



## Needlepunched Nonwoven

### Civil Nonwoven

| Properties<br>MARV <sup>2</sup>           | ASTM<br>TEST | UNIT  | 120EX                                 | 125EX                                | 130EX                                 | 140EX                                 | 145EX                                 | 150EX                                 | 160EX                                 | 180EX                                 | 225EX                                 | 245EX                                 | 250EX                                 | 275EX                                  | 350EX                                 |
|---|--------------|---|---------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|--|---------------------------------------|
| <b>MECHANICAL PROPERTIES</b>              |              |   |                                       |                                      |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |  |                                       |
| Grab Tensile Strength                     | D4632        | lbs (N)                                     | 80 (356)                              | 90 (401)                             | 105 (467)                             | 120 (534)                             | 140 (623)                             | 165 (734)                             | 180 (801)                             | 205 (912)                             | 215 (957)                             | 250 (1112)                            | 270 (1202)                            | 300 (1335)                             | 380 (1691)                            |
| Elongation                                | D4632        | %   | 50                                    | 50                                   | 50                                    | 50                                    | 50                                    | 50                                    | 50                                    | 50                                    | 50                                    | 50                                    | 50                                    | 50                                     | 50                                    |
| Trapezoid Tear                            | D4533        | lbs (N)                                     | 35 (156)                              | 40 (178)                             | 45 (200)                              | 50 (223)                              | 60 (267)                              | 65 (289)                              | 75 (334)                              | 80 (356)                              | 85 (378)                              | 100 (445)                             | 100 (445)                             | 115 (512)                              | 145 (645)                             |
| Puncture                                  | D4833        | lbs (N)                                     | 45 (200)                              | 55 (245)                             | 65 (289)                              | 70 (312)                              | 85 (378)                              | 90 (401)                              | 105 (467)                             | 120 (534)                             | 125 (556)                             | 155 (690)                             | 155 (690)                             | 175 (779)                              | 240 (1068)                            |
| CBR Puncture                              | D6241        | lbs (N)                                     | 220 (979)                             | 265 (1179)                           | 300 (1335)                            | 340 (1513)                            | 360 (1602)                            | 400 (1780)                            | 475 (2114)                            | 535 (2380)                            | 600 (2670)                            | 700 (3115)                            | 725 (3226)                            | 830 (3694)                             | 1050 (4673)                           |
| Mullen Burst                              | D3786        | psi (kPa)                                   | 160 (1103)                            | 185 (1275)                           | 210 (1448)                            | 230 (1586)                            | 280 (1930)                            | 310 (2137)                            | 330 (2275)                            | 350 (2413)                            | 360 (2482)                            | 460 (3171)                            | 460 (3171)                            | 580 (3999)                             | 750 (5171)                            |
| <b>ENDURANCE PROPERTIES</b>               |              |   |                                       |                                      |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |  |                                       |
| UV Stability                              | D4355        | % @ 500 hrs                                 | 70                                    | 70                                   | 70                                    | 70                                    | 70                                    | 70                                    | 70                                    | 70                                    | 70                                    | 70                                    | 70                                    | 70                                     | 70                                    |
| <b>HYDRAULIC PROPERTIES</b>               |              |   |                                       |                                      |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |  |                                       |
| Permittivity                              | D4491        | sec <sup>-1</sup>                           | 2.2                                   | 2.1                                  | 2.0                                   | 1.8                                   | 1.5                                   | 1.5                                   | 1.5                                   | 1.5                                   | 1.3                                   | 1.2                                   | 1.2                                   | 0.9                                    | 0.7                                   |
| Water Flow Rate                           | D4491        | gpm/ft <sup>2</sup> (l/min/m <sup>2</sup> ) | 160 (6519)                            | 155 (6315)                           | 145 (5908)                            | 135 (5501)                            | 115 (4886)                            | 110 (4482)                            | 110 (4482)                            | 110 (4482)                            | 95 (3871)                             | 85 (3463)                             | 85 (3463)                             | 65 (2648)                              | 50 (2037)                             |
| Permeability                              | D4491        | cm/sec                                      | 0.22                                  | 0.22                                 | 0.22                                  | 0.22                                  | 0.22                                  | 0.25                                  | 0.25                                  | 0.30                                  | 0.30                                  | 0.25                                  | 0.25                                  | 0.20                                   | 0.20                                  |
| Apparent Opening Size (AOS <sup>3</sup> ) | D4751        | US Sieve Number (mm)                        | 70 (0.212)                            | 70 (0.212)                           | 70 (0.212)                            | 70 (0.212)                            | 70 (0.212)                            | 80 (0.180)                            | 100 (0.150)                           | 100 (0.150)                           | 100 (0.150)                           | 100 (0.150)                           | 100 (0.150)                           | 100 (0.150)                            | 100 (0.150)                           |
| <b>PHYSICAL PROPERTIES<sup>5</sup></b>    |              |   |                                       |                                      |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |  |                                       |
| Weight                                    | D5261        | oz/yd <sup>2</sup> (g/m <sup>2</sup> )      | 3.2 <sup>T</sup> (109 <sup>T</sup> )  | 3.5 <sup>T</sup> (119 <sup>T</sup> ) | 4.0 <sup>T</sup> (136 <sup>T</sup> )  | 4.5 <sup>T</sup> (153 <sup>T</sup> )  | 5.5 <sup>T</sup> (186 <sup>T</sup> )  | 6.0 <sup>T</sup> (204 <sup>T</sup> )  | 7.0 <sup>T</sup> (237 <sup>T</sup> )  | 8.0 <sup>T</sup> (271 <sup>T</sup> )  | 9.0 <sup>T</sup> (305 <sup>T</sup> )  | 10.0 <sup>T</sup> (339 <sup>T</sup> ) | 10.5 <sup>T</sup> (356 <sup>T</sup> ) | 12.0 <sup>T</sup> (407 <sup>T</sup> )  | 16.0 <sup>T</sup> (543 <sup>T</sup> ) |
| Thickness                                 | D5199        | mils (mm)                                   | 45 <sup>T</sup> (1.143 <sup>T</sup> ) | 50 <sup>T</sup> (1.27 <sup>T</sup> ) | 55 <sup>T</sup> (1.397 <sup>T</sup> ) | 60 <sup>T</sup> (1.524 <sup>T</sup> ) | 70 <sup>T</sup> (1.778 <sup>T</sup> ) | 75 <sup>T</sup> (1.905 <sup>T</sup> ) | 85 <sup>T</sup> (2.159 <sup>T</sup> ) | 90 <sup>T</sup> (2.286 <sup>T</sup> ) | 95 <sup>T</sup> (2.413 <sup>T</sup> ) | 100 <sup>T</sup> (2.54 <sup>T</sup> ) | 100 <sup>T</sup> (2.54 <sup>T</sup> ) | 120 <sup>T</sup> (3.048 <sup>T</sup> ) | 150 <sup>T</sup> (3.81 <sup>T</sup> ) |
| <b>PACKAGING<sup>4,5</sup></b>            |              |   |                                       |                                      |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |                                       |  |                                       |
| Roll Width                                |              | ft (m)                                      | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                  | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                   | 12.5/15 (3.81/4.57)                    | 12.5/15 (3.81/4.57)                   |
| Roll Area                                 |              | yd <sup>2</sup> (m <sup>2</sup> )           | 500 (418)                             | 500 (418)                            | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                             | 500 (418)                              | 500 (418)                             |
| Roll Weight                               |              | lbs (kg)                                    | 125 (57)                              | 135 (61)                             | 150 (68)                              | 170 (77)                              | 208 (94)                              | 230 (104)                             | 260 (118)                             | 290 (131)                             | 315 (143)                             | 350 (159)                             | 365 (166)                             | 410 (186)                              | 530 (240)                             |

1 - Contact your Thrace-LINQ distributor or representative for technical assistance and for products meeting AASHTO M288 specifications. Additional information can also be found at [www.thracelinq.com](http://www.thracelinq.com). Methods and values may change without notice.

2 - Minimum Average Roll Value. All values are MARV unless otherwise noted.

3 - AOS values are reported as Maximum Average Roll Value.

4 - Other products and roll sizes may be available.

5 - Roll lengths, areas and weights may vary.

6 - Physical properties reflect industry standards. Roll Data may reflect higher values than those listed above.

T - Typical roll properties.