



**Fermilab**

**Particle Physics Division**

**Mechanical Department Engineering Note**

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Title: IPND chiller system data points

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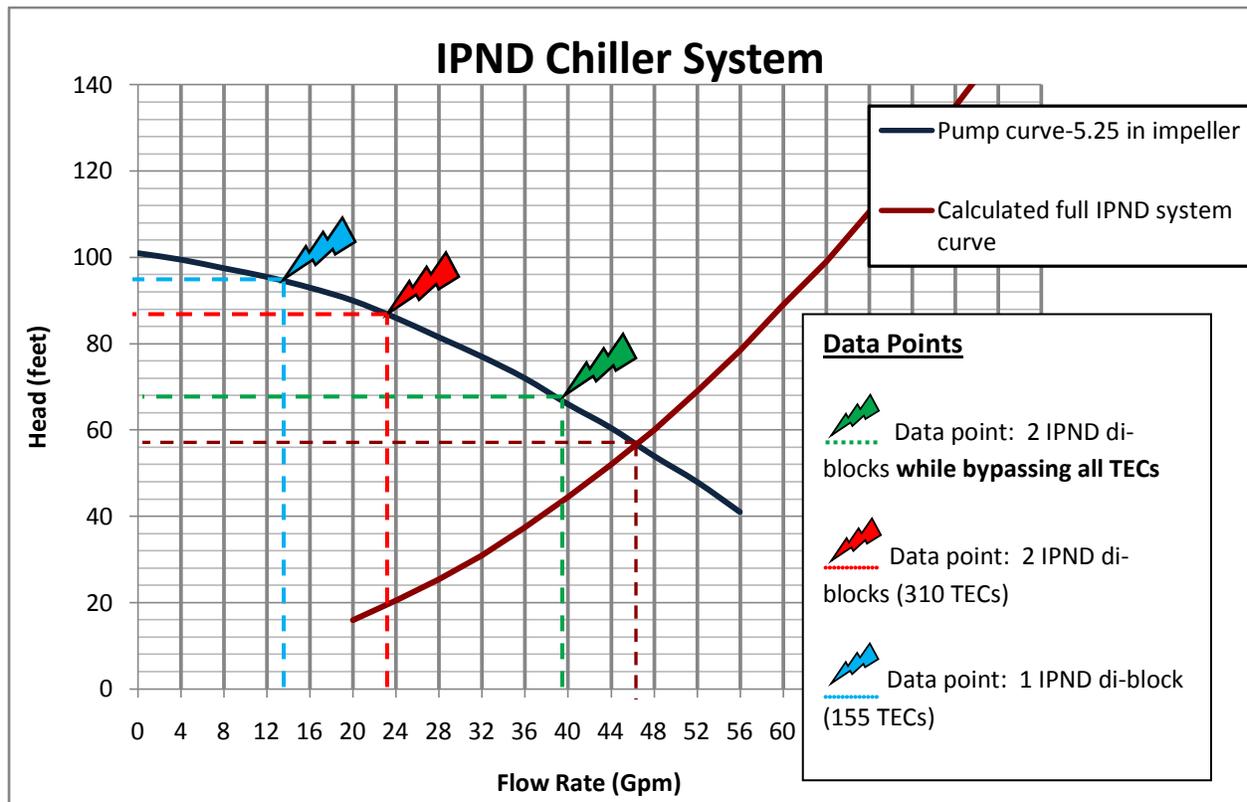
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Abstract Summary: The following is a graph (total flow v. head/pressure) containing the IPND chillers pump curve, the full system curve, and three data actual data points taken with the chiller system running in three different configurations, which are all described in detail.

## IPND Chiller System Data



- Pump curve and calculated system curve shown courtesy of Dave Pushka. The intersection of these two curves predicts the full IPND to run at about 46 gpm with about 57 feet of required head (24.7 psi). With 498 TEC's in the full setup, **each TEC will receive about 5.83 mL/sec**
- **First data point** was taken during the initial leak test of the first two IPND di-blocks with supply and return hoses connected by a double ended male Colder quick disconnect jumper, bypassing all TECs. Without TECs the two di-blocks were supplied with a total of 39 gpm and required about 68 feet (29.5 psi) of head.
- **Second data point** was taken with two fully outfitted IPND di-blocks running. With the TECs hooked up, the two di-blocks were supplied with a total of 23 gpm and required about 87 feet of head (37.76 psi). With 310 TECs contained in the two di-blocks, **each TEC receives about 4.68 mL/sec**. It can be seen that just connecting all TECs has added about 20 feet of required pump head (8.68 more psi).
- **Third data point** was taken with one full di-block running while the second was still being outfitted. With one full di-block including TECs connected, the system received a total of 13.5 gpm and required about 95 feet of head (41.23 psi). With 155 TECs in one di-block, **each TEC received about 5.49 mL/sec** of flow.