



Yarn Count

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard is to be used to determine the structural density of woven and knitted textile materials (Yarn Count). For woven materials, this is the number of threads/yarns in the warp and the weft/fill directions within an area. For knitted materials, this is the number of wales and the number of knit stitches (courses) within an area.

1.2 Applicability. This standard applies to automotive organic materials.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3221

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Suitable magnifying device such as magnifying glass, pick glass, microfilm reader or projection equipment.

3.2.2 Metric scale graduated in millimeters.

3.2.3 Apparatus for conditioning to the appropriate requirements as described in GMW3221 Code A, unless otherwise specified in the relevant Materials Specification.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time.

Calendar time: Not applicable.

Test hours: 1 hour

Coordination hours: Not applicable

3.5 Test Required Information. For woven materials, the threads/yarns in both the warp and weft/fill directions are counted within a specified area. For knitted materials, the wales and courses/stitches are counted within a specific area. The count is then used to define the density number per centimeters.

3.6 Personnel/Skills. Personnel trained in accordance with the laboratory accreditation and Standard Operating Procedure requirements.

4 Procedure

4.1 Preparation.

4.1.1 Unless otherwise specified in the relevant Material Specification, conditioning shall be performed according to GMW3221 Code A.

4.1.2 Measurements can be taken on a material sample with or without cutting test specimens.

4.1.3 Take at least three (3) measurements in each direction (machine direction and cross machine direction).

4.1.4 Measurement Length.

4.1.4.1 Measure a length of $2\text{ cm} \pm 0.05\text{ cm}$ for materials that have linear structure densities >10 threads/wales/courses per centimeters.

4.1.4.2 Measure a length of $10\text{ cm} \pm 0.05\text{ cm}$ for materials that have linear structure densities ≤ 10 threads/wales/courses per centimeters.

4.2 Conditions.

4.2.1 Environmental Conditions.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Materials Manufacturer's Calculated Procedure.

4.3.1.1 Woven Material Warp Thread Density. Define the number of warp threads/yarns (excluding the selvages) in the loom setup. Measure, in centimeters between the selvages, the width of the material produced and divide into the number of threads. Divide by two (2) if a "sandwich" material is produced and slit making two (2) material pieces.

4.3.1.2 Knitted Material Wale Density. Define the number of wales by measuring, in centimeters, the width of the material produced and divide into the number of needles knitting on the knitting machine. Divide by two (2) if a "sandwich" material is produced and slit making two (2) material pieces.

4.3.2 Measuring Procedure.

4.3.2.1 Woven Materials. Measure woven material thread density by using a magnifying device and a metric scale to count the number of threads/yarns over the distance specified in 5.2.4. Materials too dense to count, can be measured by one (1) of the following methods:

- Cut a test specimen bigger than required and mark the specified distance.
- Remove some of the edge threads so as to reveal the threads under examination.
- Count the number of threads using a magnifying device, or cut a test specimen bigger than required and ravel to the specified distance.
- Completely remove all the threads under examination.
- Count the number of threads removed.

4.3.2.1.1 Warp Count Density. Count the number of warp threads/yarns in the specified distance to the nearest $\frac{1}{2}$ thread/yarn.

4.3.2.1.2 Wet/Fill Thread Density. Count the number of weft/fill threads/yarns in the specified distance to the nearest $\frac{1}{2}$ thread/yarn.

4.3.2.2 Knitted Materials. Measure knitted material structure density by using a magnifying device and a metric scale to count the number of wales and courses/stitches over the distance specified in 5.2.