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~~Designation:D5426–07a~~ Designation: D 5426 – 08

Standard Practices for Visual Inspection and Grading of Fabrics Used for Inflatable Restraints[1]

This standard is issued under the fixed designation D 5426; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 These practices cover procedures for the inspection and grading of coated and uncoated woven flat and one-piece woven (OPW) fabrics, and for the inspection and culling of cut parts made of such fabrics, all of which are used in the manufacture of inflatable restraint cushions.

1.2 For ease of reference, the scope, summary of practice, significance and use, apparatus, sampling, procedure, and report sections are listed separately for each inspection practice.

Inspection Practice	Section
Fabric Rolls	7
~~Cut Pieces~~	~~8~~
Cut Pieces & OPW	8

1.3 These practices can be used to distinguish those fabric imperfections that may adversely affect inflatable restraint cushion fabrication or performance from those imperfections that will not.

~~1.4Only major imperfections are considered in the grading systems of these practices.~~

~~1.5Procedures~~ 1.4 Procedures and apparatus other than those stated in these practices may be used by agreement of the purchaser and supplier with the specific deviations from these practices acknowledged in the report.

~~1.6The~~1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

~~1.7~~1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

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2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 123 Terminology Relating to Textiles

~~D3990Terminology Relating to Fabric Defects~~ 6799 Terminology Relating to Inflatable Restraints

ASTM D5426-08 https://standards.iteh.ai/catalog/standards/sist/4ea55a59-bbd1-4581-b33d-fc80a718a267/astm-d5426-08

2.2 *ASTM Adjuncts:*[3]

Reference Photographs of Imperfections

3. Terminology

~~3.1*Definitions*—For definitions of textile terms used in these practices, refer to Terminologies D123 and D3990.~~

~~3.2 For definitions of imperfections in inflatable restraints, additionally refer to~~

3.1 For all terminology relating to D13.20, Inflatable restraints, refer to Terminology D 6799.

3.1.1 The following terms are relevant to this standard: abrasion, air splice, bleedthrough, blip, broken filament, bruise, coating slub, coating streak, coating transfer, contamination, cushion, defect, filling bar, finished, foreign matter, grading, hard contamination, heavy coating streak, hole, imperfection, inflatable restraint, inspection, light coating, light coating streak, long float, loop, major imperfection, minor imperfection, missing coating, missing yarn, misweave, module, rework, sharp crease, short float, short knot, soft contamination, spit mark, stain, stitching, tight yarn, yarn streak.

3.2 For all other terms related to textiles, see Terminology D 123.

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[1] These practices are under the jurisdiction of ASTM Committee D13 on Textiles and are the direct responsibility of Subcommittee D13.20 on Inflatable Restraints . Current edition approved July 1, ~~2007.~~2008. Published ~~July 2007.~~August 2008. Originally approved in 1993. Last previous edition approved in 2007 as D 5426 – 07a.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service ast service@astm.org. For *Annual Book of ASTM Standards*volume information, refer to the standrd's Document Summary page on the ASTM website.

[3] Available from: ASTM International Headquarters. Order Adjunct No. ADJD5426. Original adjunct produced in 1996.

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4. Summary of Practices

4.1 Rolls of finished or coated fabric are examined for imperfections as the fabric traverses an inspection station. They are graded per Tables Tables 1-5 ~~of these practices.~~

~~**4.Summary of Practices**~~

~~4.1Rolls of finished or coated fabric are examined for major imperfections as the fabric traverses an inspection station. They are graded on the basis of a unit area.~~

~~4.2Cut pieces are inspected individually for major imperfections. Cut pieces containing major imperfections are culled from use for later review.~~ .

4.2 Cut pieces are inspected individually for imperfections. Cut pieces containing imperfections are culled from use for later review.

5. Significance and Use

5.1 These practices are suitable for incorporation in a specification. Any reference to material or cushion specification in these practices shall mean any similar agreement between the purchaser and supplier relating to the inspection and acceptance of fabric intended for inflatable restraint use.

5.2 These practices constitute the terminology, conditions, equipment, and procedures by which rolls of inflatable restraint fabrics or cut parts are inspected and graded.

5.3 A specification incorporating these practices may deviate from them to account for considerations of fabric property, material handling equipment, or inflatable restraint cushion design, or a combination thereof. Whenever such deviations from standard occur, they are recorded in the report.

5.4 These practices acknowledge that, in the normal course of production, acceptable rolls of fabric will be produced containing imperfections; subsequently, pieces will be cut from the rolls and those pieces that contain ~~major~~ imperfections restricted in Tables 1-5 will be culled at that time.

5.5 The accuracy in the results from visually inspecting fabric using these practices is affected by the ability of the inspector to detect, identify, and evaluate the severity of an imperfection in a moving fabric or in a cut part. Such ability can be affected by visual acuity, viewing distance, fabric traverse speed, lighting conditions, inspector discipline and training, and the availability and accuracy of suitable visual aids.

5.6 Systematic bias may result from using these practices whenever the precision or scale of the visual aids used to identify and quantify ~~major~~ imperfections differs between the purchaser and supplier.

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6. Visual Aids

6.1 A calibrated measuring device or clear template of sufficient size to contain an array of circles whose diameters equal the length, diameter, separation, or area limits listed in Tables 1-5, with labeling corresponding to the terminology for each imperfection: 3, 10, 15, 35, 50, 200, 225, 300, 400 and 500 ~~mm (0.10, 0.4, 1,4, 2.0, 7.9, 8.9, 11.8, and 19.75 in.)~~.

~~6.1.1Dimensions~~ mm. The template should be positioned such that the maximum number of ~~circles~~ imperfections is captured.

6.1.1 Dimensions on the measuring device or template shall be traceable to the National Institute for Standards and Technology (NIST) (or similarly recognized standards facility) via a master reference standard to ensure accuracy.

6.2 Reference photographs of each imperfection listed in Tables 1-5 based on ADJD5426.

7. Practice for Inspecting Fabric Rolls

7.1 *Scope*—This practice describes a procedure for the inspection and grading of coated and uncoated woven fabrics used in the manufacture of inflatable restraint cushions.

7.2 *Summary of Practice*:

7.2.1 Rolls of fabric are visually inspected for the presence of ~~major~~ imperfections and graded at an inspection station. Rolls of fabric are unwound and rewound as the fabric traverses the inspection station, with provision for interruption of the traverse for stationary inspection.

NOTE 1—In accordance with an applicable material specification, fabric is inspected full width or within a specified distance of the outer edge of the selvage, or if its in one-piece woven fabric within a specified distance of the visible line created where the two inflatable layers initially interlace.

7.2.2 Fabric inspectors grade imperfections for severity in terms of their size, relative separation, and frequency per unit area in accordance with Tables 1-5 of these practices.

7.2.3 A count of ~~major~~ imperfections is recorded, and the roll is further processed in accordance with the applicable material specification.

7.3 *Significance and Use*:

7.3.1 This practice for inspecting rolls of fabric is used to identify imperfections on a unit area basis and to flag them in accordance with an applicable material specification.

7.3.2 The suitability of a roll of fabric for further use or processing is not determined by the presence or severity of imperfections, but by the limits placed on rolls of fabric, if any, in the applicable material specification.

TABLE 1 Coating Non-Uniformity

Imperfection	Definition	Limits		
		Maximum Size[A]	Minimum Separation	Maximum Frequency[A,B]
~~Soft contamination~~	~~the presence of non-c oating material within or on the coating layer, such material visibly appearing to be of small size, smooth in surface texture, and of a thickness that does not protrude significantly above the surface of the coating layer. Examples are dirt, smudge, lint, human hair, yarn filaments, and flies and similarly small insects.~~	~~15 mm diameter~~		~~2 none within the line where two OPW inflatable layers interface~~
Soft contamination	the presence of materials not specified as part of the coating or fabric within or on the coating layer, such material visibly appearing to be of small size, smooth in surface texture, and of a thickness that does not protrude significantly above the surface of the coating layer. Examples are dirt, smudge, lint, human hair, yarn filaments, and flies and similarly small insects. Soft contamination not listed herein shall be from a known source which is demonstrated to have no adverse effect on fabric properties.	15 mm diameter		2 none within the line where two OPW inflatable layers interface
~~Hard contamination~~	~~the presence of non-coating material within or on the coating layer, such material visibly appearing to be of small size, smooth in surface texture, and of a thickness that protrudes significantly above the surface of the coating layer. Examples are metal filings, glass, plastic, or wood splinters.~~	~~none~~		
Hard contamination	the presence of non-coating material within or on the coating layer, such material visibly appearing to be of small size, smooth in surface texture, and of a thickness that protrudes significantly above the surface of the coating layer. Examples are metal filings, glass, plastic, or wood splinters.	none		none allowed
~~Missing coating~~	~~portions of the coated layer containing exposed base fabric or scrape marks in the coated layer~~	~~15 mm diameter~~		~~2 none within the line where two OPW inflatable layers interface~~
Missing coating	portions of the coated layer containing exposed base fabric or scrape marks in the coated layer	15 mm diameter or 5mm diameter		2 or 5 none within the line where two OPW inflatable layers interface
~~Coating transfer~~	~~the presence of coating material on the uncoated side, covering one or more yarns~~			~~none allowed~~
Coating transfer	the presence of coating material on the uncoated side, covering one or more yarns			none allowed
~~Bleedthrough~~	~~the presence of coating material on the uncoated side, between two yarns without covering either yarn~~	~~35-mm length~~	~~500 mm~~	~~2~~
Bleedthrough	the presence of coating material on the uncoated side, between two yarns without covering either yarn	35-mm length	500 mm	2
~~Coating slub~~	~~an irregularly shaped lump of coating material on the surface of the coated layer resembling a yarn slub~~	~~15 mm diameter~~		~~2 per 400 cm^2~~
Coating slub	an irregularly shaped lump of coating material on the surface of the coated layer resembling a yarn slub	15 mm diameter		2 per 400 cm^2
~~Spit mark~~	~~an essentially round spot of coating material on the surface of the coated layer~~	~~1.5 mm diameter~~		~~2 per 400 cm^2~~
Spit mark	an essentially round spot of coating material on the surface of the coated layer in which the coating spot is visibly at a higher rate of coverage than the surrounding material.	15 mm diameter or 5 mm diameter		2 per 400 cm^2 or 5 per 400 cm^2
~~Heavy coating streak~~	~~a narrow area of fabric, generally in the shape of a line oriented in the warp direction of the fabric, in which the coating layer is visibly at a higher rate of coverage than the surrounding material.~~			
Heavy coating streak	a narrow area of fabric, generally in the shape of a line oriented in the warp direction of the fabric, in which the coating layer is visibly at a higher rate of coverage than the surrounding material.	5 mm wide		No limit
Light coating crease	a narrow area of light (not missing) and heavy coating associated with localized creasing in the fabric, visibly at a lower rate of coverage than the surrounding material.	5 mm wide		3 none within the line where two OPW inflatable layers interface
~~Light coating streak~~	~~a narrow area of light coating, generally in the shape of a line oriented in the warp direction of the fabric.~~	~~5 mm wide~~		~~1~~
Light coating streak	a narrow area of light coating (not missing), generally in the shape of a line oriented in the warp direction of the fabric.	5 mm wide		1
Light coating (except light coating streak)	a localized amorphous area of fabric in which the coating layer is visibly at a lower rate than the surrounding material.	50 × 100 mm		1

[A] For diameter call outs, an equivalent area is permissible

[B] Per linear m (yd), or unit of area indicated. For cut pieces, limits apply to cut pieces ≤ 2 meters in longest dimension. For cut pieces > 2 meters in longest dimension, multiply limits by 1.5. Per linear m (yd), cut piece, or unit of area indicated.

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