

CRYOGENIC TESTING

Goodwin International is capable of pressure testing at temperatures from room temperature down to -196°C .

Cryogenic testing is conducted by immersing the valve in Liquid Nitrogen to cool to the desired temperature which is monitored at a number of locations on the valve, both internally and externally.

Once temperature has stabilised, the pressure test commences using pure Helium or 99% Helium / 1% Nitrogen mix as the test medium. Pressure can be increased in increments and seat leakage measured at each increment. Test pressure depends on the rating of the valve and the maximum is limited by the Cold Working Pressure as designated by ASME B16.34.

Seat leakage is measured with calibrated flow meters. Valve Inspection and Test Standard API 598 defines the maximum permissible leakrate with air or inert gas at ambient temperature conditions as 700cc/minute/inch bore diameter. For cryogenic service Goodwin manufactures, as standard, its valves with a maximum leakrate of 500cc/minute/ inch bore diameter with Helium at -196°C . Goodwin has selected this maximum leakrate in response to the requirements of LNG plant designers. Following the seat leak test, valve body integrity is tested whereby the entire body cavity is pressurised and a shell leak detection test carried out using a Mass Spectrometer.

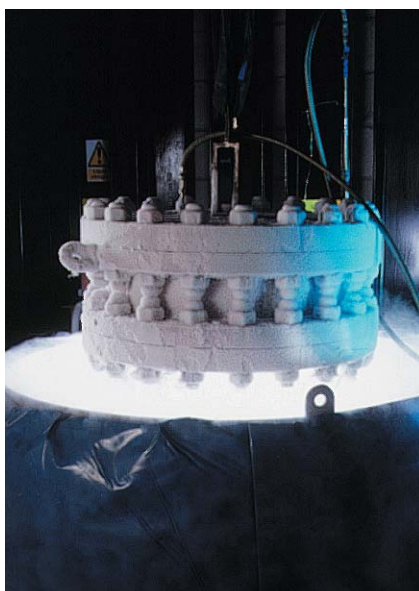
Goodwin has supplied to a number of the world's prestigious LNG (Liquefied Natural Gas) export projects. The vast majority of valves are of 316 Stainless Steel construction for use in Liquefied Natural Gas service at a temperature of -161°C . Additionally, a large number of valves are of LTCS body construction for low temperature service applications.

Increasingly, engineering contractors and client companies have ever more stringent specifications whereby the degree of shut-off is now much tighter than has previously been demanded of Dual Plate Check Valves. On a number of LNG projects, in response to customers' design requirements, Goodwin has supplied valves to far lower permissible leakrates than the 500cc/minute/inch bore diameter. Goodwin's ability to meet these more stringent customer shut-off requirements is achievable due to Goodwin's unique and patented pressure sensitive plate design.



Cryogenic Test Facility/Explosion Proof Chamber.

Goodwin has over 20 years of in-house cryogenic testing experience. Having its own cryogenic and high pressure gas test facility enables Goodwin to test valves in-house as large as 72" at temperatures down to -196°C and pressures to 6000psig/414barg.



24"ANSI 150lb Check Valve on Cryogenic Test

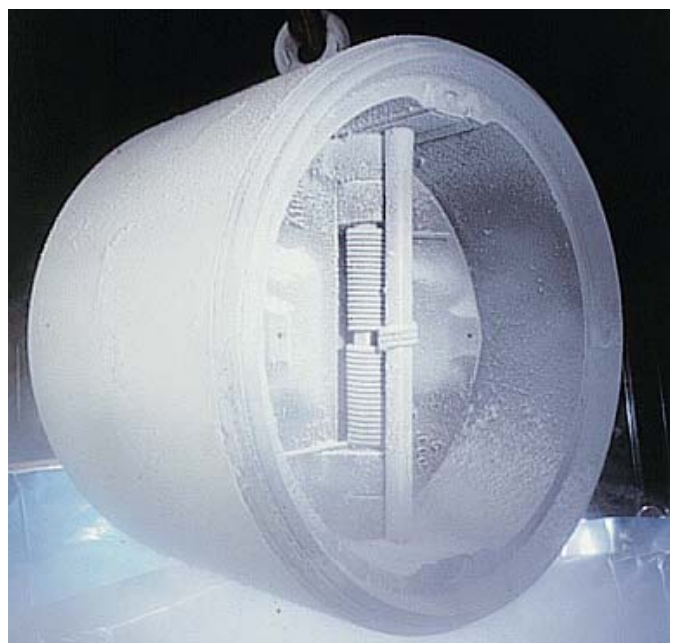
Typical Test Procedures

BS 6364
Shell SPE 77/306

Acceptance Standards

Seat Leakage: API598 -
700 cc/min/inch bore

Outside Leakage (body):
Shell SPE 77/306 -
zero leakage.



42"ANSI 600# Butt-weld end Check Valve after Cryogenic Test with test plates removed.