Advanced Piping Products

ProTek Pipe Shoe

Compression Test – Mechanical Property

From cryogenic conditions to extremely high temperatures, our ProTek Pipe Shoes are able to withstand the large compressive loads they may be subjected to. These compression test results demonstrate our pipe shoe's high compressive strength in a variety of scenarios.

Test Set Up: 4 ProTek Pipe Shoes (8" X 4" X 14") underwent compression testing for 4 varied environments:

Test Number	Testing Environment	Test Set Up
1	479°F, on I-beam	Heaters and thermocouples used to simulate hot pipe. Surface ground plates used to simulate I-beam.
2	Room temperature, on I-beam	Surface ground plates used to simulate I-beam.
3	Room temperature, without I-beam	No surface ground beam.
4	-320°F, without I-beam	Submerged in liquid nitrogen for 30 minutes immediately prior to testing.

Compression Test Results: The results of the compression test demonstrate the ProTek Pipe Shoe's high compressive strength in various environments. Below are the specific results for each environment:

Test Number	Testing Environment	Test Result (Maximum Load)
1	479°F, on I-beam	20,700 lbs.
2	Room temperature, on I-beam	80,500 lbs.
3	Room temperature, without I-beam	165,000 lbs.
4	-320°F, without I-beam	64,000 lbs.

Please note that these test results are expressed in lbf, not PSI.

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Charpy Impact Test – Mechanical Property

Charpy impact tests measure the amount of energy required to fracture a material. The charpy impact test results show how our ProTek Pipe Shoe does not experience a decrease in impact toughness, even at cryogenic temperatures.

Test Set Up: Charpy impact tests were performed on 5 ProTek Pipe Shoes at room temperature and 5 ProTek Pipe Shoes at -320°F (after 30 minutes of liquid nitrogen submersion).

Test Results: The testing served to compare the impact toughness of the ProTek Pipe Shoe at both room temperature and cryogenic conditions. The tables below outline the results:

Test Number	Test Temperature	Test Results
1	Room Temperature	4.1 Ft. lbf.
2	Room Temperature	2.65 Ft. lbf.
3	Room Temperature	3.3 Ft. lbf.
4	Room Temperature	2.75 Ft. lbf.
5	Room Temperature	3.9 Ft. lbf.

Test Number	Test Temperature	Test Results
1	-320°F	5.0 Ft. lbf.
2	-320°F	3.15 Ft. lbf.
3	-320°F	2.04 Ft. lbf.
4	-320°F	4.55 Ft. lbf.
5	-320°F	2.45 Ft. lbf.

At room temperature, the average impact energy is 3.34 foot-pound force. Removing the high and low data points provides an average impact energy of 3.31 foot-pound force. At -320°F, the average impact energy is 3.51 foot-pound force. Removing the high and low data points provides an average impact energy of 3.38 foot-pound force. The results show almost no discernible difference between the impact performance of the ProTek Pipe Shoe at the two test temperatures. This demonstrates how the ProTek Pipe Shoe maintains material integrity even in cryogenic conditions.