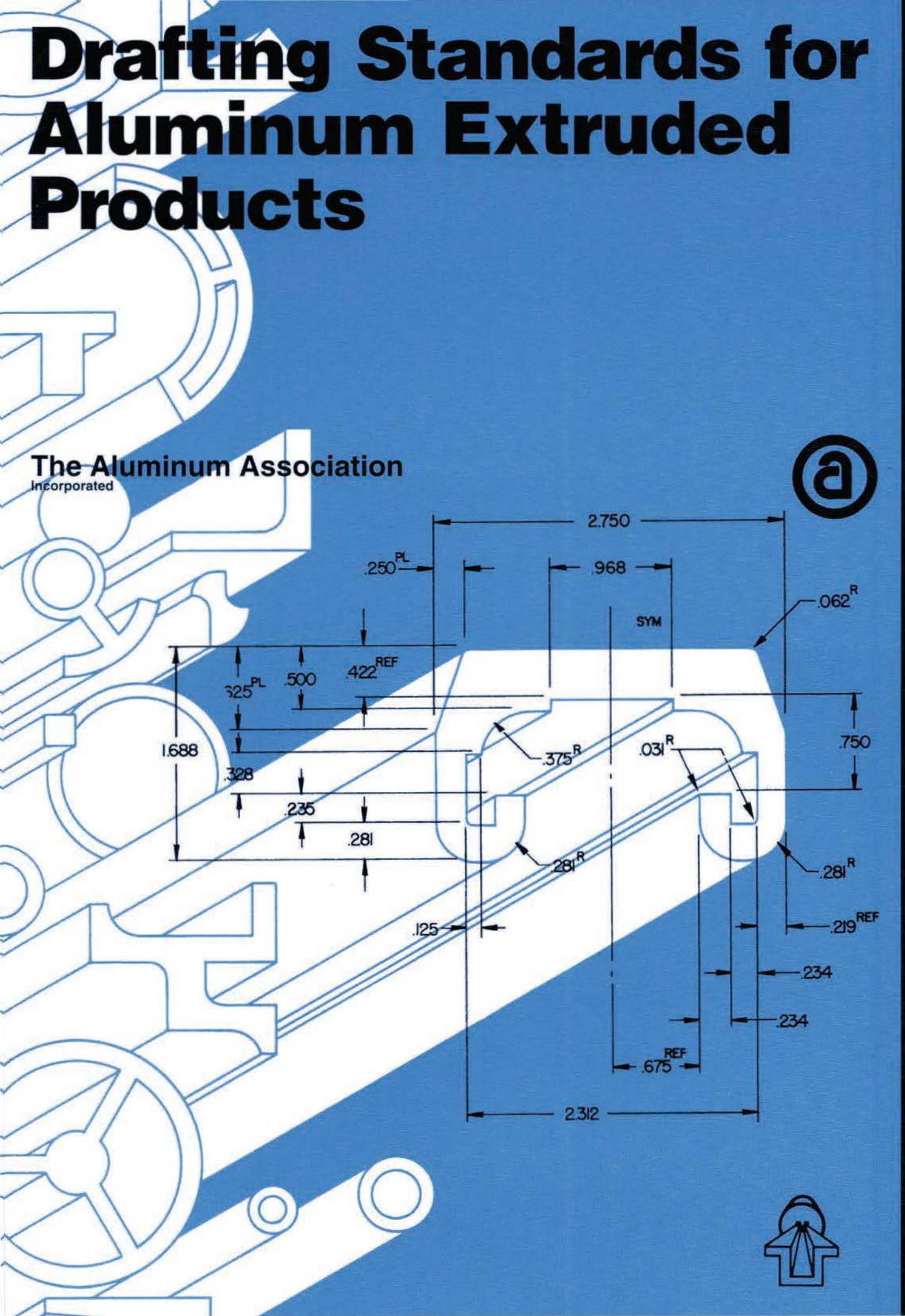
Drafting Standards for Aluminum Extruded Products

2

The Aluminum Association
Incorporated



ABOUT
THE ALUMINUM ASSOCIATION

The member companies of The Aluminum Association, Inc., represent approximately 85 percent of domestic production of primary ingot and shipments of U.S. aluminum mill products. Mill products include sheet and plate; foil; extrusions; electrical conductor and wire, rod and bar. In addition to producers of primary ingot and mill products, the association's membership also includes secondary smelters, foundries and producers of master alloy and additives.

The association is a primary source of statistics, standards, and economic and technical information on aluminum and the aluminum industry in the United States.

NOTICE

Disclaimer

The use of any information contained herein by any member or non-member of The Aluminum Association is entirely voluntary. The Aluminum Association has used its best efforts in compiling the information contained in this book. While the Association believes that its compilation procedures are reliable, it does not warrant, either expressly or impliedly, the accuracy or completeness of this information. The Aluminum Association assumes no responsibility or liability for the use of the information herein.

The Aluminum Association published standards, data, specifications and other technical materials are reviewed at least every five years and revised, reaffirmed or withdrawn. Users are advised to contact The Aluminum Association to ascertain whether the information in this publication has been superseded in the interim between publication and proposed use.

Drafting Standards for Aluminum Extruded Products

Tenth Edition

July 2012 The Aluminum Association
1525 Wilson Boulevard, Suite 600
Arlington, VA 22209

Copyright © 2012

Members of the Task Group for Revision of Drafting Standards for Aluminum Extruded Products

Jerome Fourmann, Rio Tinto Alcan
Scott Greeson, Alcoa Inc.
Frank Henry, Sapa Extrusions, Inc.
Gary Jones, ILSCO Extrusions
James Sanderson, Kaiser Aluminum & Chemical Corp.
Ed Steill, Alcoa Inc.
Michael Skillingberg, The Aluminum Association

Preface to the Tenth Edition

Because the Standard Drafting Practices published by the American National Standards Institute, American Society of Mechanical Engineers and others, are not entirely suitable to aluminum extruded products, this manual was prepared. Its purpose is to outline certain basic practices that are necessary with extruded products and to standardize those practices insofar as practical. Changes in production and application methods, however, require occasional revision to keep the manual fully abreast to those advances. In addition, experience gained in the use of the manual has indicated some revisions that would make it still more useful. The principal changes from the previous issue were the removal of the tolerance tables, which have been replaced by reference to ANSI H35.2 so that the most up-to-date changes are included.

Reference index

The standard procedures as outlined herein agree in part with the historic S.A.E. Aerospace-Automotive Drawing Standards (Society of Automotive Engineers); however, there is no current SAE specification number or revision number available for these references.

Editions of this publication have been issued as follows:

First Edition	October 1949	Seventh Edition	December 1973
Second Edition	April 1954	Eighth Edition, 1st Printing	December 1978
Third Edition	May 1957	2nd Printing	June 1981
Fourth Edition	January 1962	3rd Printing	June 1992
Fifth Edition	October 1966	Ninth Edition, 1st Printing	October 1998
Sixth Edition	March 1969	Tenth Edition	July 2012

Table of Contents

Section I - Introduction

Introduction 4

Section II - Definition of Products

Definition of Products 4

Section III - Identification of Products

Extruded Shapes 6
Extruded Rod 6
Extruded Bar 6
Extruded Tube and Drawn Tube 6

Section IV - Profile Drawings

Principal Function 7
Drawing Format 7
Title Block
7
Profile Geometry 7

Section V - Tolerances

Special Tolerances 9

Section VI - Notes

Special Tolerance Note 10
Exposed Surface Note 10
Radii Notes 10

Section VII - Lines and Line Work

Weight of Lines 10
Outlines 10
Leaders 10
Extension Lines 10
Center Lines 10
Dimension Lines 10
Arrow Heads 11
Focal Points 11
Imaginary Points 11

Section VIII - Lettering

Types 12
Height 12

Section IX - Views

Type of View 13
Enlargement of View 13
General Arrangement of Views 13
Assembling Shapes 13
Auxiliary Views 13

Section X - Dimensioning

General 14
Decimal System 14
Decimal Conversion 14
Placement of Dimensional Values 14
Reference Dimensions 14
Inspection Dimensions 14
Angular Dimensioning 14
Assembling Shapes 15
Curved Surfaces 15
Exposed Surfaces 15
Placement to Facilitate Inspection 15
Radii and Diameters 18
Tolerances 18
Geometric Dimensioning & Tolerancing 21
Standard Dovetails 21
Standard Half Dovetails 21
Standard Screw Slots 22

Section XI - Abbreviations

Abbreviations 23

Section I - Introduction

Because of the constant exchange of Extrusion Profile Drawings between customers and extruders, a uniform method of preparing such drawings will be highly beneficial to both.

Certain basic methods of dimensioning, for example, are important to enable the extruder to maintain reasonable efficiency in the manufacture of extrusion tools and in the inspection of extruded material. Adoption of these dimensioning methods by the customer will help insure that the extruder will obtain a suitable and economically produced product.

It is hoped, therefore, that extrusion customers and producers will prepare their profile drawings in conformity with the practices suggested herein.

Section II - Definition of Products

extruded profile general: A profile produced by hot extruding that is long in relation to its cross-sectional dimensions and has a cross section other than that of rod, bar or tube.

semihollow extruded profile: An extruded profile any part of whose cross section is a partially enclosed void for which the ratio of the area of the void to the square of the gap width is greater than the value shown in Table I for applicable class and alloy.

class 1 semihollow extruded profile: A semihollow extruded profile of two voids or less in which the area of the voids and surrounding metal thickness is symmetrical about the centerline of the gap. Examples, Figures 1a and 1b.

class 2 semihollow extruded profile: Any semihollow extruded profile other than class 1. Examples, Figures 2a and 2b.

hollow extruded profile: An extruded profile any part of whose cross section completely encloses a void.

class 1 hollow extruded profile: A hollow extruded profile, the void of which is round and one inch or more in diameter and whose weight is equally distributed on opposite sides of two or more equally spaced axes. Example, Figure 4.

class 2 hollow extruded profile: Any hollow extruded profile other than Class 1 which does not exceed a 5-inch diameter circumscribing circle and has a single void of not less than 0.375 inch diameter or 0.110 square inch area. Example, Figure 5.

class 3 hollow extruded profile: Any hollow extruded profile other than Class 1 or Class 2. Example, Figure 6

Table 1 — Classification - Semi-Hollow Extruded Profiles

GAP WIDTH inches	CLASS 1		CLASS 2	
	Group A Alloys	Group B Alloys	Group A Alloys	Group B Alloys
	RATIO*			
0.040-0.062	2.0	1.5	2.0	1.0
0.063-0.124	3.0	2.0	2.5	1.5
0.125-0.249	3.5	2.5	3.0	2.0
0.250-0.499	4.0	3.0	3.5	2.5
0.500-0.999	4.0	3.5	3.5	2.5
1.000-1.999	3.5	3.0	3.0	2.0
2.000 and over	3.0	2.5	3.0	2.0

GROUP A alloys are 1060, 1100, 3003, 5454, 6063, 6061
GROUP B alloys are 2011, 2014, 2024, 5083, 5086, 5456, 6066, 7001, 7075, 7178
* See Figure 3 for typical methods of figuring ratios.