



PRECISION TESTING LABORATORIES

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Laboratory Report No. 22265
14-Jul-14

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Dr. Sam Raney
Nautilus International (Cayman) Ltd.
PO Box 30739 Camano Bay
Grand Cayman, KY1-1203
Cayman Islands
British West Indies

Cc: n/a

PO #: n/a

Item: One (1) sample of coveralls (qty. 9 submitted)

Identification: CHEMTEC 1000FR (NAVY BLUE, Size: XXXL)

Specification: Breaking Strength, ASTM D751-06 R2011
Hydrostatic Resistance; Procedure A, Procedure 1, ASTM D751-06 R2011
Bursting Strength, ASTM D751-06 R2011
Seam Strength, ASTM D751-06 R2011
Tearing Strength of Nonwoven Fabrics, Trapezoid Tear, ASTM D5733-99 (withdrawn 2008)
Puncture Propagation Tear Resistance, ASTM D 2582
Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method), ASTM D4157-13
Flammability, NFPA 701-2010, Test I
16 CFR Part 1610 - (Revised as of January 1, 2009) - Standard for the Flammability of Clothing Textiles, (Plain Surface)


Test, Unit of Measure	Specimen Results					Average
Breaking Strength						
ASTM D751-06 R2011, Procedure A, Grab Method						
<u>Length</u>						
Breaking Strength, lbf	25.63	22.33	25.10	21.97	23.97	23.80
<u>Width</u>						
Breaking Strength, lbf	37.28	38.97	39.23	36.25	38.56	38.06
Bursting Strength						
ASTM D751-06 R2011						
Mullen Diaphragm Bursting Tester						
Inside to outside of coveralls						
psi	75	74	73	76	74	
	77	75	75	74	75	75


Test, Unit of Measure	Specimen Results					Average																																																															
<p>Hydrostatic Resistance ASTM D751-06 R2011 Procedure B, Procedure 1 & Section 4.6.3 of client supplied specification Suter Hydrostatic Tester, 71.0° F Travel set @ 10 mm / sec. cm of H²O/ failure Outside to inside of coveralls</p>																																																																					
	34.2	33.7	40.5	38.1	35.2	36.3																																																															
<p>Seam Strength, lbs. ASTM D751-06 R2011</p> <table border="0" style="width: 100%;"> <tr> <td></td> <td style="text-align: center;"><u>Length</u></td> <td style="text-align: center;"><u>Width</u></td> <td style="text-align: center;"><u>Width</u></td> <td colspan="3"></td> </tr> <tr> <td></td> <td style="text-align: center;">23.01</td> <td style="text-align: center;">39.51</td> <td style="text-align: center;">38.93</td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">Type failure</td> <td style="text-align: center;">MFS</td> <td style="text-align: center;">MF</td> <td style="text-align: center;">MF</td> <td colspan="3"></td> </tr> </table> <p>MF = Material failure; MFS = Material failure @ seam</p>								<u>Length</u>	<u>Width</u>	<u>Width</u>					23.01	39.51	38.93				Type failure	MFS	MF	MF																																													
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Test	Specimen Results					Average	Pass/Fail
Flammability, NFPA-701-2010							
Test 1							
<u>% Weight Loss</u>	2.7	4.2	5.7	5.5	4.6		
	9.0	8.0	10.0	12.0	8.0	7.0	Pass
<u>Residue Burn (seconds)</u>	0.0	0.0	0.0	0.0	0.0		
	0.0	0.0	0.0	0.0	0.0	0.0	Pass
<u>Standard Deviation</u>	4.0						
<u>3 Standard Deviations</u>	12.0						
<u>Retest Required</u>	No						
Retest Requirement							
9.1.4	When the percent mass loss of any individual specimen exceeds the mean value plus 3 standard deviations, the test shall be repeated on another sample of 10 specimens.						
Flame Propagation Performance Requirement							
10.1.1.1	Fragments or residues of specimens that fall to the floor of the test chamber shall not continue to burn for more than an average of 2 seconds per specimen for the sample of 10 specimens.						
10.1.1.2	The average weight loss of the 10 specimens in a sample shall be 40 percent or less.						
10.1.1.3	No individual specimen's percent mass loss shall deviate more than 3 standard deviations from the mean for the 10 specimens.						
10.1.1.4	When a retest is required, no individual specimen's percent mass loss in the second set of specimens shall deviate from the mean value by more than 3 standard deviations calculated for the second set.						
This sample does conform with NFPA 701, Test 1 requirements.							
Flammability							
16 CFR-1610; Modified							
As Received							
	Length Direction	DNI	DNI	DNI	DNI	DNI	n/a
							Class 1
Modified: Per client - The sample dos not require flammability after refurbishment.							
DNI = Did not ignite.							
<u>Test Criteria for Specimen Classification; Plain surface textile fabric</u>							
Class 1	Normal Flammability, when the time of flame spread is 3.5 seconds or more.						
Class 2	Not applicable.						
Class 3	Rapid and intense burning, when the time of flame spread is less than 3.5 seconds.						
Sample conforms with 16 CFR-1610, Class 1 requirements.							

Note: The length direction is considered material from the head to the toe while width specimens are materials across the chest direction.

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Signed: 
Don G. Roney, Laboratory Manager

Signed: 
Suzanne Piispanen, COO