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iSecure Syringe



Molder: All west Plastics Inc.

Moldmaker: KTW Group

Designer: John Domkowski / Robert Oshgan

OEM: Hospira Inc.

Product Description



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The Hospira iSecure syringe is an innovative, tamper evident single dose, ready-to-use, disposable syringe. The simple preparation process requires no ancillary supplies, streamlining workflow and lowering injection costs compared to traditional vial administration. The syringe is designed to be compact and self-contained for easy storage and administration. The pre-filled and ready to use platform helps reduce the potential risk of drug contamination along with standardize dosing, ensuring accuracy of drug delivery. The iSecure pre-filled syringe is unique in the fact that it reduces the environmental footprint by eliminating traditional packaging reducing hospital waste. Unlike other pre-filled syringes that utilize external packaging to aid in tamper evidence; Hospira's iSecure syringe tamper evidence is integrated in the primary cap label, tamper band and in the protection of drug cartridge prior to activation. The actual size of the iSecure 1ml product is 3.4" which provides storage flexibility in Automated Dispensing Machines (ADM). The reduction of the outside packaging coupled with the mounting of the plunger rod adjacent to the syringe body allows hospitals to store multiple units into a single drawer in the ADM platforms.

Why is the product innovative?

The Hospira iSecure Syringe was developed with specific goals in mind. The foremost of which was manufacturing cost. To spearhead this, iSecure utilizes an innovative plastic process technology of multi-shot molding in a unique form, as the entire molded device of four components are manufactured within one injection mold. To further differentiate the design and manufacturing of the iSecure Syringe, all components of this device are non-bonding (mechanical or molecular) which allows for the select disassembly by the user. Taking this path eliminated the need of costly assembly equipment while reducing what conventionally would have been four injection molds into just one multi-shot injection mold that vastly reduced the overall manufacturing cost of this product. With this in mind, the development of the device proved to be challenging as this technology dictated many areas of the product while still having to meet the specific criteria set at the start of the development cycle. Focusing on manufacturability, allowing for this four component device to be manufactured within one injection mold required the use of three different polymers. Opposed to conventional multi-shot molding, these polymers could not bond to each other in any combination as the device would become a failure. The device is molded in three separate positions within the mold with one position molding two of the four components. The first polymer required was for the "body" of the device, of which a copolyester was selected. The requirement for this component was to be water clear and protective as it encapsulates the sterile drug cartridge that is assembled into this device for final product. The second polymer was for the "Plunger", that required stiffness for which a polypropylene was selected. The final polymer that forms the "Tamper Band and Cartridge Clamp" was a delicate combination of opposing requirements which a middle of the road solution was required to balance out the criteria. For this a low density polyethylene was selected that allowed for the "Tear Band" to be flexible and to be able to tear, creating the tamper evident feature and the "Cartridge Clamp" which required a living hinge and a strong snap feature. From the part design, a balance of moldability and function had to be harmonized. These



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challenges included, but were not limited to the removal of features that would require actions in the mold (i.e. slides, unscrewing cores, etc.). This was painstakingly accomplished in this part design by identifying the molding process up front and using the multi-shot technology as a baseline moving forward. By doing this, the product design was able to conform to multi-shot molding, exceeding the development team's goals for manufacturing cost with the successful build of the first production mold, cycling at a rate under 10 seconds. In conclusion, the Hospira iSecure Syringe is an innovative, cost effective and unique device that exemplifies what the future holds in plastic part design and manufacturing.