NORSOK STANDARD

2D-CAD DRAWING STANDARD

Z-005
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FOREWORD

NORSOK (The competitive standing of the Norwegian offshore sector) is the industry initiative to add value, reduce cost and lead time and remove unnecessary activities in offshore field developments and operations.

The NORSOK standards are developed by the Norwegian petroleum industry as a part of the NORSOK initiative and are jointly issued by OLF (The Norwegian Oil Industry Association) and TBL (The Federation of Norwegian Engineering Industries). NORSOK standards are administered by NTS (Norwegian Technology Standards Institution).

The purpose of this industry standard is to replace the individual oil company specifications for use in existing and future petroleum industry developments, subject to the individual company's review and application.

The NORSOK standards make extensive references to international standards. Where relevant, the contents of this standard will be used to provide input to the international standardisation process. Subject to implementation into international standards, this NORSOK standard will be withdrawn.

Annexes A, B, C and D are normative.

INTRODUCTION

The different CAD environments in the petroleum industry are evolving rapidly and often in different directions. Considerable cost reductions has been identified by standardisation of file formats and methods of work. NORSOK organised a workgroup to recommend a standard for drawing file formats. The goal was to enable file transfers and conversions between different formats without problems.

This standard may not be optimal for all working environments but aims at the main goal of creating one common standard.

The goal was to enable transfers and conversions between different systems without problems. This will result in:

- Unified understanding of file structure and formats
- File transfer without problems
- Simplified data file conversion of drawings between different CAD systems

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1 SCOPE

The primary purpose of the standard is to define a common format for drawing files in the hand-over phase between companies.

The entire lifetime of the drawing file has been taken into account; from the very beginning of a project to operation and maintenance phase. The standard is divided into a general part and specific annexes for the two most common 2D-CAD systems in the oil and gas industry.

2 NORMATIVE REFERENCES

The following standards include provisions which, through reference in this text, constitute provisions of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet or exceed the requirements of the standards referenced below.

NS 1402	Engineering drawings - Title block and parts list
ISO 3098-1	Technical drawings - Lettering
NS 2400	Technical drawings - Building drawings - Size and layout of drawing sheets
NORSOK Z-004	CAD symbol libraries (to be issued in near future)
ISO 128-20	Technical drawings - Lines

3 DEFINITIONS AND ABBREVIATIONS

Drawing frame	Outer frame that defines the drawing boundary.
Main drawing scale	The drawing scale that is applicable to the major parts in the drawing and is described in the title block.
Hybrid file	Vector file and belonging raster file which together holds the content of the drawing.
.DXF	AutoDesk Data eXchange Format
.DWG	AutoDesk AutoCad
.DGN	Bentley Systems MicroStation (Intergraph IGDS)

4 DEVIATION FROM STANDARD

In the event that the contents of this standard cannot be conformed due to the platform or application/methods used, it is the responsibility of the Party (Contractor) using the CAD-platform/application to submit a deviation request to the Owner/Customer prior to start-up of the CAD-platform/application.

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Both the Contractor and the Customer must be aware of applications with automatic drawing production such as 3D-modelling systems which may have difficulties to deliver drawings 100% according to this standard in their native form.

For MicroStation based solutions Working Units in particular may be an area where systems with automatic drawing production do not support this standard in their native format. It must be stressed that Contractor in these instances must inform the Customer to clarify whether a deviation may be accepted or not.

5 SETUP OF 2D-CAD DRAWING FILES

5.1 Co-ordinate system

The co-ordinate system shall be metric with millimetres as main unit.

5.2 Scale

Design drawings shall be made with main elements in scale 1:1. Drawing frame, text and drawing symbols shall be scaled up relative to the main drawing scale.

Example: If the drawing has a main scale of 1:50, the drawing frame, text etc. is scaled up by a factor of 50.

For schematic drawings, symbols and drawing frame are used in original size and scale. The drawing frame shall have its insertion point in the drawing co-ordinate origin.

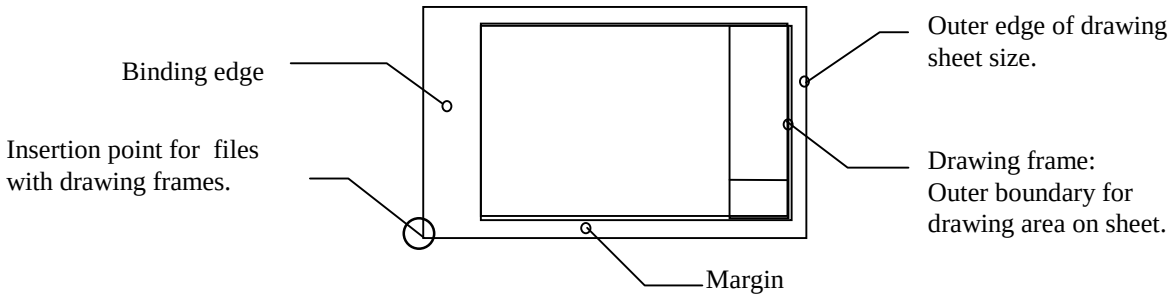
5.3 Reference files

For CAD systems that can handle reference files and use of hybrid files, only the drawing frame and one raster file is allowed as reference file. No other internal or external reference files are allowed.

Files that contain drawing frames shall be stored in a separate directory and referenced by relative directory name (environment parameter) BORDER.

5.4 Drawing frame insertion point

The drawing frame insertion point shall be in the outer, lower, left corner of the outer edge.



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5.5 Elements outside outer edge

No elements are allowed outside the given outer edge of the drawing. The CAD file shall only contain one drawing.

5.6 Drawing sheet sizes

The outer edge of all sheet sizes shall be defined with a thin, solid 0,18 mm line. The outer edge dimensions are equal to the sheet size (ref. NS 2400). There shall be a binding edge in and a margin on the remaining three sides, between outer edge and the drawing frame for all sheet sizes.

Format:	Sheet size (mm)	Margin (mm)	Binding edge (mm)
A4	210x297	10	15
A3	297x420	10	15
A2	420x594	14	21
A1	594x841	20	30
A0	841x1189	28	42

5.7 Information and title block

The information and title block shall have size and placement as defined in NS 1402. Then, the maximum width is 180 mm for title blocks along right edge and the maximum height is 70 mm for title blocks along lower edge of the drawing sheet.

The sheet size and main drawing scale shall be defined in the title block.

Optional may an informative text string containing file name, date and time of plotting be placed outside the drawing frame.

5.8 Line width

The following line widths are valid. Line width is also indicated by colour coding as given below:

Line width (mm)	Colour	abbreviated
0,18	red	red
0,25	yellow	yel
0,35	green	grn
0,5	cyan	cya
0,7	blue	blu
1,0	grey	gre
1,4	grey	gre
2,0	grey	gre

5.9 Fonts

All text shall be shown with fonts as defined in the standards ISO 3098-1. The relation between text height and line spacing shall be:

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Text height (mm)	Line spacing (mm)
1,8	1,0
2,5	1,4
3,5	2,0
5,0	2,8
7,0	4,0
10,0	5,6

5.10 File names

All CAD drawing files shall have file names of maximum 8 characters and suffix of 3 characters for compatibility with DOS based systems. It is recommended that the suffix (see Definitions and Abbreviations) pertaining to the relevant drawing format (CAD platform) is used to avoid misunderstandings.

5.11 Symbols

Symbol usage shall be in accordance with NORSOK Z-004. Symbols shall not have names with more than 6 characters to simplify conversion between different CAD platforms and systems. Filled areas should not be hatched.

Symbols shall be created by lines and text from their respective layer definitions. When these components are defined into a single symbol, this symbol must be placed according to the layer definitions for symbols.

5.12 Line types

Special line types shall be in accordance with NORSOK Z-004.
All other standard line types shall be in accordance with ISO 128-20.

5.13 Use of grid for Schematic Drawings

Schematic Drawings shall have a snap grid with a spacing of 1 mm between each dot, and a highlight for every 10 mm.

6 LAYER USAGE

The layer usage follows the principle of uniqueness: each layer has one function, one line width and one line type only.

The layer usage is designed to be used in **all recognised CAD programs** so that *conversion* between different platforms and file formats can be done **without problems**. The entire lifetime of the drawing file has been taken into account; from the very beginning of a project to operation and maintenance phase. Also, actions to obtain **compatibility across different disciplines** are introduced as far as possible.

For disciplines with detailed design, for example steel construction and architecture, two selectable alternatives are given:

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- Only line type identify the different layers.
- Both line type and purpose identify the different layers, as indicated by the optional layer note in the layer usage tables of appendix C.

For all other disciplines (ISO-, schematic drawings etc.) only one alternative is given.

The intention is not for one discipline to utilise all layers. Only the layers indicated for the given discipline shall be used. Layer usage in general, and for MicroStation and AutoCad in particular are given in Annex C.

7 DETAILED SET-UP

7.1 MicroStation

Addendum for MicroStation set-up is given in Annex A.
MicroStation seed file set-up is given in Annex D.

7.2 AutoCad

Addendum for AutoCad set-up is given in Annex B.

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