



KAYE

Aluminium

Guide to BS EN 755



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Introduction

This guide is intended as a quick reference to how BS EN 755 is applied and used by Kaye Aluminium Ltd, and how it relates to BS1474. It therefore excludes alloys and profile sizes outside of the production limits of Kaye Aluminium.

BS EN 755 Supercedes and replaces BS1474:1987 and DIN 1748.

This document is intended as a guide only. Full copies of the standards listed below should be referred to if further explanation is required.

BS EN 573-3:1995	<i>Chemical Composition</i>
BS EN 573-3:1995	<i>Forms of products</i>
BS EN 755-1:1997	<i>Technical conditions for inspection and delivery</i>
BS EN 755-2:1997	<i>Mechanical Properties</i>
BS EN 755-3:1996	<i>Round bars, tolerances on dimensions and form</i>
BS EN 755-4:1996	<i>Square bars, tolerances on dimensions and form</i>
BS EN 755-5:1996	<i>Rectangular bars, tolerances on dimensions and form</i>
BS EN 755-6:1996	<i>Hexagonal bars, tolerances on dimensions and form</i>
BS EN 755-7:1998	<i>Seamless Tubes, tolerances on dimensions and form</i>
BS EN 755-8:1998	<i>Porthole Tubes, tolerances on dimensions and form</i>
BS EN 755-9:2001	<i>Profiles Tubes, tolerances on dimensions and form</i>

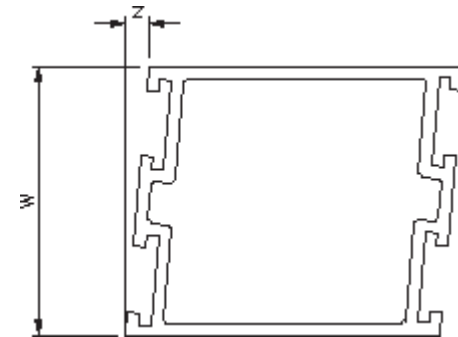
Alloys

Alloys fall into two groups:-

Group 1 6060, 6063, 6005

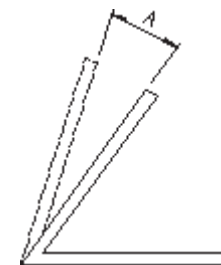
Group 2 6082

Where tolerance limits vary between alloy groups, the following tables will show the values for group 1 alloys followed by the value for group 2 alloys in brackets
eg. 0.25 (0.35)

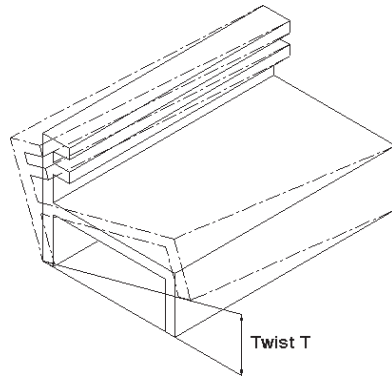


Width W		Maximum allowable Deviation Z from a right angle
Over	Up to and Including	
-	30	0.4
30	50	0.7
50	80	1.0
80	120	1.4
120	180	2.0
180	240	2.6

The maximum allowable deviation A in an angle other than 90 degrees is **1 degree**.



Twist



Width W		Twist tolerance T for Length L		
Over	Up to and including	Per 1000mm	On Total Profile Length L	
			1000 - 6000	Over 6000
-	30	1.2	2.5	3.0
30	50	1.5	3.0	4.0
50	100	2.0	3.5	5.0
100	200	2.5	5.0	7.0

Tensile strength and Hardness

Tensile Strength	"F" Value	Vickers No	Webster	6060	6063	6005	6082
300	30	105	16				
290	29	99					
280	28	96					
270	27	92	15				
260	26	88					
250	25	84					
240	24	81	14				
230	23	77	13				
220	22	73	12				
210	21	69					
200	20	65	11				
190	19	62					
180	18	58	10				
170	17	54	9				
160	16	50	8				
150	15	46	6				
140	14	42	4				
130	13	38	3				

NB. 6005 T5 value is approximate as no reference exists for it in BS EN 755-2.

Chemical Composition of Alloys

ALLOY	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	OTHERS		Al
									EACH	TOTAL	
6060	0.3-0.6	0.1-0.3	0.1	0.1	0.35-0.6	0.05	0.15	0.10	0.05	0.15	REMAINDER
6063	0.2-0.6	0.35	0.10	0.10	0.45-0.9	0.10	0.10	0.10	0.05	0.15	REMAINDER
6005	0.6-0.9	0.35	0.10	0.10	0.4-0.6	0.10	0.10	0.10	0.05	0.15	REMAINDER
6082	0.7-1.3	0.5	1.0	0.4-1.0	0.6-1.2	0.25	0.20	0.10	0.05	0.15	REMAINDER

Chemical Symbol Alloy Designations

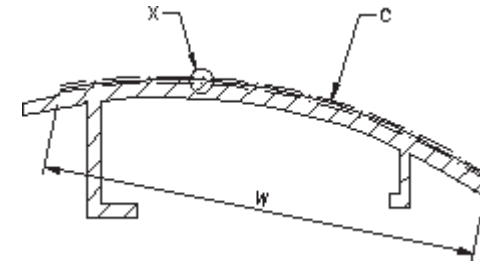
- 6060 - AlMgSi
- 6063 - AlMg0,7Si
- 6005 - AlSiMg
- 6082 - AlSi1MgMn

Corner Radii

Wall Thickness	Max allowable corner / fillet rad
up to/ including 5mm	0.8
Over 5 mm	1.5

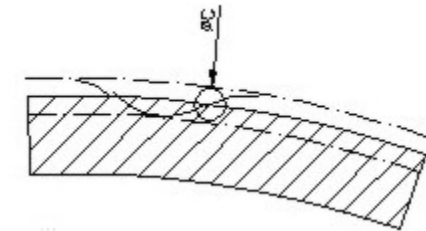
Specified Radius	Max allowable deviation
up to / including 5 mm	±0.5 mm
over 5 mm	±10%

Contour

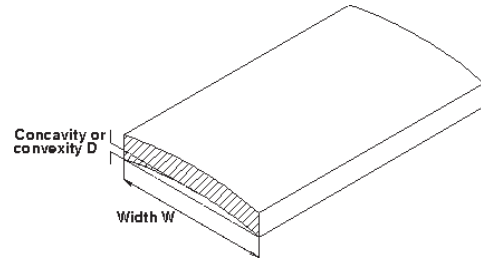


Width W of Contour		Contour Tolerance = dia C of the Tolerance Circle
Over	Upto and including	
-	30	0.3
30	60	0.5
60	90	0.7
90	120	1.0
120	150	1.2
150	200	1.5

Contour can be checked by either overlaying the profile on a 1:1 drawing or use of suitable gauges.



Convexity - Concavity



Width		Deviation F		
Over	Up to and including	Hollow Profiles		Solid Profiles
		Wall Thk<5	Wall Thk>5	
-	30	0.30	0.20	0.20
30	60	0.40	0.30	0.30
60	100	0.60	0.40	0.40
100	150	0.90	0.60	0.60
150	200	1.2	0.8	0.8

If a hollow profile has varying wall thicknesses in the measurement range, the thinnest wall thickness shall be used.

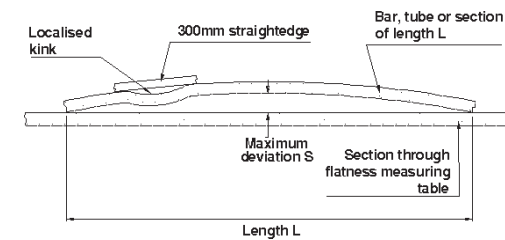
Bars and Rods Round/square/rectangular Bars

Diameter / Width Tolerances		
Diameter/width		Tolerance
Over	Up to	
8	18	0.22 (0.30)
18	25	0.25 (0.35)
25	40	0.30 (0.40)
40	50	0.35 (0.45)
50	65	0.40 (0.50)

NB. Tolerances apply only to bars of dia 8mm + greater and bars with a 10 mm flat or greater. For bars smaller than this, tolerances are by negotiation.

Straightness

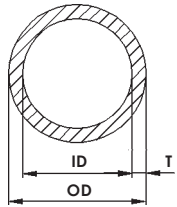
Deviations from straightness shall be measured on a horizontal flat bed so that its own mass decreases the deviation. the straightness shall not exceed 1.5 mm/m with local deviations not exceeding 0.8mm/300mm.



All other tolerances

see profile tolerances pages 7-14

Tubes



Diameter (OD or ID)		Tolerance on Diameter		
		max allowable mean deviation	max deviation from diameter	
Over	Up to and including		F	T4, T5, T6
8	18	±0.25	±0.40	±0.60
18	30	±0.30	±0.50	±0.70
30	50	±0.35	±0.60	±0.90
50	80	±0.40	±0.70	±1.1
80	120	±0.60	±0.90	±1.40

NB. Not applicable to tubes where the wall thickness is less than 2.5% of the outside dia. Tubes below this shall have the tolerance multiplied as follows.
 w/t over 2.0% up to 2.5 % of Outside Dia: 1.5 x tol
 w/t over 1.5% up to 2.0 % of Outside Dia: 2.0 x tol
 w/t over 1.0% up to 1.5 % of Outside Dia: 3.0 x tol
 w/t over 0.5% up to 1.0 % of Outside Dia: 4.0 x tol

Nominal Wall Thickness t mm		Max deviation of Wall Thickness at any Point
Over	Up to and including	
0.5	2	±7%
2	3	±6%
3	-	±5%

Length

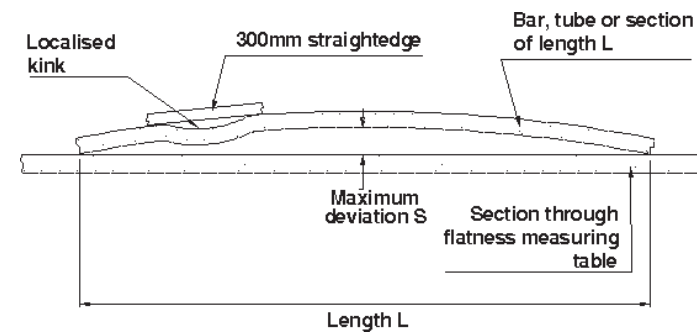
Circumscribing Circle Diameter CD		Tolerances on fixed Length L		
Over	Up to and including	L < 2000	L 2000-5000	L 5000-10000
-	100	+5 -0	+7 -0	+10 -0
100	200	+9 -0	+12 -0	+18 -0

Squareness of Cut

The squareness of cut ends shall be within half of the cut length tolerance ie for a fixed length tolerance of ± 10 the squareness of cut shall be within 5mm.

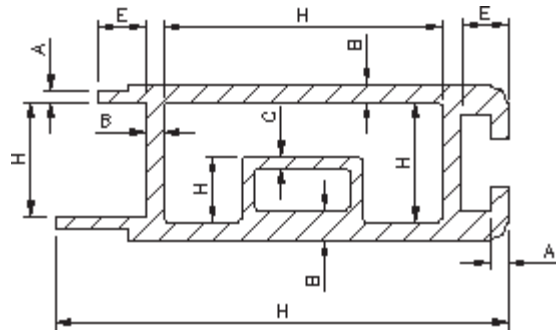
Straightness

Deviations from straightness shall be measured on a horizontal flat bed so that its own mass decreases the deviation. the straightness shall not exceed 1.5 mm/m with local deviations not exceeding 0.6mm/300mm.

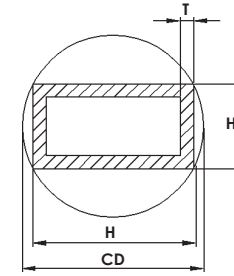


Wall Thickness Tolerances

Nominal Wall Thickness A,B, or C		Tolerances on wall thickness (Figures in brackets relate te to 6082)					
		Wall thickness A		Wall thickness B		Wall thickness C	
Over	Up to and including	CD < 100	CD >= 100	CD < 100	CD >= 100	CD < 100	CD >= 100
-	1.5	±0.15 (0.2)	±0.20 (0.25)	±0.20 (0.30)	±0.30 (0.40)	±0.25 (0.35)	±0.35 (0.50)
1.5	3	±0.15 (0.25)	±0.25 (0.30)	±0.25 (0.35)	±0.40 (0.50)	±0.30 (0.45)	±0.50 (0.65)
3	6	±0.20 (0.30)	±0.30 (0.35)	±0.40 (0.55)	±0.60 (0.70)	±0.50 (0.60)	±0.75 (0.90)
6	10	±0.25 (0.35)	±0.35 (0.45)	±0.60 (0.75)	±0.80 (1.0)	±0.75- (1.0)	±1.0 (1.3)
10	15	±0.30 (0.40)	±0.40 (0.50)	±0.80 (1.0)	±1.0 (1.3)	±1.0 (1.3)	±1.2 (1.7)



Tubes Non round Tubes



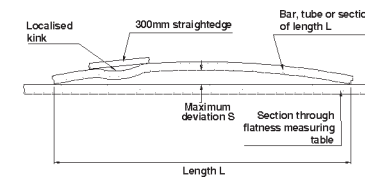
Width, Depth or width across flats.		Tolerance on H for Circumscribing Circle Diameter CD (figures in brackets refer to 6082)		
Over	Up to and including	CD up to 100	CD between 100 and 200	CD between 200 and 300
-	10	±0.25 (0.40)	±0.30 (0.50)	±0.35 (0.55)
10	25	±0.30 (0.50)	±0.40 (0.70)	±0.50 (0.80)
25	50	±0.50 (0.80)	±0.60 (0.90)	±0.80 (1.0)
50	100	±0.70 (1.0)	±0.90 (1.20)	±1.10 (1.3)
100	150	-	±1.10 (1.50)	±1.30 (1.7)
150	200	-	±1.30 (1.90)	±1.50 (2.2)

NB. Not applicable to tubes where the wall thickness is less than 2.5% of the outside dia. Tubes below this shall have the tolerance multiplied as follows.

w/t over 2.0% up to 2.5 % of Outside Dia: 1.5 x tol
w/t over 1.5% up to 2.0 % of Outside Dia: 2.0 x tol
w/t over 1.0% up to 1.5 % of Outside Dia: 3.0 x tol
w/t over 0.5% up to 1.0 % of Outside Dia: 4.0 x tol

Straightness

Deviations from straightness shall be measured on a horizontal flat bed so that its own mass decreases the deviation. the straightness shall not exceed 1.5 mm/m with local deviations not exceeding 0.8mm/300mm.



Profile Tolerances

General

Tolerances on dimensions listed below are specified in the following tables

A: wall thicknesses except those enclosing hollow spaces

B: wall thicknesses enclosing hollows, except those between two hollow spaces

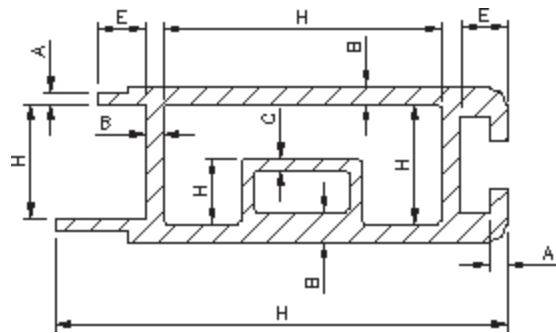
C: wall thicknesses between two hollow spaces.

E: the length of the shorter leg of profiles with open ends.

H: all dimensions except wall thicknesses.

see diagram below

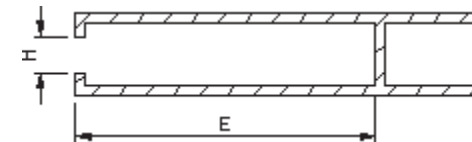
Note: tolerances on open ended sections require the values from two tables to be added together.



Tolerances on Cross sectional Dimensions of Solids and Hollows.

Dimension H		Tolerance on H for Circumscribing Circle Diameter CD (figures in brackets refer to 6082)		
Over	Up to and including	CD up to 100	CD between 100 and 200	CD between 200 and 300
-	10	±0.25 (0.40)	±0.30 (0.50)	±0.35 (0.55)
10	25	±0.30 (0.50)	±0.40 (0.70)	±0.50 (0.80)
25	50	±0.50 (0.80)	±0.60 (0.90)	±0.80 (1.0)
50	100	±0.70 (1.0)	±0.90 (1.20)	±1.10 (1.3)
100	150	-	±1.10 (1.50)	±1.30 (1.7)
150	200	-	±1.30 (1.90)	±1.50 (2.2)

For profiles with open ends, the values in the above table shall be increased by the value in the table below for the open end dimensions.



Dimension E		Additions to tolerances on H for dimensions across open ends
Over	Up to and including	
-	20	-
20	30	±0.15
30	40	±0.25
40	60	±0.40
60	80	±0.50
80	100	±0.60
100	125	±0.80
125	150	±1.0
150	180	±1.2
180	210	±1.4