DWK LIFE SCIENCES
DURAN WHEATON KIMBLE

HOW TO USE JOINTED GLASSWARE SAFELY

UNDERSTANDING THE DIFFERENT TYPES OF JOINTED GLASSWARE AND HOW TO USE THEM

Many traditional chemistry assemblies found in the lab require connected pieces of equipment.

Distillation, extraction, filtration and reflux processes all require various complexities of laboratory glassware assemblies, for example, and while many of the scientists who helped develop these techniques had to resort to custom made glassware, bungs and rubber tubing to connect items, the invention of interchangeable jointed glassware has meant many more – and safer – options are now available.

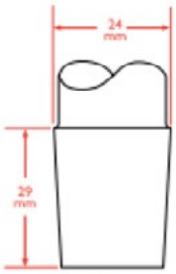
In this blog, we will look at the various types of jointed glassware available, where each type is most commonly used, and explore some basic techniques for its safe maintenance.

THE TYPES OF JOINTED GLASSWARE EXPLAINED

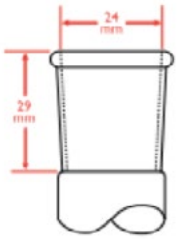
The use of jointed glassware helps to avoid spills and leaks of potentially harmful and often valuable substances during experiments. However, while its benefits are clear it is important you select the right type of jointed glassware for the process you are carrying out. There are a number of different types of joints, each with their own specific functionality.

Conical Joints

These are the most common type of ground glass joint and feature a tapered cone and socket. Sockets of this kind often feature a rounded rim profile, which gives additional strength to the joint while also making them less prone to chipping than a square rim profile.



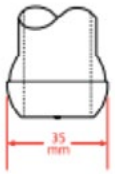
24/29 cone



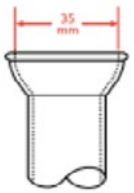
24/29 socket

Spherical Joints

Spherical joints should be used for techniques where some flexibility in the angles of the glassware being connected together is required. They are commonly used to connect receiving flasks to rotary condensers for example, whose weight can increase significantly as the flask fills. The spherical joint allows the flask to be connected to a sloping condenser at a vertical angle, thus reducing the strain placed on the joint.



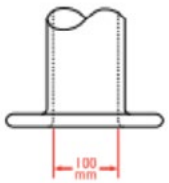
S35 ball



S35 cup

Flange Joints

Flange joints, or butt joints, are used to provide straight line connections along assemblies. This type of connection is commonly used for pipeline constructions and on large capacity flasks and reaction vessels. The ability to use wider flange joints provides easier access to the contents of flasks and tubes.



100mm bore flange

Screw Thread Joints

Screw thread joints provide a strong but easily adjustable connection. They are ideal where the length of an assembly might need to be varied, and a sliding joint can be employed to achieve this. Double ended screw cap glassware is also commonly used, enabling lines to be adjusted from either side for even greater flexibility.

28 screwthread

HOW TO OPERATE JOINTED GLASSWARE SAFELY

As with all laboratory glassware, there are some basic steps you need to follow to ensure the safe, sustainable use of jointed glassware.

It is important to always wash new glassware before its first use to avoid contamination from packaging fibres. You should also examine the glassware to ensure it is not scratched, chipped, cracked or etched as any defects will reduce the mechanical strength of the glassware and may cause it to break during use.

However, there are also a number of specific considerations to ensure the safe handling and repeated use of jointed glassware.

1. While silicone grease may be used to help seal a joint, many joints are designed to be used without it to avoid contamination. A cleaner and non-contaminating alternative is the use of a PTFE Joint Sleeve that fits between the cone and socket joints.

2. Always check the maximum temperature guidelines for the equipment you are using. Although the maximum recommended temperature for labware made from borosilicate glass is 500°C (for short periods only), the working temperature for any other items associated with the joint, for example plastic connections, stoppers, tubing, etc, could be much lower.

3. When using temperatures above 150°C, heating and cooling should be carried out in a slow and uniform manner to avoid breakage by thermal shock.

4. If using a hotplate as part of your assembly, ensure that the top plate is larger than the base of the vessel to be heated. And never put cold jointed glassware onto a pre-heated hotplate.

5. When using a Bunsen burner, employ a soft flame and use wire gauze with a ceramic centre to diffuse the flame. This will avoid 'hot spots' developing on the joints or anywhere else in the assembly which could cause it to break.

6. Do not apply high temperature or heat sources directly to any item of volumetric glassware included in a jointed glassware assembly as this will impair the volumetric accuracy.

7. Take care if you are using jointed glassware in a microwave. If your jointed glassware is made from borosilicate glass then this element will be microwave safe. But care must be taken to ensure the contents and any attachments are also microwave safe.

8. Jointed glassware can occasionally seize after a process is carried out. If this happens the jointed glassware should first be allowed to cool naturally and should then be emersed for a short period in lukewarm water containing a detergent suitable for cleaning laboratory glassware. This will loosen the seized joint and should allow you to disconnect the elements without having to apply excess pressure to the glass. It is important this is avoided to ensure the glass does not break or is not damaged ahead of subsequent re-use.

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