

Heating Controls, Pipes & Fittings

Bright future for stainless plumbing



Stainless steel plumbing is often seen as expensive, tricky to work with and difficult to get hold of. In this article for the Bulletin, the British Stainless Steel Association puts its side of the argument and offers some free publications on the subject

While copper and plastics dominate the market, stainless steel is frequently seen as restricted to a few specialist applications. However, this picture is changing. Recent research carried out by the British Stainless Steel Association (BSSA) has highlighted growing interest in stainless steel in a wide range of plumbing applications, supported by successful installation in an increasing number of major projects.

The corrosion resistance of stainless steel is well known, but the reason for it is not always appreciated. Stainless steels are protected by their alloy content, which creates a thin, very adherent oxide layer on the surface of the steel. This protective layer is self-repairing in air and water. As a result of its corrosion resistance, stainless steel systems do not require a corrosion allowance or coatings and can be left visible to the eye if required, blending well with modern architecture and interior design.

With excellent corrosion-erosion characteristics even at water flow rates over 30m/s, stainless steel can easily handle changes of cross-section, sharp changes in direction and turbulence downstream of pumps and valves. As high flow velocities can be accommodated, smaller diameter pipe sizes can be used for the same mass flow rate than would be permissible with conventional materials.

As a strong material, stainless steel is not easily damaged by use in public areas. Designers can take account of these higher strength properties to further influence diameters and wall thickness. The resulting reduction in weight can be valuable in terms of structural design, as well as in ease of installation and overall system cost.

With environmental issues increasingly to the fore, stainless steel performs well in the full range of potable waters covered by the European Drinking Water Directive. Leaching of alloy constituent falls well within limits allowed for products in contact with drinking

water. In Germany, the market share of stainless steel is forecast to increase further as a result of the revised German standard DIN 50930, which prohibits galvanised steel plumbing or allows it only where the water pH is high (above pH 7.5/7.6). The standard, which is likely to become a 'European EN standard', also creates certain restrictions on copper as a plumbing material. By contrast, 316grade stainless steel can be used without limitation.

While these features of stainless steel may be recognised by the contractor, they are often seen as offset by three key issues: ease of installation, cost and availability.



A pressfitting tool for stainless tube

While it is strong, stainless steel is also ductile and, using the appropriate tooling, is not in fact difficult to bend and cut. The most efficient and cost effective method of joining stainless steel pipework is by pressfitting. This technique takes less time and less manpower for a large installation than other joining methods, and hence is a popular choice for hospitals and other large, public and commercial buildings. As this method is also flame free, quick-to-joint and low weight, the installation cost can be substantially reduced, compared with other techniques. Where other techniques are required, compression and capillary fittings are readily available.

Stainless steel plumbing systems are, for the most part, more expensive in terms of initial cost than copper or plastic. However, while copper can be cheaper in the smaller diameter (15mm to 22mm) pipes and fittings, the gap tends to decrease in the middle range of diameters (28mm and 35mm) and to equalise in the largest diameters (42mm to 108mm). This suggests that economies of scale have a significant impact and that prices of stainless steel will tend to fall with increasing use.

Despite the higher initial cost, the economic benefit of stainless steel systems increase over time. In larger installations, the overall difference in cost of installing a commercial plumbing system may be minimal between copper and stainless steel. Lower maintenance, system downtime and replacement costs can make stainless steel cheaper over the complete life cycle of the installation. At the end of its useful life, stainless steel is fully recyclable and like copper retains a high residual scrap value.

The need to make stainless steel systems readily available to the plumbing contractor is being increasingly addressed by suppliers. A full range of market leader 'Mapress' products are stocked by leading distributors, including Pipeline Center, and products and systems from other suppliers, such as Coventry Permatube and Lancashire Fittings, are increasingly available on the market. Pressfitting tools are also available for hire as well as purchase. It is advisable for contractors to source from a single supplier or system, to obtain the desired warranty. For optimum performance from stainless steel products, care must be taken throughout the design, installation and testing phases. Advice on alloy selection and installation is available both from suppliers of stainless steel systems, as well as from non-commercial sources, such as the Nickel Development Institute (see www.stainlesswater.org) and the BSSA (www.bssa.org.uk).

Stainless steel has been used in a number of major projects including:

Royal Opera House, Covent Garden

Refurbishment of this major land mark historical building was completed in 1997 by Balfour Kilpatrick. In excess of 30,000m of stainless steel tube using the Mapress system was used with sizes ranging from 15 to 108mm, covering every aspect of potable water distribution.

Ightham Mote, Ivy Hatch, Kent

Stainless steel was used for the domestic hot and cold water services in the National Trust restoration programme of this medieval moated manor house. The consulting engineers were Gifford and Partners, Southampton, who are highly experienced in dealing with the special problems associated with historic and listed buildings. Not surprisingly the National Trust operate a "hot work ban" within the property and all service

pipework must be installed without the use of heat. Furthermore, all renewed and installed services are required to have a high mechanical integrity and long working life. All these stringent requirements could be met by the Mapress stainless pressfit system.



Stainless steel is increasingly used in Scottish hospitals

Scottish Hospitals

Corrosion of copper pipework in domestic hot and cold water services in hospitals in many areas of Scotland, where water is soft and contains high levels of sediment, has led to increasing use of stainless steel as well as plastic systems. Indications from over 10 years experience are that the stainless steel installations are performing well, both in terms of leakage prevention and reduced maintenance. The Scottish experience suggests that stainless steel will be particularly well suited for installation in other regions of the U.K. with similar, soft water conditions.

These and other case studies demonstrate a growing interest in stainless steel for plumbing applications and a developing track record of success. Stainless steel offers a range of benefits, with particular importance attached to its resistance to corrosion, extremely low leaching rates and low maintenance requirements. These make it particularly suitable for large-scale installations in segments of the commercial and public sector, such as hospitals, children's and old

people's homes, prisons, schools, libraries and hotels. With easy-to-fit systems readily available and with the potential to bring stainless within the reach of budget conscious contractors, we forecast that there is a bright future for stainless plumbing.

Technical advice on stainless steel is available from the BSSA at www.bssa.org.uk and from the Nickel Development Institute [NiDI] at www.nidi.org. The following publications are also available (f.o.c.) from enquiry@bssa.org.uk

The Suitability and use of Stainless Steel for Plumbing Applications, BSSA, 2003

Stainless Steel Plumbing, NiDI, 1997

