

ANSI/SLAS 3-2004 (*formerly recognized as ANSI/SBS 3-2004*)



for Microplates –  
Bottom Outside Flange Dimensions

Secretariat  
Society for Laboratory Automation and 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 was 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.

In July of 2010, SBS merged with The Association for Laboratory Automation (ALA) to form The Society for Laboratory Automation and Screening (SLAS).

Suggestions for improvement of this standard will be welcome. They should be sent to the Microplate Standards Development Committee of the Society for Laboratory Automation and Screening, 100 Illinois Street, Ste 242, St. Charles, Illinois 60174.

This standard was processed and approved for submittal to ANSI by the Microplate Standards Development Committee of the Society for Biomolecular Screening, (now known as the Society of Laboratory Automation and 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<sup>1,2</sup>  
BD Biosciences<sup>1</sup>  
Beckman Coulter<sup>1,2</sup>  
Boehringer-Ingelheim<sup>3</sup>  
Co Bio Engineering<sup>3</sup>  
Corning<sup>1</sup>  
Greiner BioOne<sup>1</sup>  
Hamilton Co<sup>2</sup>  
Hoffman La Roche<sup>3</sup>

MatriCal<sup>1</sup>  
Merck & Co<sup>3</sup>  
Millipore<sup>1</sup>  
MJ Research<sup>1,2</sup>  
Molecular Devices<sup>1,2</sup>  
REMP<sup>2</sup>  
Tecan<sup>2</sup>  
Thermo Electron<sup>2</sup>  
Whatman<sup>1</sup>

### 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 bottom outside flange 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.

3.4 SLAS: Abbreviation for the Society for Laboratory Automation and Screening.

## 4 Bottom-outside flange

Microplates that meet this standard may either comply with those standards specified in parts 4.1, 4.2, 4.3, 4.4, or 4.5. Microplates, or instruments that use them, that advertise compliance with this standard must clearly state which of these five parts they meet.

### 4.1 Short flange height

#### 4.1.1 Flange height

4.1.1.1 The height of the bottom outside flange shall be  $2.41 \text{ mm} \pm 0.38 \text{ mm}$  ( $0.0948 \text{ inches} \pm 0.0150 \text{ inches}$ ). This is measured from Datum A (the bottom-resting plane) to the top of the flange.

4.1.1.2 All four sides must have the same flange height.

#### 4.1.2 Flange width

4.1.2.1 The width of the bottom outside flange measured at the top of the flange shall be a minimum of 1.27 mm (0.0500 inches).

#### 4.1.3 Chamfers (Corner Notches)

4.1.3.1 The quantity and location of chamfer(s) is optional. If used, the chamfer must not include the flange.

## 4.2 Medium flange height

### 4.2.1 Flange height

4.2.1.1 The height of the bottom outside flange shall be  $6.10 \text{ mm} \pm 0.38 \text{ mm}$  ( $0.2402 \text{ inches} \pm 0.0150 \text{ inches}$ ). This is measured from Datum A (the bottom-resting plane) to the top of the flange.

4.2.1.2 All four sides must have the same flange height.

### 4.2.2 Flange width

4.2.2.1 The width of the bottom outside flange measured at the top of the flange shall be a minimum of  $1.27 \text{ mm}$  ( $0.0500 \text{ inches}$ ).

### 4.2.3 Chamfers (Corner Notches)

4.2.3.1 The quantity and location of chamfer(s) is optional. If used, the chamfer must not include the flange.

## 4.3 Tall flange height

### 4.3.1 Flange height

4.3.1.1 The height of the bottom outside flange shall be  $7.62 \text{ mm} \pm 0.38 \text{ mm}$  ( $0.3000 \text{ inches} \pm 0.0150 \text{ inches}$ ). This is measured from Datum A (the bottom-resting plane) to the top of the flange.

4.3.1.2 All four sides must have the same flange height.

### 4.3.2 Flange width

4.3.2.1 The width of the bottom outside flange measured at the top of the flange shall be a minimum of  $1.27 \text{ mm}$  ( $0.0500 \text{ inches}$ ).

### 4.3.3 Chamfers (Corner Notches)

4.3.3.1 The quantity and location of chamfer(s) is optional. If used, the chamfer must not include the flange.

## 4.4 Short flange height with interruptions

### 4.4.1 Flange height

4.4.1.1 The height of the bottom outside flange shall be  $2.41 \text{ mm} \pm 0.38 \text{ mm}$  ( $0.0948 \text{ inches} \pm 0.0150 \text{ inches}$ ). This is measured from Datum A (the bottom-resting plane) to the top of the flange.

4.4.1.2 All four sides must have the same flange height except for an allowable interruption centered along the long side.

### 4.4.2 Interruptions

4.4.2.1 Each of the long sides of the plate shall be allowed to have a single interruption or projection on center.

4.4.2.2 Each edge of the interruption shall be a minimum of  $47.8 \text{ mm}$  ( $1.8819 \text{ inches}$ ) from the nearest edge of the part.

4.4.2.3 The height of the flange at the interruption shall not exceed 6.85 mm (0.2697 inches)

4.4.3 Flange width

4.4.3.1 The width of the bottom outside flange measured at the top of the flange shall be a minimum of 1.27 mm (0.0500 inches).

4.4.4 Chamfers (Corner Notches)

4.4.4.1 The quantity and location of chamfer(s) is optional. If used, the chamfer must not include the flange.

4.5 Dual flange heights

4.5.1 Flange height

4.5.1.1 The height of the bottom outside flange shall be  $2.41 \text{ mm} \pm 0.38 \text{ mm}$  ( $0.0948 \text{ inches} \pm 0.0150 \text{ inches}$ ) along the short sides of the plate. This is measured from Datum A (the bottom-resting plane) to the top of the flange.

4.5.1.2 The height of the bottom outside flange shall be  $7.62 \text{ mm} \pm 0.38 \text{ mm}$  ( $0.3000 \text{ inches} \pm 0.0150 \text{ inches}$ ) along the long sides of the plate. This is measured from Datum A (the bottom-resting plane) to the top of the flange.

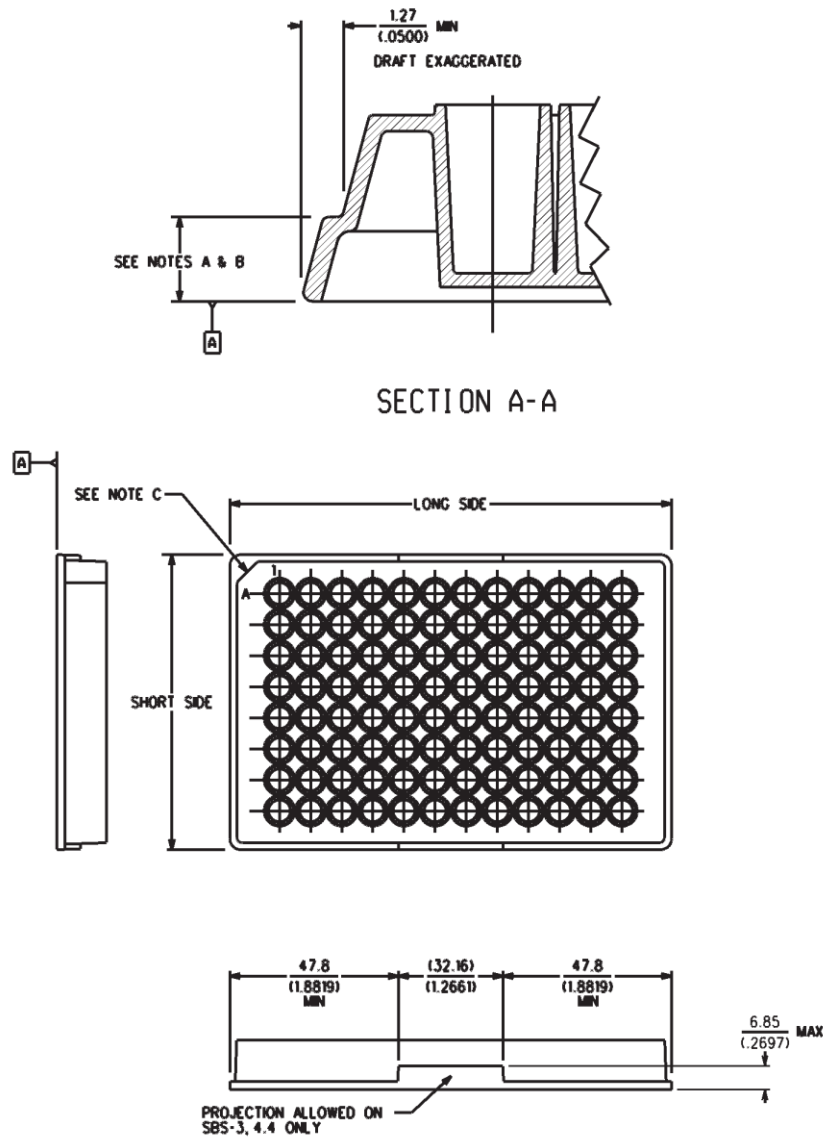
4.5.2 Flange width

4.5.2.1 The width of the bottom outside flange measured at the top of the flange shall be a minimum of 1.27 mm (0.0500 inches).

4.5.3 Chamfers (Corner Notches)

4.5.3.1 The quantity and location of chamfer(s) is optional. If used, the chamfer must not include the flange.

Figure



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 SBS-3, 4.1 short flange height =  $2.41 \pm 0.38$  mm ( $0.0948 \pm 0.0150$  inches)  
 SBS-3, 4.2 medium flange height =  $6.10 \pm 0.38$  mm ( $0.2402 \pm 0.0150$  inches)  
 SBS-3, 4.3 tall flange height =  $7.62 \pm 0.38$  mm ( $0.3000 \pm 0.0150$  inches)  
 SBS-3, 4.4 short flange height with interruptions =  $2.41 \pm 0.38$  mm ( $0.0948 \pm 0.0150$  inches) projections allowed as shown.  
 SBS-3, 4.5 dual flange heights =  $2.41 \pm 0.38$  mm ( $0.0948 \pm 0.0150$  inches) at short sides,  $7.62 \pm 0.38$  mm ( $0.3000 \pm 0.0150$  inches) at long sides.
- B The flange height for SLAS3a, 3b, and 3c (formerly SBS-3a, 3b, and 3c) must be the same on all four sides.  
 C Quantity and location of chamfers(s) is optional. If used the chamfer must not include the flange.

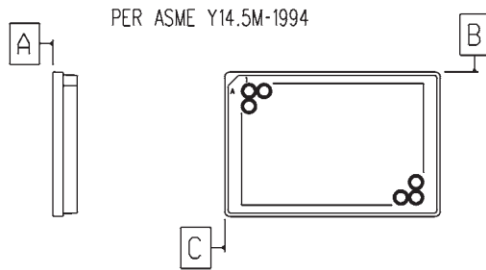
Figure 1- Mechanical drawings defining the flange dimensions of a microplate

# Annex

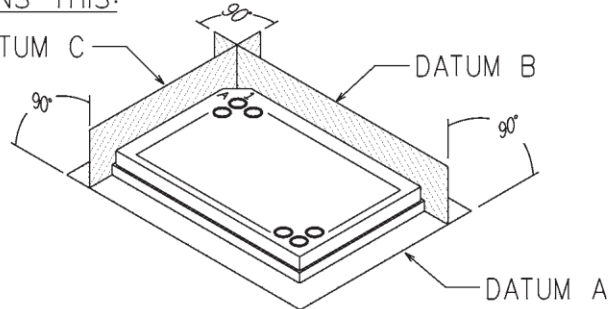
## Annex A (Informative) Interpretation of Figures

Annex A is a general guide to interpreting figures in SLAS (formerly 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 SLAS (formerly SBS) standard.

THIS ON THE DRAWING:



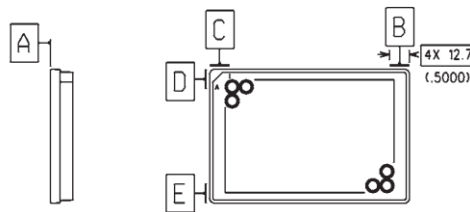
MEANS THIS:



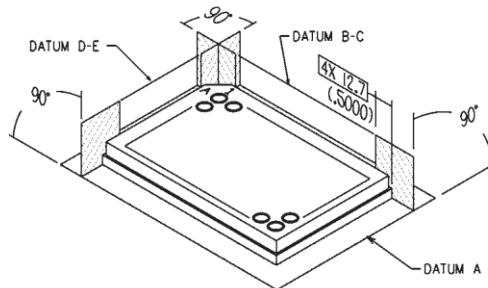
### A.1 Specifying datum

THIS ON THE DRAWING:

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



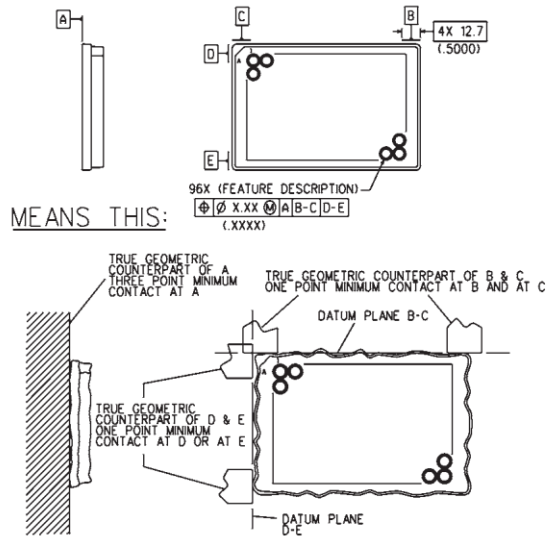
MEANS THIS:



### A.2 Specifying composite datum

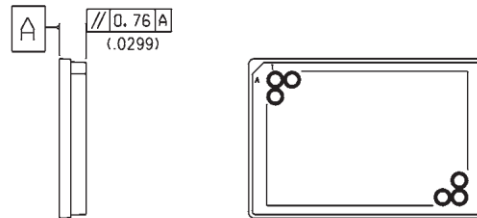


THIS ON THE DRAWING:  
 PER ASME Y14.5M-1994  
 PARAGRAPH 1.7.3, 4.5.10, 4.5.7.1



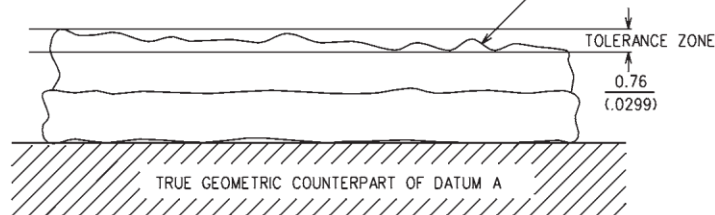
A.3 Application of composite datum

THIS ON THE DRAWING:



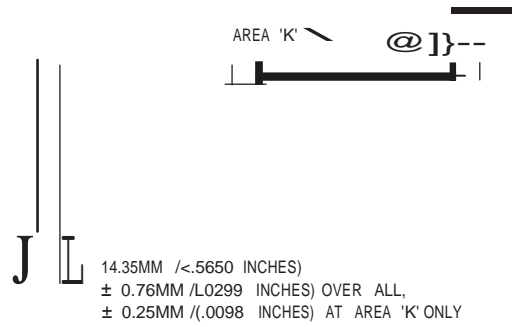
MEANS THIS: PER ASME Y14.5M-1994 PARAGRAPH 6.6.3.1

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



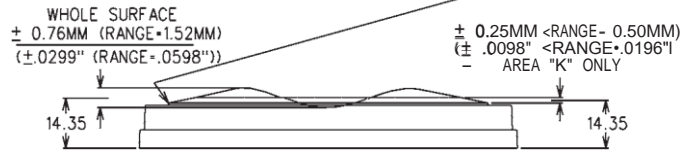
A.4 Parallelism

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