Basic Safety Assessment for Corrugated Stainless Steel Flexible Gas Tubing

In Hong Kong, the Electrical and Mechanical Services Department (EMSD) is responsible for the enforcement of the Gas Safety Ordinance (Cap. 51). According to the subsidiary regulations of the Gas Safety Ordinance, namely the Gas Safety (Miscellaneous) Regulations, corrugated stainless steel flexible gas tubing is classified as "flexible gas tubing". Approval from the Gas Authority must be obtained before the flexible gas tubing is manufactured in Hong Kong or imported for use in Hong Kong.

Gas Standards Office (GasSO) of EMSD is responsible for the approval of flexible gas tubing. The approval procedures include examination of relevant certificates such as the Type Test Certificate issued by a Recognized Certification Authority and the Basic Safety Assessment Certificate. The Basic Safety Assessment Certificate is the certificate issued by the HOKLAS laboratory, which is appointed by the applicant, after the flexible gas tubing passing a series of tests.

GasSO makes reference to EU standards BS EN 14800:2007 to formulate the contents of the Basic Safety Assessment for corrugated stainless steel flexible gas tubing. Accordingly, 7 test items are selected from BS EN 14800:2007 as reference. Besides, as the standards do not include a pressure test, a water pressure test to 5 bar is added. Detailed testing procedures are developed by HOKLAS laboratory according to the contents of the Basic Safety Assessment. Contents of the Basic Safety Assessment are set out in the table below -

Test Item	Testing Description	Acceptable Range of Test Result
Leak-tightness (5.3)	Tubing assembly tested in a water tank with an internal air pressure of 3 bar	Leakage rate shall not be more than 0.01 liter per hour
Flow Rate (5.5)	20 mbar dry air at a given pressure with a pressure drop of 1mbar across the tubing assembly	The minimum flow rate: DN8 = 0.5 m^3/h DN12 = 1.5 m^3/h Leakage rate shall not be more than 0.01 liter per hour
Tension (5.7)	The tubing assembly shall withstand an axial tension of 1000 N for 5 minutes.	Maximum increase of length during the test shall not be more than 10%, Permanent elongation shall not be more than 3% Leakage rate shall not be more than 0.01 liter per hour

Test Item	Testing Description	Acceptable Range of Test Result
Bending Performance (5.14)	The tubing assembly shall be bent 175° around freely rotating mandrels of 30mm diameter. The stationary end of the hose shall be loaded with a mass of 20kg. A minimum of 3 tubing assemblies shall be subject to 50 cycles each.	Leakage rate shall not be more than 0.01 liter per hour
Flexing Resistance (5.15)	A mass of 5kg shall be loaded in the stationary end of the tubing assembly and rotate in +30° and -30° from neutral position for 10,000 sinusoidal cycles. A minimum of 3 tubing assemblies shall be tested.	Leakage rate shall not be more than 0.01 liter per hour
Torsion Resistance (5.16)	Tubing assembly forming a 90° bend to a device allowing a rotational sinusoidal movement of +90° and -90° about the rotating axis for 10,000 cycles	Leakage rate shall not be more than 0.01 liter per hour
Impact Resistance (5.17)	A mass of 5kg shall be dropped on the tubing assembly freely from a height of 600mm	The flow rate after impact shall be at least 90% of the flow rate given in (5.5) Leakage rate shall not be more than 0.01 liter per hour
Pressure	Tubing assembly shall be tested under hydraulic pressure of 5bar for 30 seconds	Leakage rate shall not be more than 0.01 liter per hour

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