



Introduction to Nonwoven & Technical Textiles

“Look Beyond”[®]

AGC

Introduction to Nonwovens & Technical Textiles

- Textile vs. Nonwoven
- Product application
- Textile Testing
- Non-woven testing
- Grade recommendations
- Laboratory demonstrations

Textiles

- Textile – Any cloth or article that is produced by weaving or knitting.
 - Used in apparel, shoes, linens, drapes, etc.



Typically textiles have better wetting compared to non-wovens.

Nonwovens

- Nonwoven – Any cloth or article that is produced by forming bonding materials to form webs.
 - Used in medical garments, filters, automotive applications, etc.



Non-wovens typically have some hydrophobic properties without fluorochemical treatment.

Product Application

- Textiles and non-wovens are treated similarly.
- The customer's formulation is used for treating fabric and AG is added. It is important to get as much information about the customer's recipe including **reagents, quantities, order of addition, temperatures, wet pick-up, etc.**
- *Percent Wet Pickup* = $\frac{\text{Wet Mass} - \text{Dry Mass}}{\text{Dry Mass}} \times 100$
- Non-wovens usually require more or better wetting agents.
- Wetting agents - materials that lower the surface energy of a solution, increasing the speed the solution penetrates the fabric.
Examples – Hexanol, Isopropanol, and other commercial products.
- The amount of wet pick-up is very important in understanding how well a product works in a given application.

Example

- Customer's current formulation = 100% wet pick-up
- AG grade formulation = 60% wet pick-up

This means that 40% less fluorochemical solution is applied to the fabric.

- Improving wet pick-up
 - Increase the wetting agent
 - Decrease nip pressure
 - Decrease roller speed

Performance Evaluation:

Name

- Water Repellency
- Oil Repellency
- Spray Performance
- Stain Release
- Wash Durability

Method

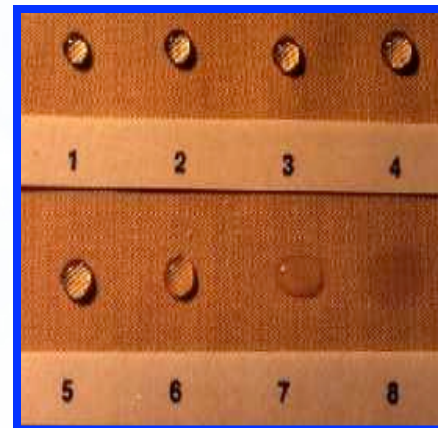
AATCC 193
AATCC 118
AATCC 22
AATCC 130
Customer specific

Static Water Repellency – Kit Test

Method:

- Three drops of the IPA/Water solutions are placed on the fabric
- Fabric passes the test if no wetting is observed after ~15 seconds

Kit Comparison



Teflon® Kit Test

Grade	Isopropanol	Water
1	2%	98%
2	5%	95%
3	10%	90%
4	20%	80%
5	30%	70%
6	40%	60%
7	50%	50%
8	60%	40%

3M Kit Test

Grade	Isopropanol	Water
W	0%	100%
1	10%	90%
2	20%	80%
3	30%	70%
4	40%	60%
5	50%	50%
6	60%	40%
7	70%	30%
8	80%	20%
9	90%	10%
10	100%	0%

Water drop test
AATCC 193
(Teflon / CHT
Standard)

Oil Repellency – Kit Test

Oil Drop Kit Test AATCC 118

Method:

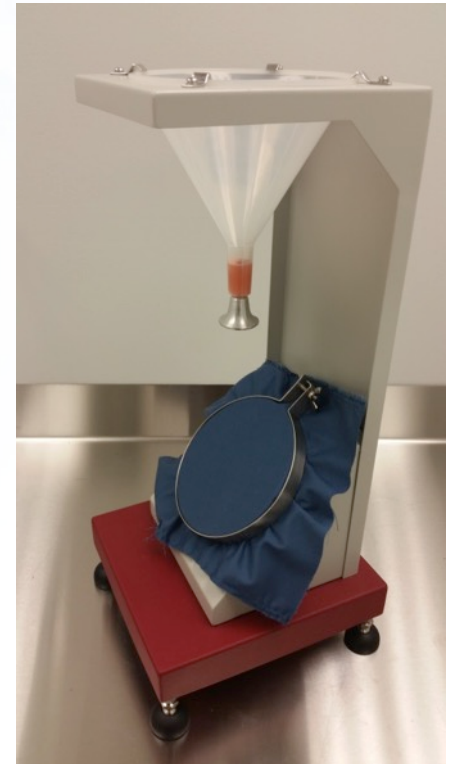
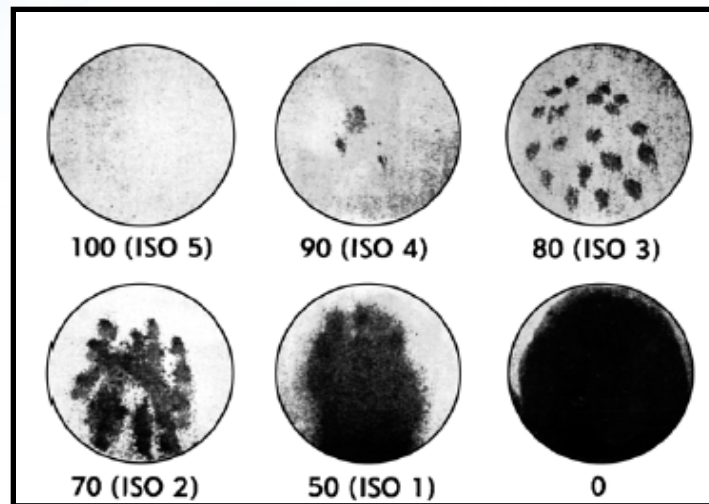
- Three drops of the test grade are placed on the fabric
- Fabric passes the test if no wetting is observed after 15-30 seconds

Oil Kit Test	
Grade	Description
1	Kaydol Oil
2	65:35 Kaydol : Hexadecane
3	Hexadecane
4	Tetradecane
5	Dodecane
6	Decane
7	Octane
8	Heptane

Dynamic Water Repellency – Spray Test

Method:

- 250 ml of tap water sprayed over fabric
- Spray height = 15 cm
- Knock-off the specimen
- Ratings: 0-100



Spray Test
AATCC 22

Stain Release



Stain Release
Test AATCC 130

Concept:

Test measures ability of fabric to release oily stains during home laundering.

Method:

Corn oil and mineral oil applied to fabric.

Glassine surface placed on top followed by a 2.27 kg weight for 60 seconds.

Surface and weight are removed and the fabric is washed.

Wash Durability



- Allows fabric to be washed/dried as much as required
- Sample evaluation is completed again after the wash/dry cycles are completed
- Provides a numerical value for performance longevity
- Used in stain release evaluations

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Performance Evaluation:

- Water Repellency***
- Wash Durability
- Hydrostatic Testing
- Static Decay
- Surface Resistivity

Optional Evaluations:

- Oil Repellency
- Spray Performance
- Stain Release

*** Water repellency for non-wovens has a 5 minute dwell time vs. 15-30 seconds for textiles

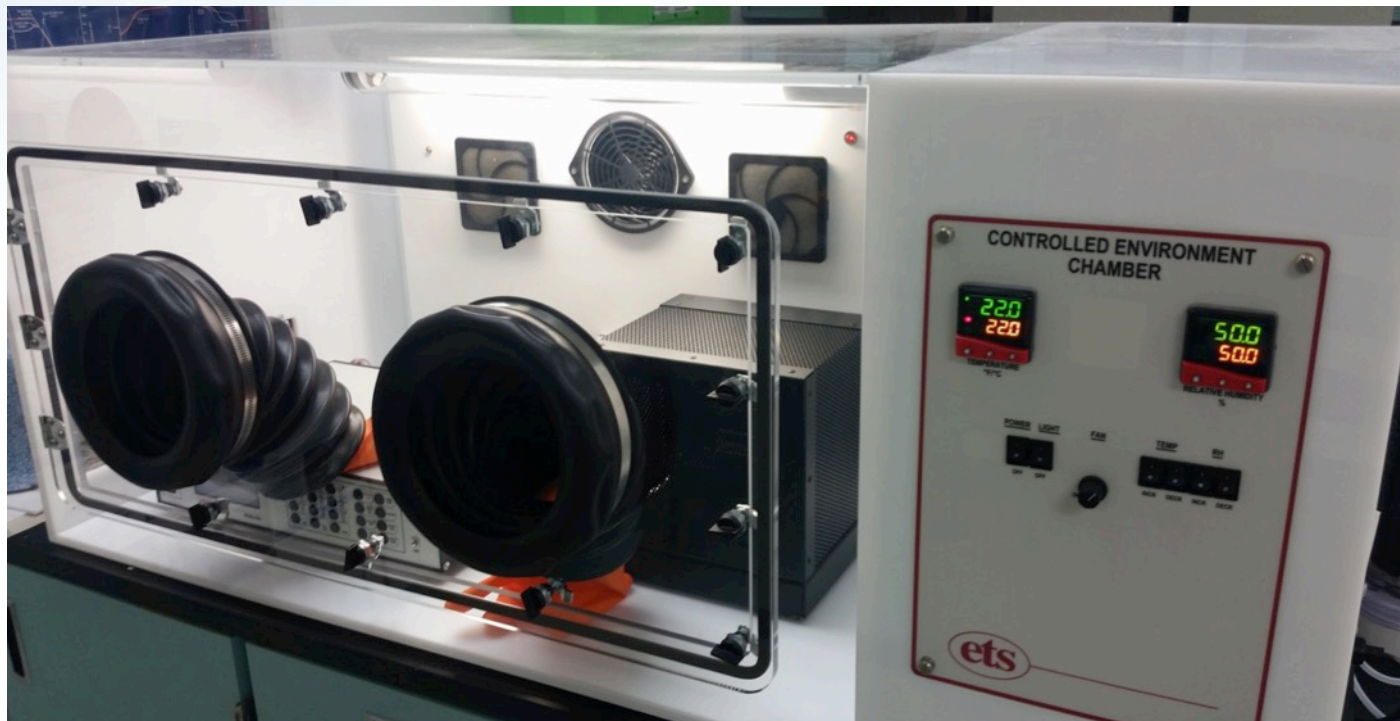
Hydrostatic Pressure Testing

- Equipment measures the force (kPa) and time required to force a liquid, usually water, through a piece of fabric.
- The larger the force and time required to penetrate the fabric the more resistant the fabric is to that particular liquid.
- This equipment provides a means of quantitatively differentiating treatments that perform similarly in the testing discussed earlier.



Static Decay Testing

- Static Decay measures the time it takes for the charge applied to fabric to dissipate
- Decay data is useful for medical garment and carpet customers



Surface Resistivity

- Electrical resistance of the fabric surface is measured between two concentric rings.
- Comparing the voltage gradient to the current density provides a numerical value of how much charge can build up on the surface of the fabric.



AsahiGuard Recommendations

- Customer applications are unique.
- AG recommendations should be tailored to fit the desired characteristics for each customer.

	Solid content [%]	Ionic character	Feature
E061	20	WC	Mildly Durable
E081	30	WC	Durable without X-linker
E082	20	WC	Durable, Mildly durable
E092	20	WC	Soft handle
E400	20	WC	Soft handle, For initial
E500D	30	WC	Durable, Less OR, Bundesmann
E550D	30	N	Durable, Nonionic, highest MW
E700D	30	WC	Durable, Bundesmann
E100	20	WC	Stain Release
E600	25	AM	For PP-SMS
E300D	30	N	For filter media

QUESTIONS?

Please join us for a tour of the new laboratory and demonstrations of how textiles and non-wovens are treated and evaluated.