Choosing The Correct Size Wrench

HexSizer®
Makers of the Heavy Hex Gauge™

Training Objectives

1. Explain the challenges of sizing heavy hex nuts/bolts using traditional methods.
2. Correctly identify nut and stud sizes using the HexSizer® Heavy Hex Gauge™.
3. Distinguish between nominal, minimum, and actual ASME size tolerances.
4. Apply the tool during job walks, maintenance, and shutdown scenarios.
5. Reduce downtime, errors, and safety risks, selecting the correct size tools first time.

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Module 1:

Introduction to Heavy Hex Fasteners

- Overview of ASME 18.2.2 standards (inch & metric)
- Difference between standard, heavy hex, and SAE hex nuts
- Importance of correct sizing in industrial bolting
- Case study: cost of downtime when the wrong socket is brought to the job

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There are standard sizes set by ASME

ASME 18.2.2

Note that there is a Min and Max size.

Nominal Size	Basic Major Diameter of Thread	Width Across Flats, *F* [Note (1)]			Width Across Corners, *G* [Note (2)]		Thickness Heavy Hex Nuts, *H*			Thickness H Hex Jam Nut	
		Basic	Min.	Max.	Min.	Max.	Basic	Min.	Max.	Basic	Min.
1/4	0.2500	1/2	0.488	0.500	0.556	0.577	15/64	0.218	0.250	11/64	0.156
5/16	0.3125	9/16	0.546	0.562	0.622	0.650	19/64	0.280	0.314	13/64	0.186
3/8	0.3750	11/16	0.669	0.688	0.763	0.794	23/64	0.341	0.377	15/64	0.216
7/16	0.4375	3/4	0.728	0.750	0.830	0.866	27/64	0.403	0.441	17/64	0.247
1/2	0.5000	7/8	0.850	0.875	0.969	1.010	31/64	0.464	0.504	19/64	0.277
9/16	0.5625	15/16	0.909	0.938	1.037	1.083	35/64	0.526	0.568	21/64	0.307
5/8	0.6250	1 1/16	1.031	1.062	1.175	1.227	39/64	0.587	0.631	23/64	0.337
3/4	0.7500	1 1/4	1.212	1.250	1.382	1.443	47/64	0.710	0.758	27/64	0.398
7/8	0.8750	1 7/16	1.394	1.438	1.589	1.660	55/64	0.833	0.885	31/64	0.458
1	1.0000	1 5/8	1.575	1.625	1.796	1.876	63/64	0.956	1.012	35/64	0.519
1 1/8	1.1250	1 13/16	1.756	1.812	2.002	2.093	1 7/64	1.079	1.139	39/64	0.579
1 1/4	1.2500	2	1.938	2.000	2.209	2.309	1 7/32	1.187	1.251	23/32	0.687
1 3/8	1.3750	2 3/16	2.119	2.188	2.416	2.526	1 11/32	1.310	1.378	25/32	0.747
1 1/2	1.5000	2 3/8	2.300	2.375	2.622	2.742	1 15/32	1.433	1.505	27/32	0.808
1 5/8	1.6250	2 9/16	2.481	2.562	2.828	2.959	1 19/32	1.556	1.632	29/32	0.868

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Who sets the standard sizes?

Common Sizes - SAE

Heavy Hex - ASME

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Heavy Hex Size Nuts & Glove

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Q: Importance of correct sizing in industrial bolting?
A: To show up with the correct size tools.

Common Sizes - SAE

- One person working by themselves.
- Usually the work is in inert surroundings.
- Stopping work doesn't affect others.
- Usually no real time-line to adhere to.
- Down time doesn't equal lost revenue.

Heavy Hex - ASME

- Technicians work in pairs with additional support staff.
- Stopping the job to go back to the shop will stop the work of others.
- The time-line is breached.
- Downtime costs the plant!

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Q: Importance of correct sizing in industrial bolting?
A: To show up with the correct size tools.

Common Sizes - SAE

Heavy Hex - ASME

How much is minute of downtime worth?

Near me is the Chevron El Segundo Refinery that according to Google, primarily produces transportation fuels: gasoline, jet fuel, and diesel. It also produces other products like fuel oils, petroleum coke, and LPG. The refinery has a capacity of 290,000 barrels of crude oil per day and is a major supplier of transportation fuels in Southern California.

- **290,000 × today's gas price (daily revenue) = $A**
- **$A (daily revenue) ÷ 24 = hourly revenue**
- **Hourly revenue ÷ 60 = revenue per minute**

How many minutes does it take for you to drive back to the shop and pick up the correct socket?

Revenue per minute × minutes to and from the shop = $ _____

Trust me, someone is looking at that number!

Module 2:

The Problem with Traditional Measurement (Demonstration)

Hands-on:

Attempting “across-the-flats” measurement with a stud in place

Discussion:

Tolerance ranges and why a 2” nut may measure 1.938”

Interactive:

Guessing nut size with calipers or tape, then comparing to actual standard

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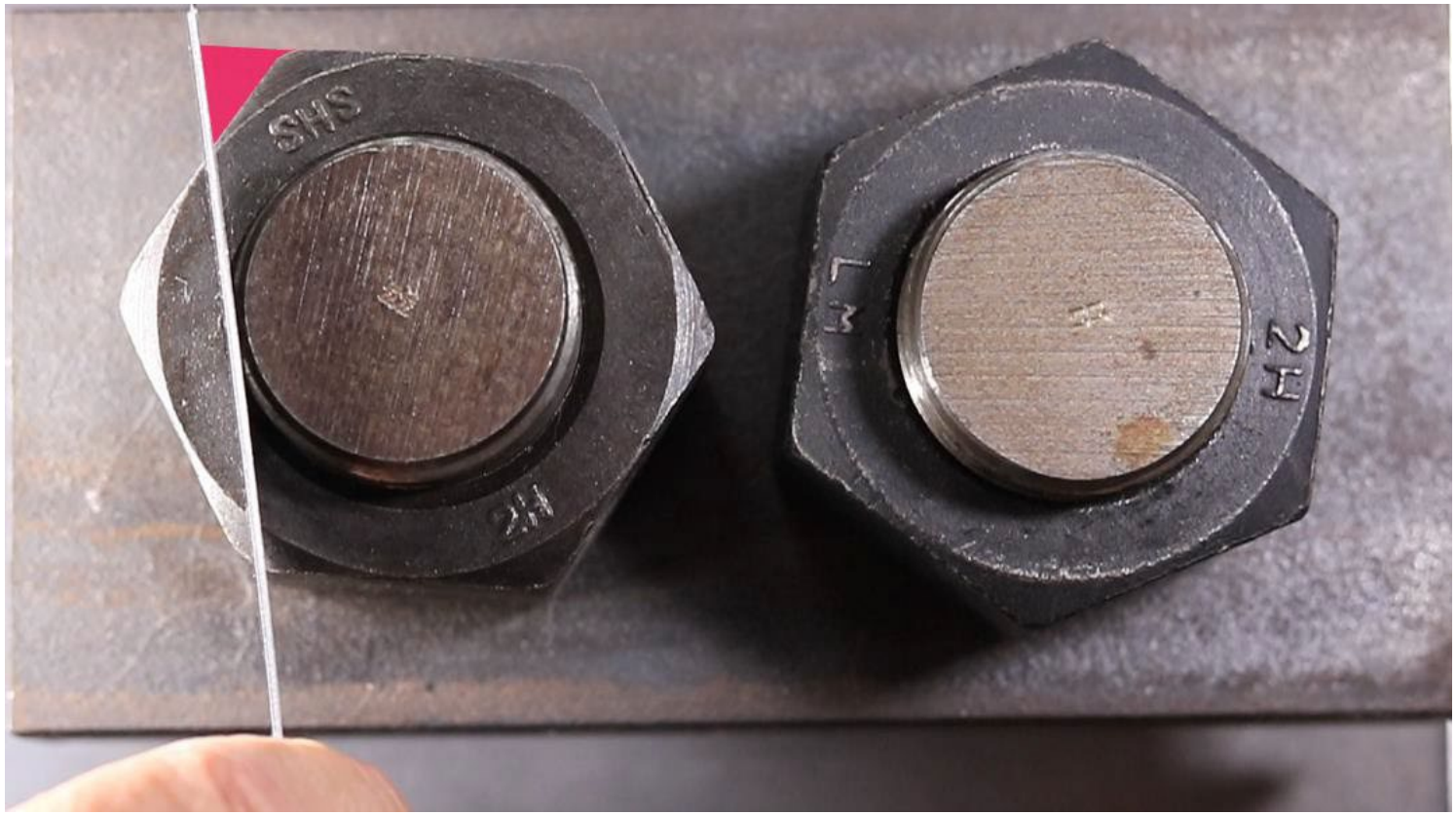
I can’t measure across both flats?



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I can’t measure across both flats?

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The stud is in the way?

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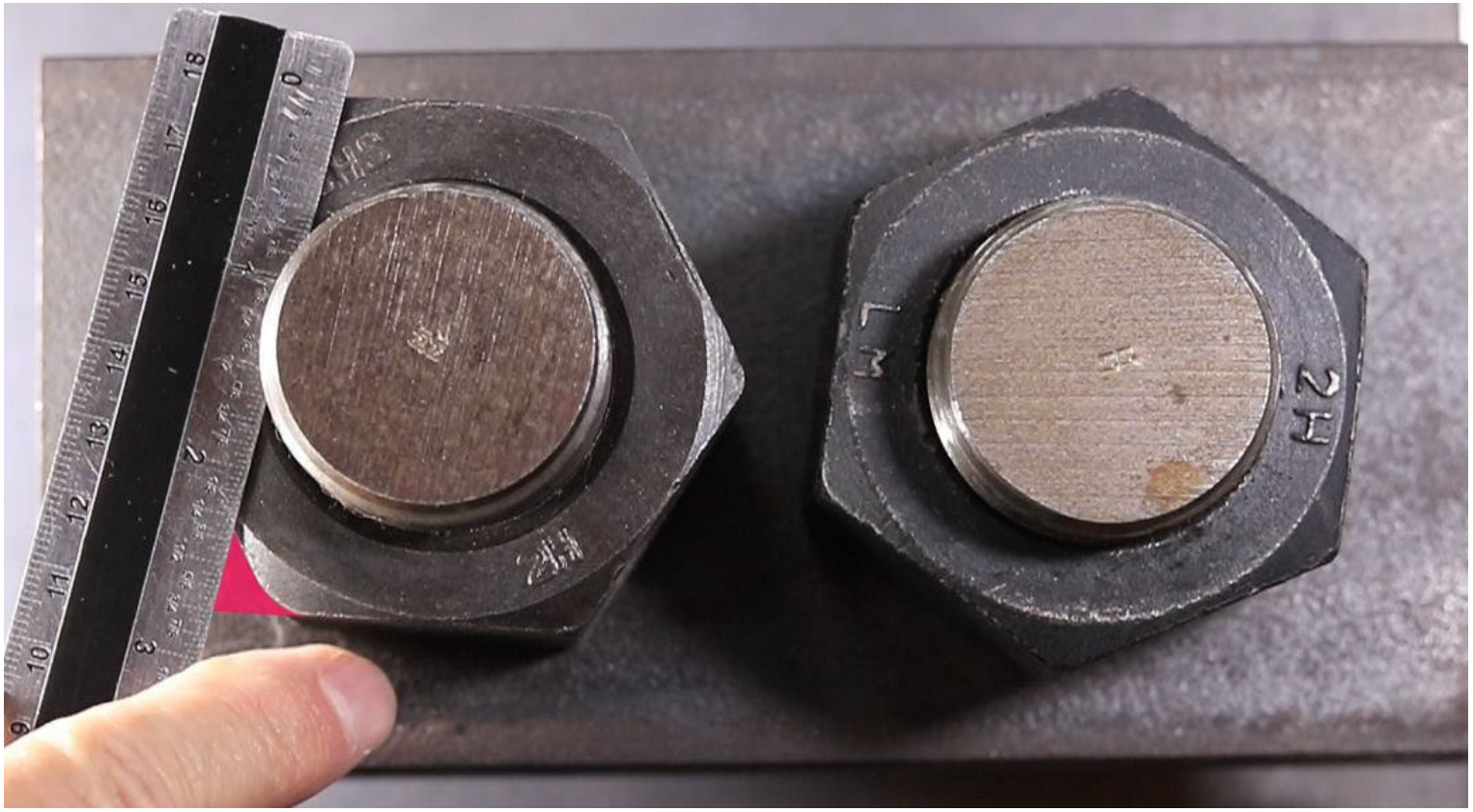
The stud is in the way?



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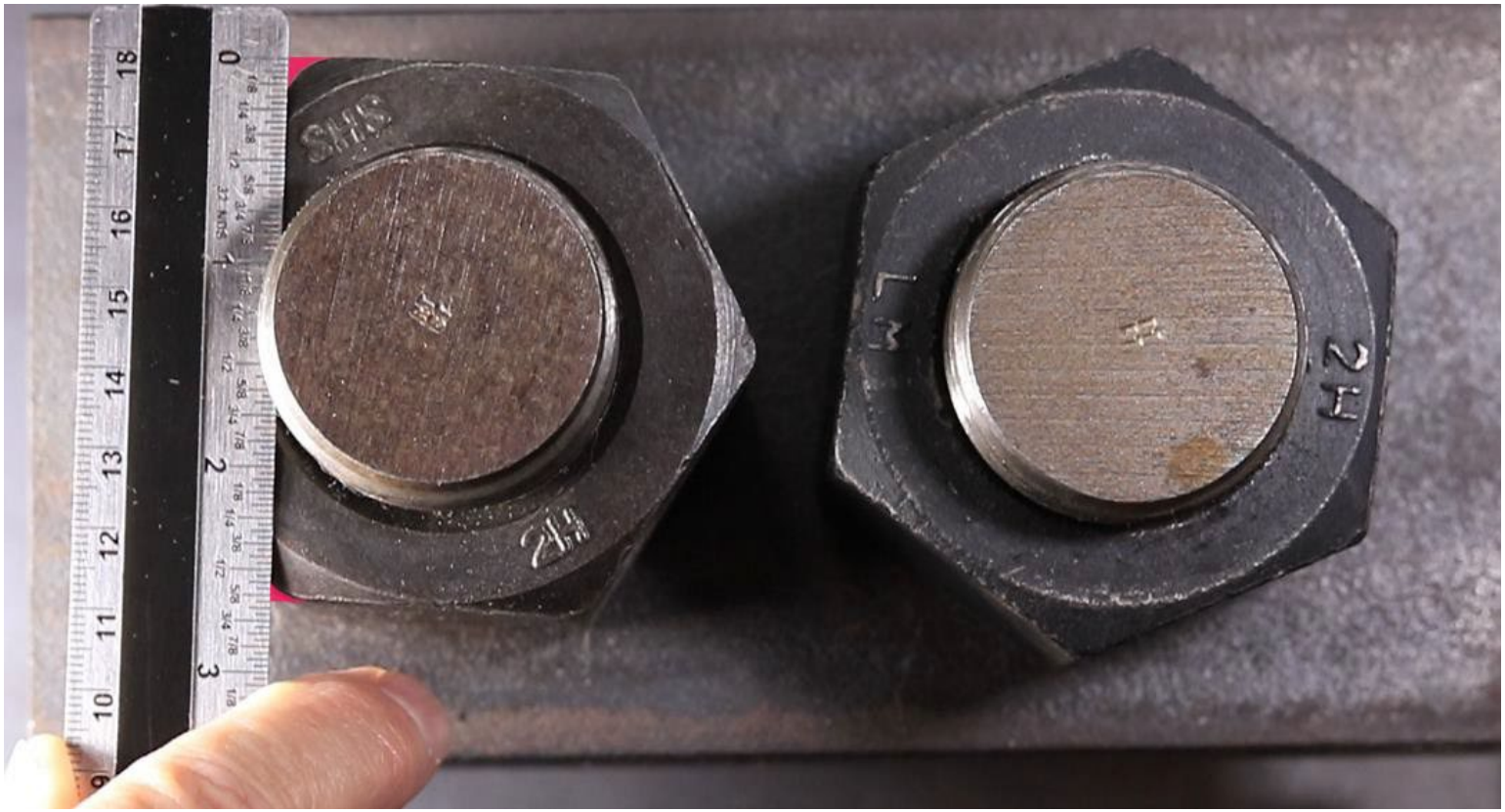
I’ll try resting my rule in the middle.



Try this: Guess what size this is?

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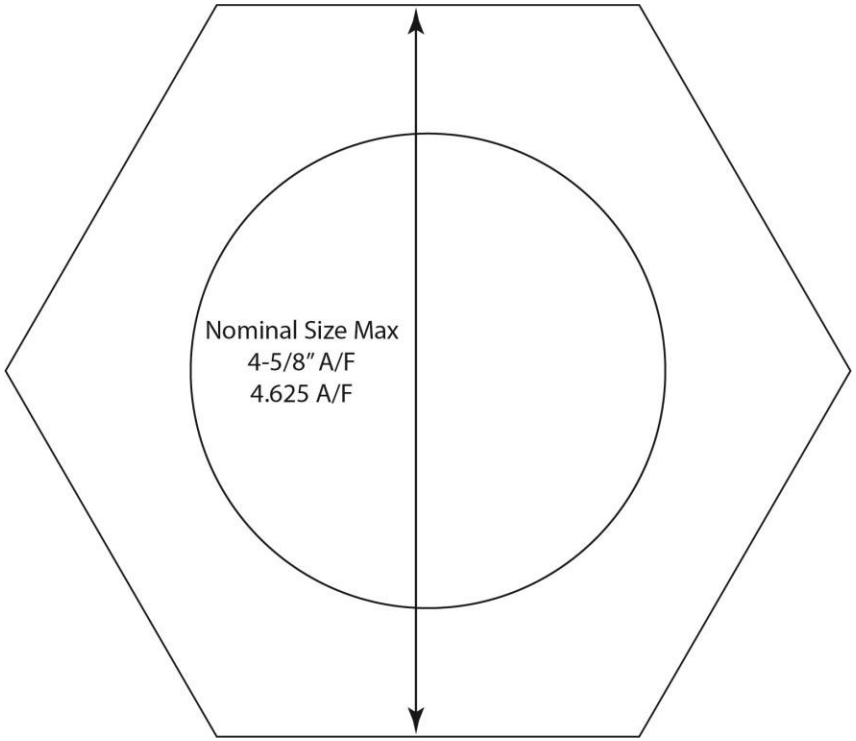
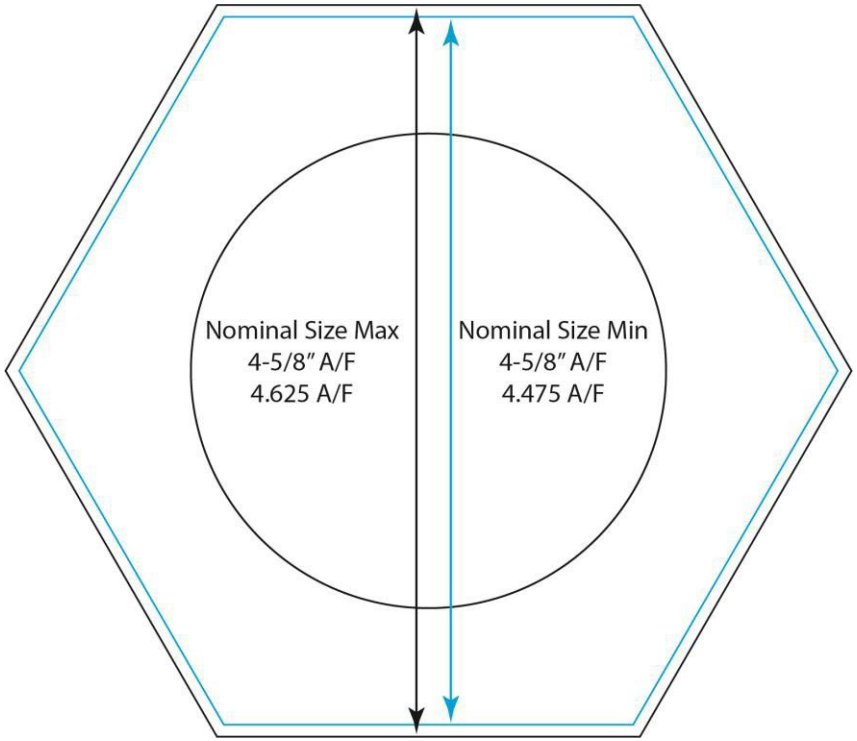
How much difference does the **min** and **max** size make?





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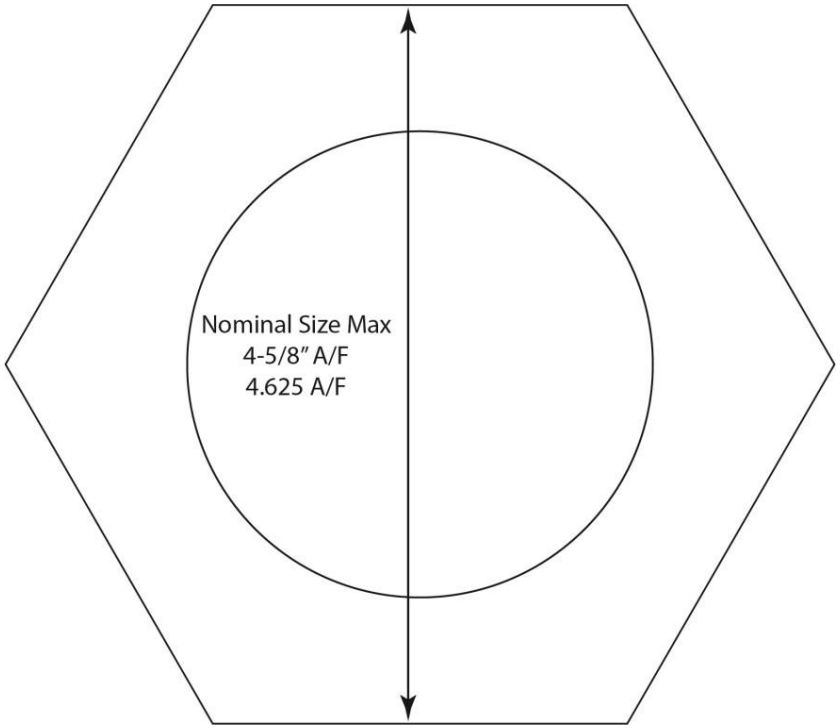
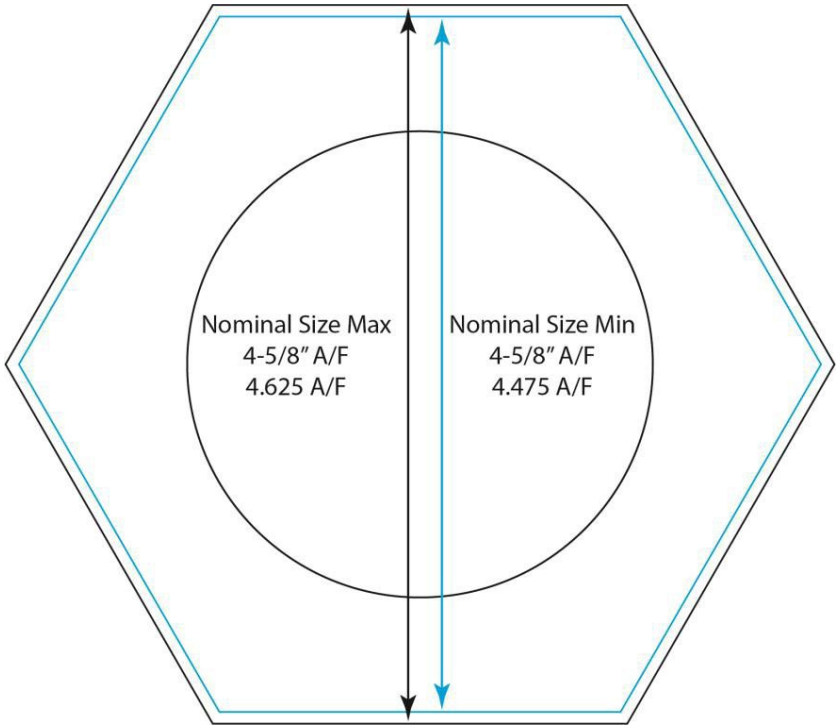
It’s close. But this is not the correct size!

Supposed to be 4-5/8” (4.625)



But I measure 4-31/64” (4.475)



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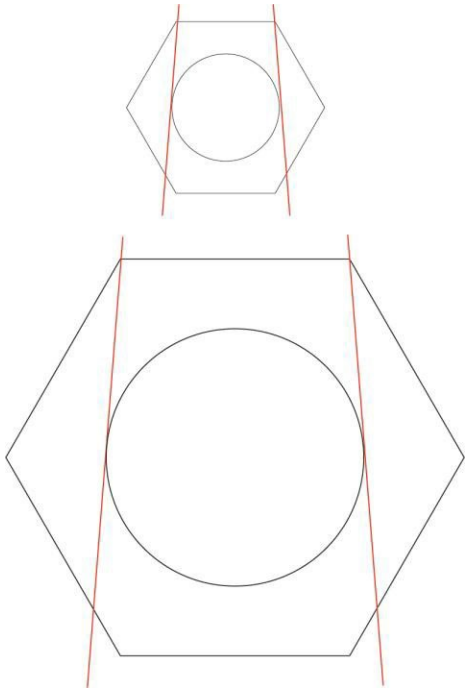
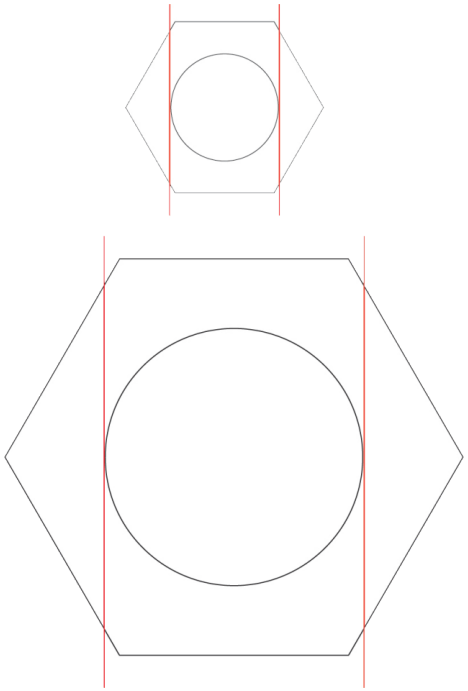
So I look for a workaround.

Can’t measure across the flats.



The stud gets in the way.



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Module 3:

Introducing the HexSizer® (Tool Familiarization)

Parts of the HexSizer®

- Nut measurement (single flat method)
- Stud size gauge
- Thread pitch gauge (if included in kit)

Materials & durability (anodized 6061 aluminum, heat resistance)

Storage methods (lanyard, wallet, tool pouch)

Measure the nut to get the wrench size.

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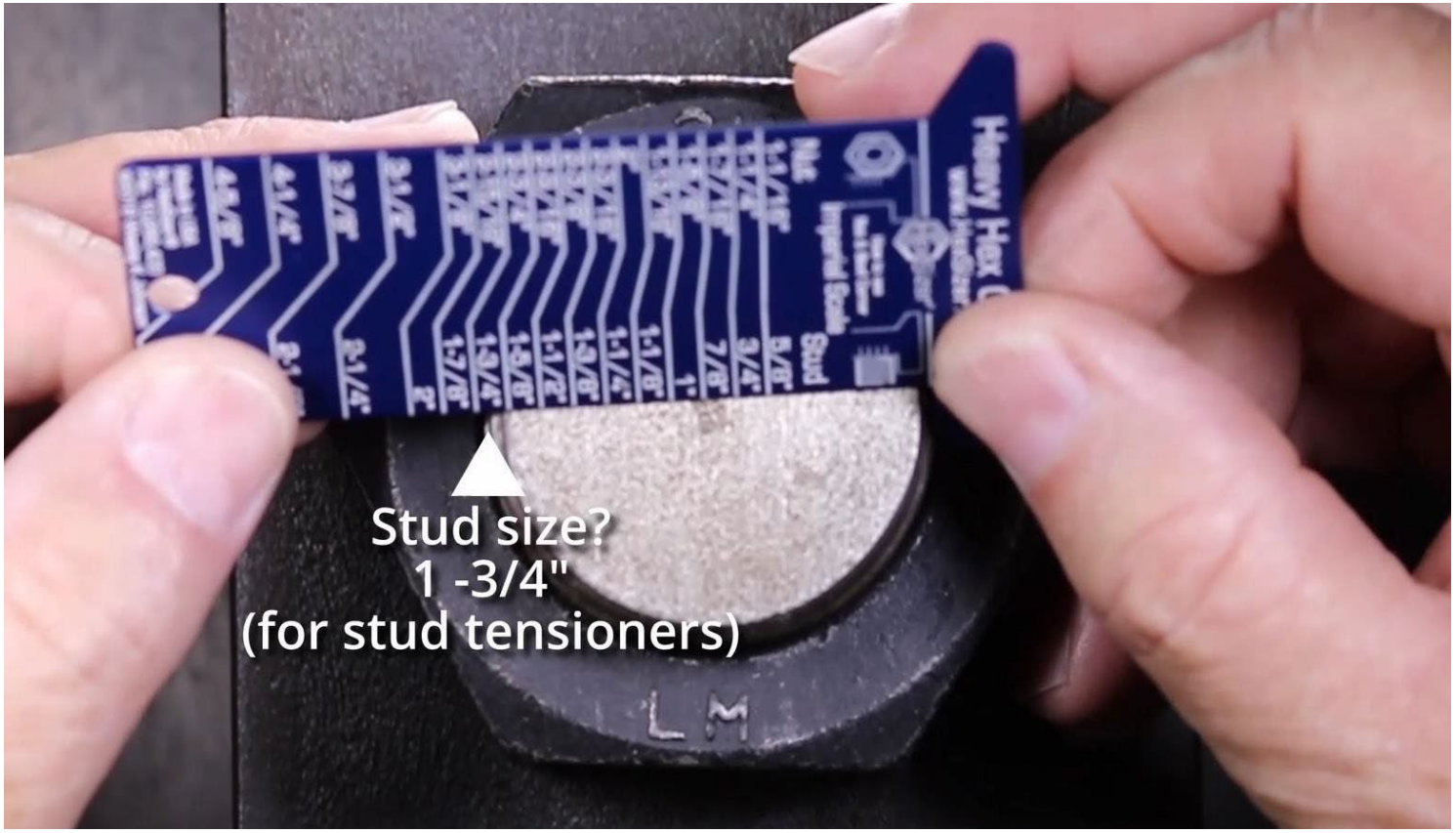
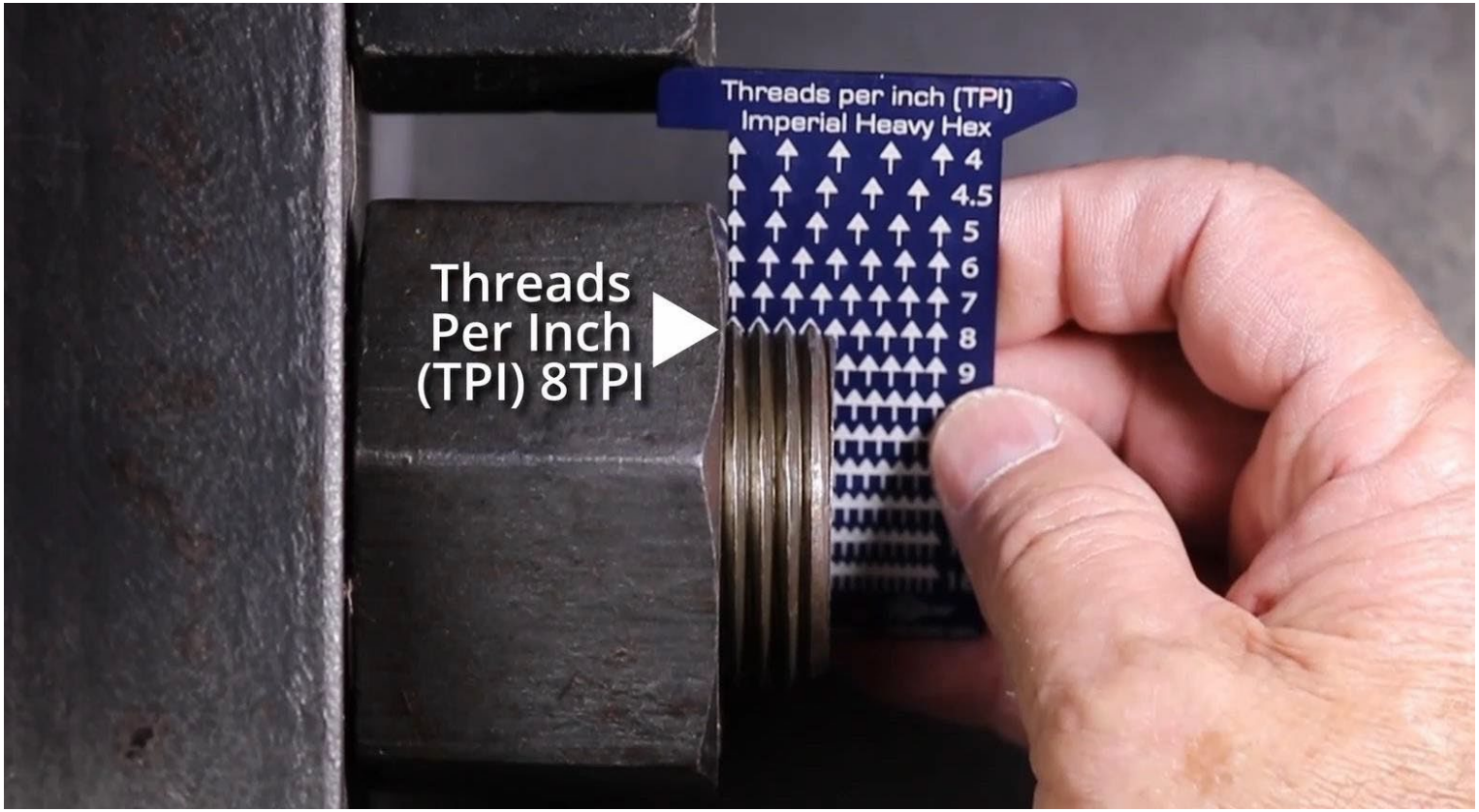
Measure the stud size.



Find the OD thread pitch.



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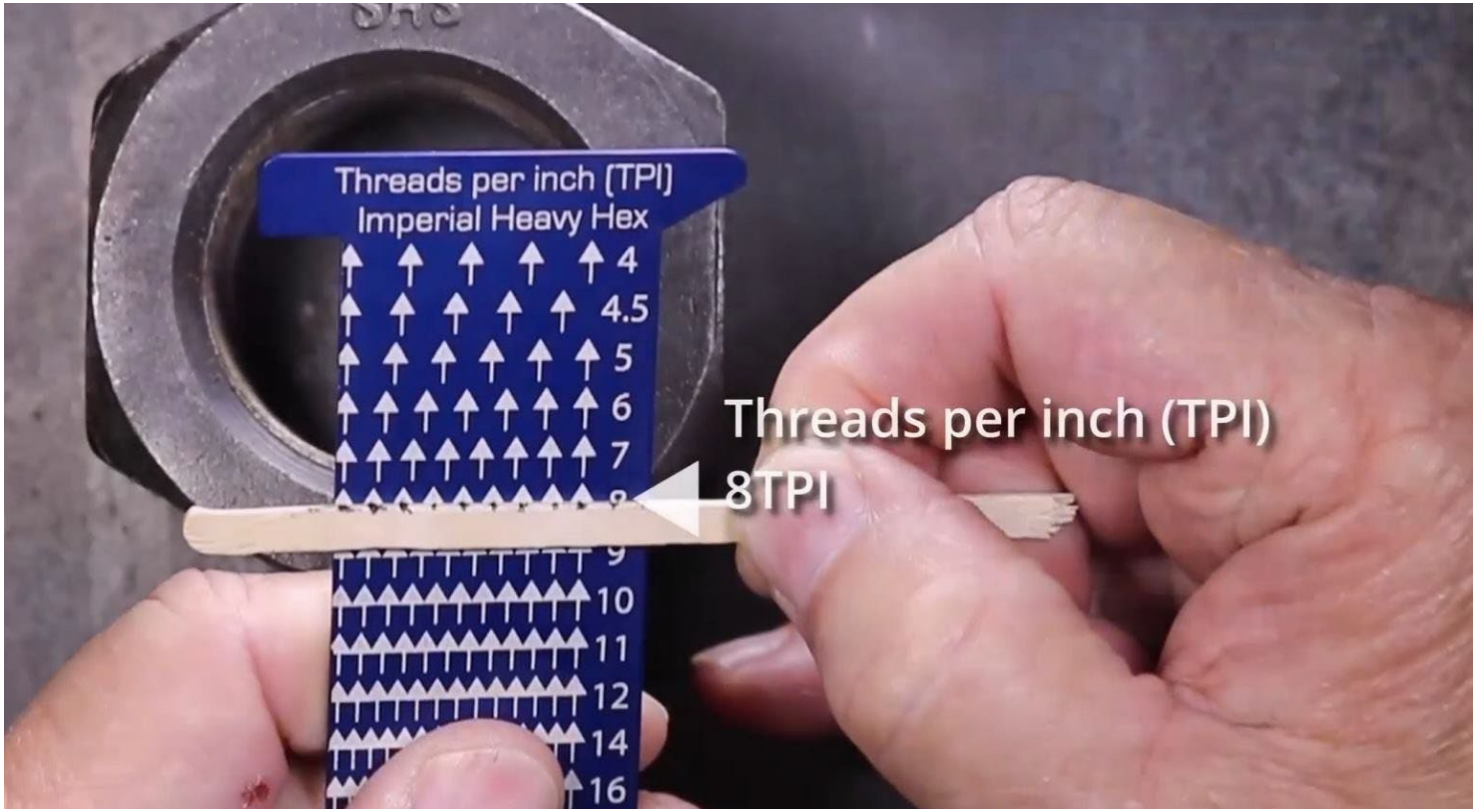
Find the ID thread pitch with a profile.

Find the ID thread pitch with a profile.



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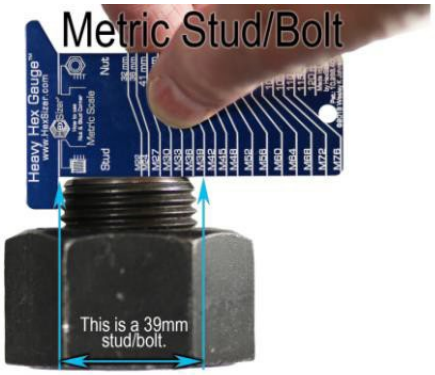
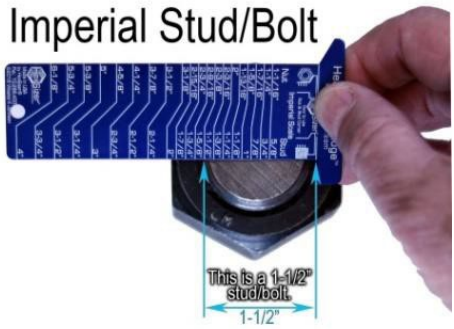
Fits in your wallet.

There are 2 sizes of HexSizers.





Fits in your wallet.
Measures up to 4-5/8”

Fits on your lanyard.
Measures up to 6-1/8”

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Module 4:

Using the HexSizer® in Practice (Hands-On)

Exercise 1: Measure loose nuts and bolts

Exercise 2: Measure installed nuts on studs (simulation board)

Exercise 3: Match nut to stud size

Exercise 4: Perform a “job walk” simulation–use HexSizer to create a correct tool list for a mock work order

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Module 5:

Common Mistakes and Troubleshooting

Measurement is between the tick lines

- That is because the nut is undersized. Use the socket
- Or wrench size from the last tick line it went past.

Misreading tick lines

Use your finger to follow the tick line or use a small magnifier.

Confusing Metric vs Inch sizes

Some versions have inch on front and Metric on back so just turn it over.

Relying on calipers or fractional ticks instead of standard marks.

Most jobs use standard sizes. I find high value in job walks. Fit test the wrench before the job starts.

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