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400 Micron Thick CRF with a 15 Micron Step KATHARINE NELSON, SUE CARTER, JOE FLORIO, JOSH GREGORY, JIM HEUER, ED HSIEH, DERRICK MATHEWS, BRIAN MOTTA, NICOLE PETTA, KEITH SHILLITO, DIANA SCHROEN, SCHAFER CORPORATION TEAM — A Resorcinol-Formaldehyde (RF) aerogel of 100 mg/cc was synthesized then carbonized by being brought up to high temperatures under an inert environment. This carbon aerogel was then machined 400 micron thick with a 15 micron step. Some of the issues encountered in the attempts to machine the CRF down to the very thin ranges with relatively fine surface finishes were: The material tended to "flake" around the perimeter. This would sometimes lead to catastrophic failure of the work piece. The material also tended to become flexible when thin. This allowed the material to distort into the vacuum holes. These phenomena were minimized by tuning vacuum hole diameter and location, and controlling total vacuum being drawn. Likewise progressively shallower cuts were required in order to obtain the relatively fine surface finishes exhibited. This was necessary in order to minimize "pull out" of the material which is porous and brittle. The machined CRF steps at less than 400 microns total thickness, with a 15 micron step represent precision diamond turning thin section CRF. The CRF was characterized using 3-D confocal microscopy and SEM for dimensions, foam pore size and surface finish. This work is supported under DOE DE-AC03-01F22260.

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