

5.2.11 Abrasion Resistance

Resistance to abrasion has been measured according to ASTM D4060-07 - Taber Abrasion Resistance. The load used was 250g and the test duration was 1000 cycles.

Initially, the test was carried out using a “Medium Coarse” wheel type CS-17 which gave a very low wear index and an unstable reading. Wear Index was estimated at around 58.

Additional testing was subsequently carried out using the “Heavy Coarse” wheel H22 and this gave more stable values resulting in a wear index of 195.

6.0 Summary of Material Properties – Qualification Level

Table 1 – Properties of C25-770-01

Property	Test Method	Units SI / English	Result
Maximum Service Depth	SST	m	2500
		ft	8200
Maximum Operating Temperature	SST	°C	150
		°F	300
Density	ASTM D-792	Kg/m ³	770
		lb/ft ³	48
Thermal Conductivity (dry)	ASTM C-518	W/m.K	0.155
		BTU/ft.hr.°F	0.09
Thermal Conductivity (wet)	ASTM C-518	W/m.K	0.18
		BTU/ft.hr.°F	0.106
Specific Heat Capacity (new)	ASTM E-1269	J/kgK	1270
		Btu/lb.°F	0.305
Specific Heat Capacity (aged) 8 weeks 96°C (204°F) and 250 bar (3625 psi)	ASTM E-1269	J/kg.K	1700
		Btu/lb.°F	0.408
Tensile Strength	ASTM D-638	MPa	2.5
		PSI	360
Tensile Strain to Failure	ASTM D-638	%	90
Compressive Strength @10% strain	ASTM D-695	MPa	1.5
		PSI	217
Poisson’s Ratio	-	-	0.445
Hardness	ASTM D-2240	Shore A	75
Water Absorption 8 weeks 96°C (204°F) and 250 bar (3625 psi)		%	<5

Table 2 - Accelerated ageing Performance

Property	Units SI	Control	1000h 250 bar 100 deg C	2000h 250 bar 100 deg C	3000h 250 bar 100 deg C
Density	Kg/m ³	785	797	802	816
Thermal Conductivity	W/mK	0.165	0.1619	0.1595	0.1591
Specific Heat Capacity	J/kgK	1.57	1.37	1.45	1.53
Tensile Strength	MPa	2.481	2.358	2.218	2.213
Tensile Strain to Failure	%	76.3	63.5	82.5	71.4
Tensile Modulus	MPa	8.7	7.5	7.5	8.7
Compressive Strength @10% strain	MPa	1.356	1.346	1.097	1.288
Hardness	Shore A	82	77	73	71
Water Absorption 100°C and 250 bar	%	N/A	1.56	3.1	3.55

7.0 Conclusions

The data provided within this pre-qualification dossier proves that the ContraTherm® C25-770-01 Subsea Insulation System meets the requirements of the assumed generic qualification requirements stipulated at 3.1 and meet the INSPEC Specification and Recommended Practice Requirements, where applicable, as detailed at 1.0 above.

The ContraTherm® C25-770-01 Subsea Insulation System meets the functional insulation requirements listed at 3.2 as demonstrated within this document and from an operational perspective as detailed in AIS application procedures and manuals.