

H-03 Enclosure Thermal Test

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COMMENTS:

Testing indicates that the MARS node enclosure is likely to dissipate heat at an acceptable rate to maintain equipment within the vendor temperature specification.

The steel MVCO node enclosure has a diameter similar to that of the MARS dry side enclosure. This was partitioned to a compliant length and the test were performed in free air at room temperature.

MARS
Org: WHOI
Engr: Fritz Sonnichsen
Date: 01/21/05

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Purpose of Test:

This test was added to give some insurance that the MARS node enclosure will dissipate heat fast enough to maintain the DCS dry side equipment at an acceptable temperature range.

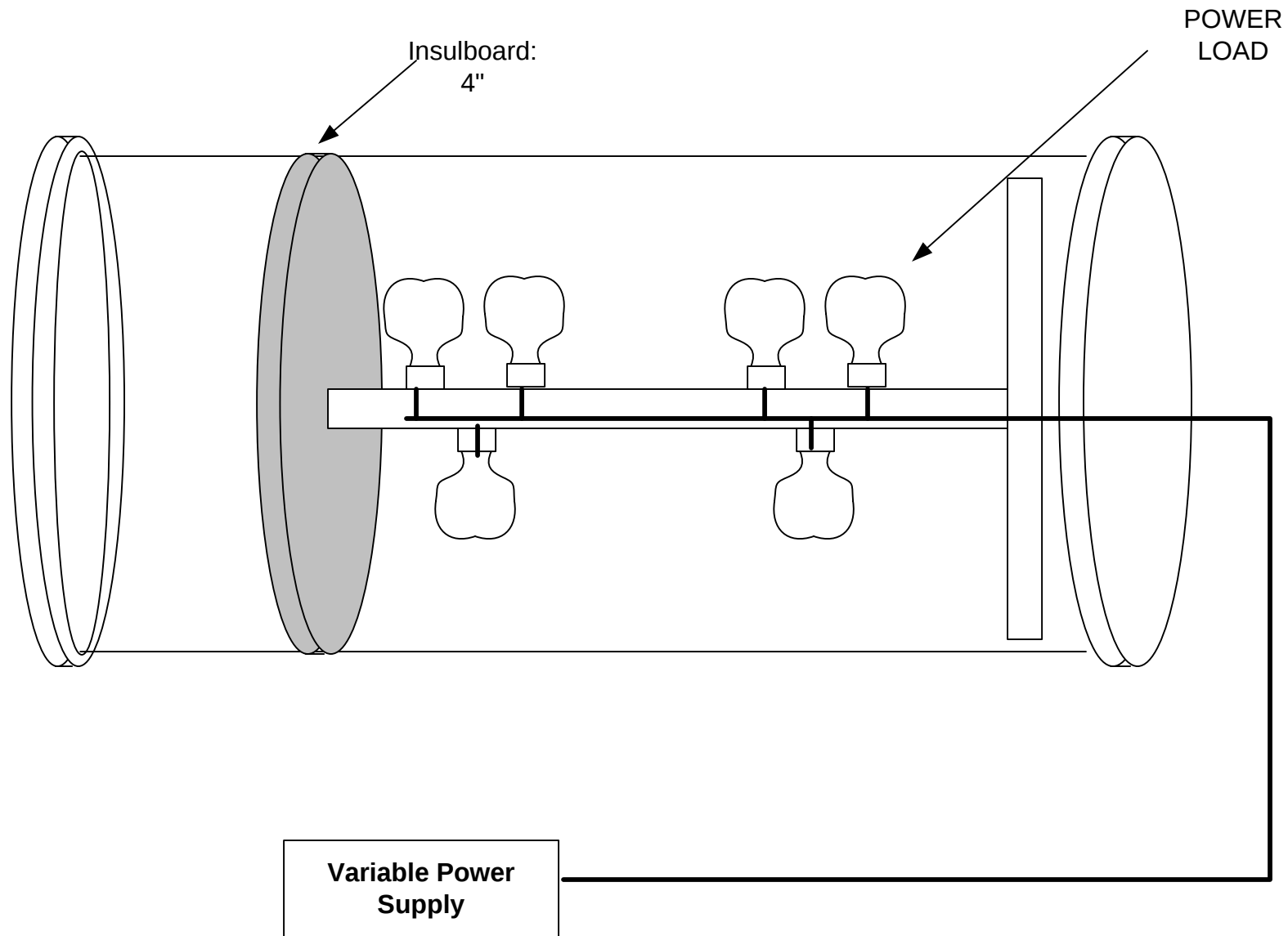
Required Equipment:

Node enclosure or similar
temperature sensing thermocouples
heat generateing loads
variable power current supply

Description:

A node enclosure of the same dimensions as the MARS dry side enclosure is to be tested in free air at room temperature to plot infused thermal power vs internal temperature at various places in the node. An assembly of light bulbs is used as the thermal source, this being attached to a variable power supply.

H-03 Enclosure Thermal Test - Physical Setup

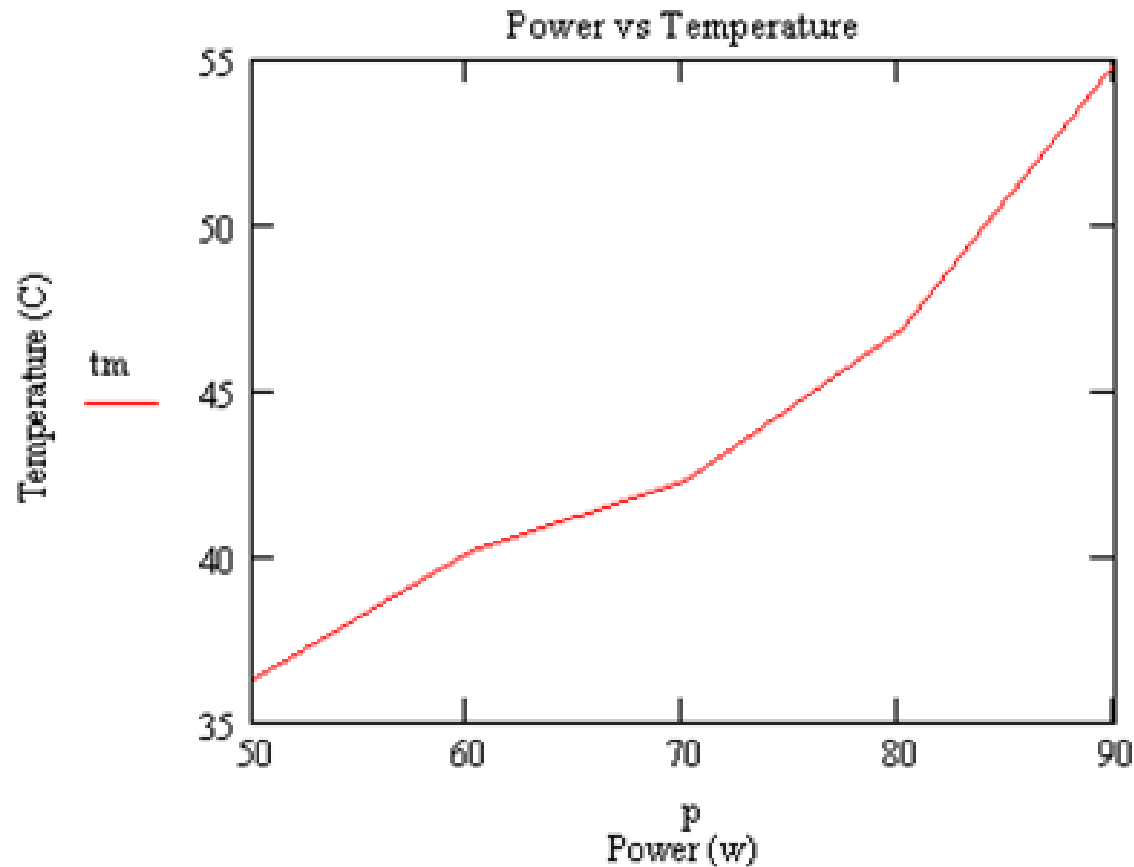


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The results for the ambient node temperature, measured at the middle of the node as shown in the diagram, is tabulated below.

Power (watts)	50	60	70	80	90
Temperature (deg C)	36	40	42	46	54
Adj. Temperature (deg C)	15	19	21	25	33

The room temperature was at 26 C during the test. Using a linear extrapolation to 5 C, we subtract 21 degrees from the above table to obtain the adjustment.



H-03 Enclosure Thermal Test - Conclusion

Preliminary estimates of the MARS node power consumption are as follows:

<u>Device</u>	<u>Power(w)</u>	<u>number</u>	<u>Total</u>
EDFA	5	2	10
OEO	5	4	20
NE	30	2	60
OBC	5	1	05
TOTAL			95 watts

This value produced an adjusted temperature of about 33C (at 90 watts) during the test. The test however did not account for:

- > Heat Sinking of any devices
- > Convective cooling enhancement due to the water surrounding the enclosure

It is therefore expected that the MARS node will operate within an acceptable temperature range.