

Design and analysis of external baking system for 80K Cryopump

Abstract

LIVISTA facility at IPR consist of a large size 80K Cryopump. The 80K Cryopump is mainly comprised of SS cylindrical vessel (Inner diameter 2m and length 5.3m), an annular reservoir made of aluminum (Inner diameter 1.3 m of 16 mm thk , outer diameter 1.5m of 12.7 mm thk and length 3.7m) and passive thermal shield (diameter 2m and length 4m). Volumetric capacity of the LN2 reservoir is ~ 0.8 m³ and the mass is ~ 1350kg. The LN2 reservoir of the 80K Cryopump system removes the heat transferred due to radiation, conduction and accumulation of condensate on the surfaces of Cryopump. In order to achieve ultra-high vacuum (UHV) of 1E-9 mbar, external surface of the outer shell required to be baked at ~ 1500 C under natural environment.

This project includes the literature survey, understanding and utilization of standard software's, analytical calculation, and design iterations as follows:

- a) Estimation of capacity of the external heater
- b) Estimation of the thickness of the external insulation
- c) Time required to bake the external vessel till 1500C and
- d) Report preparation for the design of baking system

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: M.E./M.Tech Mechanical Engineering

3) Academic Project duration:

(a) Total academic project duration: 26 Weeks

(b) Student's presence at IPR for academic project work: 3 Full working Days per week

Email to: ncgupta@ipr.res.in[Guide's e-mail address] and
project_me@ipr.res.in [Academic Project Coordinator's e-mail address]

Phone Number: 079 -07923964025 [Guide's phone number]