



for Microplates –
Height Dimensions

Secretariat
Society for Biomolecular Screening

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Foreword

As early as the first meeting of the Society for Biomolecular Screening (SBS) in 1995, a need for clearly defined dimensional standards of a microplate were identified. At the time, the microplate was already becoming an essential tool used in drug discovery research. At the time, the concept of a microplate was similar among various manufacturers, but the dimensions of microplates produced by different vendors, and even within a single vendors catalog line varied. This often caused numerous problems when microplates were to be used in automated laboratory instrumentation.

In late 1995, members of the SBS began working on defining dimensional standards for the standard 96 well microplate. The first written proposal was released in December 1995 and presented at numerous scientific conferences and journals throughout 1996. This initial proposed standard was officially presented to the membership of SBS for approval at the annual meeting in October 1996 in Basel, Switzerland. Between then and late 1998, various versions of the proposed standards for 96 and 384 well microplates were circulated to the membership of the society. In early 1999, efforts to begin formalizing the proposed standards in preparation for submission to a recognized standards organization were begun. The email ListServ was started in March, and the first regular quarterly meeting of the working committee met in August of that year. To date, the ListServ contains members representing over 100 corporations, educational institutions, and government organizations from over 15 nations.

There is one annex in this standard. Annex A is informative and not considered part of this standard. It is provided as an aid only for the interpretation of specific elements of ASME Y14.5 as they apply to figures in SBS standards.

Suggestions for improvement of this standard will be welcome. They should be sent to the Microplate Standards Development Committee of the Society for Biomolecular Screening, 36 Tamarack Avenue, Suite 348, Danbury, CT 06811.

This standard was processed and approved for submittal to ANSI by the Microplate Standards Development Committee of the Society for Biomolecular Screening. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the committee had the following member organizations:

Marc Feiglin, Co-chair
Carol Homon, Co-chair

Organization Represented

Apogent Discoveries^{1,2}
BD Biosciences¹
Beckman Coulter^{1,2}
Boehringer-Ingelheim³
Co Bio Engineering³
Corning¹
Greiner BioOne¹
Hamilton Co²
Hoffman La Roche³

MatriCal¹
Merck & Co³
Millipore¹
MJ Research^{1,2}
Molecular Devices^{1,2}
REMP²
Tecan²
Thermo Electron²
Whatman¹

Interest groups

1. Manufacturers of microplates (n=10)
2. Manufacturers of instrumentation that utilizes microplates (n=8)
3. Users of microplates that do not fit in either of the previous categories (n=4)

1 Scope and purpose

1.1 Scope

This standard defines the dimensional requirements of the height of a microplate as specified in American National Standards covering these microplates.

1.2 Purpose

It is the purpose of this standard to describe the minimal dimensions required of a microplate that is considered to meet the standards. This standard also outlines the conditions required for making necessary measurements. Unless otherwise specified, all dimensions are applicable at 20 degrees C (68 degrees F). Compensation may be made for measurements made at other temperatures.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. ASME Y14.5M-1994, *Dimensioning and Tolerancing*

3 Definitions

There are many terms and definitions associated with microplates that have special meaning to the industry. The following are definitions of terms used in this document:

3.1 ASME: Abbreviation for the American Society of Mechanical Engineers

3.2 ANSI: Abbreviation for the American National Standards Institute, Inc.

3.3 SBS: Abbreviation for the Society for Biomolecular Screening.

4 Microplate height

Microplates that meet this standard may either comply with those standards specified in parts 4.1, or 4.2. Microplates, or instruments that use them, that advertise compliance with this standard must clearly state which of these two parts they meet.

4.1 Typical height with clearance

4.1.1 Plate height

4.1.1.1 The plate height, measured from Datum A (the resting plane) to the maximum protrusion of the perimeter wells, shall be 14.35 mm \pm 0.25 mm (0.5650 inches \pm 0.0098 inches)

4.1.1.2 The overall plate height, measured from Datum A (the resting plane) to the maximum protrusion of the plate, shall be 14.35 mm \pm 0.76 mm (0.5650 inches \pm 0.0299 inches)

4.1.2 Top Surface

4.1.2.1 The maximum allowable projection above the top-stacking surface is 0.76 mm (0.0299 inches). The top-stacking surface is defined as that surface on which another plate would rest when stacked one on another.

4.1.2.2 When resting on a flat surface, the top surface of the plate must be parallel to the resting surface within 0.76 mm (0.0299 inches)

4.1.3 External Clearance to the Plate Bottom

The minimum clearance from Datum A (the resting plane) to the plane of the bottom external surface of the wells shall be 1 mm (0.0394 inches). This clearance is limited to the area of the wells.

4.2 Typical height

4.2.1 Plate height

4.2.1.1 The plate height, measured from Datum A (the resting plane) to the maximum protrusion of the perimeter wells, shall be 14.35 mm \pm 0.25 mm (0.5650 inches \pm 0.0098 inches)

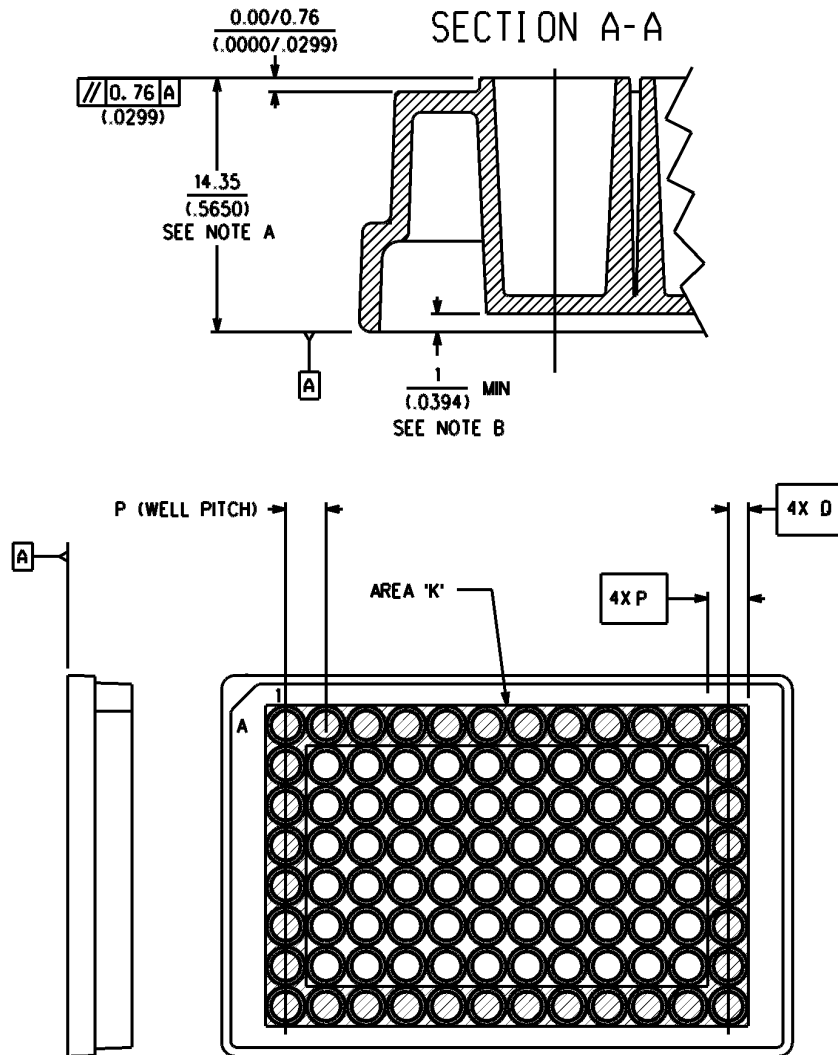
4.2.1.2 The overall plate height, measured from Datum A (the resting plane) to the maximum protrusion of the plate, shall be 14.35 mm \pm 0.76 mm (0.5650 inches \pm 0.0299 inches)

4.2.2 Top Surface

4.2.2.1 The maximum allowable projection above the top-stacking surface is 0.76 mm (0.0299 inches). The top-stacking surface is defined as that surface on which another plate would rest when stacked one on another.

4.2.2.2 When resting on a flat surface, the top surface of the plate must be parallel to the resting surface within 0.76 mm (0.0299 inches)

Figure



NO. OF WELLS	96 (SHOWN)	384	1536
P (WELL PITCH)	9/(.3543)	4.5/(.1772)	2.25/(.0886)
Q (HALF P)	4.5/(.1772)	2.25/(.0886)	1.125/(.0443)

NOTES:

- 1 The drawing standard used is ASME Y14.5M-1994
 - 2 The geometry shown is for illustration only and does not imply any preferred or required construction.
 - 3 Dimensions shown are: Millimeters / (Inches)
 - 4 Dimensions and tolerances do not include draft.
- A Typical height = 14.35 mm (0.56560 inches) ± 0.76 mm (0.0299 inches) applied overall, and a tolerance of ± 0.25 mm (0.0098 inches) applied within area "K".
- B The 1mm (0.0394 inch) clearance applies in the area of the wells only.

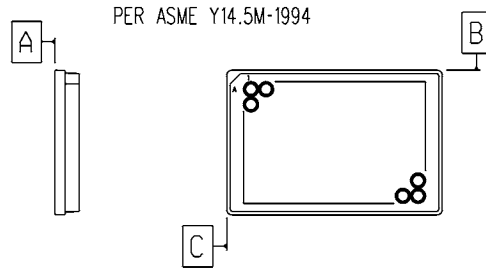
Figure 1- Mechanical drawings defining the height of a typical microplate

Annex

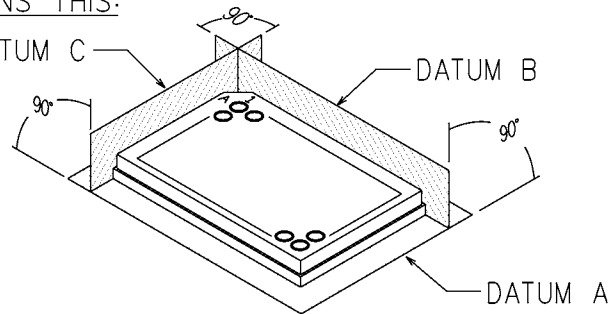
Annex A (Informative) Interpretation of Figures

Annex A is a general guide to interpreting figures in SBS standards in accordance with ASME Y14.5M-1994. Annex A is not intended to be a substitute for a working knowledge of dimensioning and tolerancing practices contained therein. The specific examples in Annex A are not comprehensive and may or may not apply to the figures in this particular SBS standard.

THIS ON THE DRAWING:



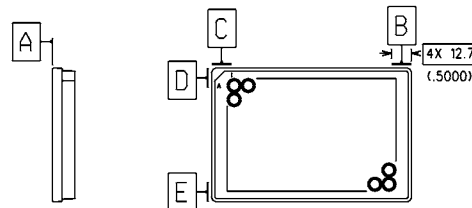
MEANS THIS:



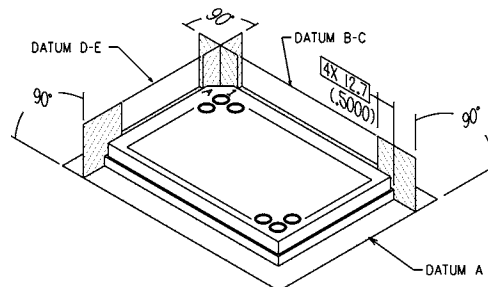
A.1 Specifying datum

THIS ON THE DRAWING:

PER ASME Y14.5M-1994 PARAGRAPH 1.7.3, 4.5.10, 6.3.1.2



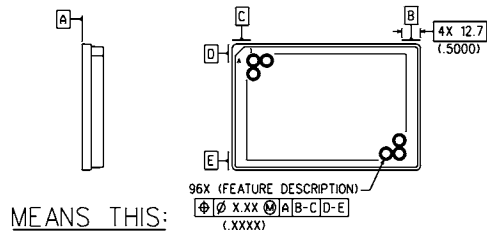
MEANS THIS:



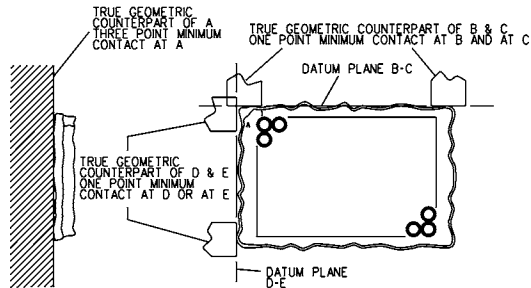
A.2 Specifying composite datum

THIS ON THE DRAWING:

PER ASME Y14.5M-1994
 PARAGRAPH 1.7.3, 4.5.10, 4.5.7.1

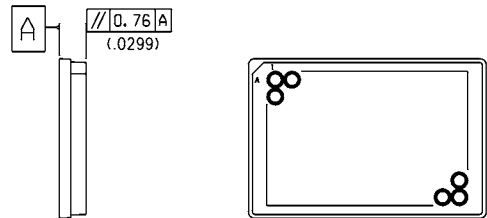


MEANS THIS:



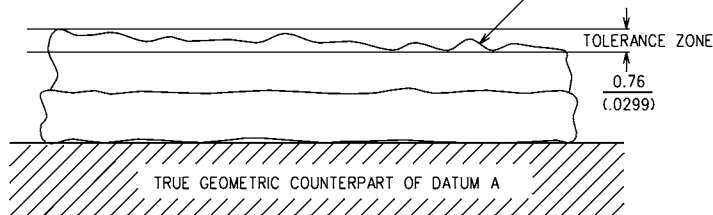
A.3 Application of composite datum

THIS ON THE DRAWING:



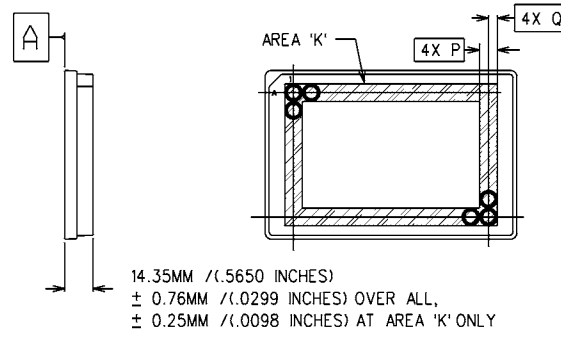
MEANS THIS: PER ASME Y14.5M-1994 PARAGRAPH 6.6.3.1

CONTROLLED SURFACE MUST LAY WITHIN A 0.76MM \varnothing (.0299 INCH) WIDE TOLERANCE ZONE, PARALLEL WITH DATUM A, AND MUST NOT EXCEED LIMITS OF SIZE



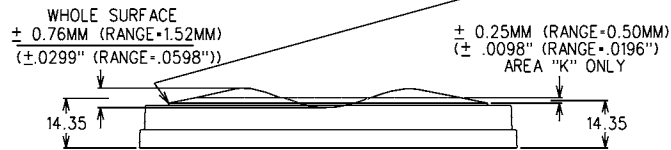
A.4 Parallelism

THIS ON THE DRAWING:



MEANS THIS:

PER ASME Y14.5M-1994 PARAGRAPH 1.7.3
 (STEP ALLOWED PER SBS-2 SHOWN FOR CLARITY)



A.5 Tolerances over a limited area