

PROBLEM STATEMENT:

Most nose cones for model rocketry in the 4-inch diameter category are made from HDPE plastic because of its easy ability to be blow formed. This material creates a significant issue for the modeler since HDPE is almost impossible to bond to without the process of plastic welding.

RESEARCH RESULTS:

This problem inspired my research into currently available products that may be applicable to a solution. An extensive survey was conducted over the Internet as well as personal conversations with persons in the business of model rocketry and in the business of adhesives development. The following table illustrates the products tested and the results ranked from best to worst. The test consisted of bonding a ¼ inch thick balsa piece on edge to an HDPE substrate. After complete drying/curing the balsa piece was manually forced sideways to failure.

Product Description	Manufacturer	Results	Cost
Scotch-Weld DP-8005 2 component acrylic	3M Company, Distributed by Ellsworth Adhesives	Very strong bond, balsa part failed-bond did not; VERY SUITABLE	\$23/35ml plus dispenser & nozzles
LOCTITE 401 Cyanoacrylate with LOCTITE 770 primer	Henkel Technologies, Distributed by Ellsworth Adhesives	Strong brittle bond, balsa bond failed; QUITE SUITABLE	\$23.34 for 1oz glue & 1oz primer
Turbo Fuse Super Glue with Turbo Primer	Palm Labs, Inc.	Reasonable bond in shear, not too good in peel, balsa part popped off with some modest resistance MODERATELY SUITABLE	\$14.47 for 1oz glue & 2oz primer
Super Glue with plastic activator	Do It Best.com From local hardware store	Weak bond, balsa part popped off easily NOT SUITABLE	\$3.18/3ml
Bondit B-45TH 2 component epoxy	RELTEK LLC	Very weak bond, balsa part popped right off; remains gummy for up to 3 days NOT SUITABLE	\$70/35ml plus dispenser & nozzles

In summary the product from 3M was superb; however, it must be handled with caution. The resultant surface of this product after drying is very rough because of bubble formation. It can be sanded and painted. The LOCTITE Product is also quite good and may be used for some applications, but it is not quite as strong as the 3M Product. As an aside, I also tried the Turbo Fuse primer as a paint primer and found the paint adhesion was much improved over conventional treatment of just sanding followed by alcohol wipe.

I hope this information is useful to the community of model rocket builders.