



METRIC DIMENSION SPECIFICATIONS

The difference between JIS, DIN, ASME, & EN Metric Hex Flange Screws & Nuts

Understanding Metric Hex Flange Dimensional Standards

Understanding the dimensional standards that metric sizes of hex flange screws and hex flange nuts can be made to is not as simple as the dimensional standards to which we make our inch (also called Imperial) sizes of flange products. When we are dealing with inch size product (ex: 5/8 - 11 x 1 1/2 Hex Flange Bolt, Grade 8, Plain) we can be confident that our customer is looking for a hex flange screw that is made to the dimensional standard of ASME B18.2.1 (also listed in IFI-111).

When you are dealing with metric products, it becomes a little more complicated. When a customer requests a metric size (ex: M10 x 1.5 x 50 Flange Bolt, Property Class 10.9, Plain) we often have to ask, "Is there a dimensional standard that you need these to meet?"

There are five main standards organizations that specify the dimensions for metric sizes of hex flange screws and flange nuts:

ANSI - American National Standards Institute and/or ASME - American Society of Mechanical Engineers

ASME B18.2.3.4M Metric Hex Flange Screws
ASME B18.2.3.9M Metric Heavy Hex Flange Screws
ASME B18.2.4.5M Metric Flange Nuts

DIN - German Industrial Standards

DIN 6921 Metric Hex Flange Bolts
DIN 6923 Metric Hexagon Nuts with Flange

ISO - International Standards Organization

ISO 4162 Hexagon Flange Bolt - Small Series
ISO 4161 Hexagon Nuts with Flange

JIS - Japanese Industrial Standards

JIS B1189 Metric Hex Flange Bolts
JIS B1190 Metric Flange Nuts

EN - European Norm (EU standards)

EN 1662 Metric Hex Flange Bolts - Small Series
EN 1665 Metric Flange Bolts
EN 1661 Metric Flange Nut

*The dimensional requirements for these five organizations can vary depending on the diameter you are dealing with.

"Is there a dimensional standard that **you** need these to meet?"

A couple of things to remember when dealing with metric flange bolts and nuts are:

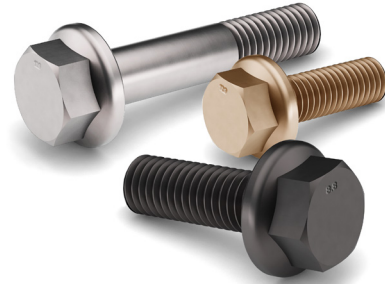
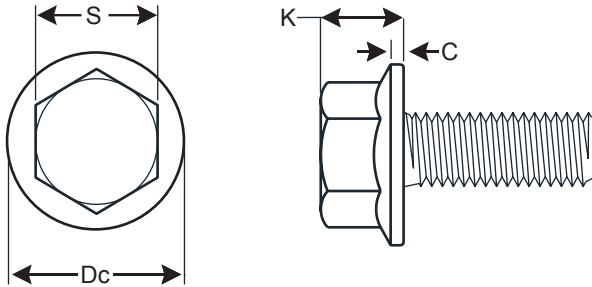
The threads are the same no matter which standards organization the parts are made from. A JIS B1190 M8 x 1.25 Flange Nut will assemble onto an M8 x 1.25 x 10 Flange Bolt made to DIN 6921.

The strength levels are the same for all of these standards organizations. A property class 10.9 flange bolt made to ASME B18.2.3.9M is the same strength as a 10.9 flange bolt made to EN 1641. A property class 10 flange nut made to ISO 4162 will be strong enough to properly assemble a property class 10.9 flange bolt made to DIN 6921.

The main difference you can run into is that the width across the flats (the wrench size needed to assemble the nut or screw) can be different between these different dimensional standards.

The tables on the following pages will give you a quick reference as to the differences and similarities of flange products that are made to these standards.

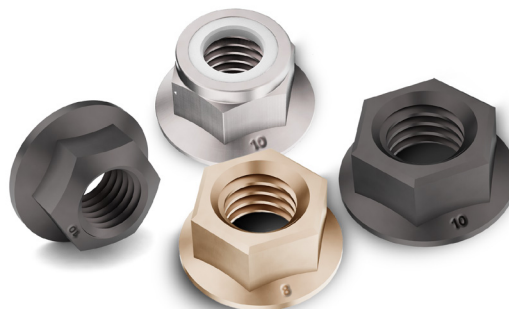
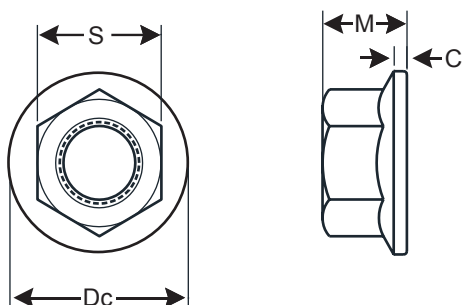
Metric Hex Flange Screws



DIAMETER	M5	M6	M8	M10	M12	M14	M16	M20
Width Across Flats - S (Max)								
ASME B18.2.3.4M	7	8	10	13	15	18	21	*
ASME B18.2.3.9M	8	10	13	15	18	21	24	30
DIN 6921	8	10	13	15	16	18	21	27
ISO 4162	7	8	10	13	15	18	21	*
JIS B1189-2005	8	10	12	14	17	19	22	*
EN 1662	7	8	10	13	15	18	21	*
EN 1661	8	10	13	16	18	21	24	30
Flange Diameter - Dc (max)								
ASME B18.2.3.4M	11.4	13.6	17.0	20.8	24.7	28.6	32.8	*
ASME B18.2.3.9M	11.8	14.2	18.0	22.3	26.6	30.5	35.0	43.0
DIN 6921	11.8	14.2	18.0	22.3	26.6	30.5	35.0	43.0
ISO 4162	11.4	13.6	17.0	20.8	24.7	28.6	32.8	*
JIS B1189-2005	12.0	14.0	17.5	21.0	25.0	29.0	33.0	*
EN 1662	11.4	13.6	17.0	20.8	24.7	28.6	32.8	*
EN 1665	11.8	14.2	18.0	22.3	26.6	30.5	35.0	43.0
Head Height - K (max)								
ASME B18.2.3.4M	5.6	6.9	8.5	9.7	12.1	12.9	15.2	*
ASME B18.2.3.9M	5.8	6.6	8.1	10.4	11.8	13.7	15.4	18.9
DIN 6921	5.4	6.6	8.1	9.2	11.5	12.8	14.4	17.1
ISO 4162	5.6	6.8	8.5	9.7	11.9	12.9	15.1	*
JIS B1189-2005	5.0	6.0	8.0	10.0	11.5	13.5	15.0	*
EN 1662	5.6	6.9	8.5	9.7	12.1	12.9	15.2	*
EN 1665	5.8	6.6	8.1	10.4	11.8	13.7	15.4	18.9
Flange Thickness - C (min)								
ASME B18.2.3.4M	1.0	1.1	1.2	1.5	1.8	2.1	2.4	*
ASME B18.2.3.9M	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0
DIN 6921	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0
ISO 4162	1.0	1.1	1.2	1.5	1.8	2.1	2.4	*
JIS B1189-2005	0.7	0.8	1.1	1.2	1.4	1.6	1.8	*
EN 1662	1.0	1.1	1.2	1.5	1.8	2.1	2.4	*
EN 1665	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0

*Dimensions for this size are not listed in spec.

Metric Hex Flange Nuts



DIAMETER	M5	M6	M8	M10	M12	M14	M16	M20
Width Across Flats - S (max)								
ASME B18.2.4.4M	8	10	13	15	18	21	24	30
DIN 6923	8	10	13	15	18	21	24	30
ISO 4161	8	10	13	15	18	21	24	30
JIS B1190-1987	8	10	12	14	17	19	22	*
EN 1661	8	10	13	16	18	21	24	30
Flange Diameter - Dc (max)								
ASME B18.2.4.4M	11.8	14.2	17.9	21.8	26.0	29.9	34.6	42.8
DIN 6923	11.8	14.2	17.9	21.8	26.0	29.9	34.5	42.8
ISO 4161	11.8	14.2	17.9	21.8	26.0	29.9	34.5	42.8
JIS B1189-1987	12.0	14.0	17.5	21.0	25.0	29.0	33.0	*
EN 1661	11.8	14.2	17.9	21.8	26.0	29.9	34.5	42.8
Nut Height - M (max)								
ASME B18.2.4.4M	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
DIN 6923	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
ISO 4161	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
JIS B1190-1987	5.0	6.0	8.0	10.0	11.5	13.5	15.0	*
EN 1661	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
Flange Thickness - C (min)								
ASME B18.2.4.4M	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0
DIN 6923	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0
ISO 4161	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0
JIS B1190-1987	0.7	0.8	1.1	1.2	1.4	1.6	1.8	*
EN 1661	1.0	1.1	1.2	1.5	1.8	2.1	2.4	3.0

*Dimensions for this size are not listed in spec.