

## JOHN DEERE HARVESTER COMBINE ACCESS DOOR

Entered by: GI Plastek



### Molder

GI Plastek

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### Designer

Brian Maas

### Moldmaker

PPD

### Original Equipment Manufacturer (OEM)

John Deere

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### Entry Description

Protection of, and access to, a John Deere combine engine housed beneath a rear wall component. The John Deere Harvester Combine Access Door weighs 35lbs and is 52" x 28". It is molded in nickel shell tooling using a high-density structural foam RIM polyurethane at 0.7 specific gravity. The part is in-mold coated to achieve a Class A finish in IMC Green.

### Why is this Part Innovative?

The part is being submitted for recognition as an innovative example of environmental responsibility. Specifically: the John Deere Harvester Combine Access Door is Reaction-Injection-Molded (RIM) using a feedstock resin developed from soybeans and is part of a larger program through which the same resin is molded to produce other parts such as exterior panels and a rear wall for John Deere Combines. 14 lbs of soybeans are consumed per each Access Door. There are 60 lbs in a bushel of soybeans. In producing the Access Door, ProTek™ In-Mold Coating System, a proprietary GI Plastek process, employs a grade of high-density structural foam RIM polyurethane believed to be the first commercial applications of a soy-based RIM formulation. The Access Door replaces a component previously molded with a RIM system derived from standard petrochemical sources. The new composite is extremely strong, but weights significantly less than a steel or SMC alternative. In addition to featuring an ecologically renewable resource, the performance of parts generate from the new structural foam polyurethane RIM formulation based on soybeans provides physical and processing parameters equivalent to conventional formulations...plus matches physical performance advantages related to strength and elasticity. Branded as HarvestForm™ by John Deere, the entire line of John Deere Harvest Works combines, beginning with 2002 model year, will feature the new composite in body panels. Among the many innovative features extending beyond environments factors is the fact that the new material is compatible with in-mold coating, thereby providing cost-saving versus the need to pain tin post production. The Access Door also meets a structural performance specification requiring that it can hinge open 30 degrees to provide easy access to the rear engine area. It has been projected that the longterm cost of molding with soybean and corn could be less than the traditional petroleum-based compounds used in the past. John Deere estimates that it will use approximately 600,00 pounds of the RIM based panels on production models in the next year, equating to a consumption of approximately 225,000 pounds of soybeans. Currently, the United States imports nearly 60 percent of its petroleum. An estimated 3% of the imported product is used in petrochemicals, including plastics. Because oils and fats from soybeans are chemically similar to petroleum it is anticipated that bio-based polymers can be used to replace anything currently made from petro-based plastic. The triglycerides in soybean oil can be chemically modified to introduce hydroxyl groups along their chains, making the modified oils useful as polyol components in polyurethane formulations. Urethane foams, in addition to urethane binders and agricultural films, are one of three market segments, identified by the United Soybean Board, as offering the best opportunities for soy plastics.