

Technology Brief

Performance Evaluation of Heavy Duty, 48 X 48 Coil Pallets Made From Recycled HDPE

The All Service All Packaging (ASAP) company of Green Acres, Washington has designed and manufactured a heavy-duty, plastic pallet specifically for the “heavy capacity” shipment of aluminum and steel coil.

The outside dimensions of the pallets are 48” x 48”. Each pallet has three stringers and five (5) top deckboards. The pallets have no bottom deckboards. The stringers are constructed of recycled, high density polyethylene (HDPE) reinforced with recycled fiberglass. The deckboards are made from 100% recycled HDPE. The recycled HDPE flake used in manufacturing the pallets was supplied by two different processors in Washington State.

With funding assistance from the Clean Washington Center (CWC), ASAP contracted with the William H. Sardo Pallet & Container Research Laboratory at Virginia Polytechnic Institute & State University, to conduct the evaluation of their coil pallet. The purpose was to test the strength and durability performance characteristics of the recycled content plastic pallet for use in the “heavy capacity” pallet market.

Key Words

Materials:	Recycled HDPE
Technologies:	Profile extrusion using recycled HDPE and recycled fiberglass.
Applications:	Plastic pallets, lumber.
Market Goals:	Plastics manufacturing; heavy duty pallet manufacturing.
Abstract:	Description of strength and durability testing on recycled plastic pallets.

The test objectives were to determine:

- average number of trips before pallet failure in a simulated rough handling environment.
- lateral collapse potential of the pallet.
- compression strength when stacked 1-high and 2-high.
- compression strength using forklift support.
- top deck edge impact resistance.
- stringer end impact resistance.

The pallets performed much better than expected in each of the tests conducted. The ASAP coil pallet will function safely and effectively based on the given material handling conditions, the pallet design, and the flatness and rigidity of the coil load. No compression failures were observed during strength testing.



All of the pallet failures that did occur, resulted from failure of the fastener at the stringer/leading edge deckboard joint, or a combination of lag bolt withdrawal and brash failure of the leading edge deckboards. With respect of the failure modes from pallet testing at Virginia Tech, a different type of fastener is recommended in the leading edge deckboards. The fastener must have greater withdrawal resistance and greater shear resistance. A bolt countersunk in the bottom of the stringer and on top of the deckboard with locking nuts would increase the withdrawal resistance. Increased shear resistance

may be obtained through higher grade or larger diameter fasteners.

The study results, showing that compression strength and durability of the pallet material far exceeded expectations, has provided ASAP with invaluable data and sales tools for maintaining and increasing their market for these pallets.

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For More Information

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