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Safety system assessment of cold box for large capacity helium liquefaction system

Content :

RRACT Indore has already developed a 35 lt/hr indigenous helium liquefier, now a larger capacity (100 lt/hr) helium liquefaction system is under development. A large size vacuum jacket is required to accommodate bigger heat exchangers, expanders and associated systems for capacity augmentation. As flow rate is high, this needs a stringent safety analysis. To ensure the safety and to take care of any accidental condition, two different type of safety valves have been designed.

These safety valves have to release all the flow coming through the compressor in case of any accidental scenario. Two different designs also ensure the diversity of the safety system. One of them is plunger type and another is plate type. Plunger type of valve will open at lower pressure rise. This valve will take care of minor leakages. Plate type valve will open at later stage of pressure rise. This will take care of the major leakages. Design of the safety valves takes care both for small leaks and large flow requirement. This will mitigate pressure buildup in all accidental conditions. This paper gives details about different safety parameters and design considerations for a large size cold box of a helium liquefier.

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