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C1Po1B-02: A cryogenic test equipment of liquid hydrogen safety valve cooled by G-M cryocooler

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In the development process of cryogenic valves, liquid nitrogen is usually used as the cooling medium to carry out relevant performance tests. When the temperature is lower than 77 K, for example, for liquid hydrogen valves, expensive liquid helium is usually used as the cooling medium due to safety concerns. In this paper, a cryogenic test equipment is designed to test the take-off characteristics and sealing performance of liquid hydrogen safety valves (covering volume is about $\phi 350\text{-}700\text{ mm}$), which is cooled by a G-M cryocooler. The construction of the test equipment, the test procedure, and the relevant thermal design to ensure that the large valve can achieve rapid cooling and good temperature uniformity will be covered. Besides, the experimental results based on a 2-inch liquid hydrogen safety valve will also be presented.

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