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What About Glass?

Technical Tips

by Lonza Scientific Support, U.S.

Composition differences between glass types result in quality differences. Borosilicate glass is more durable than the softer soda-lime glass. For an LAL test, what may be most important is the reactivity of the glass with the solution stored in it.

If you open the nearest general laboratory products catalog to the section containing test tubes, you will find a variety of sizes and shapes from which to choose. For the purpose of this discussion, let's focus on the 10 x 75 mm glass reaction tubes used for the gel clot assay. By concentrating on this subset of tubes, you will see that there is still an assortment of tubes available. The descriptions of the tubes include words like borosilicate, flint or soda-lime. Before determining which tube type is appropriate for LAL testing, an understanding of the difference between these three terms would be helpful. With some gel clot lysates, functionality may vary with the type of glass used for the reaction vessel. Lonza PYROGENT® Gel Clot Lysate performs similarly with borosilicate and soda-lime tubes. In order to make an informed decision about test tubes, we need to take a closer look at glass.

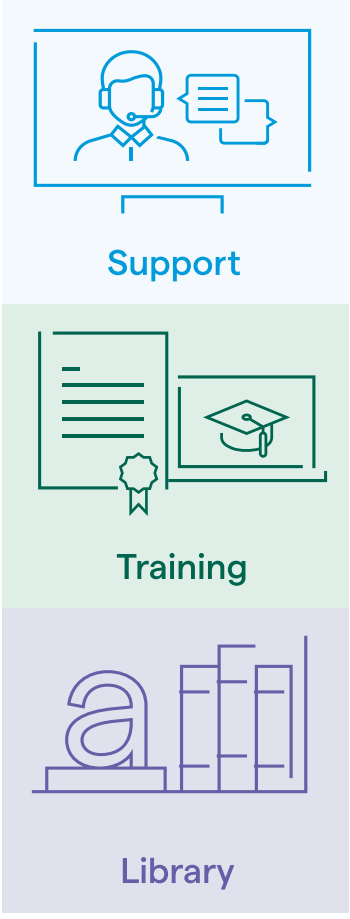
The words borosilicate and soda-lime refer to the composition of the glass used to manufacture the test tube. In some instances glass is described in terms of a "type". Type I glass is borosilicate glass. Soda-lime glass is Type III. "Flint" refers to the color of the glass. Borosilicate and soda-lime glass are flint glass if they are colorless. "Amber" glassware is brown and is used to protect the contents inside from light.

As part of the Lonza endotoxin detection portfolio, we supply depyrogenated test tubes. These tubes (catalog numbers N201, N205 and N207) are labeled "USP Type I Flint Glass" and, therefore, are colorless borosilicate glass tubes.

Composition differences between glass types result in quality differences. Borosilicate glass is more durable than the softer soda-lime glass. For an LAL test, what may be most important is the reactivity of the glass with the solution stored in it. Chapter <660> of the United States Pharmacopeia (USP) NF contains the chemical resistance requirements for glass containers. This chapter describes the use of the Glass Grains Test to determine that chemical resistance. The test procedure involves crushing the sample glass, extracting leachable

alkaline compounds from the glass grains with water at 121C for 30 min adding a pH indicator to the extracted fluid, and titrating the solution with acid. The chemical resistance of the glass is determined based on the amount of acid required to neutralize the extract (bring the pH indicator back to its original state). The limits for each glass type set by the USP are specified in terms of milliliters of 20 mM hydrochloric acid per g of glass grains. The limit for soda-lime glass is greater than that for borosilicate glass (0.85 mL/g vs. 0.1 mL/g).

A higher limit implies that soda-lime glass leaches more alkali into the water used for extraction than does borosilicate. Therefore, soda-lime glass may affect the pH of solutions which come into contact with it. Borosilicate glass, being more inert, should have less effect on stored solutions. It is for this reason that Lonza provides borosilicate tubes and specifies them for use with the PYROGENT® Gel Clot LAL Assay. For long-term storage of samples, borosilicate glass should be the glass of choice.



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