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An American National Standard

Standard Guide for Selection of Scales for Metric Building Drawings[1]

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This standard has been approved for use by agencies of the Department of Defense.

INTRODUCTION

When metric (SI) units are used in building design and construction, the need arises to show metric drawings in decimally compatible scale ratios to facilitate their production and interpretation with decimally graduated scale instruments.

This guide responds to that need by recommending a range of preferred scales for different types of building drawings.

1. Scope

1.1 This guide specifies recommended scales for architectural, building product, and building drawings using metric (SI) units of measurement, and measured with scale instruments graduated in millimetres. Preferred scales are listed for various types of drawings. [2]

2. Presentation of Scales

2.1 *General*—A scale should be stated on every drawing. The scale may be indicated as a ratio prefixed by the word "scale," for example, "SCALE 1:100." Alternatively, a graphic (drawn) scale may be shown as a reference scale.

2.2 *Single Scale*—Where only one scale is used on a drawing sheet, the scale should preferably be indicated in or near the title block.

2.3 *Multiple Scales*—Where two or more scales are used on the same drawing sheet in order to provide different levels of detail, each scale should be clearly indicated, preferably below each particular title. A notation "SCALES AS SHOWN" should also be indicated in or near the title block.

2.4 *Scale Enlargement or Reduction*—Where it is likely that a drawing may be reproduced at a reproduction ratio other than the scale shown, it is recommended that a graphic (drawn) reference scale (as shown in Fig. 1) be added to provide a visual indication of the amount of enlargement or reduction. It is also recommended that prints enlarged or reduced in size be stamped to indicate that they are no longer to scale, for example, "REPRODUCTION NOT TO SCALE—RATIOS SHOWN."

2.5 *Dimensions Not to Scale*—Where it is necessary to indicate that a dimension on a scale drawing is not to scale, the abbreviation "NTS" (not to scale) should be added.

3. Selection of Scale

3.1 Careful consideration should be given to the selection of suitable scales in metric building drawings. The following factors influence that selection:

3.1.1 The need to communicate both accurately and adequately the information necessary to carry out the intentions of the design.

3.1.2 The need to achieve economy of effort and time in the preparation and interpretation of drawings.

3.1.3 The character and size of the drawn subject (for example, house plans are generally drawn to a larger scale than plans for commercial buildings).

3.1.4 The desirability of keeping the drawing sheets for a project to one size.

3.1.5 The characteristics and capabilities of reproductive and microfilming facilities used.

4. Scale Ratios

4.1 Scales for use with metric (SI) drawings are expressed as ratios only.

4.2 A scale of 1:100, for example, indicates that every dimension on the drawing is 100 times as large in production or construction; 1 mm on the drawing represents 100 mm, 10 mm represents 1000 mm (1 m), etc.

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[2] Available from American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

FIG. 1 Example of a Graphic (Drawn) Reference Scale for Drawings Likely to be Reproduced at a Different Scale Ratio

5. Drawing Types

5.1 For the purpose of classifying suitable scale ratios, the following drawing types are identified:

5.1.1 *Area Location Plan*, showing the general geographic location of a project.

5.1.2 *Block (Locality) Plan*, locating the site within the surrounding district.

5.1.3 *Site Plans*, locating the building and site works in relation to the site. On larger scale site plans (for example, 1:200) service networks may also be shown.

5.1.4 *General Location Drawings*, showing plans, sections, and elevations of the building or major building parts with an indication of the key reference dimensions for setting out, locating of rooms and spaces, and positioning of assemblies.

5.1.5 *Component Drawings*, also applicable to schedules, showing the range of specific components or assemblies to be used in a project, or the detailed location of components or assemblies in complex situations.

5.1.6 *Assembly (Manufacturing) Drawings*, providing information on components or assemblies, or both, for shop manufacture.

5.1.7 *Component Detail Drawings*, showing the interface of two or more components or assemblies for construction purposes, or providing precise information on components and assemblies for shop manufacture.

6. Preferred Scales

6.1 The preferred scales recommended for various drawing types are shown in Table 1.

6.2 If a larger or smaller scale is needed for applications not listed in Table 1, the recommended range may be extended in either direction by the use of ratios in which the denominator or numerator is a product of the numbers 1, 2, or 5, and a power of 10 (1×10^n, 2×10^n, and 5×10^n), for example, 1:10 000, 1:20 000, and 1:50 000.

TABLE 1 Preferred Scales Recommended for Use With Different Types of Metric Building Drawings

Phase	Type of Drawing	Scale Ratio	Remarks
Preliminary design	sketch and preliminary drawings	...	scales will vary, but it is recommended that preference be given to scale ratios used at the working drawing stage
Working drawings	area location plan	...	scales will vary according to reference maps used
	block (locality) plan	1:2000 1:1000	...
	site plans	1:1000 1:500 1:200	use larger scales where details of services are to be shown on site plans
	general location drawings (plans, sections, elevations)	1:200 1:100 1:50	...
	component drawings (component schedules)	1:100 1:50 1:20	1:50 is the most preferred ratio for schedules
	assembly (manufacturing) drawings	1:20 1:10 1:5	...
	component detail drawings	1:10 1:5 1:2 1:1	...

7. Exaggerated Scales

7.1 In some applications, such as section drawings of drains, sewers, earthworks, or steelwork, it is desirable to use different scales for the horizontal and the vertical plane to facilitate the interpretation of drawings. In general, this involves the use of an exaggerated vertical scale to show the difference in levels or details.

7.2 Where exaggerated scales are used, both scale factors should be shown below each particular title or adjacent to the drawing, for example, "HORIZONTAL SCALE 1:100, VERTICAL SCALE 1:20."

8. Grid Paper

8.1 With the application of reference grids, such as in metric dimensional (modular) coordination based on the 100-mm module, the use of preprinted grid drawing paper is an obvious aid to drafting and provides an inbuilt reference scale during the drafting process.

8.2 Where grids are used, it is recommended that grid intervals of 10 mm, 5 mm, or 2 mm be chosen to complement the preferred scales indicated in Table 1.

8.3 A direct representation of the 100-mm basic module is achieved by the following combinations of grid paper and scale ratios:

10-mm grid — modular at a scale ratio of 1:10
5-mm grid — modular at a scale ratio of 1:20
2-mm grid — modular at a scale ratio of 1:50

8.4 Grids should preferably be printed in a nonreproducing type of ink.

9. Metric Drafting Scales

9.1 Metric scale instruments for use in drafting (hand scales or machine scales) will be the subject of separate ASTM standards.

10. Keywords

10.1 building; building drawings; construction; metric; scales