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# *Nonwovens Standard Procedures*

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**Edition 2015**



## **Nonwovens Standard Procedures - Edition 2015**

Ten years after the launch of the first book of test methods in 2005, INDA and EDANA are now launching the 2015 edition of this highly respected compilation. Since that launch, revisions have been published in 2008 and 2012. The purpose of a revision is to update procedures that have been modified, as well as to make using the book more intuitive and friendly.

This resource, developed in partnership by INDA and EDANA, helps define, in a technical sense, the nonwovens industry, with specifiers for the properties, composition and specifications of its products. The NWSP offers harmonised language for the industry across the USA and Europe, and recognised by many other individual markets, while the procedures offer a way for the nonwovens industry to communicate both across the globe, and within the supply chain to ensure that product properties can be consistently described, produced and tested.

With the 2015 publication, a special emphasis has been placed on renumbering of the procedures. The acronym WSP (Worldwide Strategic Partners) has been replaced by a more meaningful NWSP (Non-Woven Standard Procedures), following a desire expressed by members of the associations. Also a new logo has been adopted, building on the NWSP acronym.

Since the introduction in 2012 of the letter R in the method number, a lack of clarity was perceived and recognised that could lead to confusion between a revision, i.e. a major change in the procedure, and a release, i.e. cosmetic changes or none at all. To avoid confusion, the following format has been adopted:

NWSP 000.0.R0 (15) where the first three digits followed by one or two digits after the dot identify the method; the number after the R refers to the number of revisions (changes that affect the test procedure) that have occurred since the 2005 launch; the number in parenthesis refers to the year of publication (15 for all methods in this edition). If needed, the history of any given test method before 2005 is available from either EDANA or INDA.

The following practical example illustrates the change: considering method NWSP 120.1.R0 (15), 120.1 is the number of that method; it has had 0 (zero) revisions affecting the test procedure between 2005 and 2015; this version will be released in 2015. All procedures with R numbers higher than (0) have undergone content revisions, e.g. all polyacrylate related procedures (NWSP 2xx series).

Because of the new designation of 'R' in these latest methods, a number prior to 2015 might have a different value. For example, WSP 120.1.R4 (12) was published in 2012. 'R4' in this example is the fourth release since 2005. No reference to meaningful changes can be found in that number. The content of the document may, or may not have changed at all during the period. That was not reflected in the previous numbering system.

Another consequence of this change to the numbering logic is the introduction of an additional page to each procedure, the "track sheet", which is intended to track revisions to the method. At this time, the number of the method in the 2015 edition is reported in the "track sheet". In the future, the track sheet will describe only substantive modifications to the methods.

The second major change in the 2015 edition is the adoption of the ISO template for test methods in anticipation of a possible submission to ISO to become a recognised international standard or a

technical specification. This consistent set of headings has been added to each procedure; in some cases headings are completed by “not applicable” or “yet to be determined”. The introduction of new headers according to the ISO format required new numbering of the sections and sub-sections. The introduction of the ISO format is not considered a change that affects the procedure. Hence, methods that have been reformatted consistent with ISO and have had no substantial modification to the procedure will not reflect an increase of the “R” value.

The following sections and methods have been deleted from the 2012 edition. Any questions related to these documents can be addressed to EDANA/INDA.

- List of equipment vendors
- Guidance for evaluating nonwoven fabrics
- Guidance for evaluating nonwoven felts
- All methods of the 600 series addressing fiberglass mats

Additional remarks:

The fiberglass mat related procedures have been removed due to pending reviews by TAPPI and INDA. These procedures will be added at a later date.

Since there are other material categories for which the existing NWSP procedures might apply (e.g. filtration materials) that are not explicitly mentioned in the table of contents, the section on geotextiles has been deleted. For geotextiles, normative references exist (e.g. ISO, CEN, ASTM) that can be selected dependent on the range of application and parameter to be investigated.

‘Guidance documents’ give general guidance to address a certain topic/test parameter or provide general information but they do not contain a test methodology as such. They therefore have a different structure compared to the standard procedures and have not been adapted to the ISO template nor do they contain the track sheet.

In the table of contents you will find Normative References (ISO standards) next to the NWSP procedures. By highlighting the existence of an internationally recognised ISO standard, member companies can decide which procedure to apply (ISO or NWSP). Keep in mind, ISO and NWSP methods do not undergo revisions at the same time and may differ in their content.

Trade names are given in good faith for the convenience of the users of these standard procedures. This should not be construed as an individual endorsement by EDANA and/or INDA.



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**Nonwovens Standard Procedures – Edition 2015**  
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Description	Method number*	Normative References
<b>1) GUIDANCE DOCUMENTS</b>		
Standard Terminology Relating to the Nonwoven Industry	NWSP 001.0.R1 (15)	
Drafting a NWSP Standard Procedure	NWSP 002.0.R1 (15)	
Standard Atmospheres for Conditioning and/or Testing	NWSP 003.0.R0 (15)	ISO 139: 2005, reviewed and confirmed 2014
Associations Worldwide	NWSP 004.0.R1 (15)	
Nonwoven Sampling	NWSP 005.0.R0 (15)	
<b>2) ABSORPTION</b>		
Three Standard Test Methods for Nonwoven Absorption	NWSP 010.1.R0 (15)	ISO 9073-6: 2000, reviewed and confirmed 2011
Measuring the Rate of Sorption of Wiping Materials	NWSP 010.2.R1 (15)	
Nonwovens Demand Absorbency	NWSP 010.3.R0 (15)	ISO 9073-12: 2002, reviewed and confirmed 2013
Evaluation of Oil and Fatty Liquids Absorption	NWSP 010.4.R0 (15)	
<b>3) ABRASION RESISTANCE</b>		
Abrasion Resistance of Nonwoven Fabrics- Inflated Diaphragm Apparatus	NWSP 020.1.R0 (15)	

Abrasion Resistance of Nonwoven Fabrics- Flexing and Abrasion Method	NWSP 020.2.R0 (15)	
Abrasion Resistance of Nonwoven Materials (Rotary Platform, Double-Head Method)	NWSP 020.4.R0 (15)	
Abrasion Resistance of Nonwoven Fabrics using a Nonwoven Modified Martindale Abrasion Test Method	NWSP 020.5.R0 (15)	
<b>4) BURSTING STRENGTH</b>		
Hydraulic Bursting Strength of Nonwoven Materials- Motor Driven Diaphragm Bursting Strength Tester Method	NWSP 030.1.R0 (15)	
Nonwovens Burst	NWSP 030.2.R0 (15)	
<b>5) ELECTROSTATIC PROPERTIES</b>		
Surface Resistivity of Nonwoven Fabrics	NWSP 040.1.R1 (15)	
Electrostatic Decay of Nonwoven Fabrics	NWSP 040.2.R0 (15)	
<b>6) OPTICAL PROPERTIES</b>		
Optical Properties (Opacity) of Nonwoven Fabrics (INDA)	NWSP 060.1.R0 (15)	
Optical Properties Brightness of Nonwoven Fabrics (INDA)	NWSP 060.2.R0 (15)	
Nonwoven Brightness (EDANA)	NWSP 060.3.R1 (15)	
Nonwoven Opacity (EDANA)	NWSP 060.4.R0 (15)	
<b>7) PERMEABILITY</b>		



Air Permeability of Nonwoven Materials	NWSP 070.1.R0 (15)	ISO 9073-15: 2007, reviewed and confirmed 2011,
Nonwoven Coverstock Liquid Strike-Through Time Using Simulated Urine	NWSP 070.3.R0 (15)	ISO 9073-8: 1995, reviewed and confirmed 2011
Water Vapor Transmission Rates of 500 to 100,000 gm/m <sup>2</sup> /day Mocon/INDA	NWSP 070.4.R0 (15)	
Water Vapor Transmission Rate by the Principle of Measurement of Relative Humidity in a Dry cell Mocon/EDANA, Part 1	NWSP 070.5.R0 (15)	
Water Vapor Transmission Rate by the Principle of Measuring the Time to Increase Humidity Lyssy/EDANA, Part 2	NWSP 070.6.R0 (15)	
Repeated Liquid Strike-Through Time (Simulated Urine)	NWSP 070.7.R0 (15)	ISO 9073-13: 2006, reviewed and confirmed 2009
Wetback After Repeated Strike-Through Time	NWSP 070.8.R0 (15)	ISO 9073-14: 2006, reviewed and confirmed 2009
Nonwoven Adult Incontinence Products: Rate of Acquisition and Re-Wet Test	NWSP 070.9.R1 (15)	
Nonwoven Adult Incontinence Products: Centrifugal Liquid Retention Capacity Test (Dry Weight vs. Wet Spun Weight)	NWSP 070.10.R1 (15)	2012 version withdrawn, publication pending review.

<b>8) REPELLENCY</b>		
Surface Wetting Spray Test	NWSP 080.1.R0 (15)	
Penetration by Water (Rain Test) for Nonwoven Fabrics	NWSP 080.2.R0 (15)	
Evaluation of Water Penetration (Spray Impact Test) of Nonwoven Fabrics	NWSP 080.3.R0 (15)	ISO 9073-17: 2008 reviewed and confirmed 2011
Saline Repellency Using the Automated Mason Jar End Point Detector	NWSP 080.5.R0 (15)	
Evaluation of Water Resistance (Hydrostatic Pressure) Test	NWSP 080.6.R0 (15)	ISO 9073-16: 2007 reviewed and confirmed 2011
Penetration by Oil (Hydrocarbon Resistance)	NWSP 080.7.R0 (15)	
Alcohol Repellency of Nonwoven Fabrics	NWSP 080.8.R0 (15)	
Nonwovens Run Off	NWSP 080.9.R0 (15)	ISO 9073-11: 2002, reviewed and confirmed 2013
Nonwovens Coverstock Wetback	NWSP 080.10.R0 (15)	
Nonwoven Wet Barrier Mason Jar	NWSP 080.11.R0 (15)	
<b>9) STIFFNESS</b>		
Stiffness of Nonwoven Fabrics Using the Cantilever Test (INDA)	NWSP 090.1.R0 (15)	ISO 9073-7: 1995, reviewed and confirmed 2011
Stiffness of Nonwoven Fabrics Using the Gurley Tester	NWSP 090.2.R0 (15)	
Handle-O-Meter Stiffness of Nonwoven Fabrics	NWSP 090.3.R0 (15)	
Nonwovens Cusick Drape	NWSP 090.4.R0 (15)	ISO 9073-9: 2008, reviewed and confirmed 2011,



Nonwovens Bending Length (EDANA)	NWSP 090.5.R0 (15)	
Evaluation of Drapeability Including Drape Coefficient of Nonwoven Fabrics	NWSP 090.6.R0 (15)	ISO 9073-9: 2008, reviewed and confirmed 2011,
<b>10) TEAR STRENGTH</b>		
Tearing Strength of Nonwoven Fabrics by Falling-Pendulum (Elmendorf) Apparatus	NWSP 100.1.R0 (15)	
Tearing Strength of Nonwoven Fabrics by the Trapezoid Procedure	NWSP 100.2.R1 (15)	ISO 9073-4: 1997, reviewed and confirmed 2013
Tearing Strength of Nonwoven Fabrics by the Tongue (Single Rip) Procedure using the (Constant-Rate-of-Extension Tensile Testing Machine)	NWSP 100.3.R0 (15)	
<b>11) TENSILE</b>		
Breaking Strength and Elongation of Nonwoven Materials (Grab Strength Test)	NWSP 110.1.R0 (15)	ISO 9073-18: 2007, reviewed and confirmed 2010
Internal Bond Strength of Nonwoven Fabrics	NWSP 110.3.R0 (15)	
Breaking Force and Elongation of Nonwoven Materials (Strip Method)	NWSP 110.4.R0 (15)	ISO 9073-3: 1989, reviewed and confirmed 2010
Resistance to Mechanical Penetration (Ball Burst Procedure) of Nonwoven Fabrics	NWSP 110.5.R0 (15)	ISO 9073-5:2008, reviewed and confirmed 2012



<b>12) THICKNESS</b>		
Thickness of Nonwoven Fabrics (INDA)	NWSP 120.1.R0 (15)	
Thickness of Highloft Nonwoven Fabrics	NWSP 120.2.R0 (15)	
Measuring Compression and Recovery of Highloft Nonwoven Fabrics	NWSP 120.3.R0 (15)	
Determination of Compression and Recovery of Highloft Nonwoven Fabrics at Room Temperature Using Weights and Plates. Method 1: at room temperature	NWSP 120.4.R1 (15)	
Determination of Compression and Recovery of Highloft Nonwoven Fabrics at Room Temperature Using Weights and Plates. Method 1: at elevated temperature	NWSP 120.5.R1 (15)	
Nonwoven Thickness (EDANA)	NWSP 120.6.R0 (15)	ISO 9073-2: 1995, reviewed and confirmed 2011
<b>13) WEIGHT</b>		
Mass per Unit Area	NWSP 130.1.R0 (15)	ISO 9073-1: 1989, reviewed and confirmed 2010
<b>14) BINDER/APPERANCE/DRY CLEANING</b>		
Resin Binder Distribution and Binder Penetration, Analysis of Polyester Nonwoven Fabrics	NWSP 150.1.R0 (15)	
Appearance and Integrity of Highloft Batting After Refurbishing	NWSP 150.2.R0 (15)	

<b>15) LINTING</b>		
Resistance to Linting of Nonwoven Fabric (Dry)	NWSP 160.1.R0 (15)	ISO 9073-10: 2003, reviewed and confirmed 2014
Aqueous Method for Determining Releases of Particulates (Wet)	NWSP 160.2.R0 (15)	
Measuring Fibrous Debris from Nonwoven Fabrics	NWSP 160.3.R0 (15)	
Determining Fibrous Debris from Hydrophobic Nonwoven Fabrics	NWSP 160.4.R0 (15)	
<b>16) SUPERABSORBENT MATERIALS</b>		
Polyacrylate Superabsorbent Powders- Determination of pH	NWSP 200.0.R2 (15)	ISO 17190-1:2001
Polyacrylate Superabsorbent Powders- Determination of the Amount of Residual Monomers	NWSP 210.0.R2 (15)	ISO 17190-2:2001
Determination of Polyacrylate Superabsorbent Powders and Particle Size Distribution – Sieve Fractionation	NWSP 220.0.R2 (15)	ISO 17190-3:2001
Polyacrylate Superabsorbent Powders-Estimation of the Moisture Content as Weight Loss Upon Heating	NWSP 230.0.R2 (15)	ISO 17190-4:2001
Polyacrylate Superabsorbent Powders- Free Swell Capacity in Saline by Gravimetric Determination	NWSP 240.0.R2 (15)	ISO 17190-5:2001
Polyacrylate Superabsorbent Powders- Gravimetric Determination of Fluid Retention Capacity in Saline Solution After Centrifugation	NWSP 241.0.R2 (15)	ISO 17190-6:2001
Polyacrylate Superabsorbent Powders- Gravimetric Determination of Permeability Dependent Absorption Under Pressure	NWSP 242.0.R2 (15)	ISO 17190-7:2001
Polyacrylate Superabsorbent Powders- Determination of the Permeability Dependent Absorption Under Pressure of Saline Solution by Gravimetric Measurement	NWSP 243.0.R2 (15)	

Polyacrylate Superabsorbent Powders- Determination of Polymer Content by Powder Flow Rate and Bulk Density by Timed Flow through a Defined Funnel and Gravimetric Measurement	NWSP 251.0.R2 (15)	This is the merge of two WSP methods, the corresponding ISO standards are ISO 17190-8:2001 + ISO 17190-9:2001
Polyacrylate Superabsorbent Powders- Determination of Extractable Polymer Content by Potentiometric Titration	NWSP 270.0.R2 (15)	ISO 17190-10:2001
<b>17) BACTERIAL</b>		
Nonwovens Bacterial Filtration Efficiency	NWSP 300.0.R0 (15)	
Dry Bacterial Penetration	NWSP 301.0.R0 (15)	ISO 22612:2005, reviewed 2014
Nonwoven Wet Bacterial Penetration	NWSP 302.0.R0 (15)	ISO 22610:2006, reviewed 2013
<b>18) FORMALDEHYDE</b>		
Free and Hydrolyzed Formaldehyde in Nonwovens (Water Extraction Method) Method I	NWSP 310.1.R1 (15)	
Free and Hydrolyzed Formaldehyde Extracted at Stressed Extraction Conditions in Nonwovens Method II	NWSP 311.1.R1 (15)	
Determination of Free Formaldehyde in Nonwovens by Liquid Chromatography Method III	NWSP 312.0.R1 (15)	
Determination of Released Formaldehyde in the Processing of Aqueous Systems Method IV	NWSP 313.1.R1 (15)	

<b>19) Absorbent Hygiene Products</b>		
Menstrual Tampons Absorbency- Syngina Method	NWSP 350.1.R1 (15)	
Determination of Ethanol- Extractable Organotin Species in Absorbent Hygiene Products and Materials, Absorbent Hygiene Materials-Organotin I	NWSP 351.0.R0 (15)	
Determination of Organotin Species Extracted From Absorbent Hygiene Products and Materials With Synthetic Urine, Absorbent Hygiene Products – Organotin II	NWSP 352.0.R0 (15)	
Determination of Aceton Extractable Finish on Nonwoven	NWSP 353.0.R0 (15)	
Absorption Before Leakage Using an Adult Mannequin	NWSP 354.0.R1 (15)	ISO standard in process
<b>20) Supplementary Procedures</b>		
Surface Linting of Nonwovens	NWSP 400.0.R1 (15)	
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Cup Crush	NWSP 402.0.R0 (15)	
High Loft and Needled Batting For Flame Resistance and Thermal Transfer Properties	NWSP 403.0.R0 (15)	
Homogenization of Absorbent Hygiene Products Using a Laboratory Cutting Mill	NWSP 404.0.R0 (15)	
Polyacrylate Superabsorbent Powders- Determining the Content of Respirable Particles	NWSP 405.0.R0 (15)	
Polyacrylate Superabsorbent Powders- Determination of Dust in Collection Cassettes by Sodium Atomic Absorption/Emission Spectrometry	NWSP 406.0.R0 (15)	
Fiber Orientation Distribution of Nonwoven Fabrics	NWSP 407.0.R0 (15)	



<b>21) FIBER GLASS MATS Pending due to current revision by TAPPI/INDA</b>		
Guidance Document: The use of Modified TAPPI Procedures for Sampling and Lot Acceptance, Stiffness, Tear Resistance, and Thickness		
Guidance Document: Sample Location for Fiber Glass Mat Sheets		
Guidance Document: Test conditions for Fiber Glass Mat Test Methods		
Tensile Strength and Elongation at Break for Fiber Glass Mats		
Basis Weight of Fiber Glass Mats		
Moisture Content of Fiber Glass Mats		
Loss on Ignition of Fiber Glass Mats		
Fiber Glass Mat Uniformity (visual defects)		
Average Fiber Diameter of Fiber Glass Mats		

\* Method Number

NWSP nnn.nn.Rr (yy)

NWSP → NonWovens Standard Procedure

nnn.nn → Numbering system, historically chosen

Rr → Revision number

(yy) → Year of last release (publication), e.g. 2015