

# Aluminum Extrusion Types and Parts Selection

# Aluminum Extrusion Tolerance Data

## Aluminum Extrusion Types and Characteristics

	HFS Series	HFSL Series	EFS Series	NFS (NEFS, NFSL) Series	GFS Series	SLF Series
Photo						
Material	A6N01SS-T5	A6N01SS-T5	A6N01SS-T5	A6063S-T5	A6061SS-T6 Equivalent	A6063SS-T5
Features	Standard cross section shape.	Lightweight and economical extrusions. Suitable for use when light weight and economical price are given priority over strength.	Have rigidity equivalent to HFS Series yet lighter and more economical.	Material change to A6063S-T5 led to significant price reduction. The Cross Section Shape and Cross Sectional Moment of Inertia are the same as those of HFS, HFSL and EFS Series. Stress and tensile strength decrease due to material change. The color may vary slightly.*	These thick extrusions offer high rigidity and are suitable for use in high load.	Has 4 slotless flat enclosures. Excels in sanitary control since dust is not collected in slots. Various accessories for aluminum extrusions can be utilized by combining with Slot Type (SLFT6-4040, etc.)
Surface Treatment	Clear Anodize (HFS) Black Anodize (HFSB) Clear Coating (CAF) Baked Paint (Yellow) (HFSY)	Clear Anodize Black Anodize	Clear Anodize (EFS) Black Anodize (EFSB)	Clear Anodize Black Anodize	Clear Anodize	Clear Anodize
Representative Product	HFS8-4040	HFSL8-4040	EFS8-4040	NFS5-2020 (Different Material of HFS5-2020) NFS8-4040 (Different Material of EFS8-4040) NFSL6-3030 (Different Material of HFSL6-3030)	GFS8-100100	SLF6-4040 (No Slot Type) SLFC6-4040 (1 Slot Type)

\* Aluminum extrusion colors may slightly vary depending on the materials.

## Aluminum Extrusions Connection Method

Connection Method	Bracket Connection	Blind Joint Connection	Blind Brackets Connection	Screw Connection	SLF Series Connection
Connection Examples					
Features	The standard and economical connection method. Cover plates can be mounted by adding taps on the brackets.	A connection method that produces clean corners. Suitable for sections where equipment is loaded and unloaded or doors are to be mounted. Note that alterations are required to the extrusions, and available for limited extrusion models only. For applicable extrusions, see each product page. P.551, 601, 659, 705	Brackets are hidden inside of slots producing clean corners. Alterations are not required. However, allowable load is smaller than that of bracket connections.	Connections only with screws can be achieved by applying tapping and counterbore alterations on the extrusions.	• Connection with dedicated joints • Screw Connection See "Features of SLF Series" for details. P.725
Representative Product	HBLFNS6, HBLTS6, etc.	HCJ6, HMJ6, etc.	HBLBS6, HABLBS6, etc.	-	-

## Selection of Related Parts

Numbers of applicable related parts are decided at the time of selecting aluminum extrusions. When selecting related parts, see No. as reference.

(Ex.) When assembling with HFS6-3030 aluminum extrusions of 6 series

<b>Brackets</b> HBLFNS6 HBLTS6 or Others	<b>Blind Brackets</b> <b>Blind Joint</b> HBLBS6 HSJ6 or Others	<b>Nut</b> HNTT6-Tapped Hole Dia. HNTAT6-Tapped Hole Dia. or Others
<b>Extrusion End Caps and Covers</b> HFC6-3030-Color HSCA6-Color or Others	<b>Casters and Leveling Mounts</b> HAJPS6 HCFT6-60 or Others	<b>Door Parts</b> HHPSN6 HMGN6 or Others
	<b>Other Accessories</b> HFCC6 LCSA6-Shaft Hole Dia. or Others	

Many products can be used for both 8 series and 8-45 series.

Pre-Assembly Insertion Nut HNTT8-8

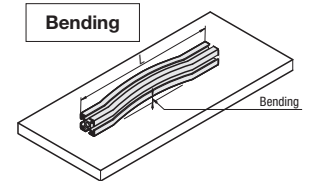
- It can be used with 8 series.
- It can be used with 8-45 series.

Various related parts can be installed to the aluminum extrusion structure according to the usage.

## Aluminum Extrusion JIS Standards

### Bend Tolerance (Special Grade)

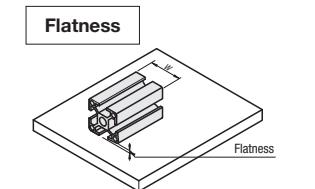
Diameter of Circumscribed Circle mm	Unit: mm		
	Minimum Thickness mm	Per Arbitrary Section of 300mm Length	per Full Length (L) mm
38 or less	2.4 or less	1.3 or less	$1.3 \times \frac{L}{300}$ or Less
	Over 2.4	0.3 or less	$0.3 \times \frac{L}{300}$ or Less
Over 38 to 300 or less	-	0.3 or less	$0.3 \times \frac{L}{300}$ or Less
Over 300	-	0.5 or less	$0.5 \times \frac{L}{300}$ or Less



Note: \* Given values are for extrusions placed on flat surfaces with minimized bends by own weight.  
\* When the overall length is not an integral multiple of 300mm, determine the tolerance by rounding up the remainder length to 300mm.

### Flatness Tolerance

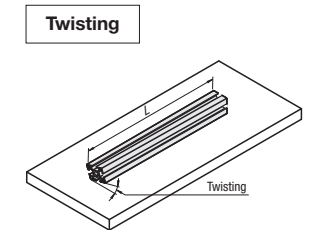
Shape Type	Unit: mm		
	General Shape	Hollow Shape	
Minimum Thickness of Measurement Point Width	-	4.7mm or Less	Over 4.7mm
25mm or Less	0.10 or less	0.15 or less	0.10 or less
Over 25mm	0.004xW or Less	0.006xW or Less	0.004xW or Less
Per Arbitrary Section of 25mm Width	0.10 or less	0.15 or less	0.10 or less



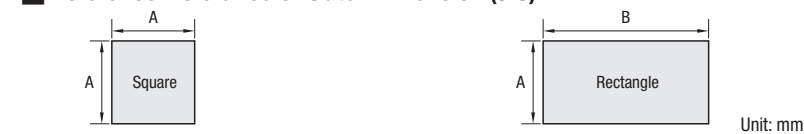
Note: Not Applicable to the plane including open section.

### Twist Tolerance

Diameter of Circumscribed Circle mm	Unit: degree	
	Per Arbitrary Section of 300mm Length	per Full Length (L) mm
38 or less	1 or less	$1 \times \frac{L}{300}$ or Less; However, Max. Value is 7
Over 38 to 76 or less	1/2 or less	$\frac{1}{2} \times \frac{L}{300}$ or Less; However, Max. Value 5
Over 76	1/4 or less	$\frac{1}{4} \times \frac{L}{300}$ or Less; However, Max. Value 3



### Reference: Tolerance of Outer Dimension (JIS)



Outer Dimension Tolerance (JIS)	Unit: mm		
	A Dimension	A Dimension	B Dimension
HFS5-2020	±0.41	HFS5-2040	±0.41
HFS5-4040	±0.54	HFS6-3060	±0.54
HFS6-3030	±0.86	HFS8-4080	±0.86
HFS6-6060	±0.86	HFS8-4590	±0.60
HFS8-4040	±0.54		
HFS8-8080	±0.86		
HFS8-4545	±0.60		
HFS8-9090	±0.86		

\*MISUMI Aluminum Extrusions are within JIS dimension tolerance above.




### Mechanical Properties of Aluminum Extrusions

Series	JIS Standard (Reference)		Actual Measurement	JIS Standard (Reference)
	HFS Series	GFS Series		
Material (JIS Symbol)	A6N01SS-T5	A6061SS-T6 Equivalent		A6063S-T5
Tensile Strength (N/mm <sup>2</sup> )	245 or more	265 or more	278	155 or more
Proof Stress (N/mm <sup>2</sup> )	205 or more	245 or more	247	110 or more
Longitudinal Elastic Modulus (N/mm <sup>2</sup> )	69972	69972		69972
Brinell Hardness (HB)	88	88		88
Surface Treatment	Anodize 9µm or more	Anodize 9µm or more		Anodize 9µm or more

# Accessories for Aluminum Extrusions - Overview

## Types of Accessories

A wide variety of products for various applications of Aluminum Extrusions are available.

Type	Usage	Product Photo	Mounting Example	Features Major Products	Page
Slot Covers	Covers			Mounted on the extrusion slot to prevent dust from being collected in the slot. Major Products: Slot Covers, Protection Covers	P.773
Additional Functional Accessories	Conveyance			Conveyance System can be constructed without alterations for extrusions. Major Products: Conveyor Rollers, Plastic Covers	P.777
	Small Products			Cables surrounding aluminum extrusions can be easily handled. Major Products: Cable Clamps, Cable Covers	P.781
Booths Components	Lighting			Dedicated lighting for aluminum extrusion frames. Can be mounted on extrusion slots. Major Products: LED Line Lights	P.784
	Panel Fixing			Prevents a looseness of the panel. Selectable from various products depending on applications. Major Products: Panel Brackets, Panel Clamps	P.785
	Sliding Components			Simple partitions such as curtains, etc. and those related components. Major Products: Curtains, Sliders for Aluminum Extrusions	P.792
	Sliding Door			Pulley enables smooth sliding of the door. Major Products: Aluminum Extrusions for Sliding Doors	P.795
Handles & Footings	Clean Room Equipment			Can be used for ventilation of clean rooms, etc. Major Products: HEPA Filter, ULPA Filter	P.799
	Handles / Hinges Door Parts			Components for Hinged Doors. A wide variety of products are available. Major Products: Hinges, Magnetic Catches, Locks, Handles	P.805
Others	Caster Leveling Mounts Pad			Components for Footings. A wide variety of products are available. Major Products: Foot Bases, Casters, Leveling Mounts	P.831
				Tools for repair, machining and assembly of aluminum extrusions. Major Products: Repair Pen for Aluminum Extrusions, Fixtures	P.846

## App. Examples of Accessories

