

## Ductile Iron Flanges

All Cornell refrigeration pumps are constructed of ASTM A536 60-40-18 fully annealed ferritic ductile iron; subsequently, they are covered by ASME/ANSI standard B16.42-1987, "Ductile Iron Pipe Flanges and Flanged Fittings Class 150 and 300." In accordance with this standard, the maximum allowable non-shock working pressure for service temperatures -20° degrees F to 100° degrees F is 250 psig. Pressure ratings are not given in any ANSI standards for temperatures below -20° degrees F; however the strength of the material will continue to increase as temperature drops until the null ductility transition temperature is reached. The null ductility transition temperature for fully annealed ferritic ductile iron is approximately -60° degrees F.

The improper usage of "125 lb." Flange, "150 lb." Flange, etc. terminology has created confusion concerning the actual flange ratings associated with Cornell's refrigeration pumps. The correct designation is class 125 flange, class 150 flange, etc. As an example, class 150 ductile iron flanges have a pressure rating of 252 psig for temperatures -20° degrees F to 100° degrees F. Cornell has standardized on the type 150 ductile iron flange.

The aforementioned example does not imply that Cornell Pump Company approves the use of liquid overfeed pumps for long-term operation at the upper pressure limit. The actual operating pressure limit is determined by the choice of mechanical seal type and materials. As an example, the upper operating pressure limit for a pump configured with a high pressure mechanical seal is 200 psig. Long-term operation beyond the 200 psig threshold will shorten the life of the seal due to increased face loading. However, brief periods of operation beyond the acceptable upper pressure limit will not significantly erode the life of the seal. Case in point, start-up of a refrigeration pump before the system has come down to temperature, may create a short term period of operation were the total discharge pressure is in excess of the acceptable upper pressure threshold of the mechanical seal.

The pressure limit imposed by the ANSI flange standard is not to be taken as a pressure beyond which the pump will leak or fail. In a static mode (motor turned off) each model of Cornell refrigerant pump has been tested to 1,000 PSIG without damage or leakage of any kind.

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