



Step 1: The 6-axis ABB articulated arm robot deposits chopped glass fiber on a screen tool at one station. The green rail allows the arm to shuttle back and forth between the two preforming stations. Source: Sara Black



Step 2: Fiber is deposited on a different preform screen tool at the second station. Note the glass roving feed system above the chopper gun.



Step 3: The matching male screen tool has now moved forward and is beginning to drop down over the preform layup.



Step 4: The upper tool is now in place. Hot air is delivered through large ducts (visible to the left and above the upper die) that enable rapid heating of the preform and melting of the string binder. Cold air delivered through the same ducts sets and cools the preform.



Step 5: The glass fiber creel supplies the robotic chopper gun. The process employs commingled E-glass/thermoplastic polymer fiber binder called PREFORMance, manufactured by PPG Industries Inc. (Cheswick, Pa.).



Step 6: After the upper die is raised and moved back away from the platform, the completed preform is manually removed from the tool.



Step 7: A stack of finished preforms is identified and ready for molding. The preforming cell's CNC software prints out unique labels for the preforms.



Step 8: The RTM mold is readied for injection, including placement of the preform within the lower fixed mold half.



Step 9: A closeup view of an RTM mold, prior to loading and injection.



Step 10: Molded parts are sanded in an automated work cell, using an articulated arm robot supplied by ABB, equipped with a force-sensitive head that applies just enough pressure to lightly sand the complex parts.



Step 11: Finished, sanded parts are loaded on wheeled carts.



Step 12: A view of the paint booth where the molded parts are primed prior to shipment to Aston Martin.