

Key Conversion & Measurement for Quick Calculation

FDM Conversion Chart		
Inches	Decimal	mm
1/16	0.06	1,59
1/8	0.13	3,18
3/16	0.19	4,76
1/4	0.25	6,35
5/16	0.31	7,94
3/8	0.38	9,53
7/16	0.44	11,11
1/2	0.50	12,70
9/16	0.56	14,29
5/8	0.63	15,88
11/16	0.69	17,46
3/4	0.75	19,05
13/16	0.81	20,64
7/8	0.88	22,23
15/16	0.94	23,81
1	1.00	25,40

Pressure:
 1 psi = 0,069 bar
 1 bar = 14,50 psi
 = 10 N/cm²
 1 kPa = 0,145 psi
 = 145 psi

Force:
 1 lbf = 4.45 N
 1 klbf = 1000 lbf
 1 kN = 1000 N

Weight:
 1 pound (lb) = 0,4536 kg
 1 kg = 2,205 lbs
 1 metric ton = 2205 lbs
 = 1000 kg
 1 ton (short) = 2000 lbs
 = 907,18 kg

Temperature:
 To Convert °C to °F:
 T°F = (T°C x 1,8) + 32
 To Convert °F to °C:
 T°C = (T°F - 32) ÷ 1,8

Volume:
 1 in³ = 16,387 cm³
 1 cm³ = 0,061 in³
 1 liter = 61,02 in³
 = 0,264 gal
 = 3,785 cm³
 = 3,785 l
 = 231 in³

Other measurements:
 1 in = 25,4 mm
 1 mm = 0,039 in
 1 ft = 0,3048 m
 1 m = 3,2808 ft
 1 in² = 6,452 cm²
 1 cm² = 0,155 in²
 1 hp = 0,746 kW
 1 kW = 1,340 hp
 1 Nm = 0,738 Ft.lbs
 1 Ft.lbs = 1,356 Nm
 1 kN = 224,82 lbs
 1 lb = 4,448 N

Ratio of Stud Size : A/F Size of Nut

Thread Size D (mm)	Hexagon Size S (mm)	Hexagon Size J (mm)
M 16	24	14
M 20	30	17
M 27	41	19
M 30	46	22
M 48	75	36
M 60	90	46

BOLTING THEORY

- All Torquing tools are of 700 bar pressure.
- Torquing includes **Tightening and Loosening of nuts.**
- For Tightening, torque required is as per A/F to Torque chart.
- For opening or loosening of nuts, torque required is 2.5 times of tightening torque.
- Tensioning tools include use of Bolt Tensioners. This is only tool that works on 1500 bar pressure and also pumps are different for Bolt tensioners which are 1500bar.

TOOLS USED FOR BOLTING OPERATIONS

GENERAL HAND TOOLS

- Impact Socket
- Hex Bit Sockets
- Slugging /Hammering Spanners
- Hex Reducers
- Manual Torque Wrenches
- Torque Multipliers
- Square Adapters
- Ratchets / Extension Bars

HYDRAULIC TOOLS

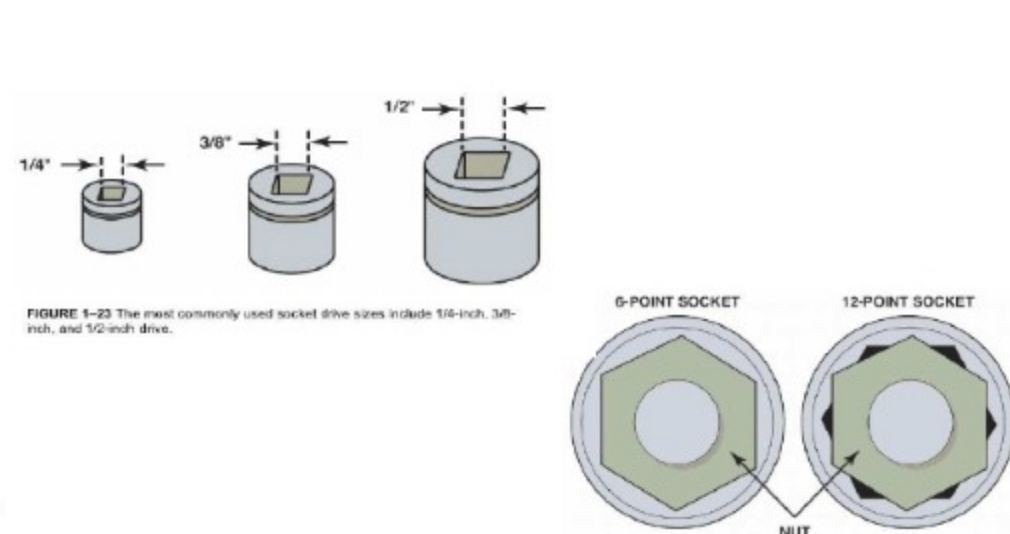
- Hydraulic Torque Wrench
- Power Pack
- Twin Line Hoses
- Hydraulic Jacks
- Hand Pump
- Electric Torque Wrench
- Pneumatic Torque Wrench
- Nut Splitters

IMPACT SOCKET

- Square Drive Size
- Across Flat size (A/F)
- Overall Length
- No. of points – 6pt or 12pt

FOR EXAMPLE

- Impact socket 1" Sq. Dr x 46mm A/F
- Standard Length – 6pt

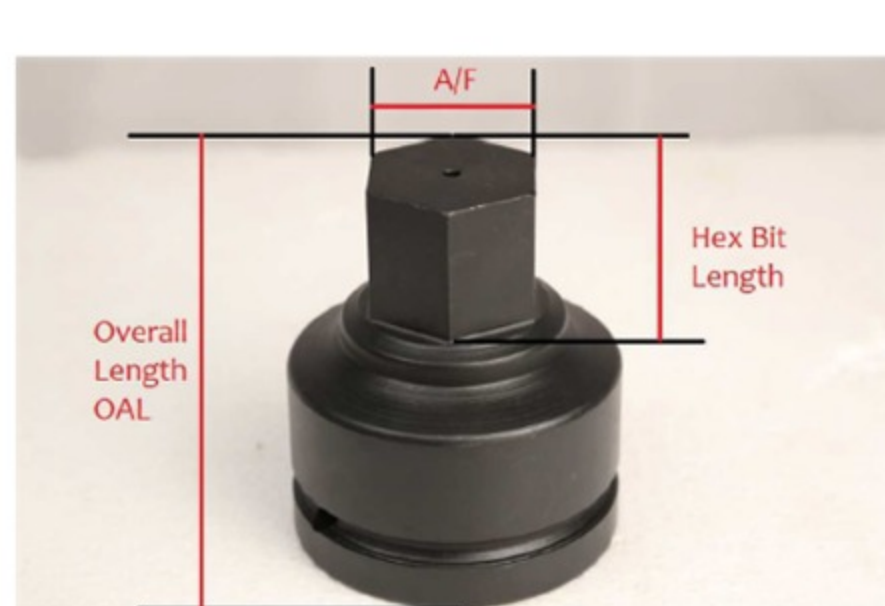


HEX BIT SOCKET

- Square Drive Size
- Across Flat size (A/F)
- Overall Length (L)
- Hex Bit Length (H)

FOR EXAMPLE

- Hex Bit Socket 1" Sq. Dr x 32mm A/F
- OAL – 120 mm and Hex Bit Length 50mm



HEX REDUCERS

- Male part of Hex Reducer = Hex Link Size
- Required Female A/F size
- Length of Hex Reducer (Width of Hex Link)

FOR EXAMPLE

- Hex Reducer of 60mm Male Hex to
- 55mm A/F (Female).



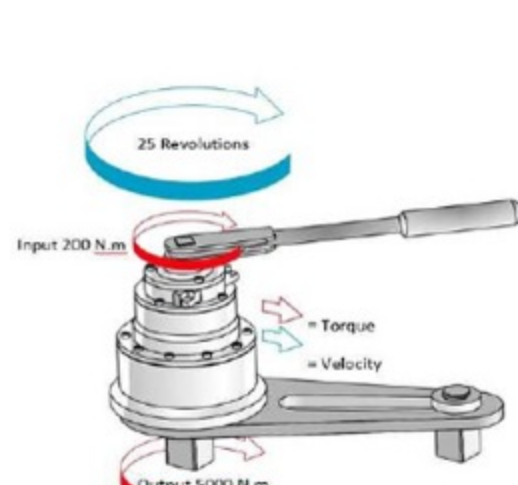
MANUAL TORQUE WRENCH

- Model is selected as per Required Torque.
- Square Drive is to be noted for socket selection.
- Manual Torque Wrench is to be used for approx torque starting from 10Nm up to 1500Nm.
- Variants of Manual Torque Wrench are as below :
 - Interchangeable Type
 - Preset Type



TORQUE MULTIPLIERS

- Model is selected as per Required Torque.
- Manual Torque Wrench is selected as per Torque Multiplier Model.
- Output Square Drive is to be ensured for socket selection to be mounted on nut.
- Torque Chart is to be followed with model and Multiplication factor.



HYDRAULIC TORQUE WRENCH

- Square Drive OR Hex Drive Type
- Torque Required
- Nose Radius
- Different size of Sockets OR Hex Reducers need to be offered with Torque Wrench.
- Pump used to drive HTW will be either Pneumatic or Electric.



POWER PACK AND HOSE



JACKS & ACCESSORIES

- Hydraulic Jack with 3/8 inlet
- Hose with 3/8" Outlet
- Hand Pump – 700 bar
- Pressure gauge – 700 bar / 10000 psi
- Manifold to connect more than one jack.



BOLTING METHODOLOGY

- To ask end user about A/F size of Nut.
- To ask if there is using any lubricant on thread and grade of nut. (OPTIONAL)
- To ask whether there is sufficient space around nut for mounting of tool and distance of next nut.
- Derive torque from chart based on A/F size and grade of nut.
- Suggest either manual torque wrench or Hydraulic torque wrench based on torque.
- If torque is up to 1500Nm then suggest manual torque wrench or Torque Multipliers and if torque is above 1500-2000Nm then suggest hydraulic torque wrench.
- They will need sockets along with Square drive hydraulic torque wrench. (Sockets not required with hex type hydraulic torque wrench).
- Square drive size of socket will be as per square drive size of tool.
- A/F Size of socket will be as per A/F size of nut (application)
- If they prefer HTW then ask them for pump based on electric or air driven criteria. (Prefer electric one)

APPLICATIONS



HYDRAULIC TORQUE WRENCH

HYDRAULIC JACKS

MANUAL TORQUE WRENCH

TORQUE MULTIPLIER