

Bottles and jars for hot filled beverages

# Standing the heat



PET bottles can be considered heat-resistant once they are able to pass a filling temperature of 85°C. This can be achieved with a special heating, crystallisation and blowing process. In the process of blowing hot fill bottles, a number of technological specifications are required: for example in order to reheat the preforms for the hot fill bottles to be blown properly, the temperature has to be 10-15°C higher than would be used for the same preform/bottle combination for a cold fill. Terekas Sweden AB supplies both the stretch blow moulding systems and dedicated PET preforms for hot-fill bottle production.

The blow moulds that are used during the blowing process have to be heated up to 120-140°C rather than being cooled as in the case of cold fill bottles production. This measure is necessary for the crystallisation process to be performed. In addition, high crystallinity levels increase the thermal resistance, minimising the risk of bottles being distorted.

Depending on the filling temperature as well as the size and wall thickness, Terekas offers several bottle design options. To begin with, there is a standard rounded bottle with collapsible panels that work as the absorber of vacuum so that the bottle walls do not collapse after cooling down. Additionally, in order to withstand the thermal load, such bottles are significantly heavier compared to bottles for water or

carbonated soft drinks. A standard bottle shape without panels is also an option which requires liquid nitrogen dosing equipment due to the vacuumation effect that begins when liquid is cooling down. Nitrogen helps counteract this effect so as to sustain the correct bottle shape. The nitrogen replaces the oxygen in the headspace, warms up, and fills in the amount lost during the shrinkage. It thereby increases the pressure inside the bottle just after the filling and may thus reduce or equalise the vacuum acting on the bottles. In addition, an option of rounded bottles with heavy ribs secures the maximum hot fill bottle strength. Finally, bottles of a squarish/oval design form are also available and well-liked by bottlers although the bottle base length can only be up to two times larger than the width. It also requires nitrogen dosing equipment when filling.

The bottles are popular amongst bottlers producing freshly squeezed fruit or vegetable juices, mixtures, syrups or any other healthy drinks that require a filling temperature up to 85°C and from 250ml to 1l in size, says Terekas. A major benefit of PET hot fill bottles is that a fill temperature of 85-93°C is already a healthy option, since all non-carbonated drinks containing sugar are sensitive to microbial contamination and therefore require a sterile container. For the most part, the temperature is sufficient to eliminate the need for preservatives to be added to the product, making it healthier and extending the product shelf life, and, as a result, preserving the same taste for a longer period of time.

Thus, hot fill bottles have a wider 38mm neck opening in comparison with cold fill PET bottles, making the bottle design highly attractive to juice lovers. Furthermore, when it comes to considering the investment in filling equipment, there could be significant cost savings for bottlers to use a hot fill PET bottles line rather than an aseptic filling line. Thus, compared to a closed environment carton tetra pack line, the advantage of having a hot fill is that it has virtually unlimited design possibilities.

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