TECHNICAL DATA

DEZINCIFICATION

As a major part of the Aquafax business is devoted to non ferrous metals we take great interest in the material specification and suitability for our type of business. We are able to call on the expertise of either major suppliers or federations within the copper based metals industry. Therefore if we are able to help or answer enquiries we shall be pleased to oblige.

The following metals are specified in the catalogue. We present here a description as to their composition and suitability. We recommend bronze and DZR brass for seawater use particularly underwater. If brass is used then it is susceptible to dezincification.

BRONZE UNI 5273

There are various types of bronze designed for particular applications but where referred to in the Aquafax catalogue, the specification is as follows:

- Also known in the UK as **Gunmetal LG2**
- Highly suitable for salt water use

Composition	Min	Max
Copper	Remainder	
Tin	4.0%	6.0%
Lead	4.0%	6.0%
Zinc	4.0%	6.0%
Nickel	-	2.0%
Total impurities (aluminium, iron, arsenic, etc.)	0.8%	

BRASS CW617N

The exact specification of brass changes both for different forms of application but also different manufacturing methods i.e. hot stamping, casting, shell mounting, cold forming etc. Below is an approximate material specification.
Brass is susceptible to dezincification.

Composition	
Copper	59%
Lead	2.5%
Tin	0.3%
Aluminium	0.05%
Iron	0.4%
Nickel	0.3%
Zinc	Remainder
Trace Elements	0.2%

- This material may also be known as CZ122 Brass,Tonval Brass, OT58 Brass
- It is not really recommended for seawater use

DZR BRASS CW602N

Dezincification Resistant Brass for Marine Application
experimental work by the BNF Metals Technology Centre has shown that the dezincification resistance of CW602N (CZ132) alloy is maintained in sea water high in chlorides and other aggressive agents. Use in a fully submerged sea water filter for one year resulted in less than 0.20 mm (0.0008in.) of corrosion of CW602N (CZ132) compared with five times as much on naval brass CW712R (CZ112). Lloyds Register of Shipping Yacht and Small Craft Department now have no objection to the use of DZR brass in through-hull fittings. Provided it is made to correct specification Dezincification Resistant Brass CW602N (CZ132) is commonly referred to as DZR brass.

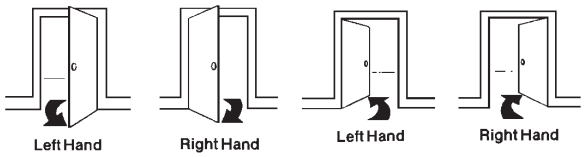
The metal is heated treated and monitored in production to achieve the strict specification necessary to meet B.S. requirements. For pressure die casting the specification changes slightly.

Composition	
Copper	61%
Lead	2.25%
Arsenic	1%
Zinc	Remainder

- This material may be known as A-Metal or Alphametal

HINGES

This illustration should help in selecting between left & right hand.



INTERNATIONAL THREAD COMPARISONS

The International Organisations (ISO), standardises the thread designations from different countries.

	ISO	UK	France	Norway	Germany	Japan	Thread Form
BSPT	ISO7/1	BS 21	NFE03-004	NS983	DIN 2999	JIS B0203	WHITWORTH
BSP	ISO228/1	BS 2779	NFE02-005	-	DIN 259	JIS B0202	WHITWORTH

COMPARISON TABLE FOR FASTENER MATERIAL GRADE

	Britain	France	Germany	Italy	Japan	Sweden
A1	303/S31	Z10CNF18-09	WI.4305		SUS303	SIS2346
A2	304/S15	Z6CN18-09	WI.4301	X8CN1910	SUS304	SIS2333
A4	316/S31	Z6CND17-12	WI.4436	X8CND1712	SUS316JI	SIS2343
C1	410/S21	Z12C13	WI.4006	X15C13	SUS410JI	SIS2302
C3	431/S29	Z15CN16-02	WI.4057	X20CN16	SUS431	SIS2321

THREAD EQUIVALENTS:

15mm	22mm	28mm	35mm	42mm	54mm
½" BSP	¾" BSP	1" BSP	1¼" BSP	1½" BSP	2" BSP

ELECTRICS

Volts x Amps = Watts
Voltage drop, prevalent in small core cable details on request.

WATER PRESSURE:

14 ½ psi equals approx. 1 Bar
FT/Head x .433 = PSI

TECHNICAL DATA

PUMPS

Pump ratings often quoted as zero head and US galls. Do not run impeller pump dry for more than 30 secs.
Neoprene impeller standard in bronze pumps. Temps 4C-80c. More blades give more pressure, same flow. Nitrile impeller for diesel, oil, etc. Temps 10-90C. 30% lower performance than neoprene. Priming when dry will increase suction head.
Mechanical seal fitted pumps recommended for gritty bilge water.
Accumulator tanks in fresh water systems aid flow and reduce wear.
Check pressure in fresh water system which can damage calorifiers. Taps and pipe fittings with bore reduction can cause back pressure.
Raw water cooling pump sizing = 64 litres (14 gallons) per 100 BHP.

Useful guide when selecting suitable pump for belt drive operation:

$$\frac{\text{Engine RPM}}{\text{Pump RPM}} \times \text{Engine pulley dia.} = \text{Pump pulley dia.}$$

Cam reduction in bronze pumps controls flow.
Selection available.

Recreational Craft Directive (RCD) & Boat Safety Scheme (BSS)

Listed below are applicable standards to which we supply components.
Equipment that is required to be CE marked will be supplied with a certificate if requested.

SECTION	PRODUCTS	STANDARD	
1	All valves & fittings relating to	BS EN ISO 10088:2001	Permanently Installed Fuel Systems & tanks.
1	Test points & bubble testers.	BS 5482-3:1999 BS EN ISO 10239:2000	LPG installations in boats, yachts and other vessels. LPG systems
1	L P Gas Components	BS 5482-3:1999 BS EN ISO 10239:2000	LPG installations in boats, yachts and other vessels. LPG Systems
1	L P Gas Hoses	BS 3212/2	LPG Systems
1 & 2	Fuel fill, supply and vent lines	BS EN ISO 7840: 1995	Type A Fire Resistant Fuel Hose
4	Ultraflex	ISO 8848 BS EN 28848:1993	Steering Push Pull Cable over 15kw outboards, outdrives etc.
4	Ultraflex	ISO 9775 BS EN 29775:1993	Steering Push Pull Cable Single Outboard 15-40kw
4	Ultraflex	ISO 10592	Steering - Hydraulic
6	Fire Extinguishers/ Blankets	BS EN ISO 9094-1:2003	Fire Protection to 15m
6	Fire Extinguishers/ Blankets	BS EN ISO 9094-2:2003	Fire Protection 15 -24m
9 & 10	Flojet & Johnson Pumps	ISO 8846 BS EN 28846:1993	Ignition Protection, test for components used in explosive atmospheres
9 & 10	Flojet & Johnson Pumps	ISO 8849 BS EN 28849:1993	Electrically operated bilge pumps.

FUEL AND GAS HOSE REGULATIONS

The below should clarify the regulations concerning use of fuel & gas hoses on boats using the inland waterways & boats covered by the RCD.

1. Gas Hoses must comply with the requirements of BS 3212, Type 2. Type 2 hose is suitable for pressures not exceeding 17.5 Bar. Refer to BS 3212 for requirements concerning colour, end fittings, marking etc. Note that BS 5482 Part 3, Clause 11.3 & ISO 10239 requires hoses used or connecting appliances to be Type 2. Braiding is not required except where abrasion may occur. British Waterways do not specify a life span: surveyor to use their judgement to condemn worn out or damaged hoses.
2. Fuel hoses including filler and vent hose must be to ISO 7840. Such hoses are suitable for petrol and diesel fuel and made up fuel hose assemblies must be CE marked.

LPG GAS

WARNING: Any work in gas installation should only be carried out by suitably qualified and competent persons. Attention is drawn to the Gas Safety (Installation and Use) Regulations 1994 (as amended) which require the installation of appropriate appliances, regular maintenance and testing of appliances. BS 5482 part 3 1998 refers to installation of LPG appliance in boats, yachts and other vessels.

Aquafax undertakes to supply gas appliances or fittings on the assumption that the installer is qualified and competent.

MEASUREMENT INFORMATION

Length

1 centimetre (cm)	= 10 mm	= 0.3937 in
1 metre (m)	= 100 cm	= 1.0936 yd
1 kilometre (km)	= 1000 m	= 0.6214 mile
1 inch (in)		= 2.54 cm
1 yard (yd)	= 36 in	= 0.9144 m

Surface or Area

1 sq cm (cm^2)	= 100 mm^2	= 0.1550 in^2
1 sq metre (m^2)	= 10 000 cm^2	= 1.1960 yd^2
1 sq km (km^2)	= 100 ha	= 0.3861 $mile^2$
1 sq in (in^2)		= 6.4516 cm^2
1 sq yard (yd^2)	= 9 ft^2	= 0.8361 m^2

Volume and Capacity

1 cu cm (cm^3)		= 0.0610 in^3
1 cu metre (m^3)	= 100 dm^3	= 1.3080 yd^3
1 litre (l)	= 1 dm^3	= 0.2200 gal
1 hectolitre(hl)	= 100 l	= 21.997 gal
1 cu inch (in^3)		= 16.387 cm^3
1 cu yard (yd^3)	= 27 ft^3	= 0.7646 m^3
1 pint (pt)	= 20 fl oz	= 0.5683 l
1 gallon (gal)	= 8 pt	= 4.546 l

Weight

1 gram (g)	= 1000 mg	= 0.0353 oz
1 kilogram (kg)	= 1000 g	= 2.2046 lb
1 tonne (t)	= 1000 kg	= 0.9842 ton
1 ounce (oz)	= 437.5 grains	= 28.35 g
1 pound (lb)	= 16 oz	= 0.4536 kg
1 ton	= 20 cwt	= 1.016 t

CONVERSION FACTORS

Length

Inches (in)	x 25.4	= Millimetres (mm)	x 0.0394	= Inches (in)
Feet (ft)	x 0.305	= Metres (m)	x 3.281	= Feet (ft)

Volume

Cubic inches (cu in: in^3)	x 16.387	= Cubic centimetres (cc: cm^3)	x 0.061	= Cubic inches (cu in in^3)
Imperial pints (imp pt)	x 0.568	= Litres (l)	x 1.76	= Imperial pints (imp pt)
Imperial gallons (Imp gal)	x 4.546	= Litres (l)	x 0.22	= Imperial gallons (imp gal)
Imperial gallons (Imp gal)	x 1.201	= US gallons (US gal)	x 0.833	= Imperial gallons (imp gal)
US Gallons (US gal)	x 3.785	= Litres (l)	x 0.264	= US Gallon (US gal)

Mass (weight)

Pounds (lb)	x 0.454	= Kilograms (kg)	x 2.205	= Pounds (lb)
Tons	x 1.01605	= Tonnes	x 0.9842	= Tons

Force

Pounds-force (lbf;lb)	x 4.448	= Newtons (N)	x 0.225	= Pounds-force (lbf;lb)
Newtons (N)	x 0.1	= Kilograms-force (kgf:kg)	x 9.81	= Newtons (N)

Torque (movement of force)

Pounds-force inches	x 1.152	= Kilograms-force centimetre	x 0.868	= Pounds-force inches
Pounds-force inches	x 0.113	= Newton-metres (Nm)	x 8.85	= Pounds-force inches

Power

Horsepower (hp)	x 745.7	= Watts (W)	x 0.0013	= Horsepower (hp)

Pressure

Bars	x 14.5	= Pounds-force per square inch (psi; lbf/in^2; lb/in^2)	x 0.069	= Bars