



FABRICATION OF HIGH TEMP COMPOSITE/ SYNTACTIC TOOLING

APPLICATION GUIDE

ADTECH
Plastic Systems

USING EL-325 HTTC

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SUGGESTED PROCEDURES FOR THE FABRICATION OF HIGH TEMPERATURE COMPOSITE/SYNTACTIC TOOLING FOR HIGH PERFORMANCE APPLICATIONS

1. After the pattern/model has been prepared with an appropriate sealer and/or mold release, catalyze ADTECH ES-215 Graphite Filled High Temp Epoxy Surface Coat and apply to the pattern or model at a thickness of 0.025" to 0.030" (**do not exceed 0.030" thickness**). Apply using a natural bristle brush or spatula (trim bristles to half the length to stiffen brush action).
2. When ES-215 reaches a tack-stage, be prepared to immediately apply a catalyzed coating of ADTECH EL-315R/EL-315-IHL High Temp Laminating Resin and begin to laminate 4 - 5 plies Style #7500 10oz Fiberglass Cloth. Vacuum bag after laminating the 4 – 5 plies, prior to the gelling of the laminating resin. Refer to work life information provided on product data bulletins. Maintain a minimum 20 inches of mercury vacuum.

Note: When using ES-215R/ES-215-IHG long work life hardener version it is recommended to allow gel coat to reach full tack stage which may require up to 10-12 hours at room temperature before applying first laminate. However, do not allow surface coat to cure to a tack free condition (non-sticky) before application of first laminate.

Apply peel ply to last laminate prior to vacuum bag materials. Removing peel ply will scarify and maximize bonding surface before laminating is resumed.

The application of dry cloth onto a pre-wet surface with a stipple brush or spatula will allow the laminating resin to flow up through the cloth, pushing air out ahead of it.

-The fabric should be cut into squares of 12" x 12" or 24" x 24" depending on the complexity of the pattern.

-Cloth edges should be placed tightly together. Do not overlap.

-Ideally, resin to fabric weight should be as close as possible to 50/50.

-Use the industry standard for the method of ply orientation.

-The laminate should remain under vacuum for a duration equivalent to 2 - 3 times the laminating resin systems work life prior to removal of the vacuum bag and peel ply. Refer to product data bulletins for work life information.

3. Remove the bag carefully without disturbing the laminate. Tip: Remove the vacuum hose and replace it with a compressed air hose. Feed in a small amount of compressed air. This will balloon the bag away from the laminate. Carefully remove the bleeder and perforated film (peel ply).
4. Apply bond coat to laminate using a 1:1 mixture of catalyzed ADTECH EL-325 HTTC High Temp Tooling Compound and catalyzed EL-315R/EL-315-IHL High Temp Laminating System. This bond coat mixture is brushed or spread on to the laminate to insure a proper chemical bond between the laminate and the tooling compound core.

-Thinly apply bond coat to a thickness of around 0.020" to 0.030".

-It is important that the bond coat is still wet during the application of ADTECH EL-325 HTTC Tooling Compound.

Continued on next page

5. Immediately mix the ADTECH EL-325 HTTC Tooling Compound by weight at 100 parts resin to 25 parts hardener (see Product Data Bulletin). The High Temp Tooling Compound has been formulated with a unique color coded natural resin and black hardener to yield a positive mix indicator of a uniform gray color.

Note: Small volume mixing can be done by hand, but for large volume and/or frequent use projects, a mechanical dough type mixer will be more practical and cost efficient.

6. In order to maintain a uniform tooling compound thickness on the mold or part you should have previously constructed a board 3-4 feet in length and 12"-18" in width with ½" shims mounted along both sides of the board. Place industrial wax paper on the board. Lay in the mixed tooling compound. Lay another sheet of industrial wax paper on top of the tooling compound and use 4" diameter PVC pipe to roll the tooling compound to ½" thickness. Remove the wax paper and cut the tooling compound into 8"-12" squares. These squares are then applied to the still wet bond coat. Care should be taken to insure that air is not entrapped between the tooling compound and the laminate.

If uniform thickness is not important, an alternate method of applying the tooling compound is to take the compound straight from the mixer, form softball size balls and pack them on the still wet bond coat. Each successive formed ball should be pushed into the inside leading edge of the previously applied material causing the tooling compound to mushroom and spread out over the surface, completely pushing out any air. This is the most effective, the least labor intensive and the quickest method of application. Tooling compound thickness can still be kept uniformly close to 3/8".

7. Debulk for 4 hours (overnight if necessary) after completing application of the compound. Remove the bag using the method described in Section 3.
8. Laminate 4 - 5 layers of Style #7500 10oz Fiberglass Cloth with EL-315R/EL-315-IHL Laminating Resin. Reference Section 2. Note: layers of fiberglass cloth should equal the number of plies used in step 2.
9. Debulk for 24 hours at room temperature.
10. Follow the preliminary cure schedule as described in the EL-315 High Temp Laminating Series Product Data Bulletin.
11. Attach the required support structure.*
12. Follow the post cure schedule as described in the EL-315 High Temp Laminating Series Product Data Bulletin.

*Note: Seal exposed areas of EL-325 HTTC High Temp Tooling Compound with a light coat of EL-315R/EL-315-IHL Laminating Resin.

FOR MORE INFORMATION PLEASE REFERENCE THE PRODUCT DATA BULLETINS BELOW

SURFACE COAT:	ES-215 High Temp Surface Coat Series
LAMINATING RESIN:	EL-315 High Temp Laminating Series
TOOLING COMPOUND:	EL-325-HTTC High Temp Tooling Compound
	EL-325-1-HTTC Slow High Temp Tooling Compound
SURFACE REPAIR SYSTEM:	ESG-215R/ESG-215-T High Temp Epoxy Patching Paste
	ES-215R/ES-215-1 High Temp Surface Coat
	P-17 High Heat Polyester Filler
MOLD RELEASE/SEALER:	MOLD SEALER MR #7
	MOLD RELEASE MR #10

Please carefully read and follow material safety data sheet instructions

Fabrication of High Temp Composite Tooling Using EL-325 HTTC / Revised 12/14/09
Supercedes 4/15/05