

Notes on the Stylx File of symbols and patterns in the FGDC Digital Cartographic Standard for Geologic Map Symbolization

(https://ngmdb.usgs.gov/fgdc_gds/)

A comprehensive and authoritative implementation of this FGDC Standard that is usable in common GIS software has long been needed. Because Esri software is widely used in the U.S. Geological Survey (USGS) and the State geological surveys, it was decided to implement the Standard in that software, specifically the most recent version (Arc GIS Pro). This note and the accompanying five MS-Word and Excel files (named with prefixes “2-...” through “6-...” provide documentation for using the file “FGDC.stylx”.

This resource was developed by the South Carolina Geological Survey (Megan James, lead developer, JamesM@dnr.sc.gov), through funding and under the direction of the National Geologic Map Database (NGMDB). The NGMDB is a Congressionally mandated resource, jointly developed by the USGS and the Association of American State Geologists (AASG, representing the State geological surveys). The stylx file, this documentation, and developer-contact information can be found at <https://ngmdb.usgs.gov/Info/standards/>.

General comments

- Every symbol in an ArcGIS style has a Name, Type, Category, and Key. Names, with only a few exceptions described below, match the reference number in the FGDC Standard. It is the Name value that is important when using the ‘match symbol to style’ method of symbology. Some symbols, patterned lines that also include a marker symbol, for example, are split into parts (more below) and the symbolization requires symbolizing more than one feature. Type indicates the feature type to which the symbol can be applied. Category will be the numbered chapter in Appendix A of the FGDC Standard within which the symbol is found. Keys are only used when a unique item lookup is required, usually programmatically, and, for the most part, may be ignored in ArcGIS Pro. When adding custom symbols, make sure Key is unique to the entire style and avoid using non-alphanumeric characters.
- All symbol names are left-padded to two digits (ex. 01.01.01) except for categories 09., 19.05., and 25. which have more than one hundred symbols and have left-padding to three digits on their final numbers.
- Polygon borders are separated from polygons and symbolized as lines (use both to match FGDC).
- Some points, lines, and polygons require two parts and are labeled with letters after the reference number. Fonts are labeled with the letter f after the reference number.
 - a: part 1
 - b: part 2
 - c: part 3, contact line, or color

- ca: contact line, part 1
- cb: contact line, part 2
- f: font
- p: point or pattern
- pa: point, part 1
- pb: point, part 2
- Some symbols require a label to mask part of an underlying line in the same way that elevation labels are commonly shown masking a section of an underlying contour line. Use the Contour Annotation tool for this effect or tools from the Masking toolset.
 - 01.04.12 - 01.04.17
 - 11.01, 11.02, 11.13, 11.14, 11.23, 11.24, 11.33, & 11.34
 - 13.72
 - 15.21
 - 26.05.01, 26.05.05, 26.05.09, 26.05.13, & 26.05.17
 - 26.06.01, 26.06.03, 26.06.05, 26.06.07, 26.06.09, 26.06.11, 26.06.13, 26.06.15, & 26.06.17

Diversions from the Standard

- 01.01.26 & 01.01.30: question mark at 6pt size looks too large--used 5pt size to better match depicted pattern
- 01.01.27: lines 3.5 wide with a 0.75 break do not match the depicted pattern--used dash spacing 2.8 1.4 instead
- 01.01.28: question mark at 6pt size looks too large--used 5pt size to better match depicted pattern; lines 3.5 wide with a 0.75 break do not match the depicted pattern--used dash spacing 2.8 1.4 instead
- 01.01.31: line 0.5 wide with a 0.75 break do not match the depicted pattern--used a 0.9 break instead
- 01.01.32: question mark at 6pt size looks too large--used 5pt size to better match depicted pattern; line 0.5 wide with a 0.75 break do not match the depicted pattern--used a 0.9 break instead
- 01.01.35 & 01.01.36: hachures 2 apart does not match the depicted pattern--used a 2.125 spacing instead
- 01.03.04: hachures 2 apart do not match the depicted pattern--used 2.125 to match
- 17.38 & 17.39: en echelon cracks or fracture lines are not an exact match to the FGDC
- 18.46 & 18.47: lines 1 mm high do not have the correct width--used 1.5 instead to match
- 22.07-22.09: triangles are not an exact match to the FGDC
- 25.046: arrows are not an exact match to the angle specified in the FGDC
- 25.67 & 25.68: triangle is not an exact match to the FGDC
- 26.01.09, 26.01.18, 26.01.27, 26.01.36, & 26.01.45: the nonflowing artesian well marker does not match the exact width specified in the FGDC
- 26.07.08 & 26.07.09: triangle is not an exact match to the FGDC
- 30.03.14: line weight is not an exact match to the FGDC

Specific Notes

- 01.03.13: pair with any dike
- 01.03.14: pair with any dike
- 01.04: pair with contacts, key beds, and dikes; place points where observations were made
- 02.11: pair with a fault; place points where observations/measurements were made
- 02.13: pair with a fault
- 03.03.03: place ticks on line showing location and orientation of data collection
- 04.02.05 - 04.02.08: place ticks on line where observations were made
- 04.03.02 - 04.03.06 & 04.03.08 - 04.03.12: rotate based on dip direction
- 05.10: place points on a fold; diverge lines from a fold
- 05.10.05 - 05.10.08: can change to any fold line and/or place more arrows along the line
- 18.07: pair with any volcano rim
- 18.45: draw red lines around collapses along black line
- 19.04: size can be changes to draw to scale
- 19.04.12: spacing and amount of chevrons can be changed to indicate steeper slopes
- 19.05.18: pair with well markers
- 24.20: use a combination of terrestrial impact crater lines within the polygon
- 25.086: add a dotted line where concealed or buried
- 32.01 - 32.34: use text symbol labeled 32

Credits

- Points, lines, polygons, or fonts with cells highlighted in **Orange, Accent 2, Darker 25%** in the symbols_references excel document were created by Megan James of the South Carolina Department of Natural Resources Geological Survey (JamesM@dnr.sc.gov).
- Points, lines, polygons, or fonts with cells highlighted in **Orange, Accent 2, Lighter 40%** in the symbols_references excel document were created by adjusting symbols from the AK GeMS symbology (Alaska Division of Geological & Geophysical Surveys, Miscellaneous Publication 169, <https://dggs.alaska.gov/pubs/id/30584>).
- 25.087 was copied from the planetary geology symbol library at the Github site (<https://github.com/afrigeri/geologic-symbols>) maintained by Andrea Nass (Institut of Planetary Research, Berlin) and Alessandro Frigeri (National Institute for Astrophysics, Rome).