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Posted by Anonymous on Wed, 2019-08-28 14:01

Glass stoppers fused to bottles: Do you have any advice regarding dealing with the (safe) removal of ground glass stoppers from reagent bottles, which have frozen to the joint? Especially those that have chemical solutions still in them. Many thanks

Voting:



No votes yet

Laboratory Technicians:

Laboratory Technicians

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Submitted by sat on 28 August 2019

Great care is required to free a frozen ground glass stopper from a reagent bottle containing a chemical solution due to the:

- Potential for the glass to break which may result in severe personal injury such as serious cuts and/or serious eye injury.
- Type of chemical present which will determine the type of removal method.

Science ASSIST recommends that unless it is absolutely necessary, the best solution is to arrange for disposal of the reagent bottle with its contents via a chemical waste contractor

rather than attempt to free the frozen stopper. In addition, if the reagent bottle contains a solution that requires professional disposal, there is no point in trying to remove the stopper.

If you wish to try to free any frozen joint, similar methods can be used as for seized Quickfit® joints. The following safety procedures and techniques are recommended:

Safe Procedures:

- Wear suitable personal protective equipment (PPE) – safety glasses or face shield, thick insulated gloves, laboratory coat and closed in shoes.
- Consider the use of a towel to wrap around the glass reagent bottle to minimise the risk of cuts from any broken glass.
- Do not apply too much force, but use gentle twisting when trying to remove the stopper to minimise the risk of glass breakage.
- Do not apply heat if dealing with a flammable or volatile chemical such as an organic solvent, or if there is the possibility of pressure build up in the bottle.

Techniques to try to loosen a frozen joint:

1. **Gently tap the stopper:** away from you with a wooden dowel or spoon. Work over a benchtop with a towel that will cushion the stopper to prevent it breaking if it falls out.
2. **Lubricate the joint:**
 - **If there is a chemical deposit inside the joint:** you may need to wet the whole joint area to dissolve the deposit before trying to work the stopper free. The type of liquid to use would depend on the chemical deposit and whether it is water or alcohol soluble.
 - **If there is no chemical deposit inside the joint:** then the addition of a lubricant such as glycerol or lubricating oil at the junction of the stopper and bottle would be needed to penetrate into the joint before trying to gently work the stopper free.
3. **Apply gentle heat to the joint area and try to loosen the stopper:** This can be in the form of a towel soaked in hot water, running hot water from a tap or hot air from a hair dryer. The heat should be directed rapidly and evenly over the outside of the joint allowing it to expand, whilst at the same time avoiding the heating of the inner joint before trying to twist out the stopper.
 - **Remember:** A heating technique should not be considered if the bottle contains a flammable or volatile chemical such as an organic solvent or there is the possibility of pressure build up in the bottle.
 - Note: it is not recommended to heat the joint with a flame as this may lead to rapid expansion and possible cracking of the joint.

If the above do not free the joint, then you may need to dispose of the glassware.

Prevention:

Prevention is better than cure:

- Do not store alkaline solutions in bottles with ground glass stoppers.
- Teflon stoppers are a better alternative to ground glass stoppers
- Screw cap lids may be more suitable

References and further reading:

'Care & Maintenance of Laboratory Glassware' Scilabware website,
<https://www.scilabware.com/en/technical/glassware-care-maintenance> (Accessed August 2019) See 'Ground Glass Joints'

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<https://www.geneseo.edu/chemstockroom/ground-joint-glassware> (Accessed August 2019)

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