GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW14231

Interior Trim Fabrics

1 Scope

1.1 Material Description. Interior trim fabrics covered by this specification are made from fibrous textile materials that are knit, woven, non-woven, or non-conventional in structure. This specification also covers laminated fabric constructions and synthetic suede.

1.2 Symbols. This code defines the material construction and will be assigned by the GM responsible department.

1.3 Applicability. This specification is divided into types relative to the application of the fabric on a part:

- Type A, (3.3) covers fabrics used for seating, including seat piping, and door trim panels.
- Type B, (3.4) covers fabrics used for overhead (headliner, visor, and sunshade), pillar, wind-lace and rear window trim.
- Type C, (3.5) covers fabrics used for instrument panel coverings.

Note: 3.1, 3.2, 3.6, 3.7, 4 and 5 apply to all fabrics regardless of application.

1.4 Remarks. All interior materials are developed to be used in vehicles with solar glass, therefore, performance may be compromised if used in non-solar glass vehicles. For requirements for vehicles without solar absorbing glass, contact the appropriate GM Materials Engineer.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

AATCC 23	ISO 105-A02	ISO 5084	ISO 12947-4
AATCC 118	ISO 105-A03	ISO 9237	ISO 13937-2
ASTM D3882	ISO 105-B06	ISO 12947-1	ISO/IEC 17025
ISO 105-A01	ISO 105-X12	ISO 12947-2	

2.2 GM Standards/Specifications.

GMW3010	GMW3259	GMW4090	GMW14162
GMW3059	GMW3283	GMW4141	GMW14364
GMW3182	GMW3326	GMW4217	GMW14444
GMW3205	GMW3347	GMW4726	GMW14775
GMW3208	GMW3387	GMW4750	GMW15058
GMW3211	GMW3390	GMW6992	GMW15377
GMW3214	GMW3402	GMW14102	GMW15651
GMW3217	GMW3405	GMW14124	GMW16853
GMW3220	GMW3414	GMW14128	
GMW3221	GMW3417	GMW14141	
GMW3232	GMW4089	GMW14146	

2.3 Additional References.

- MATINR-29 GM Best Practice. **Note:** The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

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- GMW14231 Appendix A, Construction Specification (Spec) Forms from GM SupplyPower at Uniform Resource Locator (URL): https://gmsupplypower.covisint.com/web/portal/home
- GMW14231 Appendix B, Laboratory (Lab) Data Forms from GM SupplyPower at URL: https://gmsupplypower.covisint.com/web/portal/home
- GMW14231 Global Fabric Development Guide from GM SupplyPower at URL: https://gmsupplypower.covisint.com/web/portal/home

3 Requirements

3.1 General Requirements for All Interior Trim Fabric Applications.

3.1.1 Standard Conditions (GMW3221-A). All test specimens shall be conditioned to GMW3221 Code A for a minimum of 24 h.

3.1.2 Sampling and Test Specimen Preparation. All test specimens shall be taken from the area beyond the initial 2 m of production and at least 50 mm from either selvage edge. Prepare test specimen as required in the respective test method.

3.1.3 Visual Evaluation of Automotive Trim (GMW6992). The color, pattern, aesthetics and other related qualities shall be evaluated and approved by the responsible engineering department as an acceptable match to the engineering approval sample when viewed under conditions set forth in GMW6992.

3.1.4 Deviation from Defined Test Methods. Deviations from the conditions of any test method shall be agreed upon between supplier and vehicle manufacturer. All deviations shall be specified on the component drawings, material construction specification form, and Statement of Requirements and shall be indicated as such on test certificates and reports.

3.1.5 Documentation. Samples of components or material released to this specification shall be tested for conformity with the requirements of this specification and approved by the responsible GM department prior to the start of delivery of production level components or materials.

3.1.5.1 Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

3.1.5.2 If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases a shorter test can be agreed to, between the responsible GM department and the supplier.

3.1.6 Lab Accreditation. Lab testing shall be performed by a laboratory that conforms to ISO/IEC 17025 or other 3rd party accreditation and is acceptable to the GM Materials Engineer. Supplier shall submit documentation showing proof of accreditation.

3.1.7 Material Construction Specification. All required information shall be reported on the "GMW14231 Appendix A, Construction Specification (Spec) Forms" from GM SupplyPower at Uniform Resource Locator (URL): https://gmsupplypower.covisint.com/web/portal/home. See Figure A1, Figure A2, and Figure A3 in Appendix A. A specification form shall be submitted along with each fabric and fabric composite for engineering construction or laminate approval. Established values for a construction will be reported on and controlled within the limits established on the Construction Spec Form.

3.1.8 Lab Data Forms. All required information shall be reported on "GMW14231 Appendix B, Laboratory (Lab) Data Forms" from GM SupplyPower at URL: https://gmsupplypower.covisint.com/web/portal/home. See Figure B1 in Appendix B. Submit all required test specimens.

3.1.8.1 Data Reporting. If all individual readings of a specific test meet or exceed the specified requirements, report the average. Unless otherwise stated, any individual reading outside the specified limit does not meet the requirement. Report all individual test results that do not meet the requirements.

3.1.8.2 Test Specimens. All tested specimens submitted to GM by suppliers shall be stapled to size A4 white cardstock. On each card, list the test report number, material specification and section number, test date, observations, and disposition.

3.1.9 Foam Requirements. The foam used in any laminate construction must meet the requirements of GMW15058. The supplier shall provide documentation of foam approval, included with the lab data.

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3.1.10 Soil Repellent (SR) Finish Requirement. Follow MATINTR-29 GM Best Practice to determine where standard SR finish is required; in general, flat fabrics with an L* measurement for color value higher than 31.0 as measured on the plastic primary color master will require standard SR. **Note:** The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement. The use of premium SR is determined by the program team due to the additional cost over standard SR. Premium finish has soil repellent/release plus antimicrobial and anti-stat finishes. Use of SR as determined by the best practice applies to seating fabrics, however, other applications could require it, if specified.

3.2 Construction Requirements for All Applications. These requirements describe the initial testing to be completed for a new fabric construction. This testing may be done on face fabric or on a fabric laminate. Initial construction submissions shall be in a light value color with an L* value of 55.0 or higher, unless otherwise indicated. A construction and color approval is valid when the testing in 3.2 and 3.6 is complete along with the appropriate application (type) requirements (3.3 thru 3.5).

Note: Part process-ability may require different construction properties than those listed in this section. At the approval of the appropriate GM Engineer, deviations may be given in order to meet the part process-ability requirements. Any deviations shall be documented on the "GMW14231 Appendix A, Construction Spec Forms" as well as on the Appearance Database. See 6 Approved Sources.

3.2.1 Weight (GMW3182). Report the average in gram per meter squared (g/m^2) for the face fabric weight and the total fabric weight if laminated. Acceptable production tolerances shall be ± 6%, unless otherwise stated on the construction specification and approved by the GM Materials Engineer.

3.2.2 Thickness (ISO 5084). Report the average for three (3) specimens, in millimeters (mm) to the nearest 0.01 mm. Use a 2.0 N load and a 50.5 mm diameter presser foot to achieve a pressure of 1.0 kPa. For foam laminates, use a 4.0 N load and a 200 mm ± 0.8 mm diameter presser foot to achieve a pressure of 0.127 kPa. All readings should be taken after the presser foot has been in contact with the material for at least 5 s. Acceptable production tolerance will be ± 10% for face fabric materials and ± 15% for laminate composites, unless otherwise specified on the construction specification. Specified foam thickness is measured after lamination.

3.2.3 Yarn Count (GMW4090). Not applicable to synthetic suede fabrics. Report the average count to the nearest yarn, for each direction.

3.2.4 Bow and Skew (ASTM D3882). Not applicable to solid synthetic suede fabrics. The degree of pattern misalignment must be visually acceptable in appearance, and when measured over 400 mm across any point of useable fabric width, shall not exceed the limits below.

3.2.4.1 Grade 1: High contrast/Large, repeatable pattern/Highly geometric:

- 2.0% maximum.

3.2.4.2 Grade 2: Medium contrast/Smaller pattern/Subtle geometry:

- 3.0% maximum.

3.2.4.3 Grade 3: Non-patterned:

- 5.0% maximum.

3.2.4.4 The grade of the fabric shall be assigned by the GM Approving Engineer prior to granting construction approval.

3.2.5 Dimensional Stability (GMW4217 and GMW14124 Cycle M). Dimensional change shall be ≤ 2.5% in the Machine Direction (MD) and Cross Machine Direction (CMD). The specimen shall exhibit a satisfactory rating, which is no degradation or no delamination of the layers, foam or film. Color change of the adhesive, foam or film that does not affect the appearance of the face fabric is allowed.

3.2.5.1 Dimensional Stability (GMW4217). Test one (1) specimen using the wet condition. Test another specimen using the dry condition. For both the wet and dry condition, test the specimens two (2) times. Report the dimensional changes for both wet and dry conditions after the 1st and 2nd test. For laminated fabrics report curl at completion of the 2nd cycle as directed in GMW4089.

3.2.5.2 Resistance to Automotive Environmental Cycling (GMW14124 Cycle M). One (1) specimen shall be exposed to all conditions of Cycle M two (2) times. Measure the specimen while it is at each condition, e.g., hot condition, humidity condition, cold and ambient. Report the dimensional change after each condition.

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3.2.6 Crocking (ISO 105-X12). The results shall be ≥ 4 when compared to the International Organization for Standardization (ISO) Grey Scale for Staining, ISO 105-A03 after ten strokes to and fro for both wet and dry conditions. One (1) stroke is equal to one (1) complete "to and fro" cycle. For wet testing, use a 65% ± 5% wet pick-up of the crocking cloth. In addition to meeting the crocking requirements, synthetic suede shall meet Compatibility per GMW14444.

3.2.7 Dye Migration (GMW14141). The rating of each fiber type within the multi-fiber test fabric shall be ≥ 4 when compared to the ISO Grey Scale for Staining, ISO 105-A03 and ≥ 4 for color change of the specimen using the ISO Grey Scale for Color Change, ISO 105-A02. Perform using distilled or deionized water only. Include the multi-fiber test fabric on the test specimen card.

3.2.8 Water Spotting (GMW14102). Specimen size shall be 400 mm x 400 mm. Amount of water used shall be 5.0 mL. Perform the water spotting procedure three (3) times on the same area, allowing the specimen to dry for at least 24 h after each application of water. Evaluate after each drying process and report the most noticeable results. No staining, ring formation or haptic change is allowed. If the water wicks to the edge, increase the specimen size.

3.2.9 Soil and Cleaner Resistance (GMW3402, Part A and Part B). For Part A, test all fabrics to the soils listed in the appropriate tables (3.3.18, 3.4.5 or 3.5.5) based on application as follows:

- Apply each soil and allow it to remain on the specimen for ½ h. Clean each soil within 20 minutes after the ½ h waiting period.
- Allow each specimen to condition for 24 h.
- View each soil specimen from various angles by rotating the specimen and report the results of the most severe (worst) viewing angle. Report the individual ratings for each tested specimen using the rating scale in Table 1. Also report the average of all soiled specimens. No ring formation or haptic change is allowed.

Table 1: Soil and Cleaner Resistance Rating Scale

Rating	Definition
10	No Change
8	Slight Change: Slight amount of staining visible upon close inspection
6	Moderate Change: Noticeable amount of staining visible
4	Significant Change: Objectionable amount of staining visible
2	Severe Change: Intense staining; dark stains on light color materials or light stains on dark color materials

For Part B, each tested specimen shall display no more than a slight appearance change after exposure to each cleaner. No ring formation or haptic change of the specimen is allowed. A rating of ≥ 4 is also required when evaluated using an ISO 105-A02 Grey Scale for Color Change. The crocking cloth shall have a rating of ≥ 4 when compared to the ISO 105-A03 Grey Scale for Staining.

Note: It is expected that all Soil Repellent (SR) finishes are as durable as the fabric to which they are applied and effective for 10 years of service life.

Note: Fabrics not treated with a soil repellent finish, including dark color flat fabrics which are exempt from treatment per MATINTR-29 GM Best Practice, should not be expected to perform the same as a SR treated fabric for enhanced clean-ability, water repellency, oil repellency and surface energy. **Note:** The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.2.10 Water Repellency (GMW4726). For SR treated fabrics only. The requirement is ≥ 8.

3.2.11 Oil Repellency (AATCC 118). For SR treated fabrics only. A rating of ≥ 3 is required for fabrics with standard SR and ≥ 7 for fabrics with premium SR.

3.2.12 Surface Energy. For SR treated fabrics only. Position the fabric on a horizontal, smooth surface. Place a 1 mL drop of distilled or deionized water on the surface of the fabric. Examine droplet after 10 minutes. Requirement is no absorption into the fabric allowed; the bead of water should remain on the surface. A droplet

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with low surface energy (a large contact angle indicated by a highly domed, rounded appearance) is desired as this indicates a more hydrophobic surface.

3.2.13 Antimicrobial Odor. For fabrics with antimicrobial finish only. Place 5 mL of whole milk onto the surface of the fabric. Seal in a glass jar and maintain at 24 °C for 7 days. After conditioning per GMW3221-A for 24 h, open the jar and note any presence of sour milk or other objectionable odor. A rating of ≥ 8 per the rating scale in GMW3205 is required.

Note: Whole milk = Fresh (within the expiration date), homogenized, full fat milk.

3.2.14 Colorfastness to Artificial Light, Xenon Arc Method. A rating of ≥ 3 per ISO 105-A02 Grey Scale for Color Change is required. Evaluate per ISO 105-A01. A noticeable chroma (saturation) change with minimum hue change is acceptable. Evaluate specimens as specified in GMW6992. Polystyrene reference plastic and/or blue wool is to be used to verify the xenon arc apparatus.

3.2.15 Natural Weathering. GMW3417 L1-F2-G1T5. Required for approval for non-100% polyester and non-seating fabrics, including synthetic suede for all applications. A rating of ≥ 3 per ISO 105-A02 Grey Scale for Color Change is required. Evaluate per ISO 105-A01. A noticeable chroma (saturation) change with minimum hue change is acceptable. Evaluate specimens as specified in GMW6992.

GM is responsible for conducting the natural weathering testing. Suppliers shall submit one (1) A4 sample of material to the responsible engineer at the developing region. This sample must be from the same lot of material that is tested for construction, and shall be submitted along with the construction properties test sample submission package. The sample shall be labeled "For Natural Weathering Test" and include the supplier's name, piece number, date, and GM **f**inish **s**ymbol and color number. GM will perform the specified natural weathering test on this sample and advise the supplier of compliance or lack of compliance to the requirement.

3.2.16 Fiber Degradation (GMW3387) after Artificial or Natural Weathering. Test the specimen from 3.2.14 or 3.2.15 for fiber degradation at the required exposure level. Test after natural weathering if natural weathering is the requirement and after artificial weathering if artificial weathering is the requirement. Evaluate per ISO 105-A01. A rating of ≥ 8 is required.

3.2.17 Flammability (GMW3232).

3.2.17.1 After Conditioning (GMW3232). Immediately prior to flammability testing, all test specimens shall be conditioned for a minimum of 24 h according to GMW3221-A.

3.2.17.2 After Aging (GMW3232). The test cycle shall commence with 48 h ± 1 h at 40 °C ± 3 °C and 93% ± 5% Relative Humidity (RH) followed by 168 h ± 1 h at 90 °C ± 3 °C and completed without interruption. Repeat conditioning before testing flammability.

Note: Fabric or fabric laminates that will not be 100% bonded to a substrate, e.g., cut and sew application, are required to meet GMW3232 as rolled goods. Fabric or fabric laminates that will be 100% bonded to a substrate, must meet GMW3232 as a composite (fabric/fabric laminate plus part substrate).

3.2.18 Mildew (GMW3259). There shall be no visible growth or odor of mildew.

3.2.19 Odor (GMW3205). Report both wet and dry results per GMW16853. Use a ratio of specimen size to container size of 1:50.

3.2.20 Colorfastness to Burnt Gas Fumes (AATCC 23, Propane Gas). For synthetic suede and overhead fabrics only. Test for colorfastness to oxides of nitrogen in storage or use only. A rating of ≥ 4 per ISO 105-A02 Grey Scale for Color Change is required with no hue change allowed. Evaluate per ISO 105-A01.

3.2.21 Sound Transparency (GMW14128). For fabric to be used as a speaker covering only.

3.2.22 Bond Strength (GMW3220). Laminated fabrics only. Test three (3) specimens from the MD and three specimens from the CMD and report the average. Bond strength shall be taken between fabric and foam and between foam and scrim as received and after environmental cycling. Bonded on films used in place of scrims are exempt from meeting the bond requirements of scrim to foam. Low weight scrims used as assembly aids, generally < 30 g/m^2 are also exempt from meeting the bond requirements of scrim to foam, as received and after environmental cycling. Scrims used to control physical properties of the face fabric, e.g., knit scrim used on circular knit face fabric laminates to control stretch and set, are not exempt and must meet the requirement, as received and after environmental cycling.

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3.2.22.1 As Received (GMW3220). Foam and scrim used in laminate constructions shall meet the applicable GM materials specifications. The requirement is 6 N/5 cm minimum for foam to fabric bond and 4 N/5 cm minimum for foam to scrim bond.

3.2.22.2 As Received, Nonwoven Scrim Only (GMW3220). The bond strength of bi-laminate using nonwoven scrim shall be greater than the internal strength of the nonwoven. If a separation occurs in the nonwoven, the minimum internal strength shall be 5 N/5 cm.

3.2.22.3 After Environmental Cycling per Resistance to Automotive Environmental Cycling (GMW14124 Cycle T or Cycle Q). For foam laminated fabrics only. The bond strength of bi-laminate or tri-laminate constructions with foam shall be 3 N/5 cm minimum. If foam tears this is considered to meet the requirement; indicate on the test report that foam tear occurred. The sample shall exhibit a satisfactory rating, which is no degradation or delamination of the layers, foam or film. Color change of the adhesive, foam or film that does not affect the appearance of the face material beyond a slight amount is allowed.

3.2.23 Laminate Curl (GMW4089). For foam laminated fabrics only. Requirement is ≤ 4.5%.

3.2.24 Interior Emissions (GMW16853).

3.2.25 Color Read Through of Automotive Textiles (GMW4750). Rate face fabric without foam or other backings. Evaluate and rate changes to the ISO Grey Scale for Color Change, ISO 105-A02. The minimum value for the face fabric is 4.5. No noticeable read through allowed when evaluated.

3.3. Construction Requirements for Seating and Door Applications (Type A). This section describes the additional test requirements for seating and door fabrics, 3.2 plus 3.3 are required for construction approval.

3.3.1 Weight (GMW3182). The minimum requirement for the face weight without back-coating for seat bolster and seat insert is 300 g/m^2, unless otherwise agreed upon by the appropriate GM Materials Engineer.

3.3.2 Fiber Show Through. Perforated synthetic suede fabrics only. No fiber show through is allowed on perforated fabrics. All dark color perforated fabrics should have a dark colored laminate backing and all light color perforated fabrics should have a light colored laminate backing unless otherwise agreed upon with the appropriate GM Engineer. If design intent is to have a contrasting scrim backing, this needs to be documented during color development.

3.3.3 Yarn Slippage (GMW14146). The minimum requirement for woven fabrics in both the warp and fill directions are ≥ 50 N. For knitted fabrics, the minimum requirement for the wales and course directions is ≥ 30 N.

3.3.4 Ravel Resistance (GMW3217). For woven fabrics only. A minimum of two (2) test specimens shall be taken from both the warp and fill directions. A rating of ≥ 8 is required after 1000 cycles

3.3.5 Seam Fatigue (GMW3405). For seating fabrics only. The joining seam of a fabric shall have no slippage (increased distance between rows of yarns), noticeable fiber or yarn breakage, fractures of the sew line, needle hole elongation > 2 mm nor an objectionable seam appearance after 2500 cycles. Seam appearance shall be judged on a sew line when observed from the face side. Seam evaluation may also be conducted on the sewn assembly and disposition made in accordance with these results. Use of any other needle than what is recommended in the test procedure shall be approved by the GM Materials Engineer and indicated on the test report.

3.3.6 Flexibility (GMW3390). For non-laminated seating fabrics only. Five (5) specimens shall be tested from each direction for bending length only. Report the average for MD and CMD, face up only. The bending length shall be between 30 mm and 100 mm.

3.3.7 Sagging Resistance (GMW3214). For seating fabrics only. Report the penetration depth and the average of all three (3) specimens. For information only.

3.3.8 Stretch and Set (GMW3211). Test three (3) specimens from the MD and three (3) from the CMD. Report the average for each direction. The stretch shall be between 6% and 25%; the set shall be between 0% and 4%. Also test three (3) specimens from the bias direction for information only.

3.3.9 Tensile and Elongation (GMW3010 Code S or Code T). For fabrics with elongation below 5%, Code T shall be run. Test three (3) specimens each from the MD, CMD and bias left and bias right directions. Report the average tensile and average elongation at 50 N in each direction. Report elongation in the bias directions for information only. Established values will be reported on and controlled within the limits established on the "GMW14231 Appendix A, Construction Spec Forms". Refer to Table 2 for requirements. Process-ability requirements may override elongation requirements listed here.

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Table 2: Tensile and Elongation Requirements

Minimum Requirements	Tensile	Elongation	
	MD/CMD	MD	CMD
Woven	400 N	4%	4%
Knit	250 N	5%	5%
Nonwoven, including synthetic suede	300 N	4%	5%
All others	400 N	5%	5%

3.3.10 Tear Strength. Trapezoid Tear (GMW3326) and Trouser Tear (ISO 13937-2). Test three (3) specimens from the MD and three (3) specimens from the CMD. For trouser tear, consider the short direction of the test specimen and the direction of test. The electronic method of calculation shall be used. Report the average for each direction in Newton (N). Refer to Table 3 for requirements.

Table 3: Tear Strength Requirements

Fabric Type	Minimum Requirement	Method
Knit	26 N	Trouser Tear
Woven	45 N	Trapezoid Tear
Nonwoven, including synthetic suede	75 N	Trapezoid Tear

3.3.11 Resistance to Wear/Abrasion. Test fabrics as directed in Table 4.

Table 4: Resistance to Wear/Abrasion

Fabric Type	Method
Global bolsters, all constructions	Taber + Martindale + Schopper
Flat woven bolster, not back-coated	Martindale + Schopper
Flat woven insert, not back-coated	Martindale
Woven pile, back-coated	Taber
Flat woven bolster and insert, back-coated	Taber
Knit pile, not back-coated	Taber
Flat knit, back-coated	Taber
Flat knit insert, not back-coated	Martindale
Flat knit bolster, not back-coated	Martindale + Schopper
Nonwoven, including synthetic suede	Taber
Piping fabrics	Taber + Martindale + Schopper for information (Approval by ingress/egress)

3.3.11.1 Taber Method (GMW3208). Use rating scale in Table 5. Three (3) specimens shall be tested. Test using a 1000 g weight and CS-10 wheels for 1000 cycles. A rating of ≥ 6 is considered to meet this requirement.

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For seating fabric specified as "Extra Durable", the Taber requirement is a rating of ≥ 6 after 2000 cycles, 1000 g weight and CS-10 wheels.

Table 5: Taber Method Rating Scale

Rating	Definition
10	No Change.
8	Slight Change: Fluffy surface, slight fiber disturbance, no fiber breakage
6	Moderate Change: Disturbance of surface yarns and fibers, minimal fiber breaks, slight pile distortion
4	Significant Change: Partial yarn abrasion with 50% or more fiber breakage, permanent distortion or reduction of pile fibers, and/or loss of pattern or design intent pattern
2	Severe Change: Holes, removal of pile or flocked fibers, and/or backing is visible

3.3.11.2 Martindale Method (ISO 12947-1, ISO 12947-2, and ISO 12947-4). Three (3) specimens shall be tested. Pressure applied is 12 kPa. Test for 35 000 cycles for insert fabrics. Test for 50 000 cycles for bolster fabrics. No holes are allowed and the rating on the ISO Grey Scale for Color Change shall be ≥ 3.

3.3.11.3 Schopper Method (GMW3283). Test two (2) specimens using a 1000 g weight for 200 cycles (weight loss). Requirement for maximum weight loss is 5 g/m^2 after 200 cycles. No holes after 1000 cycles.

3.3.12 Hook Fastener Resistance (GMW15651). Use rating scale in Table 6. After 48 cycles, a rating of ≥ 8 is required for seat insert and bolster applications. After 24 cycles, a rating of ≥ 6 is required for door panel, headrest or inboard seat side facing applications. For seating fabric specified as "Extra Durable", the hook fastener requirement is a rating of ≥ 8 after 96 cycles.

Table 6: Hook Fastener Resistance Rating Scale

Rating	Definition
10	No Change.
8	Slight Change: Slight filament damage (slightly fuzzy surface) only detectible upon close visual examination
6	Moderate Change: Noticeable fluffy surface and noticeable fiber breakage causing a change in design intent; slight yarn breakage; slight bearding
4	Significant Change: Significant amount of yarn or fiber breakage; noticeable bearding
2	Severe Change: Severe bearding and surface distortion; holes

3.3.13 Snagging, Rivet Method (GMW14775). Applicable to fabrics with long floats, generally ≥ 2 mm, at the discretion of the GM Engineer. Test in the MD, CMD, bias left and bias right directions. The requirement is no snagging or catching of the float by the rivet, in all directions and angles of test.

3.3.14 Pile Distortion Environmental (GMW4141). For pile fabrics only. A rating of ≥ 6 in the direction producing the worst distortion, as defined in the test method, is required.

3.3.15 Lint Pick-up and Retention (GMW3347). Use rating scale in Table 7. For pile and napped seating fabrics only. Perform on a darker color, L* value of 31.0 or lower. A rating ≥ 6 is required for lint pick-up. A rating ≥ 8 is required for lint retention after five (5) total strokes to and fro of the vacuum. For double needle bar pile fabrics, test specimens from both sides (top and bottom) and record the piece number for each, along with the rating.

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Table 7: Lint Pick up and Retention Rating Scale

Rating	Definition
10	No change: No fiber on fabric surface
8	Slight: Trace amount of fiber left on fabric surface
6	Moderate: Slight amount of fiber left on the fabric surface as seen with the naked eye
4	Annoying: Large amount of fiber left on the fabric surface and/or a change in fabric appearance
2	Severe Change: Clumps of fiber entangled with the fabric surface or complete coverage of fabric surface by fiber

3.3.16 Electrostatic Behavior. For seating fabrics only. Fabric shall be tested on a built-up seat as deemed necessary by the Seat Engineer.

3.3.17 Air Permeability (ISO 9237). For non-back-coated seating fabrics only. Report the air permeability in mm/s using a test pressure of 100 Pa.

3.3.18 Soil and Cleaner Resistance. (GMW3402, Part A and Part B, and GMW15377). For Part A, test per Table 8 for fabrics with standard SR finish, Premium Soil Repellent (PSR) finish or no finish. Follow MATINTR-29 GM Best Practice to determine where standard SR finish is required; in general, flat fabrics with an L* measurement for color value higher than 31.0 as measured on the plastic primary color master will require standard SR. **Note:** The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement. The use of premium SR is determined by the program team due to the additional cost over standard SR. Premium finish has soil repellent/release plus antimicrobial and anti-static finishes. For denim, GMW15377 applies; test for 1000 cycles.

Table 8: GMW3402 Part Requirements

Finish	Soils to Use	Requirement of Each Soil	Average of All Soils
No SR	A to D and F to J	≥ 8	≥ 8
SP/PSR	A to M	≥ 8	≥ 8

3.3.19 Colorfastness to Artificial Light, Xenon Arc Method.

3.3.19.1 100% Polyester Fabrics, GMW3414, Cycle A. The requirement for approval is GMW3414, 1204.0 kJ/m^2.

3.3.19.2 Non-100% Polyester Fabrics. Xenon shall be performed and reported for information only. Any method listed in Table 9 may be used.

Note: Natural weathering is the requirement for approval.

Table 9: Xenon Methods for Non-100% Polyester Fabric

Method	Level
ISO 105-B06, Condition 5	338.6 kJ/m^2
GMW14162, Cycle A, 100 °C, 420 nm for pile fabrics only	658.0 kJ/m^2
GMW14162, Cycle B, 100 °C, 300 nm to 400 nm	28.0 MJ/m^2

3.3.20 Natural Weathering (GMW3417, L1-F2-G1-T5).

3.3.20.1 Required for non-100% polyester fabrics. Test 40 Temperature Normalized Radiation (TNR) at 102 °C and for information only, test at 20 kL, 30 kL and 10 kL.

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