

Cryostat Preparation

Documented by Ben Best

Cryostats are manufactured for the Cryonics Institute by contract with Almax Products, a company owned and operated by Bruce Alter:

Almax Products
363 Coldbrook Road
Bearsville, NY 12409

Mailing address: Almax Products
P.O. Box 441
Bearsville, NY 12409

Phone: 845-679-4615 FAX: 845-679-8620 email: Almax441@aol.com

Almax subcontracts the actual work of building the cryostats. At last report the contractor was Polymil Products, contacts Sam Yacuzzo and Tammy Shultz

Polymil Products, Inc
51 North Street
Leroy, NY 14482

585-768-8170

Purchase price for 3 cryostats ordered in June 2007 and 2 cryostats ordered in June 2008 was \$22,000 per cryostat, half payable in advance and half payable within 45 days after delivery.

Perlite is purchased from

Noble Perlite
312 W Chestnut
Noble, OK 73068-8545

405-872-5660

A little over 80 30-pound bags of perlite are ordered per cryostat. About 70 bags per cryostat are shipped to New York for cryostat filling, and 10-12 bags per cryostat are shipped to CI in Michigan for topping-up (allowing for packing/settling during shipment). Cost per bag is \$20, plus wrapping, palletizing, etc.

Recent shipment was by R+L Carriers

R+L Carriers, Inc
600 Gillam Rd – PO Box 271
Wilmington, OH 45177-0271

937-382-1494

But shipment is arranged by Noble Perlite and is included in the total price. Total price for ten bags of perlite and shipment in April 2008 was \$409.28.



The cryostats are shipped in semi-trailers on skids (generally skids of very poor quality). Chains are placed around the skids and they are dragged to the end of the trailer. Then they are pulled out by forklift, with the outer edge allowed to rest on a box so it can be picked-up from the side.





The cryostats are shipped with a fiberglass lid bolted onto the filter opening of the cryostat with 12 bolts to hold the perlite in. Once the cryostats are in the warehouse, Andy removes the bolts and the lids and wraps openings with garbage bags that he ties on with straps to keep the perlite dry.





The cryostats are transported to the work-area in the back by placing them on a metal frame with wheels. Then the garbage bag covers are removed so that the cryostats can be topped-off with perlite.





The perlite is spread inside and packed tight with wooden sticks that have flattened end-pieces. The full weight of Andy Zawacki can be brought to bear on the packing.





With perlite nearly to the top of the filter opening, the hold is then again protected with moisture using a tied garbage bag.





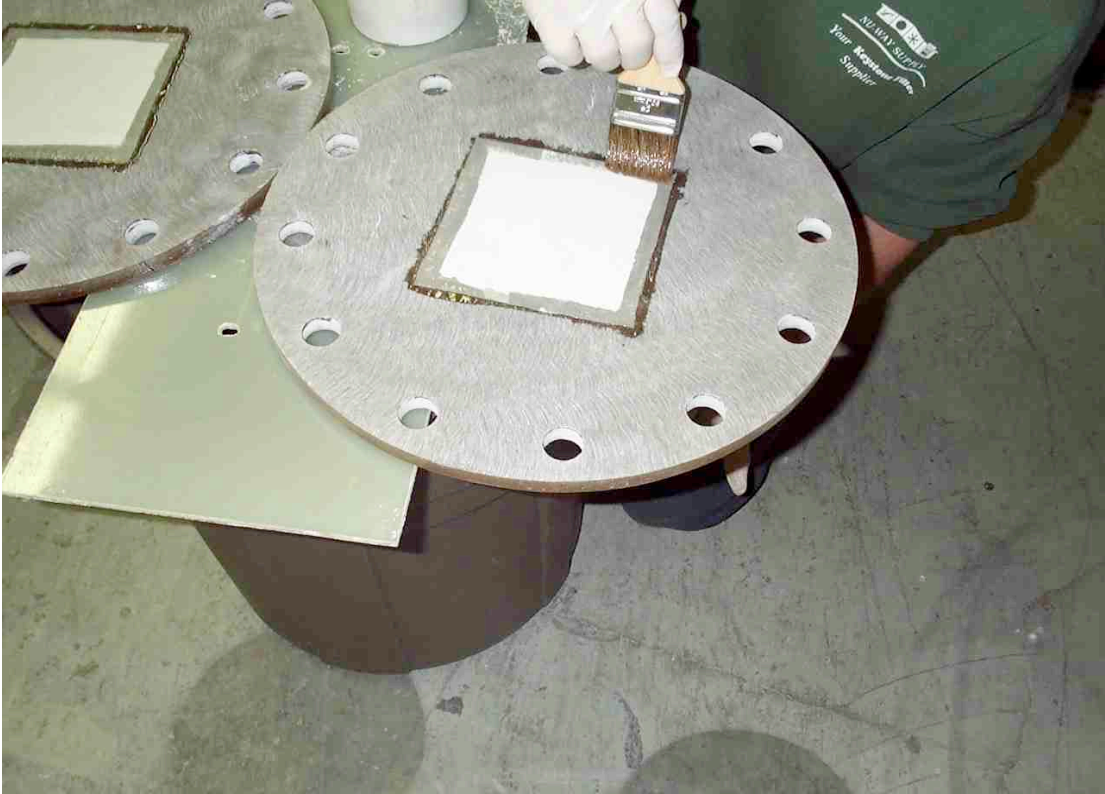
An air hose is used to clean the perlite dust off of the cryostats. The 16½" diameter fiberglass plate for the filter hole is drilled in the center and 11" copper pipe with hand ball valve (from Home Depot) is fitted to the opening.





The plate is cleaned and “roughed-up” (sanded), as is the part of the valve and pipe that is adjacent to the plate. Seven 6”x6” cotton squares for filtration are painted with special blend MFR-10 lb laminating resin, low V.O.C. mixed 100/1 with M*E*K Peroxide (both from Michigan Fiber Glass Sales, St. Claire Shores) for hardening and adhesion.





Rubber gaskets that were under the fiberglass lids on the filtration hole during shipment from New York are used as templates for cutting fiberglass “cloth” rings.





The rings are “painted” on to the cryostat opening using the same laminating resin that was used to adhere the cotton filter pads.





Pink insulating “wool” is packed against the perlite to prevent the perlite from plugging the filter. The edges are painted with laminating resin for adherence of the fiberglass “cloth” rings.





A roller is used to apply more laminating resin to the fiberglass “cloth” rings. Three fiberglass “cloth” rings are applied in this manner to each cryostat. The roller is cleaned with acetone. The filter plate is painted with laminating resin for adherence.





The filter is clamped onto the cryostat opening and held in position for the adhesive resin to dry and harden. Vacuum is first pumped with a weak pump and then a strong pump. It would be bad for the strong pump to be pumping without any partial vacuum. The weak pump pumps to about 20 inches.





Five foot diameter plywood boards are used to seal and secure the bottoms. These boards have 3 holes for insertion of urethane foam. The base will give a solid base to hold the weight of the cryostat for movement and support.





The boards are secured to the bottoms with duct tape and clamped metal bars. MF-1002-1,2 lb density urethane foam (from Michigan Fiber Glass Sales) contains an "A" and "B" component which is mixed in equal parts with a wooden stick in paper pails.





The foam will expand to ten times the volume of resin and will harden. Foaming action begins within 60 seconds after mixing, so it is quickly poured into the holes with the use of thick aluminum foil used as a funnel. It takes about an hour to set hard.





Four to six buckets is enough for each cryostat. More part “B” than part “A” results in greater volume and less density. The cryostats are now ready for movement to the warehouse area.





As before the wooden skids are placed on the metal frames for rolling.





The cryostats sit in the warehouse area awaiting the hoisting company that will hoist them into an upright position. Two eyeholes on the top and one eyehole on the bottom of each cryostat can hold metal pins that can be used for the hoisting.





The cryostats are blocked on 4-by-4s to position them for hoisting.





We have our hoisting done by E & N Hoisting Services, Inc Mt Clemens, Michigan. In June 2008 we paid \$429 to have two cryostats hoisted.



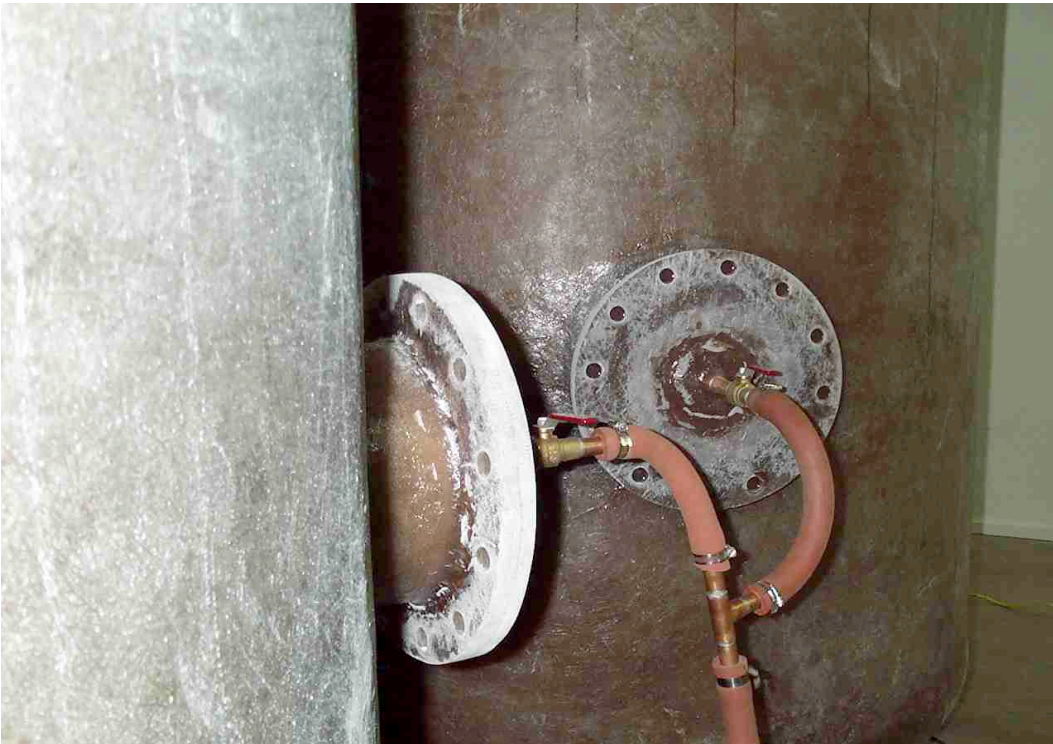


One in a vertical position, the cryostats can be placed on a forklift (pink insulation board used for padding) and returned to the warehouse for positioning.





Vacuum pumping resumes and may take five days to reach 1700 microns with valves closed, but pumping should continue until at least 1000 microns before adding liquid nitrogen. With liquid nitrogen in the cryostat an even lower pressure can be attained.





The cryostat is filled very slowly to a height of just over 22" over a period of up to two days. The full height is 24", but the final, permanent tops are 2 feet thick. The temporary tops are about 4 inches thick.





The permanent tops are made from layers of pink fiberglass board that is sandwiched between plywood boards.





A plastic cylinder is inserted into a hole made in the middle of the pink insulation boards. Plastic rods through the insulation boards and plywood secure the insulation boards.





The rim of the insulation boards is scraped/sanded (?) to a fine finish.





The tops can then be lifted into place, awaiting the metal lids.





We purchase our lids from a neighbor – Beck Industries on Sorrentino Court. In August 2008 we paid \$3,140 for four 50” diameter, 3” lip stainless steel lids. and four 8” diameter stainless steel plates for use in the removable portion of the lid when adding liquid nitrogen and measuring liquid nitrogen depth.