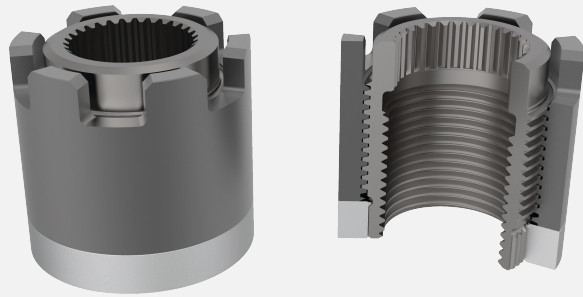


HYTORC

The World's Most Trusted Industrial Bolting Systems

The HYTORC Nut replaces fasteners, minimizes stresses, and covers a wide range of sizes and applications

TN-SERIES HYTORC NUT Specification Guide



ABOUT THE SN-SERIES HYTORC NUT

The TN-Series of HYTORC Nuts was originally specified to overcome the tight radial restrictions found in steam turbine casings. When a bolted connection has a challenging counter bore or flange radius, a TN-Series HYTORC Nut will solve the problem. The compact size of the TN-Series limits the maximum stud protrusion to approximately one stud diameter. TN-Series HYTORC Nuts are typically specified when overhead obstructions are not present.

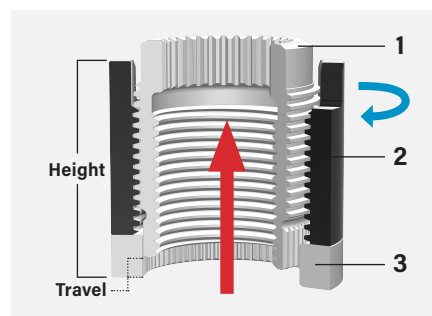
BENEFITS AND FEATURES

- Reaction-free bolt tensioning
- Pure tensile loads
- 100% elimination of galling on flange and stud surfaces
- Highest bolt tension accuracy and reliability available
- Smallest possible footprint (Diameter = Approx. Heavy Hex Nut Across Flats)
- Internal spline on inner sleeve allows for simple economical drive
- Castellated outer sleeve eliminates need for an oversized socket drive
- Standard drives available for all applicable tools
- Includes features to permit horizontal or inverted hands-free operation
- Low, Standard, Medium, and High Temperature ratings available
- All thread forms available

HYTORC NUT APPLICATION



TN-SERIES HYTORC NUT COMPONENTS



The HYTORC Nut is composed of an inner sleeve (1), outer sleeve (2), and washer (3). As the outer sleeve turns (blue arrow), the inner sleeve moves upwards (red arrow). The washer spline rotationally couples the inner sleeve with the washer preventing the inner sleeve from turning while providing a solid reaction point for turning the outer sleeve.

TN-SERIES PART NUMBER DESIGNATION

TNXX-XXXXXX-XXX

Blank Size

Thread Specification

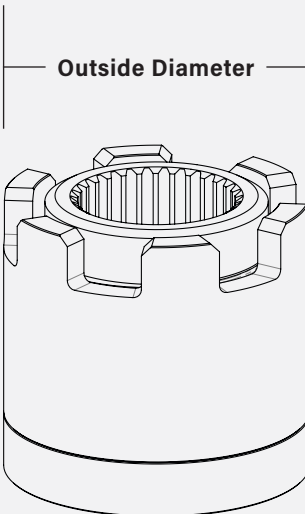
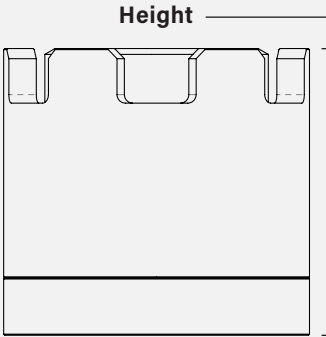
Stud Size

Thread Pitch

Temperature

Certificates

Lubrication



BLANK SIZE

The Blank Size defines the HYTORC Nut body size – retrieve from Column 1 of the Dimensional Table located on the facing page. This size is always a two-digit number.

THREAD SPECIFICATION

IMPERIAL (in.)		
TYPE	CLASS	THREAD CODE
UN	2B	U
UN	3B	S
UNJ	3B	T
ACME	2G	W
BSW	Normal	X
BSF	Normal	Y
C-ACME	2C	Z
ACME	2G	W
STUB ACME	2G	R

METRIC (mm)		
TYPE	CLASS	THREAD CODE
METRIC	6H6G	M
METRIC	4H5H	K
MJ	4H5H	N
TRAPEZOID	7H	P

STUD SIZE

IMPERIAL (in.)	
STUD SIZE	SIZE CODE
5/8	010
1	100
2-1/2	208
4-1/4	404

METRIC (mm)	
STUD SIZE	SIZE CODE
5	005
10	010
100	100
150	150

THREAD PITCH

IMPERIAL (in.)	
THREADS PER IN.	PITCH CODE (TPI)
4	04
4-1/2	45
8	08
12	12

METRIC (mm)	
MM PER THREAD	PITCH CODE
1	01
3	03
3.5	35
6	06

TEMPERATURE

For best performance, Standard Temperature should be specified unless the environment specifically requires otherwise. Temperature ratings may not apply to applications that require CREEP resistance. Please inquire with HYTORC Engineering for applications with long durations at temperatures **greater than 800°F (426°C)**.

SERVICE TEMPERATURE RATINGS

H = High $\leq 1000^{\circ}\text{F}$ ($\leq 538^{\circ}\text{C}$)

M = Medium $\leq 900^{\circ}\text{F}$ ($\leq 482^{\circ}\text{C}$)

S = Standard $\leq 550^{\circ}\text{F}$ ($\leq 288^{\circ}\text{C}$)

L = Low -150°F to 32°F (-101°C to 0°C)

LUBRICATION

Lubrication can have implications on load characteristics, temperature ratings and ease of removal. Please consult HYTORC lubrication data sheets to guide your selection process. Alternative lubricants are available upon request. The most common lubricants are:

R Molykote 1000 Paste

S Molykote P-37 Anti-Seize Paste (Standard)

T Molykote GN Metal Assembly Paste

W N-7000 Loctite Anti-Seize

MATERIAL CERTIFICATE PACKAGE*

A Certificate of Compliance (Standard)

B JQP21000

C JQP22000

D JQP31000

E JQP32000

F JQP10500

G JQP10510

*Please see HYTORC quality level data for further details.

STEPS FOR SPECIFYING THE PROPER SIZE

SIZE SELECTION CHART

1. Identify **Blank Size** from table below. (Cross reference this number from the row with the proper **Nominal Stud Size**).
2. **Outside Diameter** for this Blank Size should not interfere with adjacent nuts or other application constraints (such as a small spot face).
3. Verify that the **Max Stroke** is sufficient for your application.
4. Verify that there is sufficient overhead clearance for access with tooling.
5. Use the part number template from the adjacent page to generate the part number.

IMPERIAL (in.)					
BLANK SIZE	STUD SIZE CODE	NOMINAL STUD SIZE	OUTSIDE DIAMETER	HEIGHT	MAX STROKE
01	014	7/8	1.400	1.313	0.197
02	100	1	1.600	1.500	0.225
03	102	1-1/8	1.800	1.688	0.254
04	104	1-1/4	2.000	1.875	0.281
05	106	1-3/8	2.200	2.063	0.310
06	108	1-1/2	2.400	2.250	0.338
07	110	1-5/8	2.600	2.438	0.366
08	112	1-3/4	2.800	2.625	0.394
09	114	1-7/8	3.000	2.813	0.422
10	200	2	3.200	3.000	0.450
11**	204	2-1/4	3.600	3.375	0.506
12	208	2-1/2	4.000	3.750	0.563
13	212	2-3/4	4.400	4.125	0.619
14	-	-	4.535	4.253	0.638
15	300	3	4.800	4.500	0.675
16	-	-	5.040	4.725	0.709
17	304	3-1/4	5.200	4.875	0.731
18	308	3-1/2	5.600	5.250	0.788
19	312	3-3/4	6.000	5.625	0.844
20	400	4	6.400	6.000	0.900
21	404	4-1/4	6.800	6.375	0.956
22	408	4-1/2	7.200	6.750	1.013
23	412	4-3/4	7.600	7.125	1.069
24	500	5	8.000	7.500	1.125
25	504	5-1/4	8.400	7.875	1.181
26	508	5-1/2	8.800	8.250	1.238

METRIC (MM)					
BLANK SIZE	STUD SIZE	NOMINAL STUD SIZE	OUTSIDE DIAMETER	HEIGHT	MAX STROKE
01	020	M20	35.56	33.35	5.00
02	024	M24	40.64	38.10	5.72
03	027	M27	45.72	42.88	6.45
04	030	M30	50.80	47.63	7.14
05	033	M33	55.88	52.40	7.87
06	036/039	M36/M39	60.96	57.15	8.59
07	042	M42*	66.04	61.93	9.30
08	045	M45	71.12	66.68	10.01
09	048	M48	76.20	71.45	10.72
10	052	M52	81.28	76.20	11.43
11**	056	M56	91.44	85.73	12.85
12	064	M64	101.60	95.25	14.30
13	070	M70	111.76	104.78	15.72
14	072	M72	115.19	108.03	16.21
15	076	M76	121.92	114.30	17.15
16	080	M80	128.02	120.02	18.01
17	-	-	132.08	123.83	18.57
18	090	M90	142.24	133.35	20.02
19	095	M95	152.40	142.88	21.44
20	100	M100	162.56	152.40	22.86
21	110	M110	172.72	161.93	24.28
22	115	M115	182.88	171.45	25.73
23	120	M120	193.04	180.98	27.15
24	125	M125	203.20	190.50	28.58
25	130	M130	213.36	200.03	30.00
26	140	M140	223.52	209.55	31.45

* M42x3 Only. M42x4.5 should be specified in "08" blank size.

** Blank Size 11 supplied for 2-1/4" & M56 TN-Series clamps before 1/2009 had a 3.528 OD.

BLANK SIZE

This is the basic body size for the HYTORC Nut. Any desired thread up to the **Nominal Stud Size** can be cut into each **Blank Size**. Cross-reference this number from the row with the proper **Nominal Stud Size**. Verify that the **Outside Diameter** for this **Blank Size** will not interfere with adjacent nuts or other application constraints (such as a small spot face).

NOMINAL STUD SIZE

This is the largest stud that will fit a particular **Blank Size**. All HYTORC Nut blanks can be specified with threads smaller than the **Nominal Stud Size**.

MAX STROKE

Verify that the **Max Stroke** is sufficient for the application. HYTORC Nuts have maximum stroke lengths that are limited by the height of the splined washer. More stroke may be needed to accommodate gasket compression or an extraordinarily long joint length. Consult with a HYTORC Applications Engineer for special extended stroke HYTORC Nuts.

STUD SIZE

This is the HYTORC code used to indicate the **Nominal Stud Size**.

IMPERIAL: First digit signifies the whole number of inches. Add two digits to signify the number of 1/16 of an inch — (108 = 1" + 8/16" = 1-1/2").

METRIC: The three digits signify the whole number in millimeters — (024 = M24, 110 = M110).

HEIGHT

This is the overall height of the standard HYTORC Nut for this **Blank Size**. Tooling will require additional overhead space. This is not the **Height** of the stud protrusion. Consult with a HYTORC Applications Engineer when custom height HYTORC Nuts are required.

ADDITIONAL FACTS AND INFORMATION

SAMPLE LOAD CHART



Date tested: 2/13/2018

LOAD TO PRESSURE CONVERSION CHART TN21-M09006-SAR-AQ HYTORC-CLAMP

Projected for Tool		T-900		
Clamp Size		TN21-M09006-SAR-AQ		
PUMP	PUMP	POUNDS	kNewtons	PUMP Mpa
PSI	BAR	FORCE	Force	
1,500	103.42	242,730	1,079.72	10.34
2,000	137.90	322,370	1,433.97	13.79
2,500	172.37	399,260	1,776.00	17.24
3,000	206.84	473,400	2,105.79	20.68
3,500	241.32	544,790	2,423.35	24.13
4,000	275.79	613,430	2,728.67	27.58
4,500	310.26	679,320	3,021.77	31.03
5,000	344.74	742,460	3,302.63	34.47
5,500	379.21	802,850	3,571.26	37.92
5,945	409.89	854,274	3,800.00	40.99
6,000	413.69	860,490	3,827.65	41.37

Results Using Dow 1000 Lubricant
Target Load = Load Pounds @ Pump PSI = 854274 lbs

MATERIALS

HYTORC Nut material selection is based on the service temperature rating of the HYTORC Nut. Please consult with a HYTORC Applications Engineer for a detailed specification on the materials used for each component of the HYTORC Nut.

LOAD CHARTS

All HYTORC Nuts can be made available with a Load Chart. Load Charts provide data points showing the tool's hydraulic pressure vs. the bolt load that will be attained. A load chart can be created for any tool with any HYTORC Nut.

SPECIALS

When components fall outside of the boundaries of our standard part numbering system, they become specials. The following list exemplifies some of the variations that could make your HYTORC Nut specification a special:

- Modified or non standard thread sizes such as those for oversized studs
- Extended or shortened HYTORC Nut height requirements
- Higher than usual bolt loads
- Reduced HYTORC Nut diameter requirements
- Extended stroke requirements
- Special coating requirements such as galvanizing or xylan
- Non-standard materials, testing or certification requirements

APPLICATION TIPS

Measurement of the thread pitch is the most error prone portion of HYTORC Nut specification. The easiest way to measure pitch is with a pitch gauge. Alternatively, please provide HYTORC with a sample of the stud. Special coatings can cause dimensional variations on studs and nuts, i.e. Galvanized studs often have a coating build up that effectively changes the thread size. If the application studs have coatings, special care should be taken to determine the actual thread size. A standard HYTORC Nut will not fit a standard UN stud thread if a thick coating is applied. In these situations it will typically be best to supply HYTORC with a sample stud.

AVAILABLE DRIVES

Please contact HYTORC to request available drives and to specify non-standard HYTORC Nuts.

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