What every sailor needs to know about seacocks

Thousands of yachts, including new ones, are in danger of sinking, due to through-hull fittings made from brass rather than bronze. Yacht surveyor Paul Stevens, explains how confusion in some chandlery could put your boat at risk.

All boatbuilders used to fit high-quality bronze seacocks and skin fittings because cheaper brass fittings are known to fail, with potentially catastrophic results. Yet in recent years, some of the world’s leading boatbuilders have been using ordinary brass fittings below the waterline. These typically consist of 40% zinc and are patented not suitable for use below the waterline. Equally worrying, many yachtsmen, due to lack of advice or good labelling, are buying replacement seacocks made of brass assuming they are buying bronze or DZR (dezincification-resistant) brass. As a yacht surveyor, I have seen hundreds of brass seacocks and associated fittings that are unfit for use in salt water, on a wide range of boats.

What's wrong with ordinary brass?

In salt water, brass – an alloy of copper and zinc – is prone to a form of corrosion called dezincification. Zinc is leached from the metal and the remaining copper shell becomes porous and fragile. The result is often referred to as the metal becoming ‘caramelly’, due to its colour.

In the past, boatbuilders who used brass fittings were usually caught out and had to improve their specifications. But everything changed in 1998, when the European Community’s Recreational Craft Directive (RCD) came into force. Where seacocks are concerned, it has made matters worse.

All boats must now conform to a wide range of compulsory ISO standards. The standard for metallic seacocks and through-hull fittings (ISO 9093-1) states: ‘Materials used shall be corrosion-resistant...’ But amazingly, the directive defines corrosion-resistant as: ‘a material which, within a service time of five years, does not display any defect that will impair tightness, strength or function’.

The four main types of seacock: pros and cons

Traditional

In common use for many years, this type has proved extremely reliable. It consists of a tapered, revolving hollow plug with an aperture in the side, located in a body with a matching taper. When the apertures are in line, the seacock is open. Manufactured by Blakes for decades, originally of bronze but of DZR in more recent years.

Pros:

- Instant visual indication of whether open or closed
- Only one moving part
- Supplied as an assembly, with fixing bolts made of material completely compatible with the seacock
- Very easy to dismantle for inspection and service

Cons:

- More expensive than other types

Gate valve assembly

This is a through-hull fitting with a gate valve and a hose tail fitting. They used to be quite widely used, but are

Pros:

- Easy and quick to operate, with immediate visual indication

Cons:

- Triple the risk of dodgy materials, because there are three separate components that are not usually supplied as an assembly

Ball valve assembly

Through-hull fitting with ball valve and hose tail fitting. This is in almost universal use in new boats. Ball valves have a rotating ball within the bore, with a hole right through it. When this is in line with the bore, the valve is open. Only a 45° turn is required to close it, which gives the required visual indication.

Pros:

- Reliable and has a long life
- Provided that all the components in the assembly are made of corrosion-resistant materials such as bronze or DZR
- Less expensive than traditional seacocks, although the difference is not that significant when all three components are made of the appropriate materials

Cons:

- Requires quite a lot of space in the larger sizes as used for cockpit drains or heads discharge
- Millions made in ordinary brass
- No mandatory marking scheme, so you may not be able to tell good ones from bad ones

Prefer Plastic?

Many used boats have gate valves. This one is terminally corroded no longer found on new boats. A gate valve is exactly what it says: a circular gate is screwed down into the body of the valve to close off the bore. Many older boats still have them. Provided good materials have been used, they will generally last well.

Pros:

- Instant visual indication of whether open or closed
- Only one moving part

Cons:

- More difficult to dismantle for inspection and servicing
- Through-hull fitting with ball

For plastic seacocks, although the difference is not that significant when all three components are made of the appropriate materials

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Most modern boats have gate valves. This one needs replacing.
**Five-year lifespan – or less!**

Is a five-year service life acceptable for crucial below-the-waterline fittings? If I were buying a yacht, whether new or second-hand, I would be very uncomfortable that such a vital fitting could fail and sink the boat after just five years. This is all the more unacceptable because we could be using other materials that are proven to have a life far in excess of five years. In 1980, a British Standards specification was issued for a new type of brass, designated C2323, which was resistant to dezincification. This is now known as DZR (dezincification-resistant) brass and has the EU designation of CW620N. This material is proven to be the equal of bronze in a saltwater environment, and is now in common use. Unfortunately, the other similarity it has with bronze is price.

In the absence of any special circumstances, such as current leakage and associated electrolytic action, ordinary brass will probably last the prescribed five years. Brass is about a quarter the cost of bronze or DZR, so the decision to use it is being driven by cost.

**Buyers face a lottery**

The situation is even more difficult for yacht owners and yards replacing fittings as part of good, preventative maintenance. The ball valve has become by far the most common type of seacock used and immediately the problem is multiplied compared to traditional seacocks, because there are three components in the assembly: the through-hull fitting, the valve and the tailpipe to take the hose. These components may have been sourced from different suppliers and there is no mandatory requirement to mark them. Buying these can be a complete lottery. One well-stocked chandlery, Yachting Solutions, in Burnham-on-Crouch, Essex, sells the components loose, but the proprietor is knowledgeable and everything is properly marked. Proprietor Andy Ramsey says: ‘Customers can face a lottery, particularly online. It’s vital they get good advice.’

Because brass, DZR and bronze are virtually identical in appearance, it’s not surprising that there is confusion. Where these items are packaged, there is a tendency to clearly mark DZR and bronze items, but not to mark brass at all, with potentially disastrous consequences. I recently bought two taillights, as would be used on a typical heads discharge assembly, in a large, well-known yacht dealer’s shop. They were shrink-wrapped onto backing cards and the bronze one was described. But the brass one was not marked at all. Both were absolutely identical in appearance and presentation, apart from one little word – if it doesn’t actually say ‘brass’ or ‘DZR’, you must assume that it isn’t.

**Tovnal spells danger**

Brass is supplied under the name Tovnal. A few minutes searching the World Wide Web will reveal mail-order catalogues describing the ordinary 60/40 brass alloys. Several companies make sure you are getting the right ones. With such pressure on costs, the temptation to use cheaper components, which look identical, is strong. With underwater through-hull fittings, any risk should be avoided. Bronze or DZR should be the only choices for all metallic seacocks and associated components.

My colleague John Ross, of Malta Yacht Surveys and I wrote to several major boatbuilders, asking how they could justify installing ordinary CW617N brass fittings in new boats. We received no response from the yacht builders, but a major motorboat builder, Sealine, offered the justification that they will last the five years prescribed in the RCD’s five-year description in ISO 9093-1, as I believe is being claimed in some quarters.

**How to tell good from bad**

Buying the right skin fittings and taillights is absolutely essential, but what of the valves themselves? The ball valve in the photo show far left is a CW617N brass valve but it is not all it seems. The marking ‘CW617N’ is the European designation for ordinary brass with a high zinc content. Ball valves are made in their millions using this material, because they perform so well in fresh water plumbing and piping systems, but the material is not classed as dezincification-resistant and should not be used in salt water. To be fair, this ball valve has thick walls and may well last quite a few years if immersed in seawater. But experience suggests that if any electrolytic action is present – and with the proliferation of shore power supply, plus extensive onboard electrical systems, this is common – then the rate of dezincification is rapidly accelerated. That is exactly what nearly sink our Random Harvest, and it has also affected the brass ball valve pictured (centre right). The wall of the valve is badly dezincified and has just sheared off!

Many boat owners believe the ball valves and associated components in their boats to be made of DZR or bronze, but, in fact, some are ordinary brass alloys – typically containing 40% zinc. The Copper Development Association has set up a UK scheme to mark genuine DZR valves with the designation ‘CR’ but this is not mandatory.

**Inadequate labelling**

Many suppliers’ websites and packaging are clear in their description of materials. But are they? Alan Cousins of Seawax, in Burnham-on-Crouch, concludes that ordinary brass in seawater and, as a result, has decided that ordinary brass will not meet the RCD’s five-year specification. I believe is being claimed in some quarters.

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