

Press Release

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Laser Drilling High-Density Polyethylene

Products based on high-density polyethylene (HDPE) are commonplace in everyday life. Its purity means that HDPE products are approved by the FDA and USDA for direct contact food-grade use. Blow-moulded HDPE jugs are used to package milk, water, and fruit juices, as well as detergents and motor oils. Injection molding processes produce HDPE yogurt and margarine containers. Because HDPE also resists solvents and acids, sheets of HDPE are used as containment liners to prevent soil and groundwater contamination in sanitary landfills.

In this laser-drilling application, the task was to drill 0.71 mm (0.028") diameter holes through the rim of blow-moulded HDPE containers. The drilling set-up consisted of a *Firestar f201* (200W) laser and a fixed beam delivery system containing a 127 mm (5.0") positive meniscus lens.



This optic provides a 203 micron (0.008") focused spot with a 6.35 mm (0.25") depth of focus. In addition, an air assist at a pressure of 3.4 bar (50 PSI) was used to eliminate any melting or heat effect in the drilled area. To produce the desired hole diameter of 0.71 mm (0.028") with the 127 mm lens, the part was fixtured approximately 5.1 mm (0.20") out of focus. Using a PWM frequency of 5 kHz, a power level of 200 watts was set and fired the laser for 0.22 seconds. The resulting hole diameter in the 1.8 mm (0.07") thick HDPE material meets the customer's specification precisely with no charring or melting of the surrounding material.

Picture: This precise 0.028" diameter hole was drilled through the rim of an HDPE container using 200 watts of power and 50 PSI of air assist in a cycle time of 0.22 seconds per hole

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