

Highlighting innovative design features
and useful application information for
Thermo Scientific™ Nalgene™ plastic bottles

smart notes

design and innovation ► Nalgene HDPE storage bottles

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Q A

Why is a low metal content within the plastic walls of High Density Polyethylene (HDPE) storage bottles important?

Due to the nature of plastic, many contaminants found within plastic resins can leach into solutions in direct contact and can contaminate. Therefore low metal content is very important. Highly sensitive reagent solutions stored in HDPE bottles are especially susceptible due to the length of time the contents are in contact with the bottle.

Even small concentrations of specific metals can alter results. Calcium, magnesium, and zinc can cause protein precipitation and/or enzyme inactivation. Peroxidase reaction reagents are very sensitive to iron and manganese that can degrade hydrogen peroxide. Results in blood tests for levels of calcium and magnesium are sensitive to reagent contamination with these metals. Using containers with high metal content may result in higher costs due to the contamination of high-value content.



High quality bottles help protect important and valuable contents

HDPE Bottle Metal Content

(ppm)

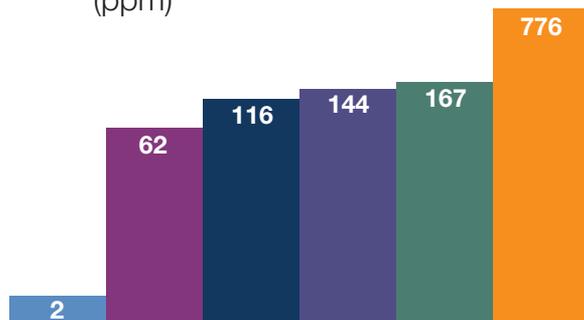


Figure 1. Total metal content (plus silicon and phosphorous) in various brands of HDPE bottle, in parts per million (ppm). Y-axis is logarithmic.

Quality and metal content

Part of the quality offering with these types of containers is preventing contaminants from altering the contents, which would compromise the integrity of any assay that uses reagents stored in them. The high quality of both the virgin plastic resin and the process and tooling used to mold these bottles allows us to produce bottles with very low metal content. To determine the metal content of bottles, portions of the bottle wall were analyzed using inductively coupled plasma mass spectrometry to determine contaminant content.

High Quality in Nalgene bottles

Nalgene bottles were found to contain far less metal than any competing brands, with the nearest competitor more than an order of magnitude higher (Figure 1). Even examining specific contaminants, Nalgene bottles were found to have the lowest levels (or below the limit of detection) in 12 out of the 17 substances tested, and were very near the lowest levels in 4 of the remaining substances. In some cases, competitor levels ranged as high as tens (or hundreds) of parts per million, whereas contamination in Nalgene bottles was found only in parts per billion.

► Summary

The extremely low quantity of detectable metals is indicative of the high quality of both the resin and the process used to manufacture Nalgene HDPE bottles.

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