# **9.1.2. DXF ASTM File Format**

* [ASTM D6673-10 Standard Practice for Sewn Products Pattern Data Interchange-Data Format (Withdrawn 2019)](https://www.astm.org/Standards/D6673.htm)

<https://fabricesalvaire.github.io/Patro/resources/file-format/dxf-astm.html>

ASTM D6673-10 is based on AutoCAD DXF version R13.

Each ASTM file contains:

* DXF file header, one pattern style per file;
* DXF entities. In DXF terms an entity can be a line, polyline, point, text, etc.;
* Layers to separate DXF information by type and function. Detail information is assigned to one of 23 pre-defined layers and a variety of DXF entities;
* Style System text that is common to all pieces in the pattern and is placed once;
* Pattern pieces. ASTM uses DXF blocks, which contain graphical and textual information, to define a piece. One block per pattern piece;
* Piece System Text that describes each pattern piece and is part of a block;
* Annotation, part of a block, to clarify instructions for production;
* Instructions for further processing for the purpose of grading, nesting, cutting, etc.

ASTM defines 23 layers for the differentiation of information:

| **Layer** | **Definition** | **Purpose** |
| --- | --- | --- |
| 1 | Piece boundary | Outline of each pattern piece and style system text |
| 2 | Turn points | Turn points for layers 1, 8, 11, 14 |
| 3 | Curve points | Curve points for layers 1, 8, 11, 14 |
| 4 | Notches; V-notch and slit-notch; alignment. | Articulation of molding; I-shape or V-shape: alignment pieces |
| 5 | Grade reference and alternate grade reference line(s) | Grading |
| 6 | Mirror line | Symmetry of fold |
| 7 | Grain line | Direction of fabric grain |
| 8 | Internal line(s) | Graphic annotation of placement. Not cut. |
| 9 | Stripe reference line(s) | Fabric alignment of stripes |
| 10 | Plaid reference line(s) | Fabric alignment of chequers |
| 11 | Internal cutouts(s) | Cutline inside of outline |
| 12 | Intentionally left blank |  |
| 13 | Drill holes | Punch markers |
| 14 | Sew line(s) | Line(s) indicate where to stitch |
| 15 | Annotation text | Annotation, not style system text (1) or piece system text (1) |
| 80 | T-notch | T-shape: slit with T-branch at end of notch |
| 81 | Castle notch | U-shape: equal width, rectangular at end of notch |
| 82 | Check notch | V-pointed notch, left or right side perpendicular to boundary |
| 83 | U-notch | U-shape: equal width, semi-circle at end of notch |
| 84 | Piece boundary quality validation curves | ASTM: Mandatory system information for polyline(s) layer 1 |
| 85 | Internal lines quality validation curves | ASTM: Mandatory system information for polyline(s) layer 8 |
| 86 | Internal cutouts quality validation curves | ASTM: Mandatory system information for polyline(s) layer 11 |
| 87 | Sew lines quality validation curves | ASTM: Mandatory system information for polyline(s) layer 14 |

Notes:

* Layer 0 is not in use.
* Layers must be numbered, not named textually.

ASTM recognizes points for the purpose of:

| **Point** | **Layer** | **Function** |
| --- | --- | --- |
| Turn points | 2 | Turn points for piece boundary (1), internal lines (8), internal cutouts (11), sew lines (14) |
| Curve points | 3 | Curve points for piece boundary (1), internal lines (8), internal cutouts (11), sew lines (14) |
| Notches | 4 | Slit and V-notches definition |
| Grading | 5 | Grade reference location |
| Stripes | 9 | Stripe match points for alignment (optional) |
| Plaids | 10 | Plaid match points for alignment (optional) |
| Drill holes | 13 | Punch marker location and definition |
| T-notch | 80 | T-notch definition |
| Castle-notch | 81 | Castle-notch definition |
| Check-notch | 82 | Check-notch definition |
| U-notch | 83 | U-notch definition |

[ASTM uses the DXF block structure to group all elements of a pattern piece.](https://fabricesalvaire.github.io/Patro/resources/file-format/svg.html)