

	<p>Test Data:</p> <p>Results of the Second Generation NyconXL Test Program Conducted at Stork-Twin City Testing</p> <p>Data Reported for ASTM Test Method C1399 as Average Residual Strength (ARS)</p>
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Overview	<p>Nycon’s Engineering Report XL01 provides the C1399 ARS data for the first generation of NyconXL, a macro synthetic fiber. This work was conducted at South Dakota School of Mines and Technology in 2002.</p> <p>This report, Engineering Report XL02, presents the second generation NyconXL results from a 2005-C1399 program conducted at Stork-Twin City Testing (TCT) in St. Paul, Minnesota. The TCT Project # is 325035. TCT is one of the few commercial laboratories in the U.S. certified by ICC, the Florida Department of Health, Dade County and others to conduct the C1399 test.</p> <p>The 2005 TCT program was very significant to Nycon as the NyconXL fiber evaluated was a new-generation product. The three dosage levels used in the first program were 3 lbs/y³, 4 lbs/y³ and 5 lbs/y³. The number of projects using macro synthetic fibers has increased exponentially and the dosage range has also expanded. With this in mind, we selected four dosage levels for the TCT program: 3 lbs/y³, 4 lbs/y³, 5 lbs/y³ and 6 lbs/y³. Research has shown that the dosage rate of the macro synthetic fiber is critical when post-first crack deflection is a factor. For the record, 3.0 lbs/y³ is the consensus as the minimum dosage level for macro synthetic fiber for post-first crack applications.</p> <p>Structural engineers need to know that the NyconXL fiber bundle has been designed to open quickly to enhance distribution, and specific chemicals were introduced to benefit the finishing properties of the product.</p>																
Material Description	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Material:</td> <td>Polyolefin</td> </tr> <tr> <td>Configuration:</td> <td>Highly modified collated fibrillated</td> </tr> <tr> <td>Color:</td> <td>White</td> </tr> <tr> <td>Specific Gravity:</td> <td>0.91</td> </tr> <tr> <td>Lengths:</td> <td>1-1/2” (38mm) and 2” (50mm)</td> </tr> <tr> <td>Tensile Strength:</td> <td>90,000-100,000 psi (620.7-689.7 MPa)</td> </tr> <tr> <td>Chemical Stability:</td> <td>Excellent</td> </tr> <tr> <td>Absorption:</td> <td>Nil</td> </tr> </table>	Material:	Polyolefin	Configuration:	Highly modified collated fibrillated	Color:	White	Specific Gravity:	0.91	Lengths:	1-1/2” (38mm) and 2” (50mm)	Tensile Strength:	90,000-100,000 psi (620.7-689.7 MPa)	Chemical Stability:	Excellent	Absorption:	Nil
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Executive Summary

The table herein provides a comparison of the results from the 2002 program at SDSM&T and the 2005 TCT program. When comparing the results of both programs, it became readily apparent that modifications in the NyconXL product resulted in a quantum increase in ARS values.

Comparison of the First and Second Generations of NyconXL

Average Residual Strength, psi (MPa)

Dosage Levels	2002 Program ⁽¹⁾		2005 Program ⁽²⁾	
	psi	MPa	psi	MPa
3.0 lbs/y ³	106	.73	141	.97
4.0 lbs/y ³	127	.87	194	1.34
5.0 lbs/y ³	134	.92	212	1.46
6.0 lbs/y ³			290	2.00

Specifications for macro synthetic fibers typically include a performance requirement based on ASTM C1399. This specification is in the form of a specific ARS target, for example 175 psi.

The numbers in the table above indicate a clear advantage to NyconXL when compared with published data for other manufacturers' macro synthetic fibers. To obtain the ARS target of 175-psi, only 3.5 lbs/y³ of the new-generation NyconXL are required, whereas published data shows 6.0 lbs/y³ of SI's Enduro are required to meet the target and 5 lbs/y³ of PGI's Genesis SF. ⁽³⁾

There are two immediate advantages to the reduced dosage of NyconXL compared to the quantity required for other macro synthetic fibers. The obvious is the reduction in material cost, and the other is the decreased need to modify the mix design to accommodate the NyconXL product.

(1) First-generation NyconXL

(2) Second-generation NyconXL

(3) Source: Florida Department of Health website.

(continued)

Mix ID XL @ #/y ³	Specimen ID	Load in Pounds at Deflection				ARS	
		0.02"	0.03"	0.04"	0.05"	psi	MPa
XL @ 3.0#	1A	817	853	891	856	152	1.05
	1B	754	743	725	714	131	0.90
	1C	753	788	817	823	140	0.97
	Average					141	0.97
	Standard Deviation						
	% C.V.						
XL @ 4.0#	1A	X	X	X	X	X	X
	1B	1018	1065	1093	1074	192	1.32
	1C	1002	1062	1088	1058	195	1.34
	Average					194	1.33
	Standard Deviation						
	% C.V.						
XL @ 5.0#	1A	X	X	X	X	X	X
	1B	1157	1231	1260	1200	222	1.53
	1C	1046	1096	1096	1043	201	1.38
	Average					212	1.46
	Standard Deviation						
	% C.V.						
XL @ 6.0#	1A	X	X	X	X	X	X
	1B	1601	1658	1642	1593	304	2.10
	1C	1443	1501	1547	1549	276	1.90
	Average					290	2.00
	Standard Deviation						
	% C.V.						

Note: X denotes this test specimen was determined to be an outlier.

Copies of the Stork-TCT Reports for each NyconXL dosage level are available to engineers upon request.



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