

Construction drawing practice —

Part 5: Guide for structuring of computer graphic information

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- British Standards Society
- Building Employers Confederation
- Chartered Institution of Building Services Engineers
- Concrete Society
- Department of Education and Science
- Department of the Environment
- Property Services Agency
- Department of the Environment (Building Research Establishment)
- Incorporated Association of Architects and Surveyors
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The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Constructional Steelwork Association Ltd.
- Building Services Research and Information Association
- Construction Industry Computing Association
- Landscape Institute

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Foreword

This Part of BS 1192, having been prepared under the direction of the Basic Data and Performance Criteria for Civil Engineering and Building Structures Standards Policy Committee, has been written to bring the recommendations for construction drawing practice up-to-date and to comply with other national standards of the United Kingdom and with standards of the International Organization for Standardization (ISO) that have been accepted by the UK. (See also the introduction.)

BS 1192 comprises five Parts as follows:

- *Part 1: Recommendations for general principles;*
- *Part 2: Recommendations for architectural and engineering drawings;*
- *Part 3: Recommendations for symbols and other graphic conventions;*
- *Part 4: Recommendations for landscape drawings;*
- *Part 5: Guide for structuring of computer graphic information.*

BS 1192 gives guidance and recommendations on the production of graphical information needed to provide communication, with accuracy, clarity, economy and consistency of presentation, between all concerned with the construction industry, including architects, civil engineers, contractors, landscape architects, services engineers, site operatives, structural engineers and surveyors.

Computer aided design (CAD) systems have been in use since about 1970 and a growing number of drawings are now produced on them by the construction industry. Each of the many proprietary CAD systems has been developed independently using varying terminology and storing data in different ways. This part of BS 1192 indicates features that are common to all CAD systems, and proposes a common terminology.

BS 1192-5 is written for the users and managers of CAD systems in the construction industry. It is not a standard for producers of CAD systems.

By 1990, when international standards for exchange of data between different CAD systems are likely to be agreed, the construction industry should have adopted a standard approach to organizing data within CAD systems in order to be able to exchange as much of this data as possible. Building owners may also wish to retain drawing records on computer for building management and future alteration.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

This Part of BS 1192 is written for the users and managers of CAD systems in the construction industry who may be architects, contractors, engineers, surveyors and others. It is not a standard for the producers of CAD systems.

There are a number of reasons why users and managers of CAD systems should take note of this standard and apply its recommendations in order to:

- a) understand what is common between different CAD systems;
- b) increase the efficiency of an office which is using CAD;
- c) manage the use of a CAD system by more than one user;
- d) organize the transfer of CAD data between several offices;
- e) structure data for archiving to help future retrieval.

Computer produced drawings should always satisfy the requirements of the users of information shown on the drawings. The drawings should also comply with the recommendations of all Parts of BS 1192. Developing computer technology needs some additional considerations which are the subject of this Part of BS 1192.

Projection systems for three dimensional viewing are set out in BS 1192-1 and relate to visualization by computer.

1 Scope

This Part of BS 1192 gives guidance on the representation of construction by computers primarily for the purpose of generating drawings and the exchange of data between CAD users.

The standard identifies a data model from which proprietary CAD systems may vary in several ways. Terminology used in this model, independent of particular system terms, is recommended. A basis for allocating construction data to layers is recommended in appendix A. A list of equivalent terms is given in appendix B.

This guide covers the production of drawings and non-graphic data from two and three dimensional computer models to facilitate more effective exchange of data between different CAD systems under the proposed International Standard for Exchange of Product Data, STEP.

NOTE The titles of the publications referred to in this Part of BS 1192 are listed on the inside back cover.

2 Definitions and abbreviations

2.1 General

For the purposes of this standard, the definitions given in BS 6100-1.5.7 and in BS 1192-1 and BS 1192-3 apply. In addition, the definitions given in 2.2 and the abbreviations in 2.3 of this Part of BS 1192 apply. Definitions of general building and civil engineering terms also apply, as given in BS 6100-1.0.

There is a need for standard terminology since the diversity of terms used in each system hinders discussion and understanding. A table of recommended terms compared with system terms is given in appendix B.

Abbreviations and terms defined in the standard are reproduced, the first time they appear within any one of the clauses 2 to 9, in bold type.

2.2 Definitions

2.2.1 annotation

parts of a drawing consisting of letters or numbers and, where relevant, associated graphic **entities**

2.2.2 attribute

essential property, trait, quality or characteristic of an **entity**

2.2.3 background model

graphic data used for reference only

2.2.4 computer graphics

methods for converting data to or from graphic displays via computers

2.2.5 co-ordinate system

system of magnitudes used to fix position of point, line or plane

2.2.6 database

consistent collection of data that can be interpreted and operated on, by the computer system

2.2.7 data structure

description of the way in which data is organized in a computer program

2.2.8 drawing specification

specific details of a drawing including sheet size, layout, title block and notes, and of content in terms of **model views** and positions.

NOTE Not to be confused with specification of works.

2.2.9 entity

information unit having uniform meaning and use

NOTE This term may include **models**, **sub-models**, **primitives** and **instances**.

2.2.10 fill (filled area on a drawing)

enclosed area on a drawing covered with ink or other medium

2.2.11 group

collection of **entities** within a **model** behaving like a single **entity**

2.2.12 handing

conversion of an item to its mirror image

2.2.13 instance

occurrence of a **sub-model** at a particular location and orientation within a **model** or **sub-model**

2.2.14 layer

attribute of an item commonly used for classification, and to control visibility and manipulation

NOTE STEP uses the term "level" while "layer" is used for segments: application, logical and physical.

2.2.15 mathematical model

representation of something by numbers

2.2.16 model

collection of **entities** arranged in 2-D or 3-D space

2.2.17 model view

representation of all, or part, of the contents of a **model**

2.2.18 nesting

hierarchical arrangement of **entities**

2.2.19 parameter

attribute of an item which effects its geometry or appearance when drawn

2.2.20 primitive

item which is not defined in terms of subordinate items

2.2.21 read-only file

file which can be displayed as a background but which cannot be edited; typically used in computer graphics to co-ordinate consultants' drawings while maintaining individual control

2.2.22 style

parameter affecting the appearance of a **primitive**

2.2.23 sub-model

collection of **entities** arranged in 2-D or 3-D space like a **model**

NOTE **Sub-models** may be **nested**.

2.2.24 visualization

generation of three dimensional projections from computer **models**

2.3 Abbreviations

AEC Architect, Engineer, Constructor.

CAD Computer Aided Design.

NOTE This may include both modelling and draughting.

GKS Graphical Kernel System.

NOTE BS 6390 refers.

IGES Initial Graphics Exchange Specification¹⁾

NTF National Transfer Format for mapping developed from the Ordnance Survey Transfer Format¹⁾.

OSI Open Systems Interconnection.

NOTE BS 6568 refers.

PDES Product Data Exchange Specification²⁾

STEP Standard for Exchange of Product Data³⁾

¹⁾ See publications referred to.

²⁾ A proposed development from IGES.

³⁾ Drafting work in progress in ISO/TC 184/SC4 External representation of project definition data.