Designation: D7331 – 11

Standard Practice for
Sewn Products Marker Data Interchange[1]

1. Scope

1.1 This practice describes a format for transferring marker data from a CAD marker software system to another or to a CAM software system.

1.2 This practice does not support curve interpolation or definitions. All curves are represented by discrete vectors and are dependent on the resolution of the CAD software.

1.3 This practice is concerned in limiting differences when processing the same data on different CAD systems.

1.4 This practice is not intended to represent the dimension relationships between pattern pieces or between pattern sizes, or the correspondence between 2D or 3D sewn product pattern piece geometries.

1.5 The file format for the marker data exchange file defined by this standard complies with the XML format.

1.5.1 The XML schema describing marker data exchange standard XML structure is presented in an ASTM adjunct.[2]

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]
D6963 Terminology Relating to Sewn Products Automation
2.2 *ASTM Adjuncts:* ASTM Adjunct:[2]
XML Schema

3. Terminology

3.1 For all terminology related to Sewn Products Automation, see Terminology D6963.

3.2 The following terms are relevant to this standard: drill hole, grainline, line, notch, style.

3.3 The following terms are new terms related to Sewn Products Automation:

3.3.1 *absolute pattern matching, n*—nesting specification where a nested piece match point shall have a specified position in regard to a repeat line. See Fig. 1.

3.3.2 *bundle, n*—set of nested pieces that are intended to be processed together because they are issued from the same graded style and are parts of the same end user's product.

3.3.2.1 *Discussion*—All bundle pieces are to be cut on the same material.

3.3.3 *bundle group, n*—set of bundles that are used to define constraints.

3.3.3.1 *Discussion*—A bundle may be part of several bundle groups for several different constraints. Example: pockets from the jacket and the trousers of a suit may have a mutual rotation constraint.

3.3.4 *constraint, n*—description of the behavior that one or several nested piece of the marker should follow during marker processing.

3.3.5 *efficiency, n*—area of the produced pieces located on the up side of the fabric, including blocking, versus area of the marker, defined by its length and its width.

3.3.5.1 *Discussion*—Pieces area inside fusing blocks is considered when calculating efficiency. Fusing blocks area is not considered.

3.3.6 *fabric category, n*—identifies the category to which the fabric belongs.

3.3.6.1 *Discussion*—The category allows the definition of fabric groups that will be used for pattern matching constraints definitions.

3.3.7 *fabric type, n*—characteristic of a pattern piece used to identify the material type the piece has to be made of.

3.3.8 *five star pattern, n*—motif on a plaid fabric where the center of the pattern unit cell has the same role as its four corners.

3.3.9 *flip, n*—transformation of a geometry that gives the symmetry of the sized piece geometry either across the X axis or across the Y axis or across both, that is equivalent to a 180 degrees rotation. See Fig. 2.
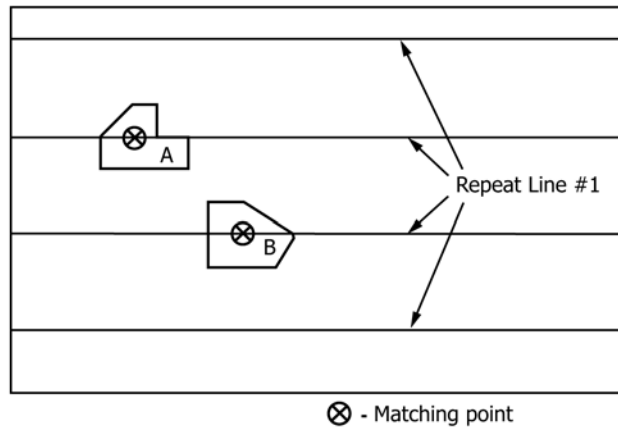

⊗ - Matching point

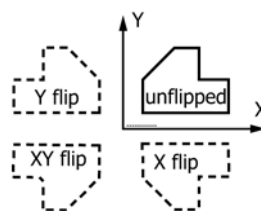**FIG. 1 Absolute Matching**

FIG. 2 Unflipped and Flipped Geometries

3.3.9.1 *Discussion*—The X and Y axis to consider are those from the sized piece referential.

3.3.10 *geometry to nest, n*—geometry of a sized piece or a nested piece used for nesting operation.

3.3.10.1 *Discussion*—Geometry to nest is computed from geometry to produce with spacing added if it exists.

3.3.11 *geometry to produce, n*—geometry of a sized piece or a nested piece used when cutting the marker.

3.3.11.1 *Discussion*—Geometry to produce is computed from reference geometry, enhanced with production processing such as notch insertion and blocking.

3.3.12 *graded piece, n*—explicit description of one or more specific sizes of a pattern piece, and related information used to produce it.

3.3.13 *graded style, n*—explicit description of one or more specific sizes of a style, and related information used for production.

3.3.13.1 *Discussion*—A graded style is composed of graded pieces.

3.3.14 *marker, n*—main object that can be exchanged using this practice and that contains all the theoretical information needed to process nesting and production of a set of nested pieces on a flat material.

3.3.15 *marker order, n*—set of data containing all necessary information to nest a set of bundles.

3.3.16 *match point, n*—specific point on the geometry of a piece used to achieve absolute pattern matching or relative pattern matching.

3.3.17 *material, n*—description of the material structure. It includes material geometric information and optional repeat lines description.

3.3.18 *mutual constraint, n*—constraint that applies to several nested pieces in such way that all these nested pieces must respect this constraint in the same way.

3.3.19 *nested piece, n*—the smallest entity that can be nested. Can be nested or not.

3.3.19.1 *Discussion*—A nested piece is an instance of a sized piece repetition and contains geometrical description and positioning parameters.

3.3.20 *pattern piece, n*—design level description of an elementary part of a sewn product.

3.3.20.1 *Discussion*—The Pattern piece is a design entity, not suited for production. It is not included in the marker.

3.3.21 *plaid fabric, n*—fabric which has repeat lines in both the X and Y directions.

3.3.22 *plot line, n*—internal line intended to be plot.

3.3.23 *primary repeat line, n*—particular repeat line from which can be defined other parallel repeat lines.

3.3.23.1 *Discussion*—There are at most two primary repeat lines on a fabric.

3.3.24 *reference geometry, n*—geometrical description of the graded shape issued from the original CAD system using its own grading engine, without any other computation associated to the production.

3.3.25 *relative pattern matching, n*—nesting specification where nested pieces match point positions are mutually constrained to have the same offset (non-symmetrical matching) or opposite offset (symmetrical matching) in regard to a repeat line. See Fig. 3.

3.3.26 *repeat line, n*—line that is a characteristic of a structured fabric and that is periodically repeated at a known increment throughout the whole material. See Fig. 4.