



Security Shade Fabric

1 Scope

1.1 Material Description. This specification describes materials used in rear cargo or window areas. Materials covered by this specification are made from fibrous textile materials that are knit or woven and can be part of a layered structure with vinyl or be made from other materials such as plastic roll goods.

1.2 Symbols. A unique finish symbol will be given to each fabric by the responsible GM representative at initial development.

1.3 Applicability.

- **Type I:** Cargo security shade applications.
- **Type II:** Mesh fabric construction used in side, back, or sunroof window openings to reduce the amount of light penetrating the vehicle without obstructing driver vision.
- **Type III:** 100% light blocking fabric for sunroof window openings.

Note: If no type is specified, assume Type I.

2 References

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

2.1 External Standards/Specifications.

ISO 105-A02	ISO 105-B06	ISO 5084	ISO 13937-2
ISO 105-A03	ISO 105-X12	ISO 9050	ISO/IEC 17025

2.2 GM Standards/Specifications.

GMW3010	GMW3221	GMW14102	GMW14270
GMW3059	GMW3232	GMW14124	GMW14444
GMW3116	GMW3235	GMW14126	GMW15634
GMW3182	GMW3402	GMW14132	GMW15635
GMW3205	GMW3417	GMW14141	GMW16853
GMW3208	GMW6992	GMW14162	

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221. All test specimens shall be conditioned to GMW3221, Code A, for a minimum of 24 h before and after completion of test unless the test method indicates that standard conditioning is not required.

3.1.1 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.

3.1.2 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.

3.1.3 Deviation from Defined Test Methods. Deviations from the conditions of any test method shall have been agreed upon between supplier and vehicle manufacturer. All deviations shall be specified on the component drawings, material specifications, etc., and shall be indicated on test certificates, reports, trim transmittal, etc.

3.1.4 Certification of Test Data. Laboratory testing is to be performed by a laboratory that conforms (meets requirements, may not be formally recognized by a third party) to ISO/IEC 17025, or is acceptable to the customer (GM). Supplier shall submit a letter of compliance.

3.2 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts.

3.3 Construction Requirements. These requirements describe the initial testing to be completed for a new fabric construction. Report the construction parameters per Appendix A, Data Sheet A1. For complete construction approval, 3.3 must also be completed using a representative color. Report the data per Appendix B, Data Sheet B1. Test specimens shall be submitted where indicated on the data sheet. Test a minimum of three (3) samples per requirement (unless otherwise specified), reporting the average value if all values meet requirements, otherwise report the values outside of the requirement.

3.3.1 Weight (GMW3182). Report the average of three (3) specimens in grams per square meter (g/m^2) to the nearest 0.1 g/m^2 . Acceptable production tolerances shall be $\pm 6\%$ unless otherwise specified on the construction specification form. (Appendix A, Data Sheet A1).

3.3.2 Thickness (ISO 5084). Report the average thicknesses for three (3) specimens, in millimeters to the nearest 0.01 mm. Use a 2.0 N load and a 50.5 mm diameter pressure foot to achieve a pressure of 1.0 kPa. All readings should be taken after the pressure foot has been in contact with the material for at least 5 s. Acceptable production tolerance shall be $\pm 10\%$ unless otherwise specified on the construction specification form. (Appendix A, Data Sheet A1).

3.3.3 Resistance to Blocking (GMW14132). There shall be no blocking or surface marring when specimen pairs are placed face-to-face and face-to-back. Use a 3600 g mass. A total of six (6) 50 mm by 50 mm specimen pairs are needed for each test condition below (3.3).

3.3.3.1 As Received. Test three (3) specimen pairs face-to-face and three (3) specimen pairs face-to-back.

3.3.3.2 After Humidity. Test three (3) specimen pairs face-to-face and three (3) specimen pairs face-to-back. All specimen pairs shall be tested after 24 h pre-conditioning at $38^\circ\text{C} \pm 2^\circ\text{C}$ and $95\% \pm 3\%$ relative humidity (RH). Test within 10 minutes of removal from humidity.

3.3.3.3 After High Temperature. Test three (3) specimens pairs face-to-face. Test another three (3) specimen pairs face-to-back. All specimens shall be tested after $24 \text{ h} \pm 0.5 \text{ h}$ aging at $100^\circ\text{C} \pm 2^\circ\text{C}$ in a mechanical convection oven.

3.3.4 Cold Crack (GMW14126). Test two (2) specimens from the Machine Direction (MD) and two (2) specimens from the Cross Machine Direction (CMD): $H=150 \text{ mm}$, $G=500 \text{ g}$. Evaluate the face side of specimens by flexing at the point of impact. There shall be no cracking or crazing of the finish or fibers when evaluated with the trained naked eye.

3.3.5 Dimensional Stability (GMW14124, Cycle M Performed Twice). Report the dimensional change after each condition of the cycle. There shall be no greater than 2.5% dimensional changes in either the MD or CMD. The material must withstand the environmental exposure with no objectionable visual appearance changes. Visual observations shall include changes in color or gloss, warping, wrinkling, sag, staining, haptic, or other undesirable changes. High temperature is to be 110°C .

3.3.6 Resistance to Wear (GMW3208). Test three (3) specimens using 500 g weights and H-38 wheels for 300 cycles. A rating of six (6) or greater is required.

3.3.7 Light Transmissivity (ISO 9050). Type II and Type III material only. Report the τ_v and the instrument used to obtain the data. This information will be used to characterize the material for appropriate usage.

τ_v is the amount of light not blocked by the fabric.

3.3.8 Tensile Strength and Elongation (GMW3010 Code A). Established values for a construction will be reported and controlled within the limits established on the construction specification form. The minimum tensile requirement at break is 350 N as received. Record and maintain elongation at 44 N as specified on the construction specification form (Appendix A, Data Sheet A1). In addition, report elongation at 25 N, 50 N, 100 N, and at break; or include a force-elongation chart for information only. MD, CMD, and 45 degrees to be tested.

3.3.9 Trouser Tear Strength (ISO 13937-2). Established values for a construction will be reported and controlled within the limits established on the construction specification form using the manual calculation method. Test three (3) specimens from both the MD and the CMD; consider the short direction of the test specimen the direction of test per Figure 1. Report the average for each direction in Newtons. The minimum tear strength shall be 30 N. Manual calculation method is preferred.

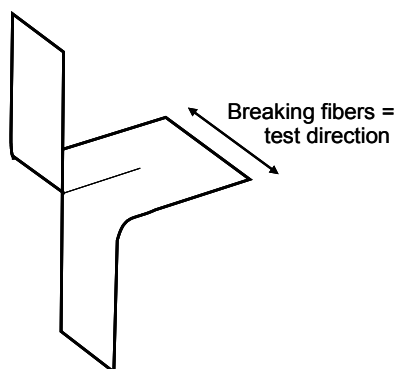


Figure 1: Trouser Tear

3.3.10 Overall Interior Emissions (GMW16853) Applicable for GMW14444, Code E Parts Only. For required tests, procedure and limits, see Table titled "Overview of Test Procedures required for the Individual Materials and Part Approvals" and Table titled "Emission Requirements for Interior Material/Parts/Assembly List" according to GMW16853.

3.3.10.1 Resistance to Odor (GMW3205). Report results for wet and dry conditions. Use a ratio of specimen size to container volume of 1:50. A rating of ≥ 6 is required.

3.3.10.2 Fogging (GMW3235, Method B). The bath temperature for Type I shall be 100 °C (T2). The bath temperature for Type II and Type III shall be 110 °C (T3). The condensable constituents, or the fogging value G, shall be ≤ 2 mg. No droplets, or crystals are acceptable upon visual examination.

3.3.10.3 Emission Limit of Volatile Organic Compound/Semi-Volatile Organic Compound (VOC/SVOC) (GMW15634). Record total amounts of VOCs and SVOCs in milligram/kilogram and attach a report listing all chemicals detected. Required limits vary according to material type. See GMW16853 Table titled "Emission Requirements for Interior Material/Parts/Assembly List" for specific requirements.

3.3.10.4 Carbonyls (GMW15635). Required only for plastic materials and flame laminated textile fabrics. Record the amounts of each chemical listed along with the sum of C2 to C6 Carbonyls. See GMW16853 Table titled "Emission Requirements for Interior Material/Parts/Assembly List" for specific requirements.

3.3.11 Flammability (GMW3232). For initial approval and routine quality control, submit the GMW3232 worksheet.

3.3.11.1 After Conditioning (GMW3232). Immediately prior to tests, all test specimens shall be conditioned for a minimum of 24 h according to GMW3221 Code A.

3.3.11.2 After Aging (GMW3232). In addition to tests conducted in the as received condition, all materials shall additionally be tested for flammability after the following artificial condition:

- The test cycle shall commence with 48 h $\pm$ 1 h at 40 °C $\pm$ 3 °C and 93% $\pm$ 5% relative humidity followed by 168 h $\pm$ 1 h at 90 °C $\pm$ 3 °C and completed without interruption. Repeat 3.3.11.1 before testing flammability.

3.4 Color Requirements. These requirements describe the testing to be completed with each new color being considered for an approved construction. Report data per Appendix B, Data Sheet B2. Test specimens shall be submitted where indicated on the data sheet.

3.4.1 Colorfastness to Artificial Light. The procedure and requirement will be defined on the construction specification sheet or by approving region. A noticeable value (lightness) and/or chroma (saturation) change with minimum hue change is acceptable. The evaluation criterion for noticeable value change is a rating of four (4) or better per the ISO 105-A02 Grey Scale for Color Change. Evaluate specimens per conditions set forth in GMW6992. For each type, only one (1) test method is required.

Note: Xenon testing shall be performed and reported for limited approval status while Nature Weathering testing is ongoing. Natural Weathering is the requirement for full approval.

Table 1: Xenon Method ISO 105-B06, Condition 5

Type	Requirement
I	601 kJ/m ²
II	1240 kJ/m ²
III - Front Side (facing interior)	263 kJ/m ²
III – Back Side (facing exterior)	1240 kJ/m ²

Table 2: Xenon Method GMW14162

Type	Cycle and Temperature	Requirement
I	Cycle B, 100 °C	44 MJ/m ²
II	Cycle C, 115 °C	26 MJ/m ²
III – Front Side (facing interior)	Cycle B, 100 °C	22 MJ/m ²
III – Back Side (facing exterior)	Cycle C, 115 °C	26 MJ/m ²

3.4.1.1 Trouser Tear after Xenon (ISO 13937-2). After exposure per 3.4.1, the average tear strength must not be reduced by more than 25% (Type I), and 50% (Type II and Type III) of the as-received condition. See Figure 2 for illustration of sample position for xenon exposure.

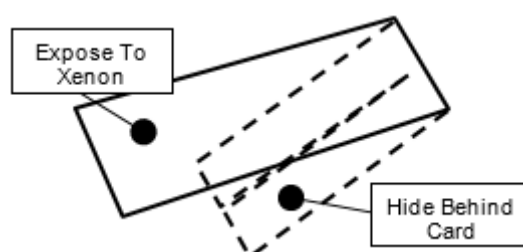


Figure 2: Trouser Tear after Xenon

3.4.2 Natural Weathering Exposure – Arizona (GMW3417). At the discretion of the GM engineer, new constructions, colors or applications may be sent for Weathering Exposure Test for Interior Trims.