



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne

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Computer Aided Design (CAD) Using AUTOCAD®



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Standard

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Document Management

1. Authority

This document is issued by the Director General, Integrated Technical Services, Canadian Coast Guard (CCG)'s National Technical Authority under delegation from the Deputy Minister, Fisheries and Oceans (DFO) and the Commissioner of the CCG.

2. Responsibility

- a) The Integrated Logistic Support branch is responsible for:
 - i) the creation and promulgation of the document; and
 - ii) the identification of an Office of Primary Interest who is responsible for the coordination and the content of the document.
- b) The Office of Primary Interest is responsible for:
 - i) the validity and accuracy of the content;
 - ii) the availability of this information;
 - iii) the update as needed;
 - iv) the periodical revision; and
 - v) the follow-up of all requests, comments and/or suggestions received by the originator.

3. Inquiries and/or Revision Requests

All inquiries regarding this document, including suggestions for revision and requests for interpretation shall be addressed to:

Position Title: Technical / Project Officer, Technical Data
Address: Mail Stop 7N135B
200 Kent St, Ottawa,
Ontario, K1A 0E6

All requests should:

- i) be clear and concise; and
- ii) reference the specific Chapter, Section, Figure or Table.

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Foreword

The Computer Aided Design (CAD) Drafting Standard provides a source of information for design and production of engineering and construction drawings depicting the Canadian Coast Guard's physical assets.

The document has equal authority in either official language. Where problems of interpretation arise, preference shall be given to (in decreasing order of priority) the latest version of this document, the CCG Technical Data Management Standard CA-014-000-NS-TD-001 referring to this document, or the applicable commercial standard reflecting the true spirit, intent and meaning of the work to be done.

1. Purpose

This Computer Aided Design (CAD) drafting standard sets forth the general rules and practices to be used in the preparation of drawings for the CCG, and as a basis for the preparation of subordinate Guidance documentation and associated Work Instructions.

This is not intended as a manual of instruction in the basic principles of drafting. It must be assumed that the personnel engaged in the preparation of drawings have sufficient experience in the fundamentals of drafting to enable them to produce technical drawings.

2. Scope

This standard is to be used for the preparation of all Engineering drawings using AutoCAD®. This standard is the primary source of information whenever a question arises concerning the preparation of drawings for Canadian Coast Guard.

3. Source of Information

A list of international standards and coordinate information are to be found in Annex A.

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Chapter 1 GENERAL DRAWING RULES

In absence of directives one should follow international industry standards and remain consistent. Suggested list of international standard institutes can be found in Annex A.

1.1 CCG TEMPLATE

All technical Drawings must be created using CCG package, which can be obtained from the CCG project manager or contacts listed in Annex A.

1.2 DRAWING FILE FORMAT

The CAD drawings shall be delivered in AutoCAD® Native format DWG and also in Real size PDF format.

1.3 DRAWING FILE CONTENT

Drawings shall respect following criteria:

- 1) Drawings must be modelled at full scale in “Model Space”. “UCS” is to be set to “World”. Text, symbols, hatch patterns and line widths are to be adjusted by the required scale factor.
- 2) The title block shall be used in paper space only.
- 3) Drawings will be saved in AutoCAD® version 2008 or to the latest accepted version by CCG.
- 4) PDF format should have a white background and the color adjusted in order to obtain good contrast ex: yellow on white is not accepted.
- 5) Drawings will be saved in the “Paper Space” mode with the view selected to “Zoom Extents”.
- 6) No objects should reside on layer “0” or “DEFPOINTS” except for objects contained in a block definition or dimensions. Use the “Plot/Non plot” layer instead of the “Defpoints” layer.
- 7) Drawings are to be purged of all unused objects.
- 8) Drawings must not contain any object definitions without geometry, such as empty text or blocks without objects.
- 9) The “Audit” command must be performed before delivery.
- 10) □ Drawings will have the “Ltscale” adjusted for printing.
- 11) When applicable, all external reference “XRef” must be delivered with the drawing.
- 12) All new fonts, fill patterns and other user preference settings added to those of the basic AutoCAD® program must be supplied with the DWG digital files (by using, for example, “**Pack and GO**”, “**eTransmit**”).

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Chapter 2 TITLE BLOCK TEMPLATE

The National CCG Title Block template shall be used for all drawings. A complete set of title blocks in all sheet sizes used by the CCG are available from the National Headquarters Technical Project Officer, Technical Data. An example of CCG title block can be seen in Annex C Figure 1. The drawing title block shall be completed as follows:

2.1 LAYOUT “PAPER SPACE”

The title block template shall be used in paper space only. Title blocks inserted in Model Space are not acceptable.

2.2 BLOCK ATTRIBUTE

All CCG title block attributes are pre-set, and the integrity must be maintained.

Official DFO / CCG organization marking. Do not change.



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All vendor information shall be located in the vendor information data area. When applicable the engineering stamp is to be placed in this area.

Vendor / Sous-traitant

This data field shall consist of the following:
First attribute is the name of the asset: e.g. name of the ship, area of navaid, etc...
Second attribute is the description/ type: e.g. MSPV (Mid Shore Patrol Vessel), Lighthouse, etc...

rev	description	by	date
	Asset - Actif		
	SITE/ SHIP - SITE/NAVIRE		
	SITE/ SHIP - SITE/NAVIRE		
	DESCRIPTION		
	DESCRIPTION		
	Drawing - Dessin		
	TITLE - TITRE		
	TITLE - TITRE		
	TITLE - TITRE		
	TITLE - TITRE		
	drawn - dessiné		date
	DRAWN		YYYY-MM-DD
	designed - conception		date
	DESIGNED		YYYY-MM-DD
	checked - vérifié		date
	CHECKED		YYYY-MM-DD
	approved - approuvé		date
	APPROVED		YYYY-MM-DD
	CCG ref. no. - no. réf. GCC		scale - échelle
	REF NO / PROJ NO / FILE NO		SCALE
	drawing no. - no. dessin	sheet-feuille	rev
	DWG NO - NO DES	01/01	#

Brief description shall be entered in this field such as:
The name by which the part or items shall be known, equipment type, number, drawing type and shall include the Drawing release level (ex: conceptual, as fitted, etc.)

Date shall be entirely numeric following YYYY-MM-DD format as per ISO 8601 standard.
N.B: When drawings have been redrawn, the new draftsman's name and date will appear in the revision comment data field.

When available the official CCG Contract project number shall be indicated in this field.

The drawing number, as specified in chapter 3 shall be inserted in this field.

Examples of scales and the method of designating different scales can be found in Annex B. Drawings which are not drawn to a specific scale, the scale field shall read "N/A".

Revisions shall be consistent with the original method. Best practice would be to use letters for design/conceptual and numerical for construction and post-construction.

The drawing sheet number shall be entered within this field. When only one sheet is drawn, 01/01 shall be inserted. For multi-sheet drawings, 01/05, 02/05 etc. shall be used.

Chapter 3 DRAWING NUMBER

3.1 INTERNAL USE:

Drawing numbering will be identified to ensure that assets, systems, and equipment drawing numbers within the CCG will be unique to the items depicted. Numbers for internal drawing shall follow the approved national CCG numbering standards. In absence of an approved national numbering standard, numbering shall be in accordance with local numbering system, and avoiding duplicity with existing national CCG numbers as much as possible.

3.2 CONTRACTOR USE:

Contractors are recommended to obtain drawing numbers provided by the CCG. However, a drawing number following the contractor's numbering convention may be used, as long as it follows a standard. In such a case, the standard used shall be included as a deliverable of the project. In absence of a compliant numbering system the contractor shall follow the CCG numbering standard. In all cases unique numbering is the objective, avoiding duplication with existing contractor and CCG drawing identification numbers.

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Chapter 4 GENERAL DRAWING PRACTICE

4.1 SIZE AND FORMAT

4.1.1 Layout

Each drawing shall consist of no more than one layout to accommodate CCG metadata management system.

4.1.2 Model space

As much as practical, drawings must be modelled at full size using the International System of Units (S.I.).

4.2 ANNOTATIVE MODE

Consistency in use of annotative mode is mandatory. It is preferred not to use annotative and non-annotative style simultaneously.

4.3 TEXT STYLE STANDARD

- 1) True type font shall be used in all text style within drawings.
- 2) Preferred font file is Arial.
- 3) Font usage should be uniform throughout each project. The height of text must be set to 0 (not fixed) so that it can be changed to suit different scaling requirements.
- 4) All French characters should be accented whether upper or lower case.
- 5) Private company logos must not contain a special font file.
- 6) Paragraphs must be created with “MTEXT” command.
- 7) It is recommended to use only annotative style.

4.4 DIMENSION STYLE STANDARD

All dimensioning must be created on entities in model space with associative dimensions.

Annotative dimension styles are preferred.

Two dimensioning formats shall be used to cover most applications:

- 1) Engineering with arrowheads for dimension terminators.
- 2) Architectural with ticks for dimension terminators.

4.5 ORTHOGRAPHIC PROJECTION SYMBOLS

Projection symbols shall be placed as a note, only when it differs from third angle projection.

4.6 SHEET SIZE FOR PAGE SETUP

Below are the common sheet sizes used by CCG and are included in the CCG Package. Sheet sizes that differ to those below can be used but shall meet commercial standards and respect CCG's Title block template and attributes integrity:

Sheet Designation Overall Size (mm)

A0	841 x 1189
A1	594 x 841
A2	420 x 594
B1	707 X 1000
Arch D	610 X 914
Arch E	864 X 1118
11 x 17 ANSI B	279 x 432
8.5 x 14	216 x 356
8.5 x 11	216 x 279

Note: When drawings larger than A0 are required, it is recommended that they use a width of 889mm.

Chapter 5 LAYER AND LAYER STRUCTURE

5.1 SCRIPT

Scripts are available in the CCG package to automatically create discipline specific layers. In the event that the CCG layering system is not used, the third party shall provide their layering system information with the deliverable.

5.2 LAYER NAMING

Layer naming systems shall be used and based on the specific usage of the drawing information. It shall be used to distinguish system types, component sizes and/or materials, manufacturing data, geometric location or orientation, type of drawing entity and other uses specific to the needs of the user. The following general layer system guidance shall be applied to all drawings.

5.3 LAYER SYSTEM

At a minimum, layering systems shall provide at least one separate layer name for each of the following elements:

- 1) Notes and other text not part of dimensions;
- 2) Dimensions;
- 3) Reference or construction lines that do not represent actual material or structure, such as baselines, centerlines, lines of frames, perpendiculars, etc.;
- 4) Systems, structure or components used as background, not ordered or modified by the drawing;
- 5) Specialized information;
- 6) Drawing features such as section or detail cut lines, break lines, and similar non-physical entities;
- 7) Layer Specification; and
- 8) Revision entities outside of the revision block such as revision triangles, hashing and revision clouds shall be on a separate layer for each revision.

Layer names shall not be used solely to distinguish between line types or colors. Layer names used to distinguish line types or colors shall include elements that also identify the entities as to drawing function.

Line weight must be included in the layer information. Layers structure used within the standard Coast Guard drawing template shall not be changed.

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Annex A REFERENCES

A.1 INTERNATIONAL STANDARDS INSTITUTES

American Society of Mechanical Engineers (ASME)

Three Park Avenue
New York, NY 10016-5990

American National Standards Institute (ANSI)

1899 L Street, NW, 11th Floor
Washington, DC, 20036

International Organization for Standardization (ISO)

1, ch. de la Voie-Creuse
CP 56 CH-1211 Geneva 20
Switzerland

American Society for Testing and Materials (ASTM)

100 Barr Harbor Drive, West
Conshohocken, Pennsylvania, USA

American Welding Society, Inc. (AWS)

8669 Doral Boulevard,
Doral, Florida 33166

National Electrical Manufacturers Association (NEMA)

1300 North 17th Street
Suite 1752
Rosslyn, Virginia 22209

Canadian Standards Association, (CSA)

178 Rexdale Blvd.
Toronto, Ontario
Canada M9W 1R3

Aerospace Industries Association of America, (AIA)

1000 Wilson Boulevard, Suite 1700
Arlington, VA, 22209

Society of Automotive Engineers (SAE)

400 Commonwealth Drive
Warrendale, PA 15096-0001 USA

A.2 REGIONAL/HEADQUARTERS ILS

Headquarters

200 Kent Street, Centennial Towers
Station 7W124,
Ottawa, ON K1A 0E6

Western

25 Huron Street,
Victoria BC V8V 4V9

Central & Arctic

101 Champlain Blvd.,
Québec QC G1K 7Y7

520 Exmouth Street,
Sarnia, ON N7T 8B1

Atlantic

Canadian Coast Guard Base
Southside Road
P.O. Box 5667
St. John's, NL A1C 5X1

4-50 Discovery Drive
P.O. Box 1000
Dartmouth, NS B2Y 3Z8

Annex B EXAMPLE SCALE

Stage	Type of drawing	Scale	Notes
Design	Sketch and preliminary drawings	-	Scales will vary but it is recommended that preference be given to those used in the working drawing stage.
	Location drawings	-	Scale will vary according to maps used as reference.
Working	Key Plan	1:2000 1:1000	
Drawing	Site Plan	1:500 1:200	
	General location drawings	1:200 1:100 1:50	
	Component range drawings	1:100 1:50 1:20	
	Assembly drawings	1:20 1:10 1:5 1:2 1:1	
	Component details drawings	1:10 1:5 1:2 1:1	

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