



Industrial Technology Virtual Learning

:measuring a bolt(part 1 of 2)

April 30, 2020



Lesson: April , 2020

Objective/Learning Target:

Students will properly measure a bolt and be able to identify different grades of bolts, both standard and metric.

Identifying Metric from Standard

Size and Pitch



Head Markings



BOLT SIZE

• Diameter x Thread Pitch x Length

SAE Bolt Size

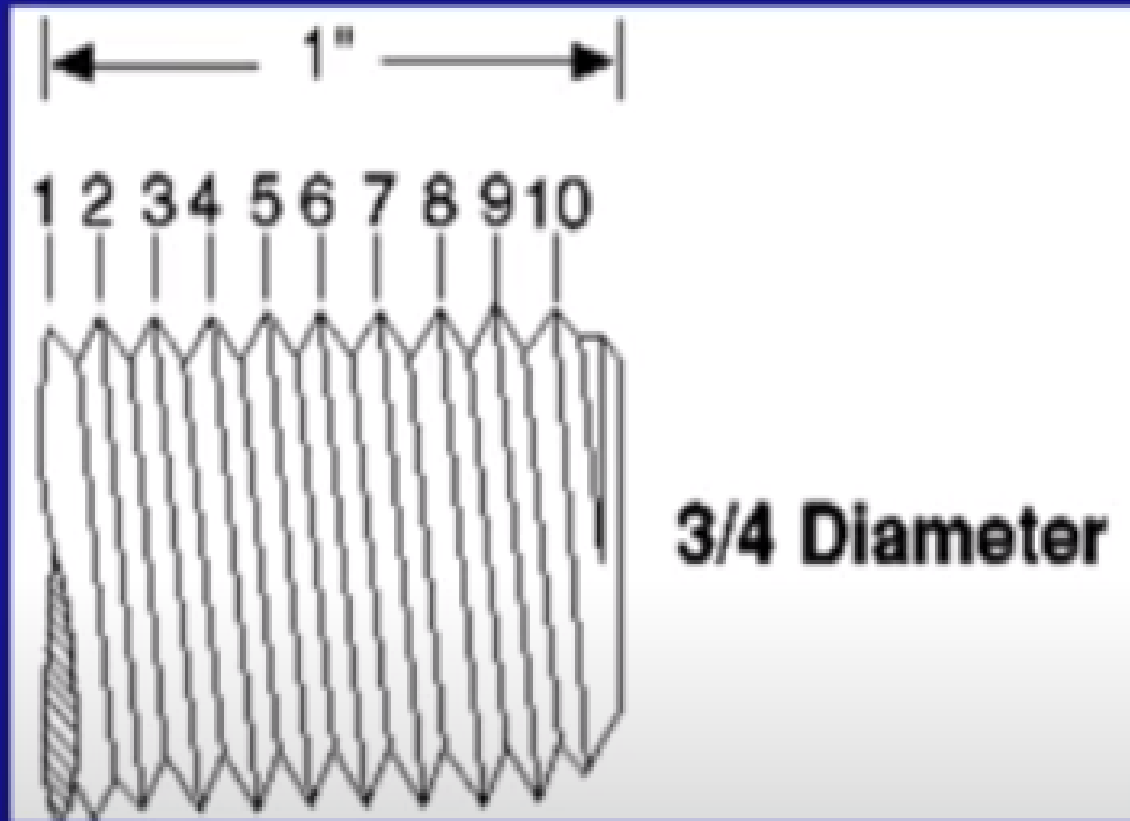


- Aka Standard Bolt
- Diameter
- Thread Pitch (threads per inch)
- Length

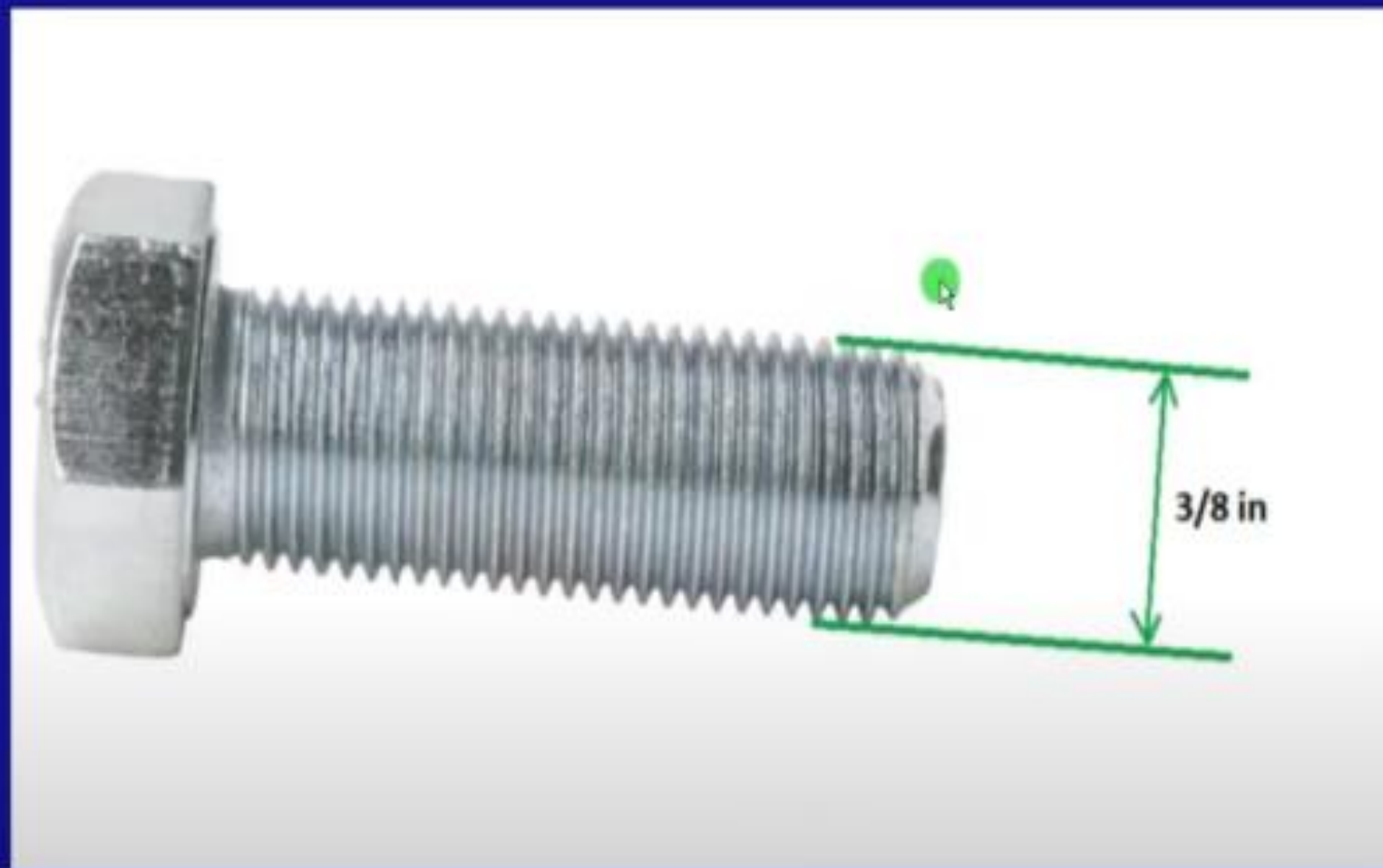
Written as :

Diameter x Pitch x Length

Example: $1/4 \times 20 \times 2 \frac{1}{2}$

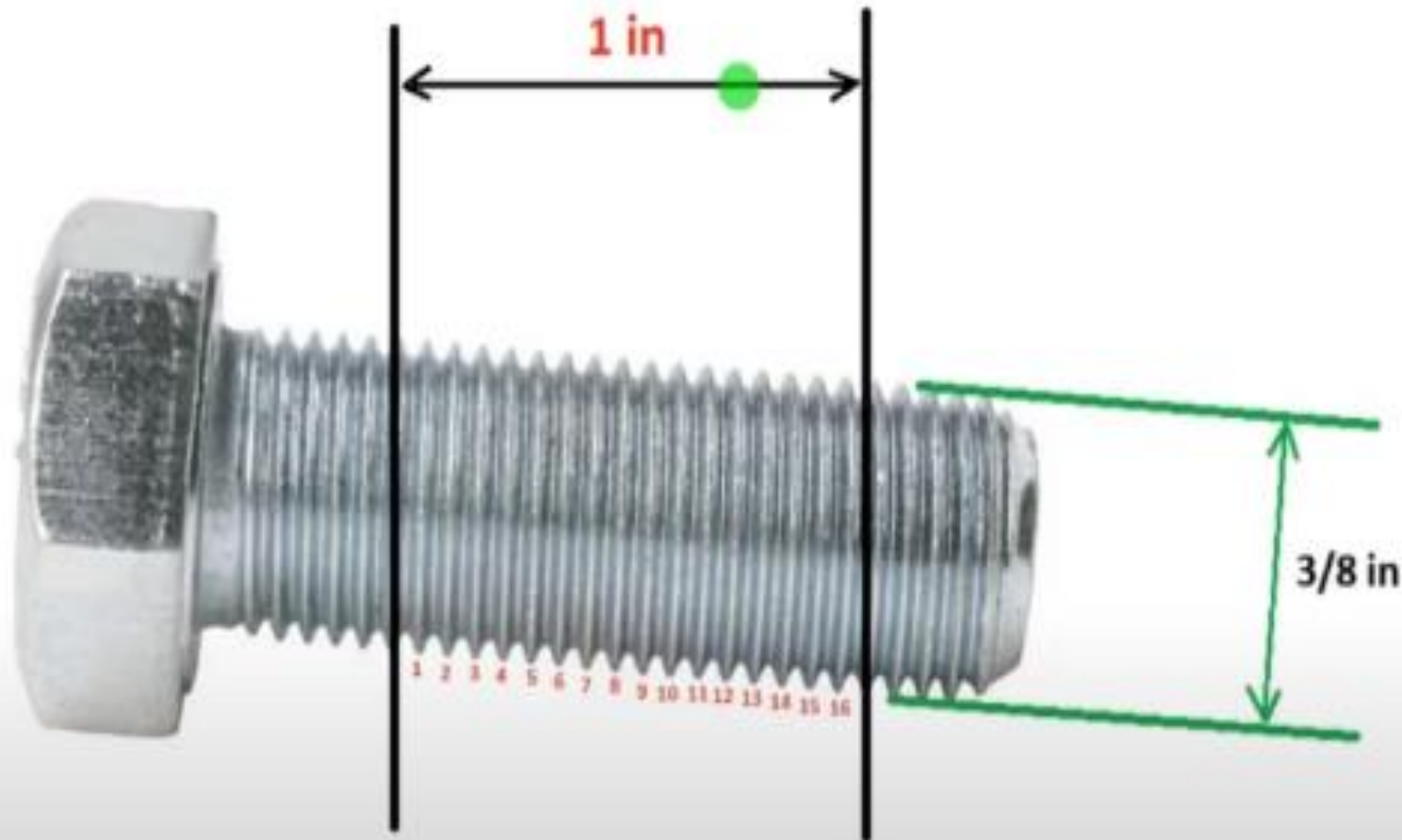


Diameter



- Outside measurement of thread width.
- **NOT** the size of the wrench head.

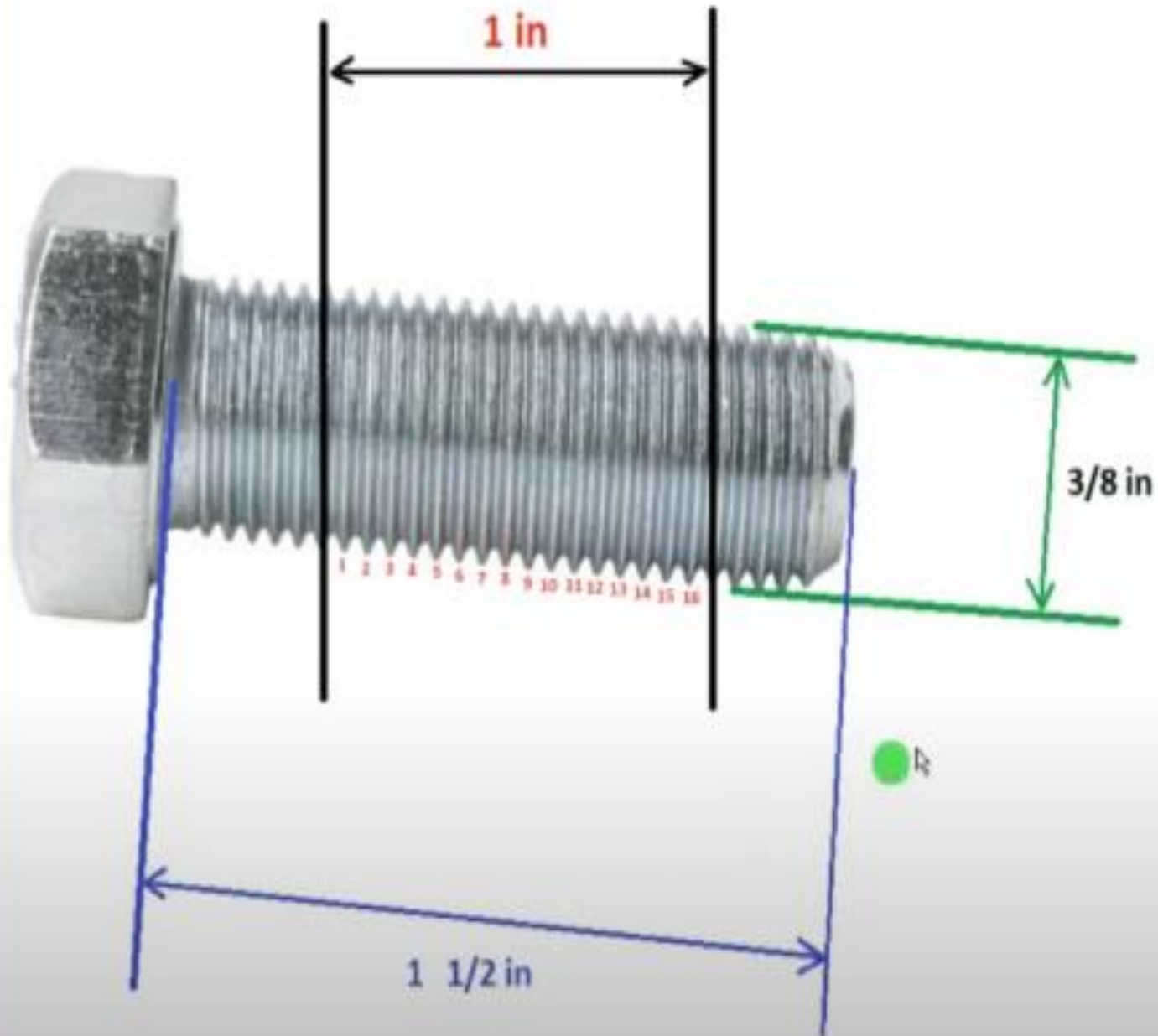
STANDARD



Thread Pitch

- TPI (threads per inch)
- Number of threads found in each inch of length.
- NC National Course
- NF National Fine
- BPT Pipe Thread

Length



- How long the bolt is.
- DOES NOT count the head.

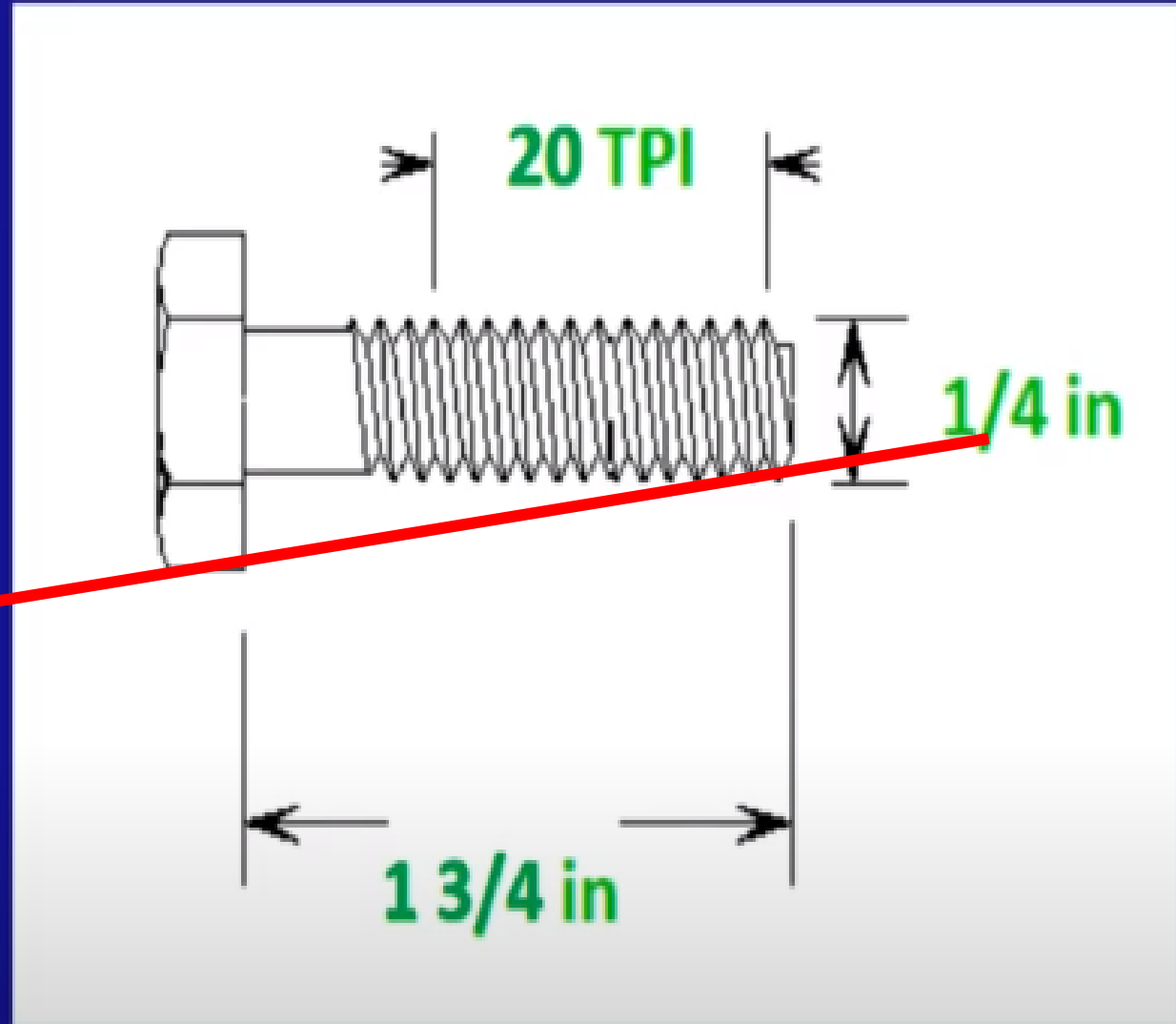
Standard Bolt Size

- Diameter
- Pitch
- Length
- Dia. x TPI x Length

$1/4$

x

x

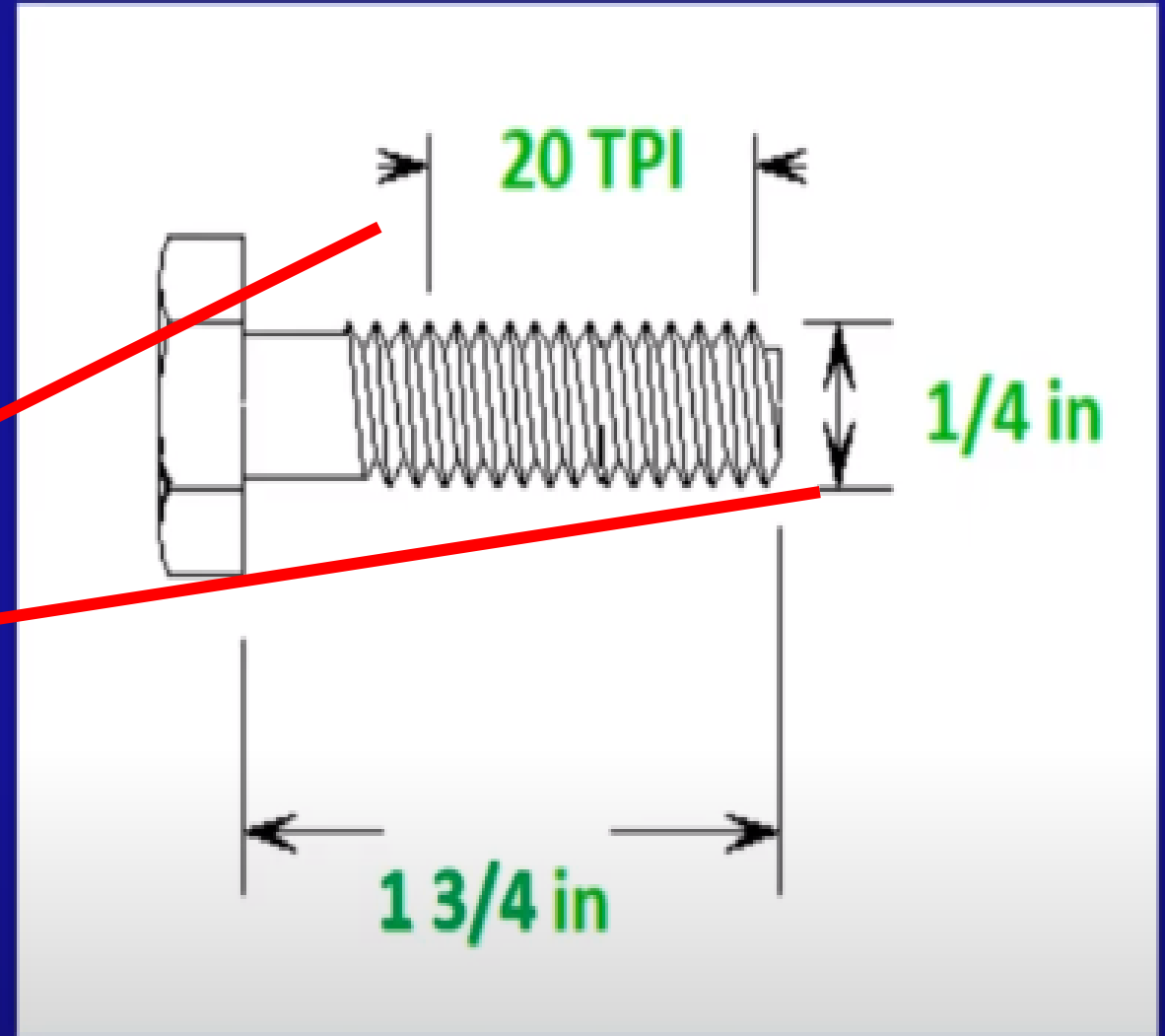


Standard Bolt Size

- Diameter
- Pitch
- Length
- Dia. x TPI x Length

$\frac{1}{4}$ x 20

●

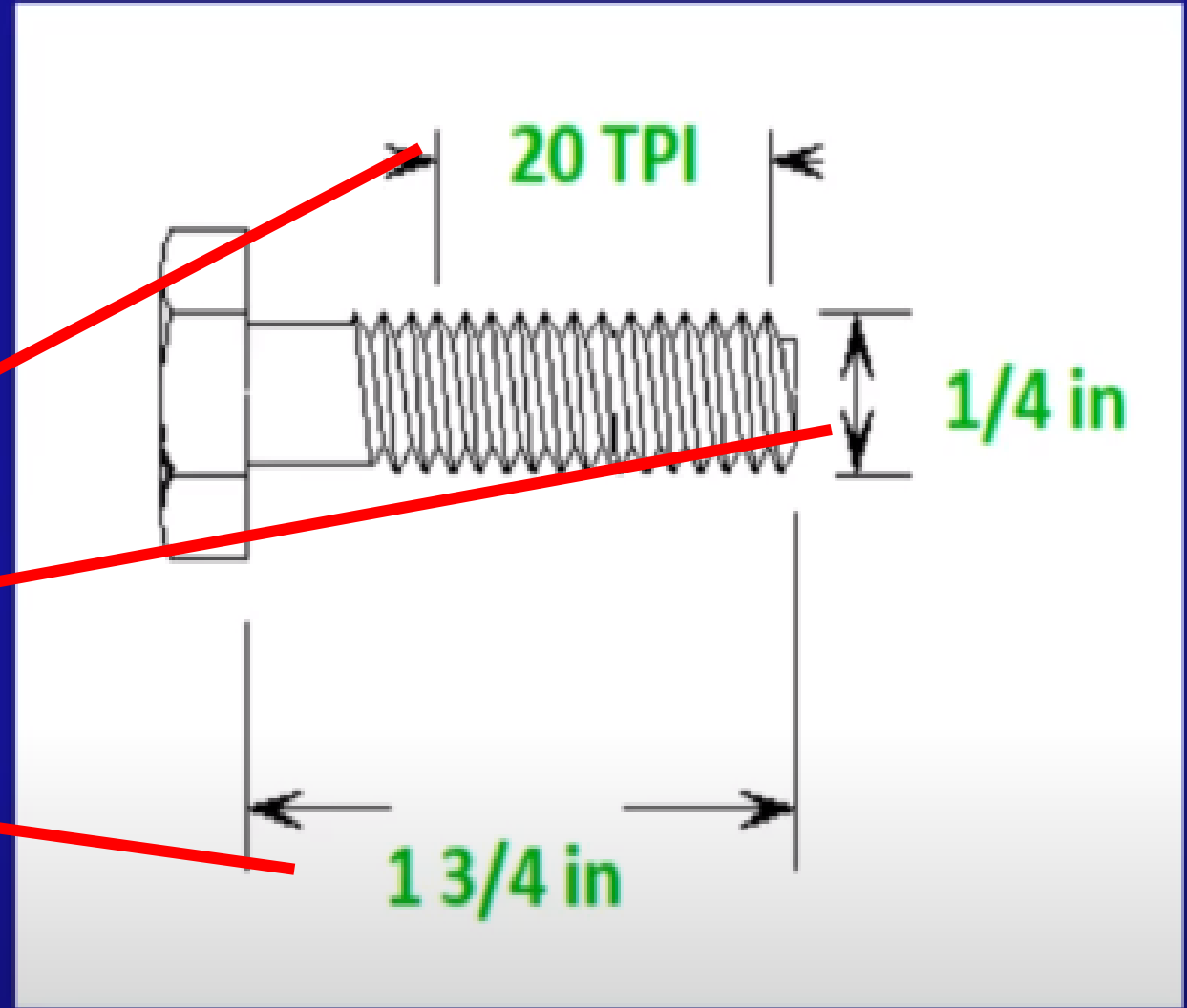


Standard Bolt Size

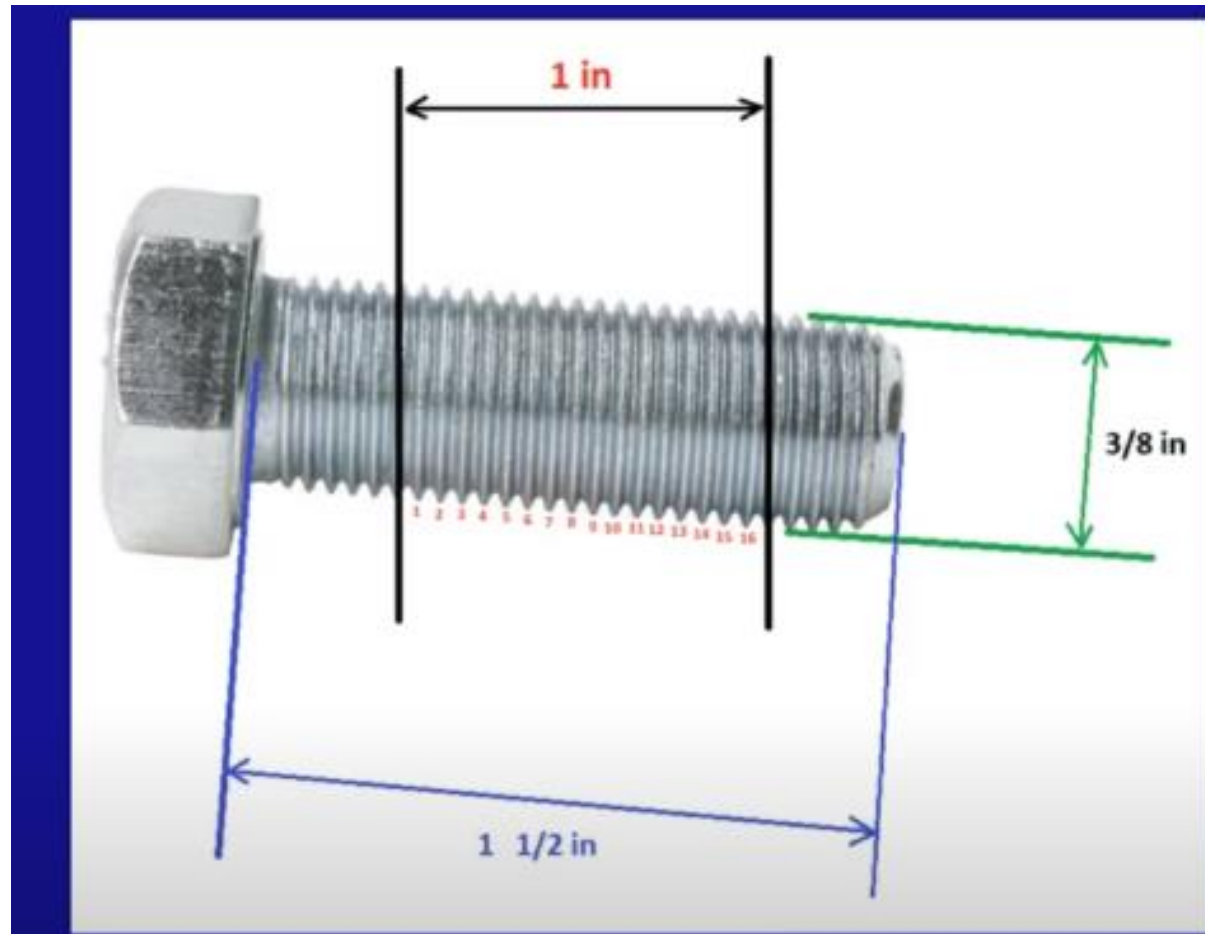
- Diameter
- Pitch
- Length
- Dia. x TPI x Length

$$\frac{1/4}{\text{---}} \times \frac{20}{\text{---}} \times \frac{1\ 3/4}{\text{---}}$$

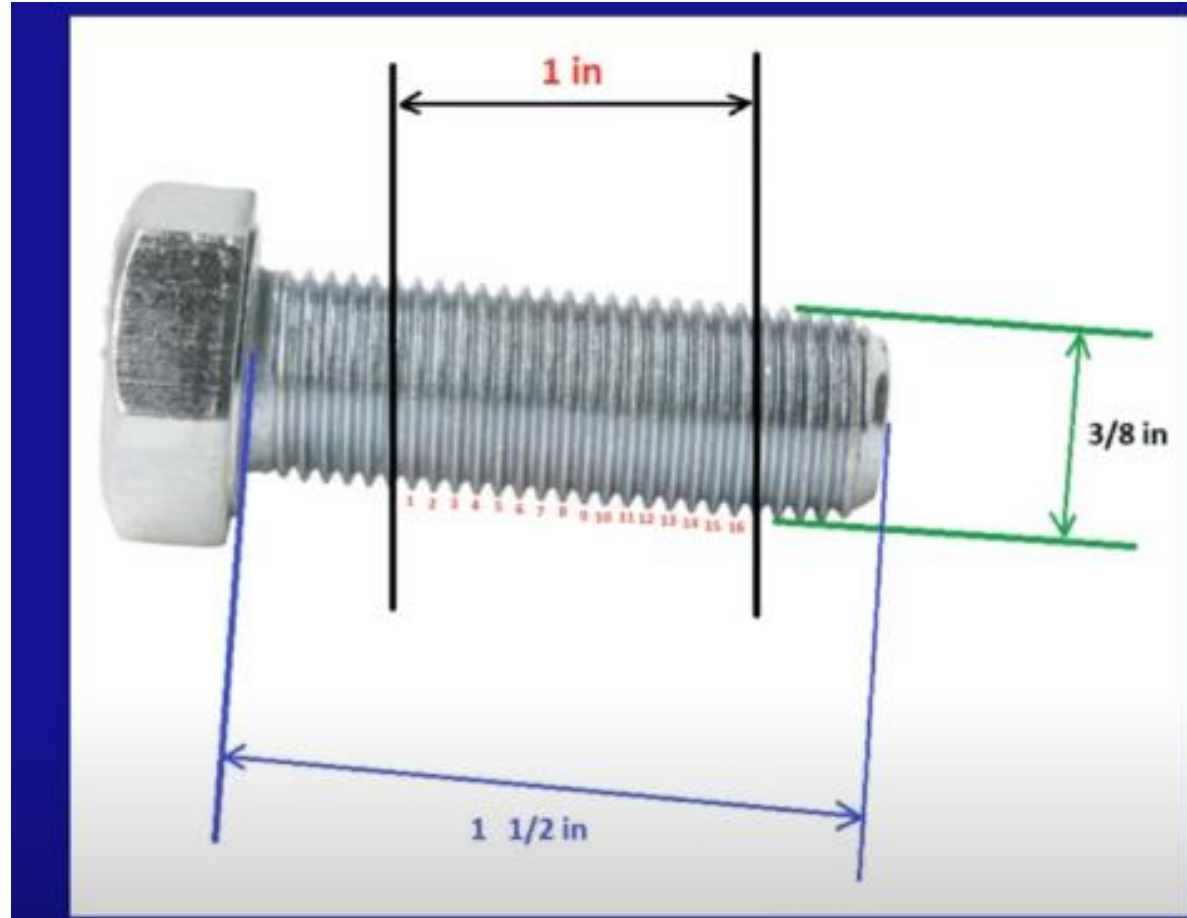
●



What size is this bolt?

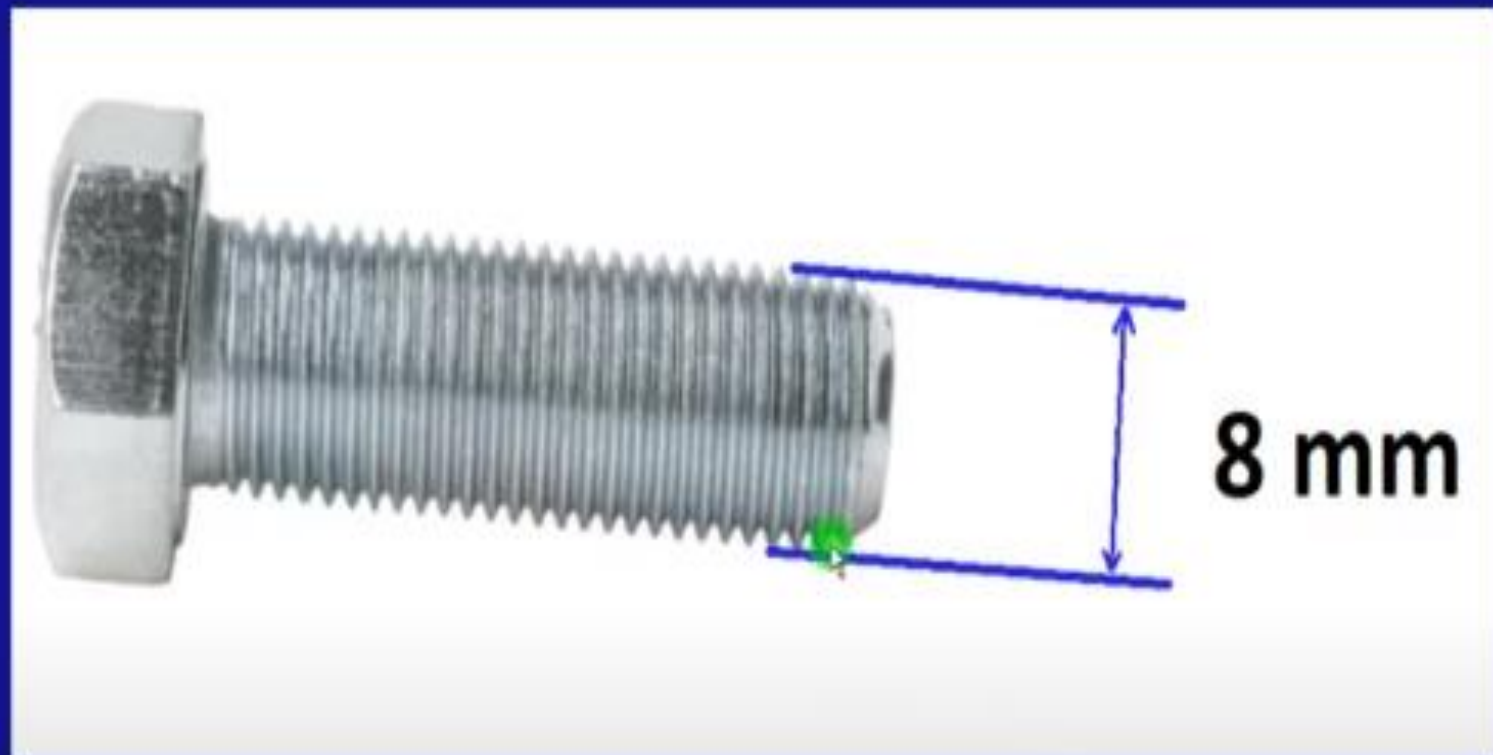


Remember it's Dia x TPI x length



$3/8 \times 16 \times 1 \frac{1}{2}$

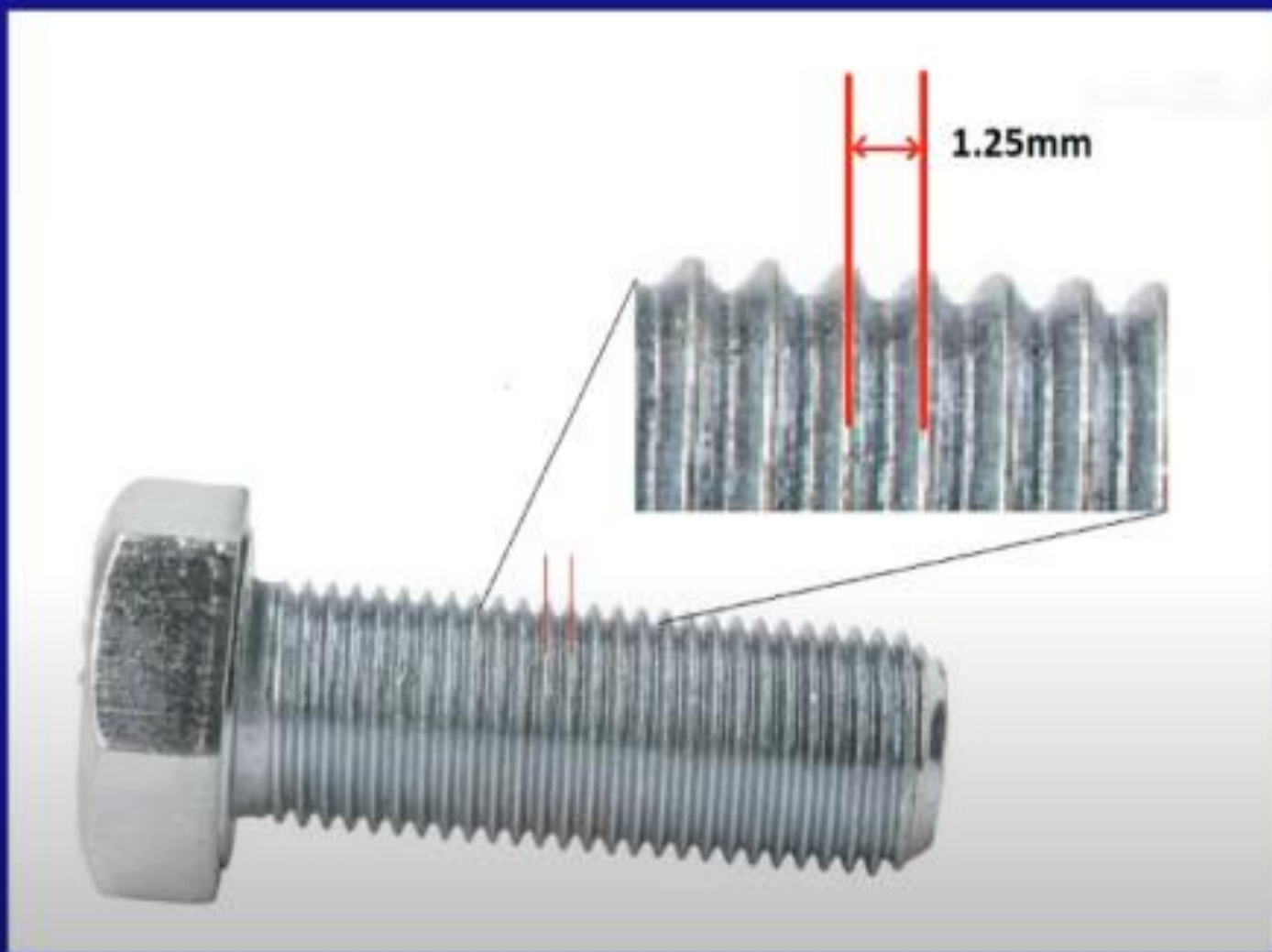
METRIC



Diameter (Metric)

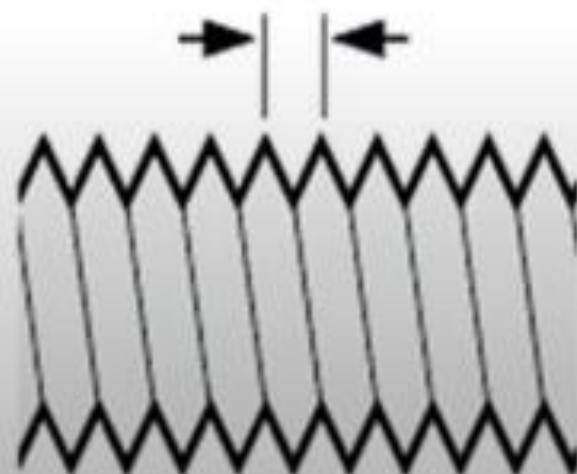
- Distance between outside of threads.
- Measured in millimeters.

METRIC



Thread Pitch (Metric)

- Distance between threads.
- Measured in millimeters.



Metric Thread Pitch

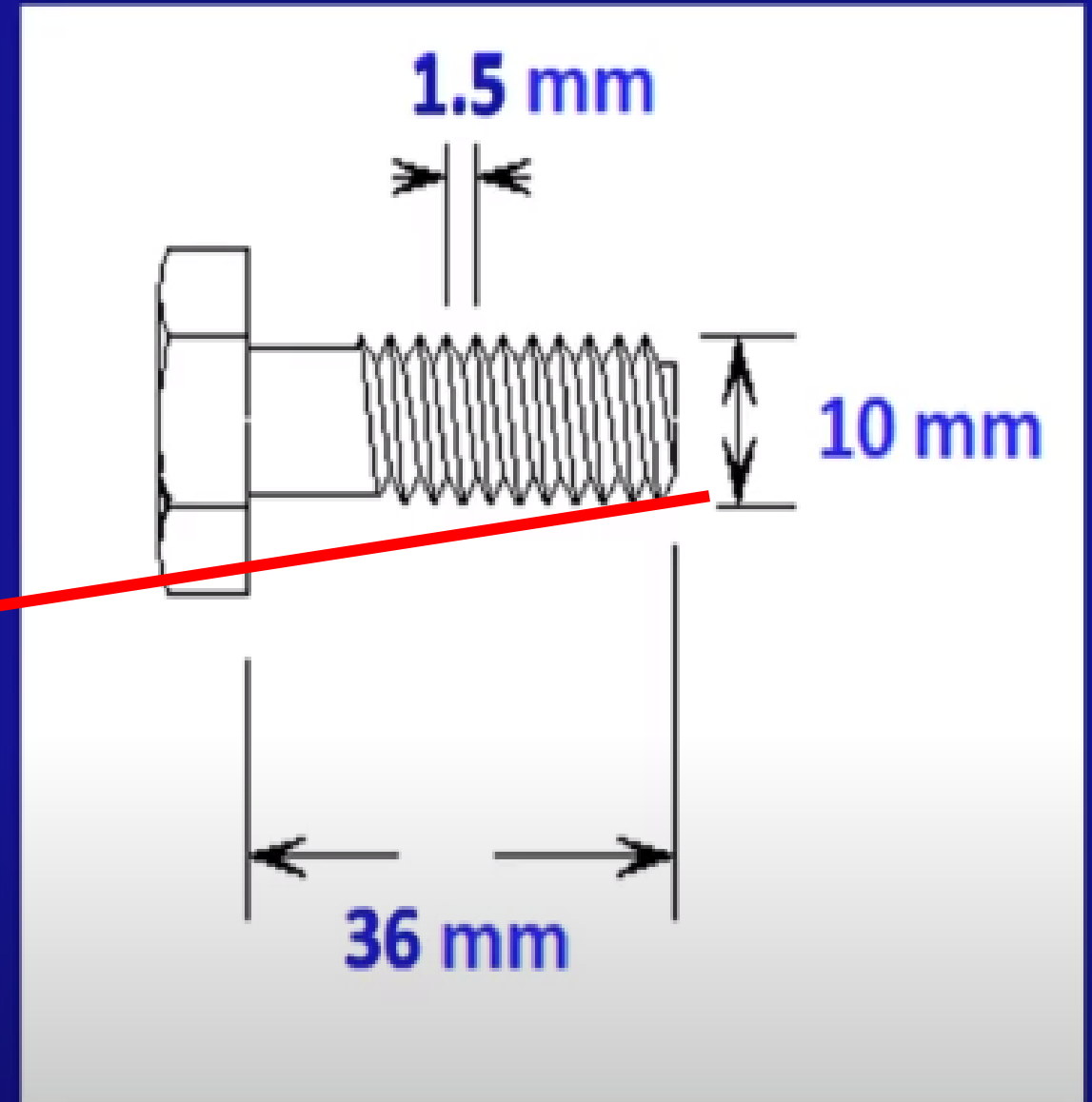
Metric Bolt Size

- Diameter
- Pitch
- Length
- Dia. x Pitch x Length

10

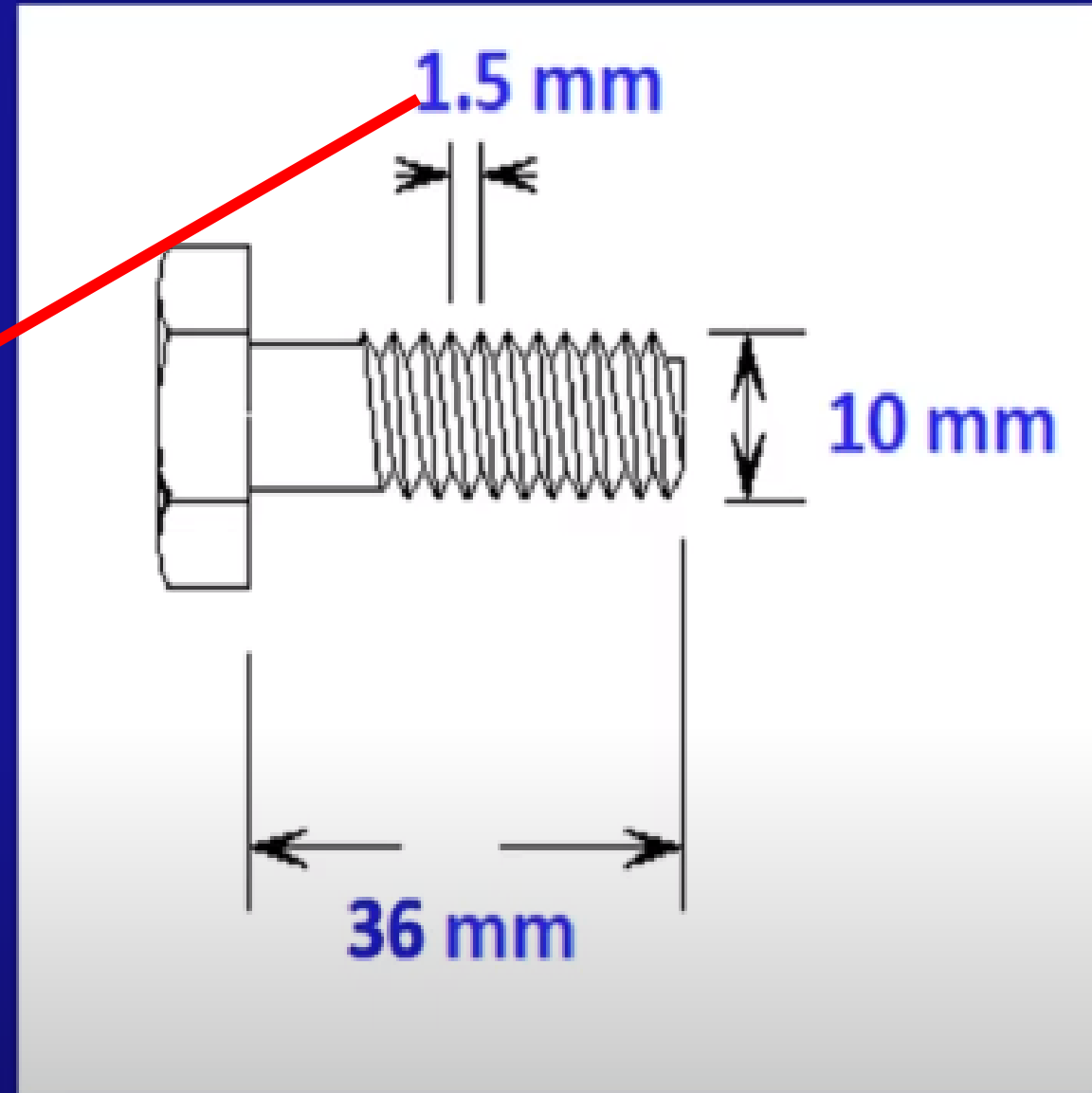
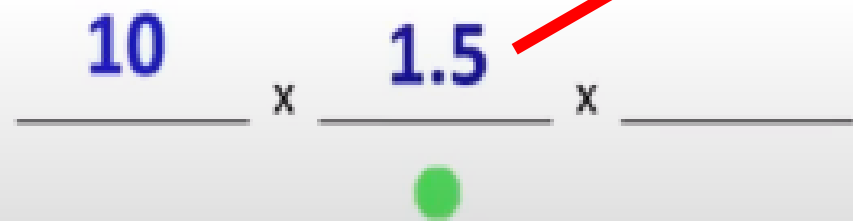
x

x



Metric Bolt Size

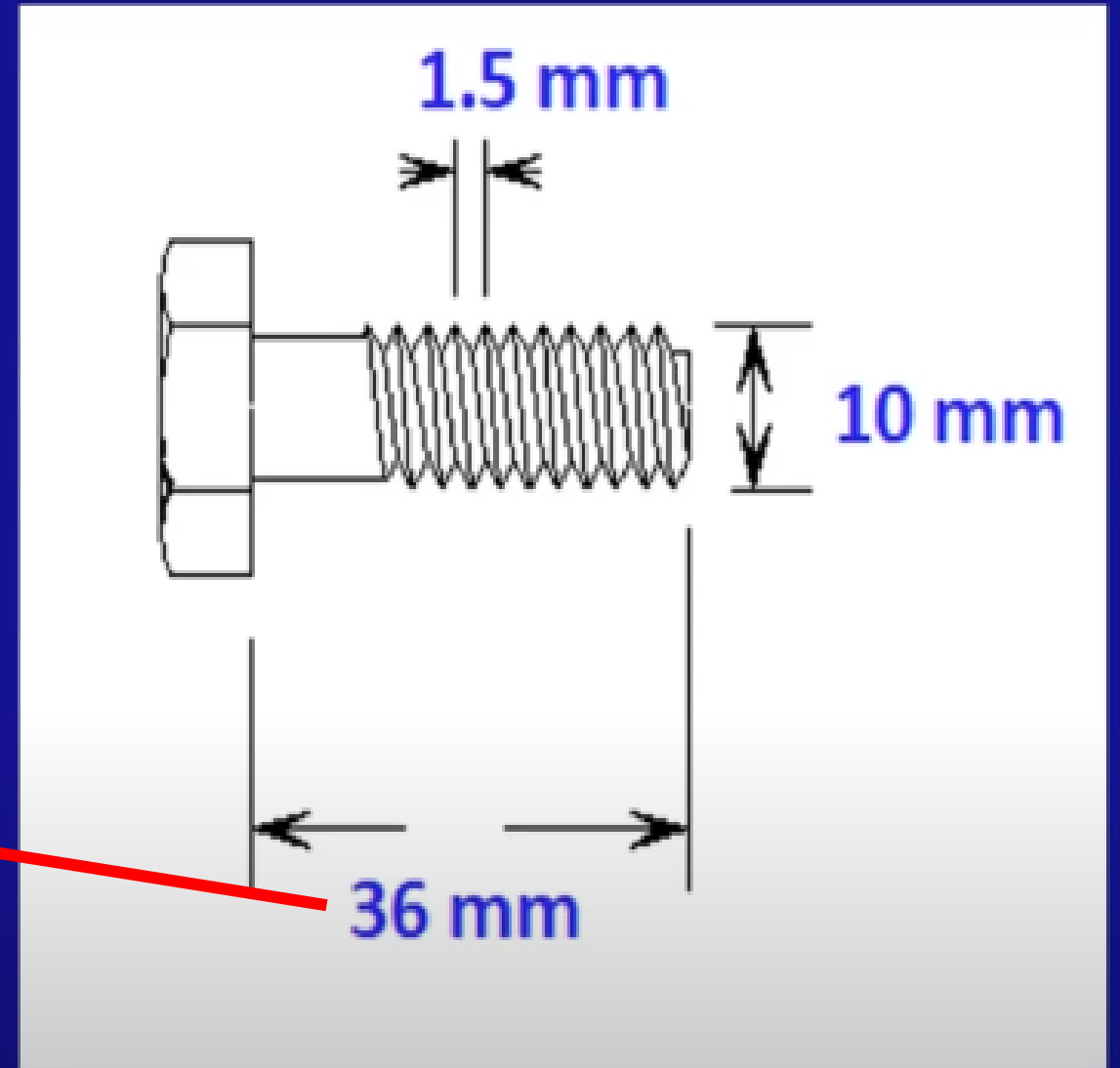
- Diameter
- Pitch
- Length
- Dia. x Pitch x Length



Metric Bolt Size

- Diameter
- Pitch
- Length
- Dia. x Pitch x Length

10 x 1.5 x 36



Thread Pitch Gauge

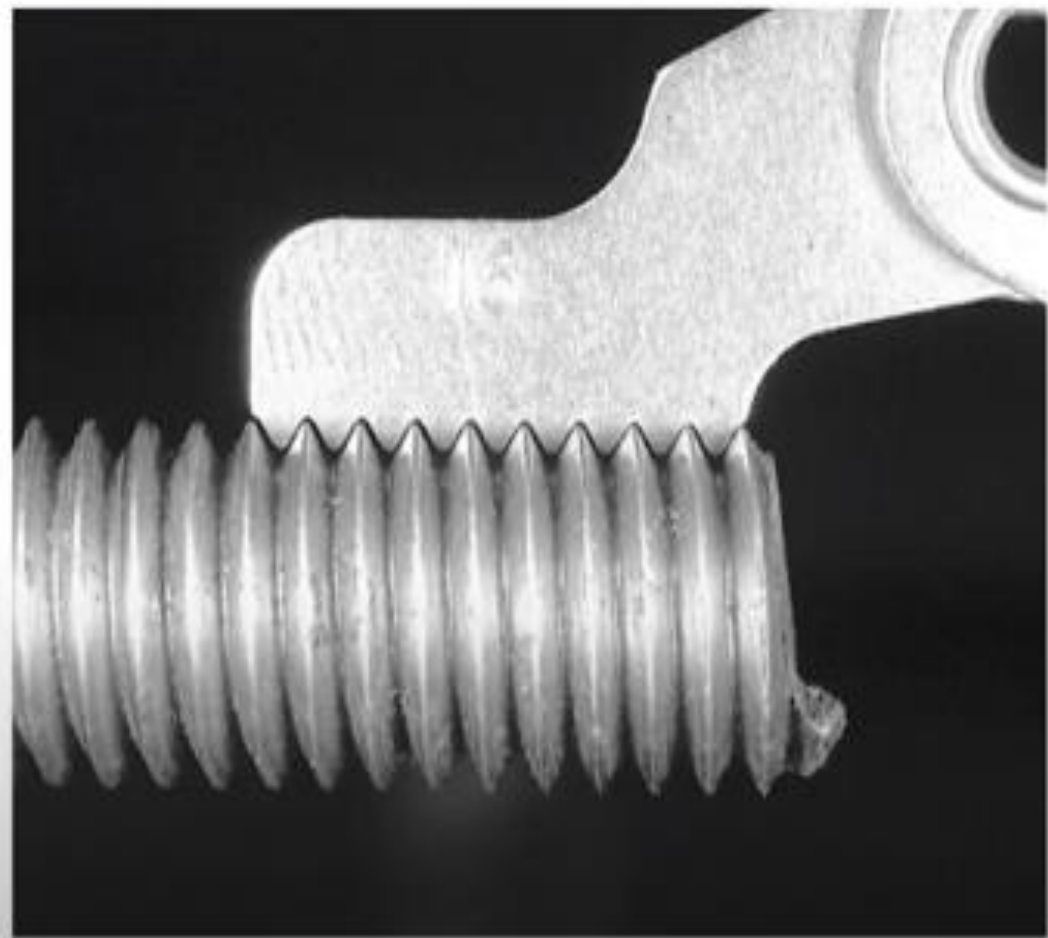
- Sample thread pitches
- Metric and Standard sizes



Metric Thread Gauge

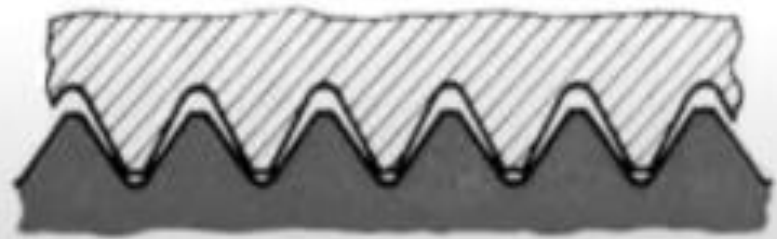
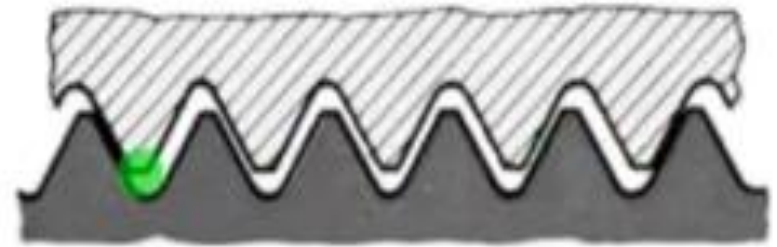


Using the Gauge



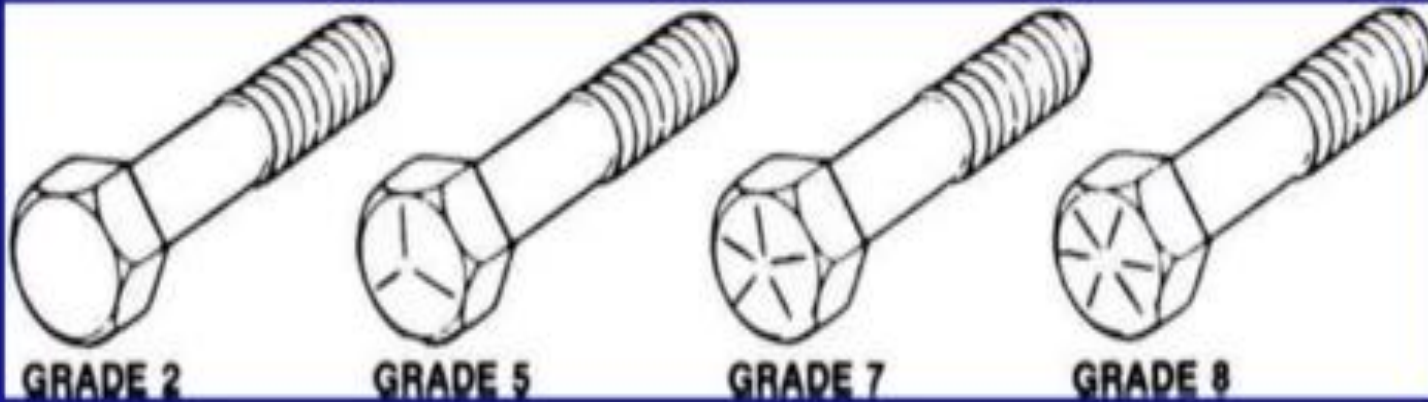
Carefull

- Some Metric and Standard pitches are really close.
- Hold it up to the light to make sure.

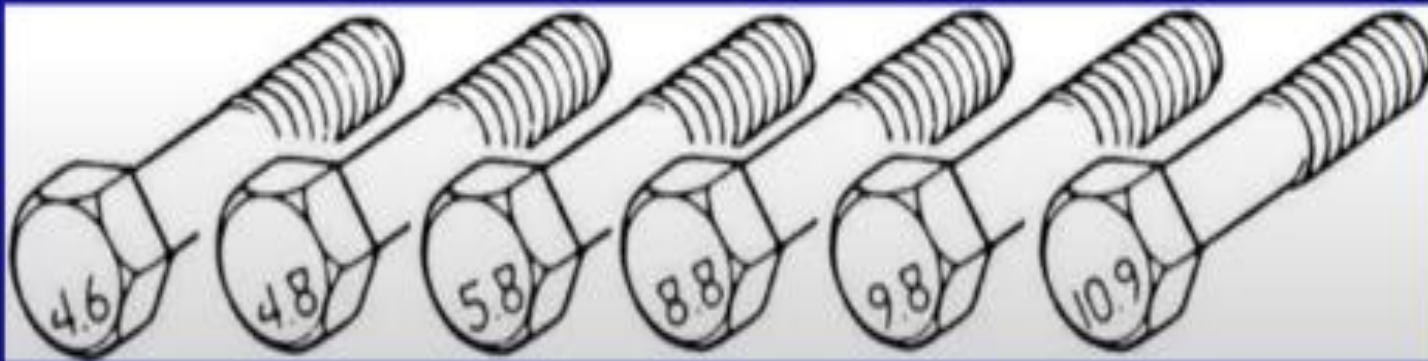


Bolt Head Markings

SAE



METRIC



Head Markings

- Identify Strength of Bolt
- Not required