO 17672:2010 CuP 279 ISO 3677 B-Cu92PAg-645/825 UNS Number C55279										
VBC ALLOY 4885	CP201	770	bal					7.8		
<b>Specifications List:</b> BS EN 1044 CP201 BS EN ISO 17672:2010 CuP182 ISO 3677 B-Cu92P-710/770 UNS Number C55181										
VBC ALLOY 4886	CP202, MBF 2005	820	bal					7		
<b>Specifications List:</b> BS EN 1044 CP202 BS EN ISO 17672:2010 CuP 180 ISO 3677 B-Cu93P-710/820 UNS Number C55182 JIS BCuP-2										
VBC ALLOY 4887	CP203	890	bal					6.2		
<b>Specifications List:</b> BS EN 1044 CP203 BS EN ISO 17672:2010 CuP 179 ISO 3677 B-Cu94P-710/890 UNS Number C55179										
VBC ALLOY 4888	CP301	825	bal					6		2.0Sb
<b>Specifications List:</b> BS EN 1044 CP301 BS EN ISO 17672:2010 CuP 389 ISO 3677 B-Cu92PSb-690/825 UNS Number C55389										
VBC ALLOY 4889	CP302	700	bal				7	6.8		6.8P
<b>Specifications List:</b> BS EN 1044 CP302 BS EN ISO 17672:2010 CuP386 ISO 3677 B-Cu86SnP-650/700 UNS Number C55385										
VBC ALLOY 4403	Cu 85MnNi	1000	bal	3.25	12.5					
<b>Specifications List:</b> BS EN ISO 17672:2010 Cu 595 ISO 3677 B-Cu84MnNi-965/1000										
VBC ALLOY 4966	616	710	bal						61.5	2Ti-14.5In
VBC ALLOY 4650	50Ni-50Cu	970	50	50						
VBC ALLOY 4968	721	780	bal						72	2Ti
VBC ALLOY 4967	716	795	bal	0.5					71.5	2Ti
VBC ALLOY 4001	OFHC Cu	1085	99.95							controlled impurities
<b>Specifications List:</b> MSRR 9500/100 Omat 3/46 AWS A5.8 BCu-3 BS EN 1044 CU102 BS EN ISO 17672:2010 Cu 102 ISO 3677 B-Cu100-1085 UNS Number C10200										
VBC ALLOY 4820	Cu101	1085	99.9							
<b>Specifications List:</b> AMS 4701 AWS A5.8 BCu-1b BS EN 1044 CU101 BS EN ISO 17672:2010 Cu 110 ISO 3677 B-Cu100-1085 UNS Number C14180 JIS BCu-1										
VBC ALLOY 4821	Cu104, Micro-Braz CuBraz	1085	99.9					0.03		0.01Al
<b>Specifications List:</b> BS EN 1044 CU104 (AMS 4740) AWS A5.8 BCu-1 BS EN ISO 17672:2010 Cu141 UNS Number C11000 ISO 3677 B-Cu100(P)-1085										

Alloy	Alternative	Liquidus Temperature	Cu	Ni	Mn	Zn	Sn	P	Ag	Others
VBC ALLOY 4000	CP Cu	1085	99							
<b>Specifications List:</b> AWS A5.8 BCu-1a BS EN 1044 CU103 BS EN ISO 17672:2010 Cu 099 ISO 3677 B-Cu99-1085 JIS BCu-2										
VBC ALLOY 4002	Copper ABA	1024	92.75							2.25 Ti-2Al-3Si
VBC ALLOY 4099	Gemco	975	87.75	0.25						12.00Ge
<b>Specifications List:</b> Omat 373 - 3/33A										
VBC ALLOY 4401	Cu 87Co	1030	87		10					3Co
VBC ALLOY 4402	Cu 86 Co	1030	86			10				4Co
VBC ALLOY 4404	Cu 86MnNi	995	86	2	12					
VBC ALLOY 4088	Cutin	960	85				15			
VBC ALLOY 4064	18Pd-82Cu	1090	82							18 Pd
<b>Specifications List:</b> MSRR 9500/702 BS EN 1044 Pd 203 ISO BS EN 17672:2010 Pd 483 ISO 3677 B-Cu82Pd-1080/1090 UNS Number P07483 JIS BpD-8										
VBC ALLOY 4092	Nicutin-P	650	78.5	5.7			9.3	6.5		
VBC ALLOY 4915	Incuro-20	1025	78							20Au-2In
VBC ALLOY 4906	Incuro-20	1025	78							20 Au-2.0In
VBC ALLOY 4003	Cu70/Pt30		70							30.00Pt
VBC ALLOY 4070	30Au-70Cu	1020	70							30 Au
<b>Specifications List:</b> MSRR 9500/710 BS EN 1044 Au 104 BS EN ISO 17672:2010 Au 295 ISO 3677 B-Cu70Au-995/1020 UNS Number P00295 JIS BAu-1A										
VBC ALLOY 4089	Nicuman-23	955	67.5	9	23.5					
VBC ALLOY 4891		1080	65	bal				3.5		4.9Cr
<b>Specifications List:</b> Omat 373A										
VBC ALLOY 4071	35Au-65Cu	1010	65							35Au
<b>Specifications List:</b> AWS A5.8 BVAu-9 BS EN ISO 17672:2010 Au 354 ISO 3677 B-Cu65Au-990/1020 UNS Number P00354										
VBC ALLOY 4072	37.5Au-62.5Cu	1000	62.5							37.5Au
<b>Specifications List:</b> AWS A5.8 BAu-1 BS EN 1044 Au 103 BS EN ISO 17672:2010 Au 375 ISO 3677 B-Cu62Au-980/1000 UNS Number P00375 JIS BAu-1										
VBC ALLOY 4082	Nicoro	1030	62	3						35Au
<b>Specifications List:</b> AWS A5.8 BAu-3 BS EN ISO 17672:2010 Au 351 UNS Number P00350 ISO 3677 B-Cu62AuNi-975/1030 IS BAu-3										
VBC ALLOY 4653	Cu301	895	60			bal				0.30Si
<b>Specifications List:</b> MSRR 9500/94 MSRR 9500/717 BS EN 1044 CU301 BS EN ISO 17672:2010 Cu 470a ISO 3677 B-Cu60Zn(Si)-875/895 JIS Bcu-5										
VBC ALLOY 4907	40Au-60Cu	1000	60							40Au
VBC ALLOY 4408	Cu302	895	59			bal	0.35			
<b>Specifications List:</b> AWS A5.8 RBCuZn-A BS EN 1044 CU302 BS EN ISO 17672:2010 Cu 470 ISO 3677 B-Cu60Zn(Sn)(Si)-875/895 UNS Number C47000 JIS BCu-6										

Alloy	Alternative	Liquidus Temperature	Cu	Ni	Mn	Zn	Sn	P	Ag	Others
VBC ALLOY 4400	Cocuman	999	58.5		31.5					10Co
Specifications List: PWA 716										
VBC ALLOY 4870	Cu303	890	58	0.5	0.3	bal	0.95			0.15Si
Specifications List: BS EN 1044 CU303 BS EN ISO 17672:2010 Cu 680 ISO 3677 B-Cu60Zn(Si)(Mn)-870/900 UNS Number C68000										
VBC ALLOY 4871	Cu304	900	58		0.15	bal	0.35			0.15Si
Specifications List: AWS A5.8 RBCuZn-C BS EN 1044 CU304 BS EN ISO 17672:2010 Cu 471 ISO 3677 B-Cu60Zn(Sn)(Si)(Mn)-870/900 UNS Number C471000										
VBC ALLOY 4873	Cu306	890	58	0.5	0.25	bal	0.95			0.12Si-0.7Fe
Specifications List: AWS A5.8 RBCuZn-B BS EN 1044 CU306 BS EN ISO 17672:2010 Cu 681 ISO 3677 B-Cu59Zn(Sn)(Ni)(Mn)(Si)-870/890 UNS Number C681000										
VBC ALLOY 4405	Cu 57 Co	930	57.5		2	38.5				2Co
VBC ALLOY 4090	Nicuman-37	925	52.5	9.5	38					
Specifications List: AMS 4764										
VBC ALLOY 4073	50Au-50Cu	970	50							50Au
Specifications List: AWS A5.8 BVAu-10 BS EN ISO 17672:2010 Au 503 ISO 3677 B-Au50Cu-955/970 UNS Number P00503 JIS BAu-11										
VBC ALLOY 4872	Cu305	920	48	10		bal				0.17Si
Specifications List: AWS A5.8 RBCuZn-D BS EN 1044 CU305 BS EN ISO 17672:2010 Cu 773 ISO 3677 B-Cu48ZnNi(Si)-890/920 UNS Number C77300 JIS BCu-8										
VBC ALLOY 6049	RI-49	949	43.5	9.75	16					31Au-9.75Pd
VBC ALLOY 4021	Nicusil-8	895	42	2					56	
Specifications List: AMS 4765 MSRR 9500/113 AWS A5.8 BAg-13a BS EN ISO 17672:2010 Ag 456 ISO 3677 B-Ag56CuNi-770/895 UNS Number P07560 JIS BAg-13a										
VBC ALLOY 4117	Ag 205	790	40			35				25
Specifications List: MSRR 9500/93 BS EN 1044 Ag 205 BS EN ISO 17672:2010 Ag225 ISO 3677 B-Cu36ZnAgSn-700/790 UNS Number P07254 JIS BAg-20A Omat 3/33 - 3/33B										
VBC ALLOY 4406	BS 27 MnNi	830	38	5.5	9.5	20			27	
Specifications List: BS EN 1044 AG 503 BS EN ISO 17672:2010 Ag 427										
VBC ALLOY 4407	EC 25 MnNi	715	38	2	2	33			25	
Specifications List: AWS A5.8 Bag-26 BS EN ISO 17672:2010 Ag 425										
VBC ALLOY 4074	62.5Au-37.5Cu	940	37.5							62.5Au
Specifications List: BS EN 1044 Au 102 BS EN ISO 17672:2010 Au 625 ISO 3677 B-Au62Cu-930/940 UNS Number P00625										
VBC ALLOY 4059	Palnicurom-10	1013	37	10	13					25Au-15Pd
VBC ALLOY 4911	Incuro-60	900	37							60Au-3.0In
VBC ALLOY 4011	Cusil ABA	815	35.25						63	1.75 Ti
VBC ALLOY 4040	Cusin-1 ABA	806	34.25				1 Sn		63	1.75Ti

Alloy	Alternative	Liquidus Temperature	Cu	Ni	Mn	Zn	Sn	P	Ag	Others
VBC Alloy 4962	CB5	810	34.2						64	1.8Ti
VBC ALLOY 4051	Palcusil-10	850	31.5						58	10Pd
Specifications List: AWS A5.8 BVAg-31 BS EN 1044 Pd 105 ISO BS EN 17672:2010 Pd 387 ISO 3677 B-Ag58CuPd-825/850 UNS Number P07387 JIS BPd-2										
VBC ALLOY 6046	RI-46	1004	31.5	14	9.5					35Au-10Pd
VBC ALLOY 4732	Palnicurom-25	1052	31	18	11					25 Au-15 Pd
VBC ALLOY 4954	Incusil-25 ABA	612	29.1				24.3Sn		43.6	3Ti

# Aluminium

Brazing of aluminium requires a different approach due to the unique nature of aluminium as a material. This does not mean it needs to be difficult. VBC will be right there with you to advise on the correct brazing method, conditions and alloy selection to ensure you get the best out of your application. Aluminium braze alloys are available in wire, powder, paste, foil or preforms and are released to AWS or ISO specifications.

Alloy	Alternative	Liquidus Temperature	Al	Fe	Mn	Zn	Si	Cu	Mg	Others
VBC ALLOY 6888	Al 822	426	22			78				
VBC ALLOY 6889	Al 802	385	2			98				
VBC ALLOY 6990	Al719	560	76			10	10	4		
Specifications List: AA4245										
VBC ALLOY 6992	AL102	615	bal	0.8	0.1	0.2	7	0.13		
Specifications List: AWS A5.8 BAlSi-2 BS EN 1044 AL102 BS EN ISO 17672:2010 Al 107 ISO 3677 B-Al92Si-575/615 UNS Number A94343 JIS BA4343 AA4343										
VBC ALLOY 6993	AL103	590	bal	0.8	0.05	0.1	10	0.15	0.03	0.10Ti
Specifications List: AWS A5.8 BAlSi-5 BS EN 1044 AL103 BS EN ISO 17672:2010 Al 110 ISO 3677 B-Al90Si-575/590 UNS Number A9405 JIS BA4045 AA4045										
VBC ALLOY 6994	AL104/ Al718	585	bal	0.3	0.8	0.2	12	0.15	0.05	
Specifications List: AWS A5.8 BAlSi-4 BS EN 1044 AL104 BS EN ISO 17672:2010 Al 112 ISO 3677 B-Al88Si-575/585 UNS Number A94047 JIS BA4047 AA4047										
VBC ALLOY 6995	AL201 / Al716	585	bal	0.8	0.15	0.2	10	4	0.05	-/0.1Cr
Specifications List: AWS A5.8 BAlSi-3 BS EN 1044 AL201 BS EN ISO 17672:2010 Al 210 ISO 3677 B-Al86SiCu-520/585 UNS Number A94145 JIS BA4145 AA4145										
VBC ALLOY 6863	ZAL15	480	15			85				
VBC ALLOY 6864	SiAl90	595	90				10			



## Ancillary Items

### Welding

#### Deep Penetration welding flux

- We are able to offer a range of catalysts when welding with titanium, nickel and stainless alloys that have proven to significantly enhance weld bead penetration.

#### Locking wire

- Extensively used to secure components which are subject to either vibration and/or a critical environment. Manufactured from a wide range of materials and certified to international specifications such as DTD189A and MS20995 series.

#### Micro Laser Welding Wire

- Fine diameter wire rods, typically between 0.3 - 0.6mm diameter, in a wide range of alloys

#### Welding Flux

- Numerous formulations of flux are available selected for the base metal being welded. Fluxes are available as powders or paste.

#### Welding inserts

- Consumable inserts provide the highest quality root pass for welds that require radiography. With this proven reliability, they have gained acceptance throughout the commercial industries as well. Preformed fitted rings are furnished in standard pipe schedules with an overlap. These rings are designated Style B in the Military and AWS specifications. Split rings, Style C, are supplied with tolerances to fit special customer requirements. Consumable Insert material can also be furnished in standard 50-foot lengths, are designated Style A in accordance with the AWS and Military specifications

#### Tungsten Electrodes

- we are able to source the seven types and five industry-standard diameters. Packaged in ten seven-inch (175 mm) tungsten electrodes and to ensure quality and safety, our tungsten will meet the AWS (American Welding Society) specifications and package labels feature important safety information.

## Ancillary Items

### Brazing

#### Dispensing Systems

- Pneumatic dispensing control unit systems, all offer unsurpassed accuracy, ease of use and precise control of amounts of braze paste for laying-up

#### Flux

- We are able to supply Flux which is critical to the torch brazing and soldering process because it minimizes the oxidation that may form on both the brazing filler metal and the materials being joined.

#### Honeycomb

- Whether for new manufacture or repair, we can offer abrasion resistant metallic honeycomb for gas turbine engine high temperature seals. These can be manufactured from a variety of materials such as Haynes 214, Hastelloy X and Nimonic alloys, and are approved by the major aero engine OEM's.

- Structures can be supplied as segments (straight and chamfer), rings (straight and chamfer), segments annular, multi-stepped cross sections, elongated, and net-shaped.

- VBC have responded to increased demand for ready to braze components preloaded with braze tape. Coupled with an in-depth practical knowledge of the process we are a leading specialist who can support you worldwide.

#### PSPS

We are able offer a wide array of Pre-Sintered Preforms (PSP™) used to dimensionally restore and repair cracks on worn jet engines, components for aerospace and industrial applications, such as high pressure, gas turbine vanes

PSP™ is a customized blend of superalloy and braze powders in either a plate form or specific shape allows selective build-up of worn surfaces to be achieved quickly and efficiently offering savings in time and cost. Extrudable paste allows for application in difficult to reach areas and a brushable paint form is used for sealing deep or narrow cracks or micro-cracks.



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