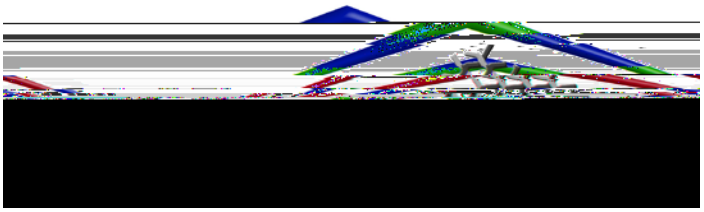

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NCAMP Process Specification
This specification is generated and maintained in accordance with NCAMP Standard Operating Procedures, NSP 100

Fabrication of NMS 451 Qualification, Equivalency, and Acceptance Test Panels (Solvay (Formerly Advanced Composites Group (ACG) MTM45-1 prepregs))

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REVISIONS

Revision	Date	Description
-	3/18/2011	Initial Release
A	4/7/2011	Added “MTM45” to the title page. Added “ACGP 1001-01” sections 1 and 2.4.

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- Open source

Note. Paper Chipboard was used for NMS 451/4 7781 E Glass and NMS 451/12 6781 S-2 Glass Qualifications.

3.6 **Tape**, Pressure Sensitive Flashbreaker Tape 375ºF minimum use temperature
Sources:
- D574A or equivalent #75 Blue Silicone, De-Comp Composites, Inc., RR 4 Box 4460, Cleveland, OK 74020 USA
- Or equivalent

3.7 **Sealant tape**, compatible with nylon vacuum bag, 375ºF minimum use temperature
Sources:
- SM5142 or equivalent, Umeco Process Materials, 12801 Ann Street, Santa Fe Springs, CA 90670
- Airtech International, Inc., 5700 Skylab Road, Huntington Beach, CA 92647
- Or equivalent

3.8 **Mold** (bottom tool), 0.25 to 0.50 inch thick, aluminum, steel, or composite, flat and smooth
- Open source

3.9 **Release Agents**
Sources:
- Frekote 700-NC, K.R. Anderson, Inc., 18330 Sutter Blvd. Morgan Hill, CA 95037 or equivalent

3.10 **Peel-ply, uncoated**
Sources:
- D1600 or D1700 or equivalent, De-Comp Composites, Inc., RR 4 Box 4460, Cleveland, OK 74020 USA
- Or equivalent

3.11 **120 Style Glass Fabric**
Sources:
- Open source

4. TEST LAMINATE FABRICATION

4.1 Prepreg cutting

Wear non-contaminating gloves such as disposable powder-free nitrile gloves when handling the prepreg. The prepreg may be cut using conventional method (i.e. on a polyurethane table top with utility knife) or automated method. The method of cutting must not contaminate the prepreg. Fiber orientation (e.g. warp versus fill directions) must be maintained during the cutting process. All the panels should have rectangular shapes;

intended to help maintain warp and fill direction traceability.

4.2 Prepreg layup and bagging

Wear non-contaminating gloves such as disposable powder-free nitrile gloves when handling the prepreg. The panel layups (stacking sequences) for qualification and equivalency purposes should be in accordance with appropriate test plans. For material acceptance purpose, the panel layups should be in accordance with NMS 451/X, where ”X” is the appropriate detail specifications.

In the case of materials which are not mid-plane symmetric, such as satin weave fabrics, plies must be orientated such as to give a mid-plane symmetric laminate as best as possible, as shown in Figure 1.

Figure 1 Example Satin Weave Showing Warp and Fill Faces Used for Ply Collation

In the layup of unidirectional prepreg, plies may be butt spliced in the 90º direction; ply splicing is not allowed in the 0º direction. Ply splicing is not allowed in the layup of woven fabric prepreg in any direction.

Figures 2 shows the bagging arrangement which is used for the manufacture of mechanical test panels f

The quality of vacuum, especially for final cure, has been found to have a profound effect on the quality of oven/vacuum bag cured laminates. The minimum required vacuum level is 28" Hg under average sea level conditions with an assumed ambient barometric pressure of 30" Hg. The requirement may be reduced for lower barometric pressure levels due to altitude or atmospheric conditions, the required vacuum gauge reading being reduced by the difference between the actual ambient barometric pressure and 30" Hg. In the absence of a direct measure of barometric pressure being available, the requirement of 28"Hg may be reduced by 0.001"Hg per foot of elevation above sea level.

Tools larger than 3 ft^2 or longer than 5 feet shall have at least two vacuum connections at opposite ends or corners of the tool. Tools longer than seven feet shall have at least one vacuum connection every three feet of tool length.

Prior to the start of the cure cycle, the vacuum bag shall be checked for leak rate by applying full vacuum (minimum 27 inches Hg in Tulsa, OK) then removing the vacuum source. The maximum leak rate of the bag shall not exceed five inches mercury (Hg) over a minimum five minute period as measured immediately after removing the vacuum source. It is recommended the vacuum gage be located as far as possible from the vacuum source by a “dead-end” gage.

For vacuum bag cure processes, vacuum level shall be verified and recorded minimum at

Date:

For material qualification and equivalency purposes, it may be necessary to send the panels to a designated test lab. The panel shipping instruction is typically included in the