

# Ensure GD&T Practices in Models Directly with SOLIDWORKS MBD

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**THINK SOLIDWORKS**

CREATE

EXPERIENCE

SPEED

GAME CHANGING

SMART DESIGN

NEXT-GEN

COMMUNITY-DRIVEN

EVOLVE

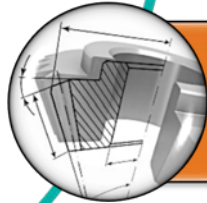
# Why Does GD&T Matter?



Significant economic consequences



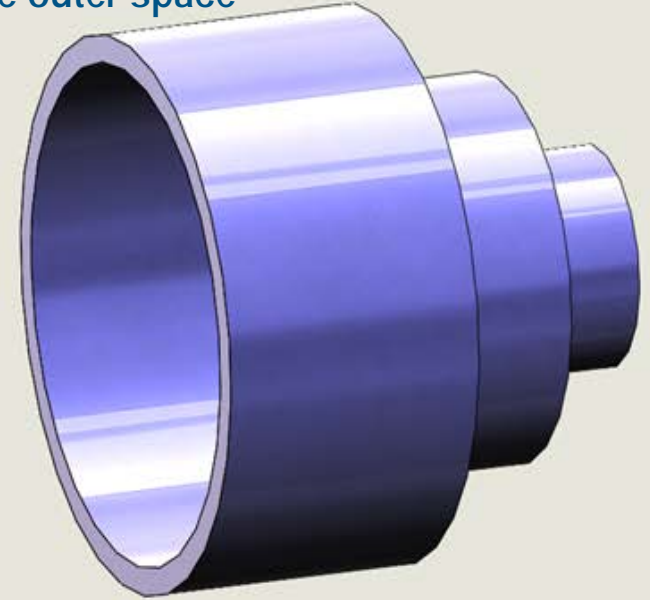
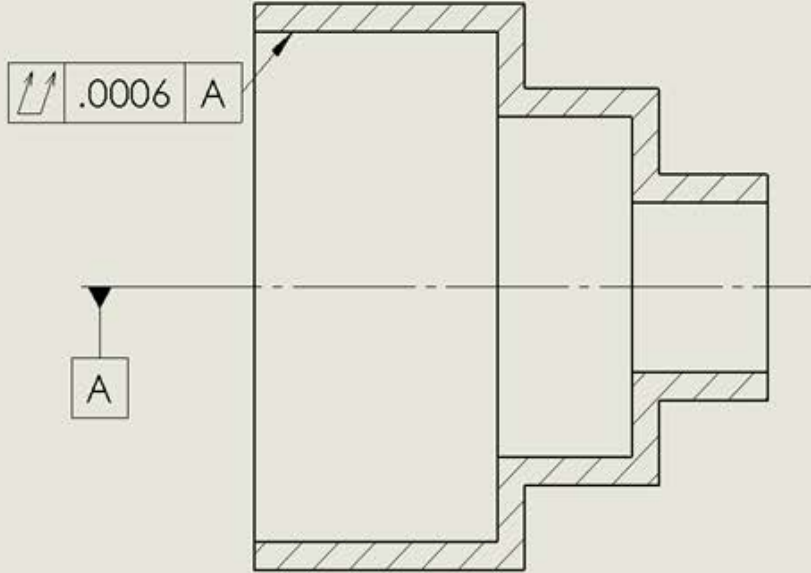
Small details entailing big changes



Different from drawings to MBD

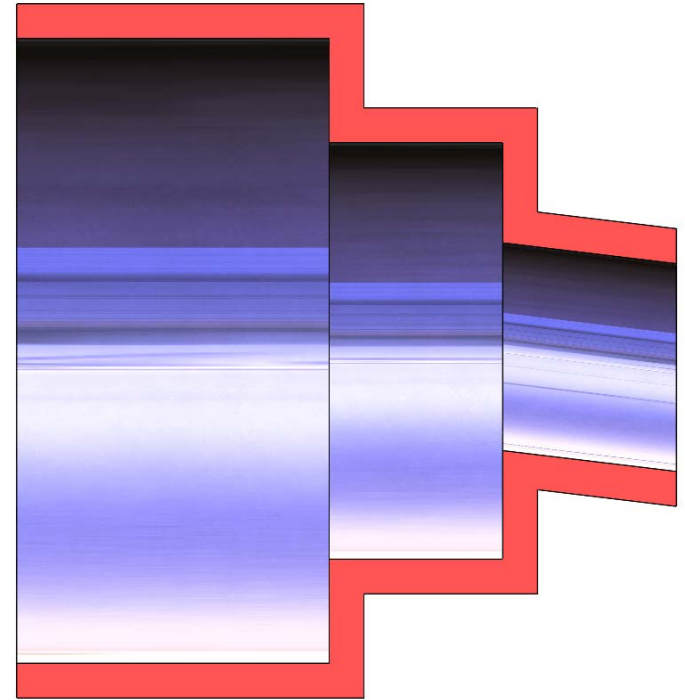
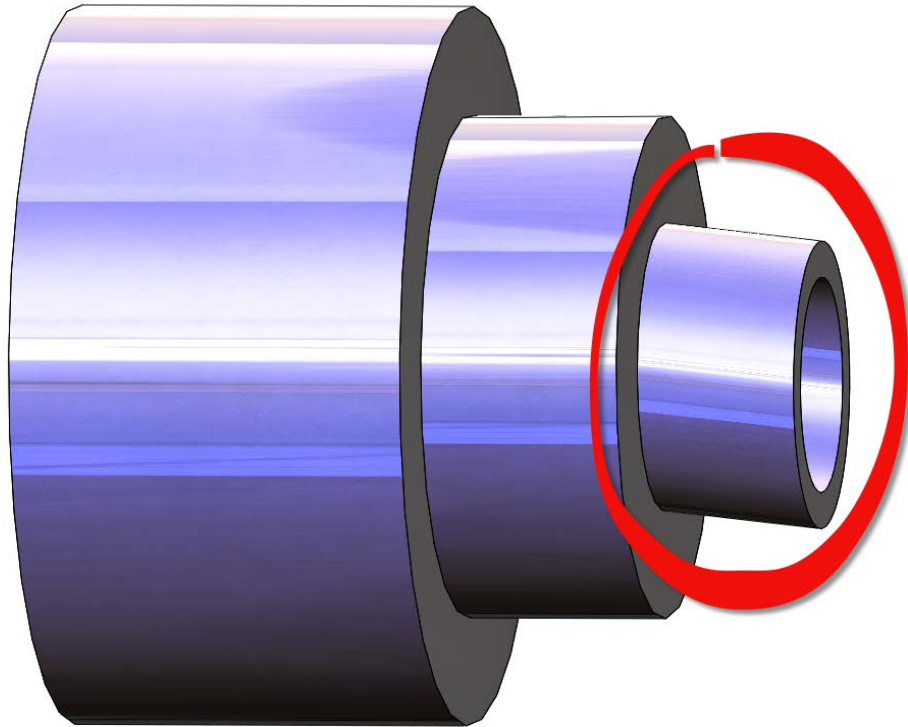
# Does It Look Familiar?

A telescope lens barrel in the outer space



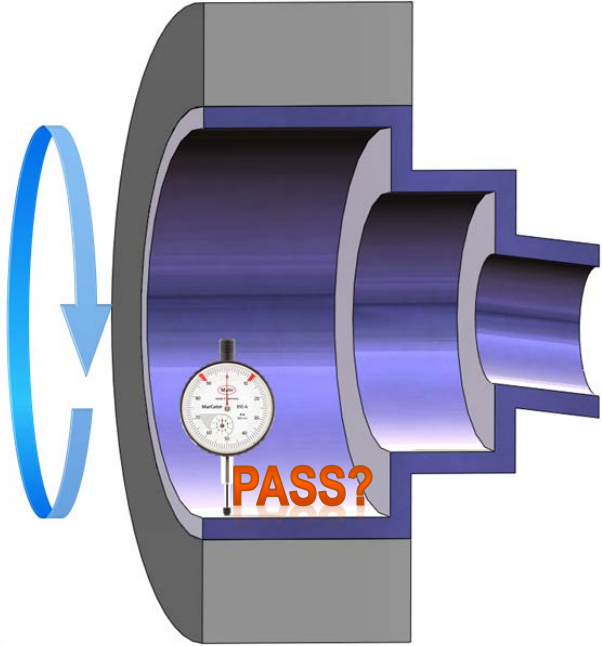
*Story courtesy of Tec-Ease*

# An Actual Machined Part

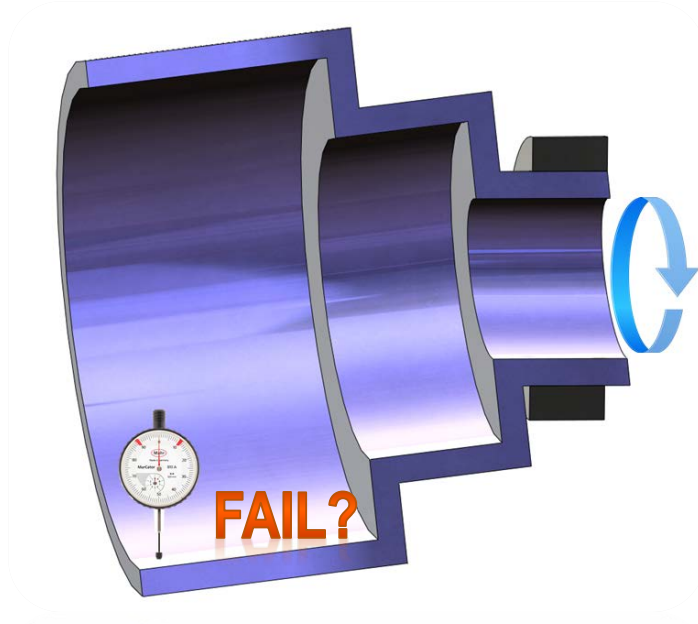


# How to Inspect?

 Supplier



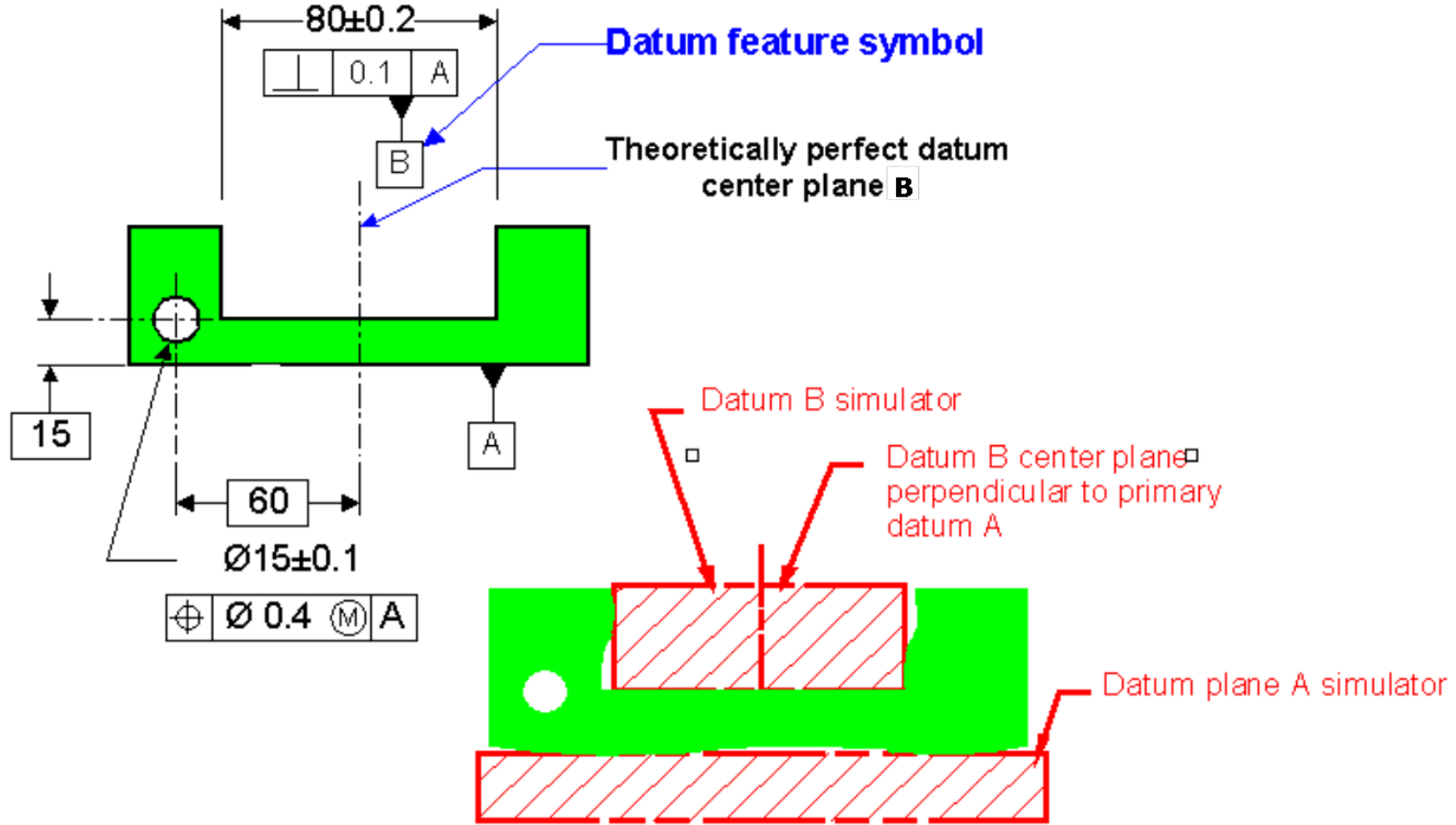
 Client



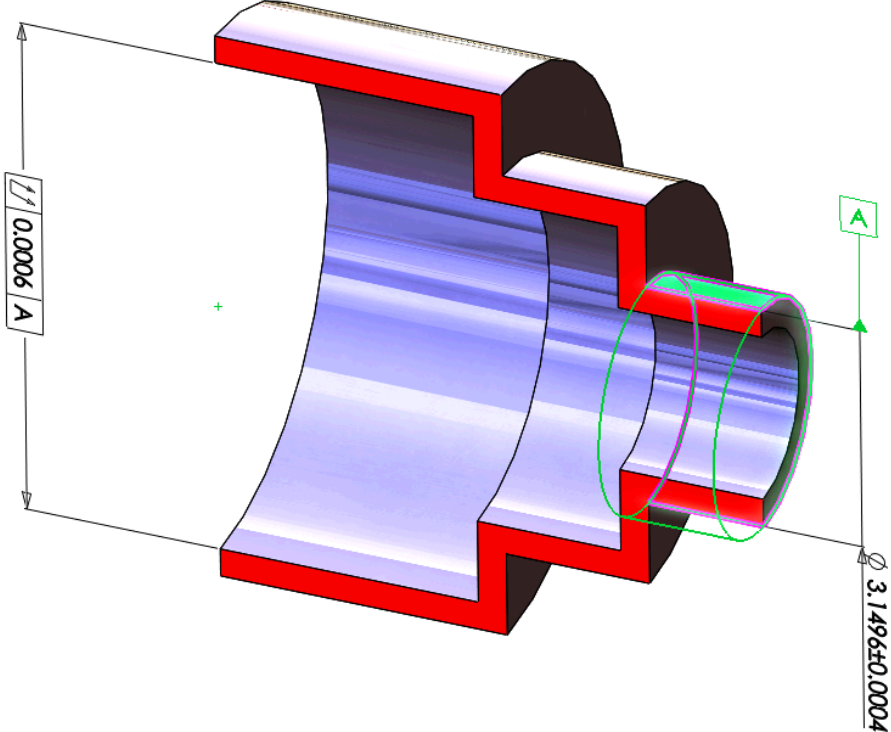
**\$8,000,000 LAWSUIT**



# Datum, Datum Feature, and Datum Feature Simulator



# How Does SOLIDWORKS Define It?





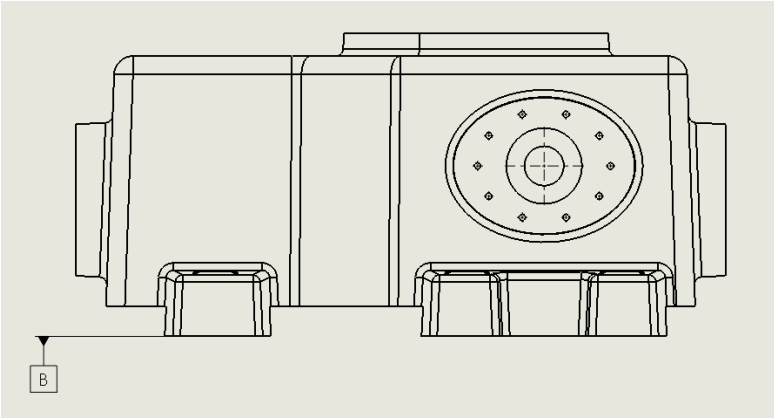




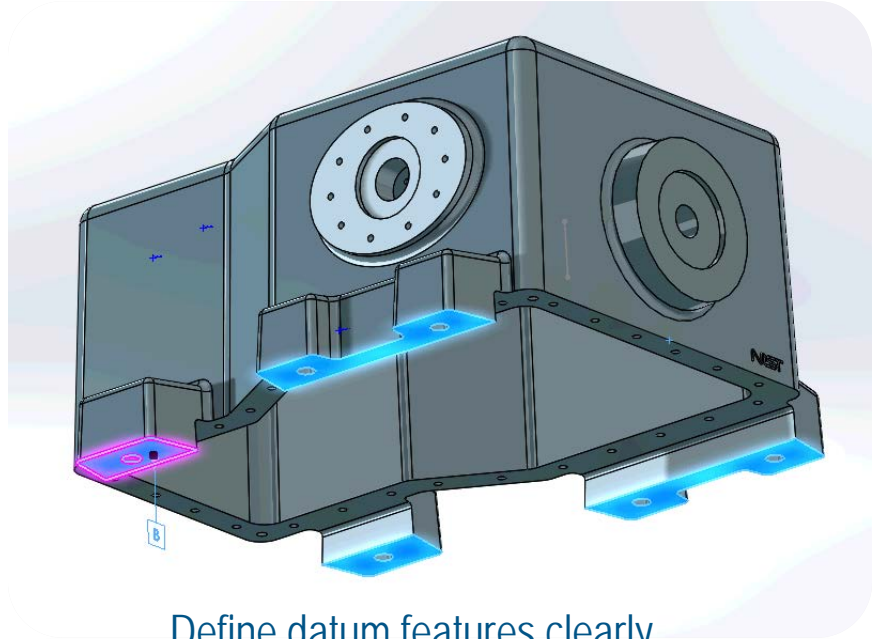
# Define Features Unambiguously

# Define Features Unambiguously

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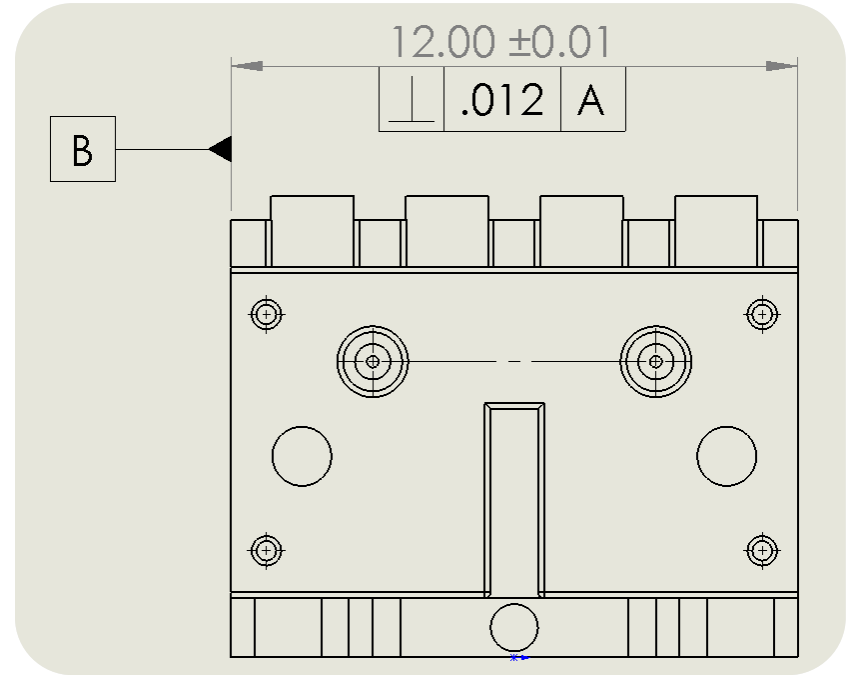
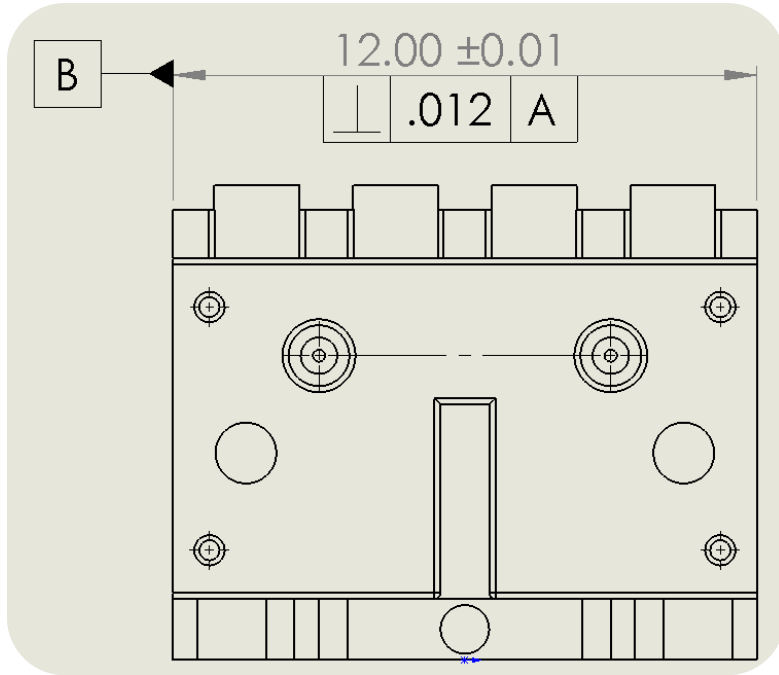


Confusing datum feature symbol

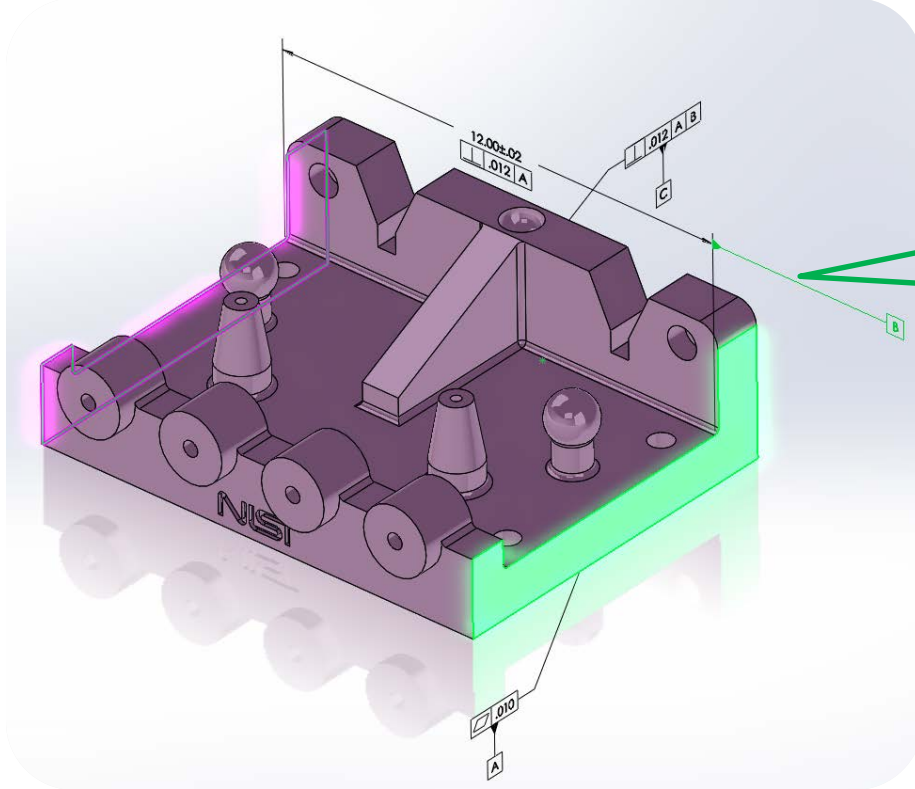


Define datum features clearly

# Are They The Same?

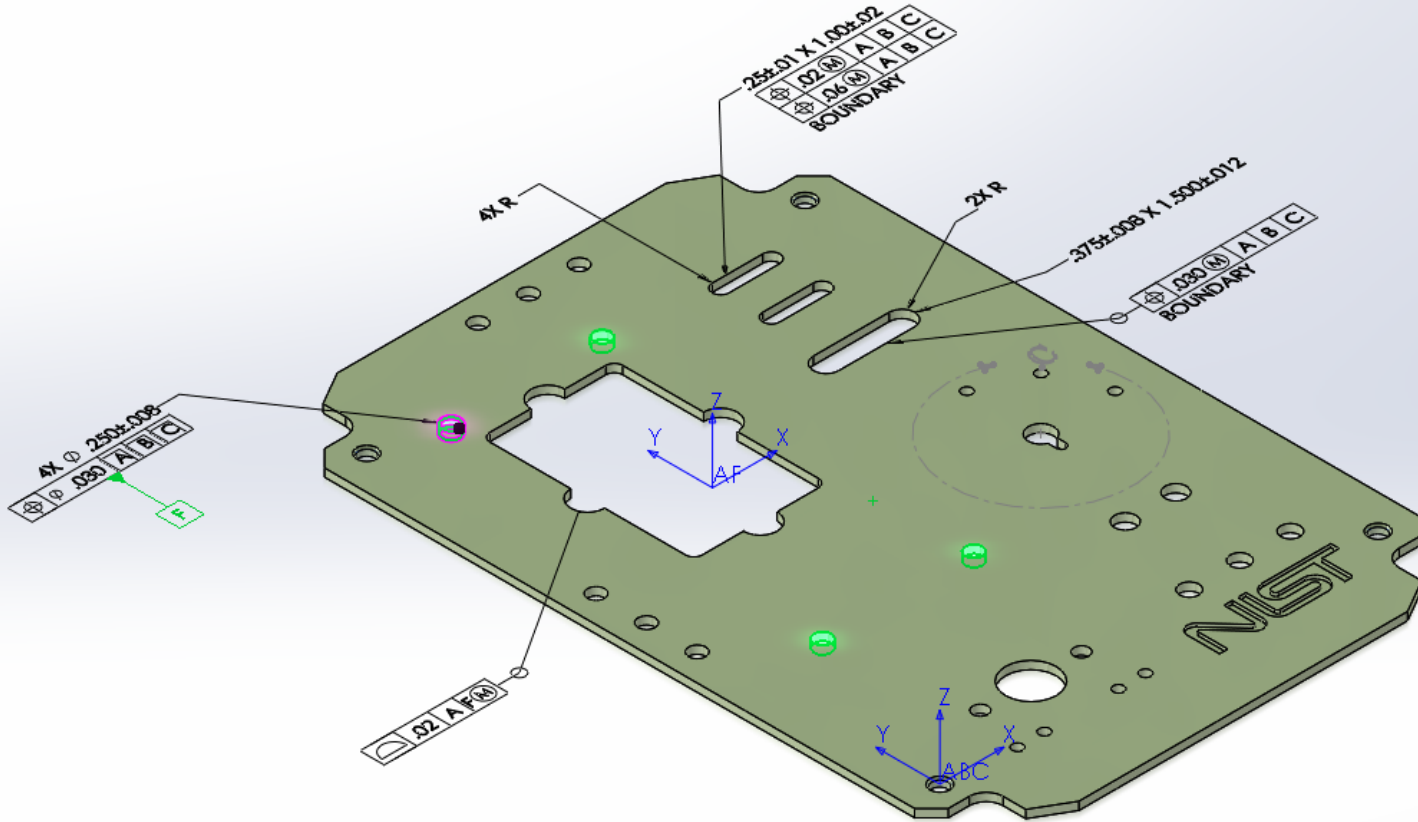


# Define A Width Feature as A Datum Feature

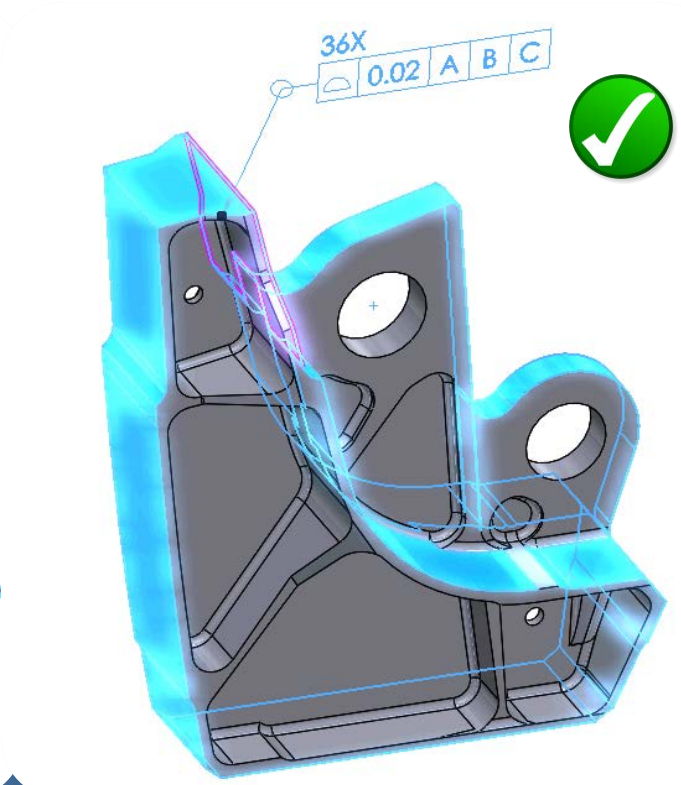
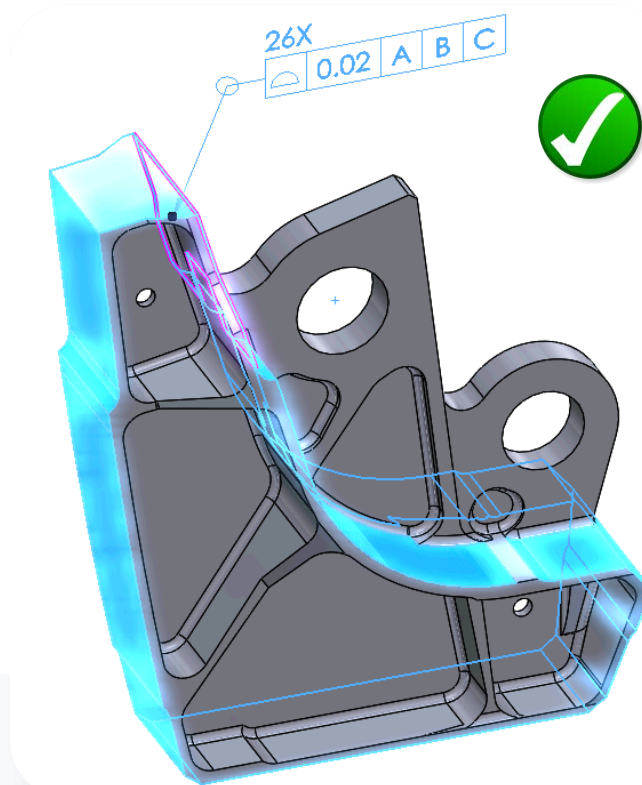
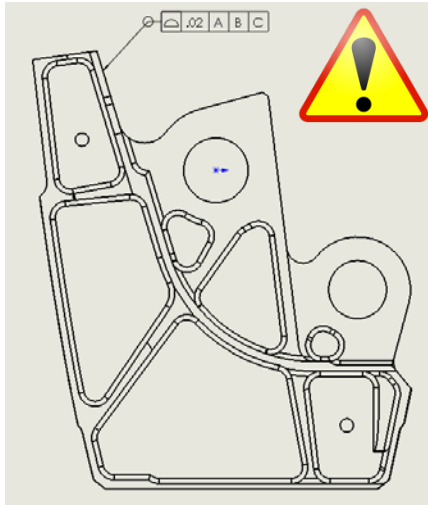


The dimension lines are automatically aligned

# Define A Pattern as A Datum Feature



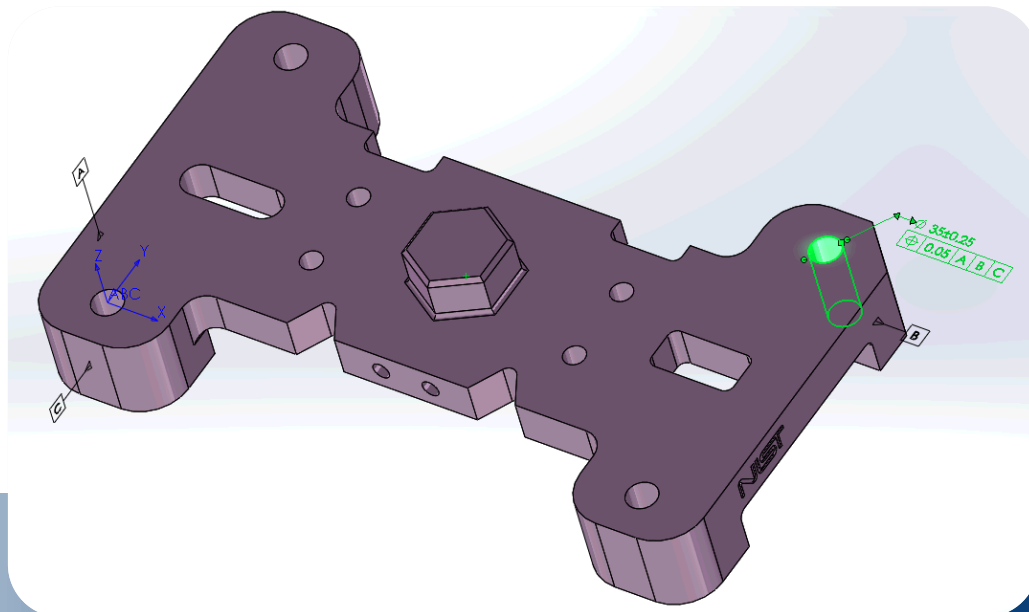
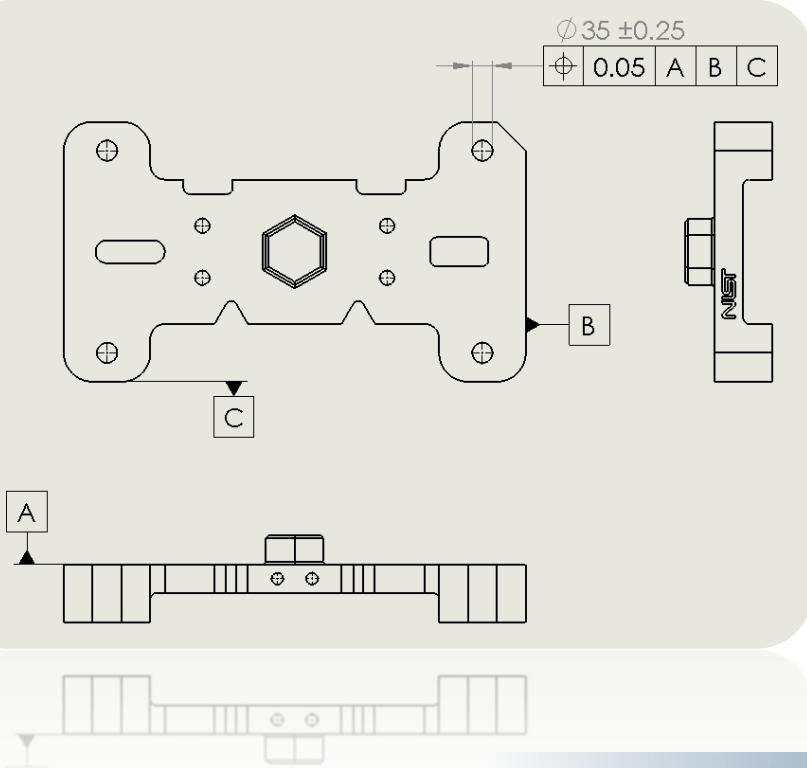
# Define Features Unambiguously



# Ensure Compliances with Built-in GD&T Intelligence



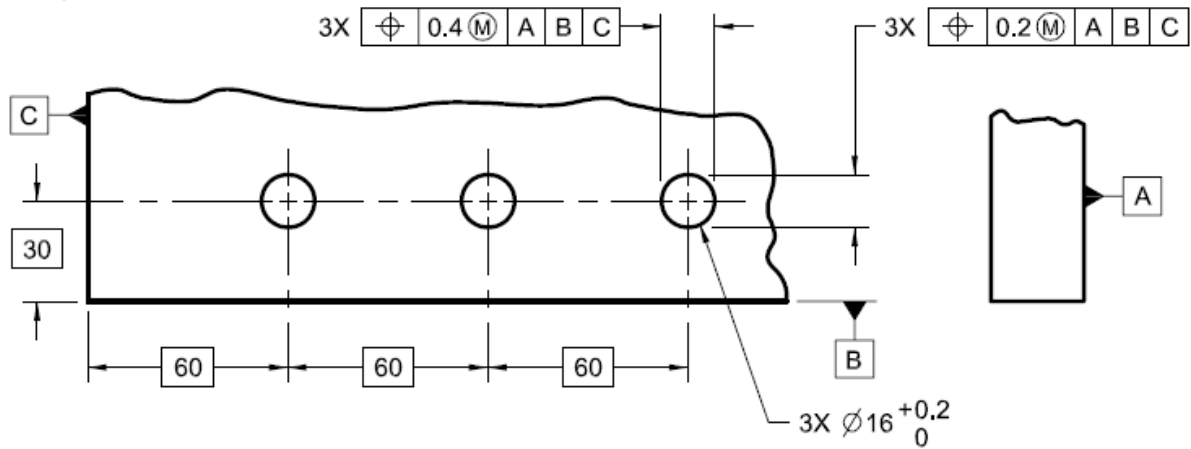
# Ensure Compliances with Built-in GD&T Intelligence



3DS

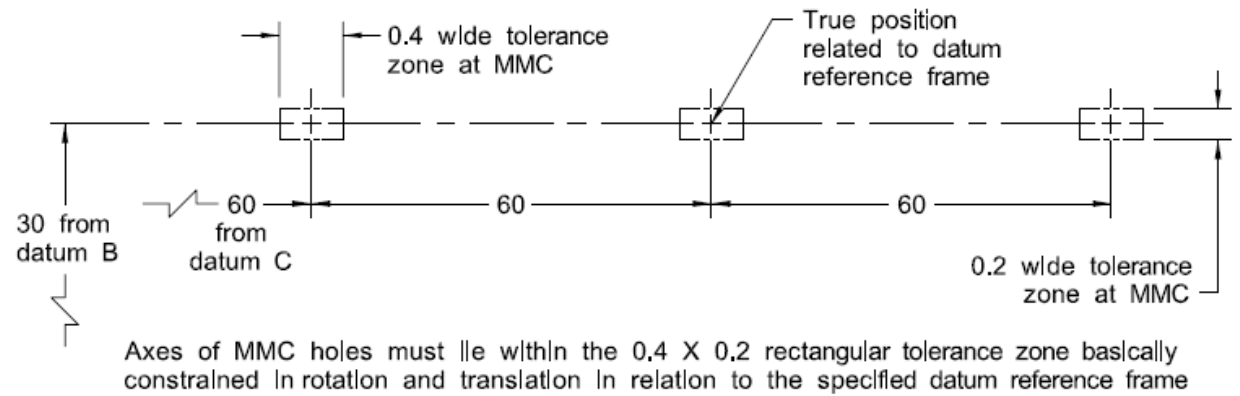
# Fig. 7-28 Bidirectional Positional Tolerancing, Rectangular Coordinate Method

This on the drawing

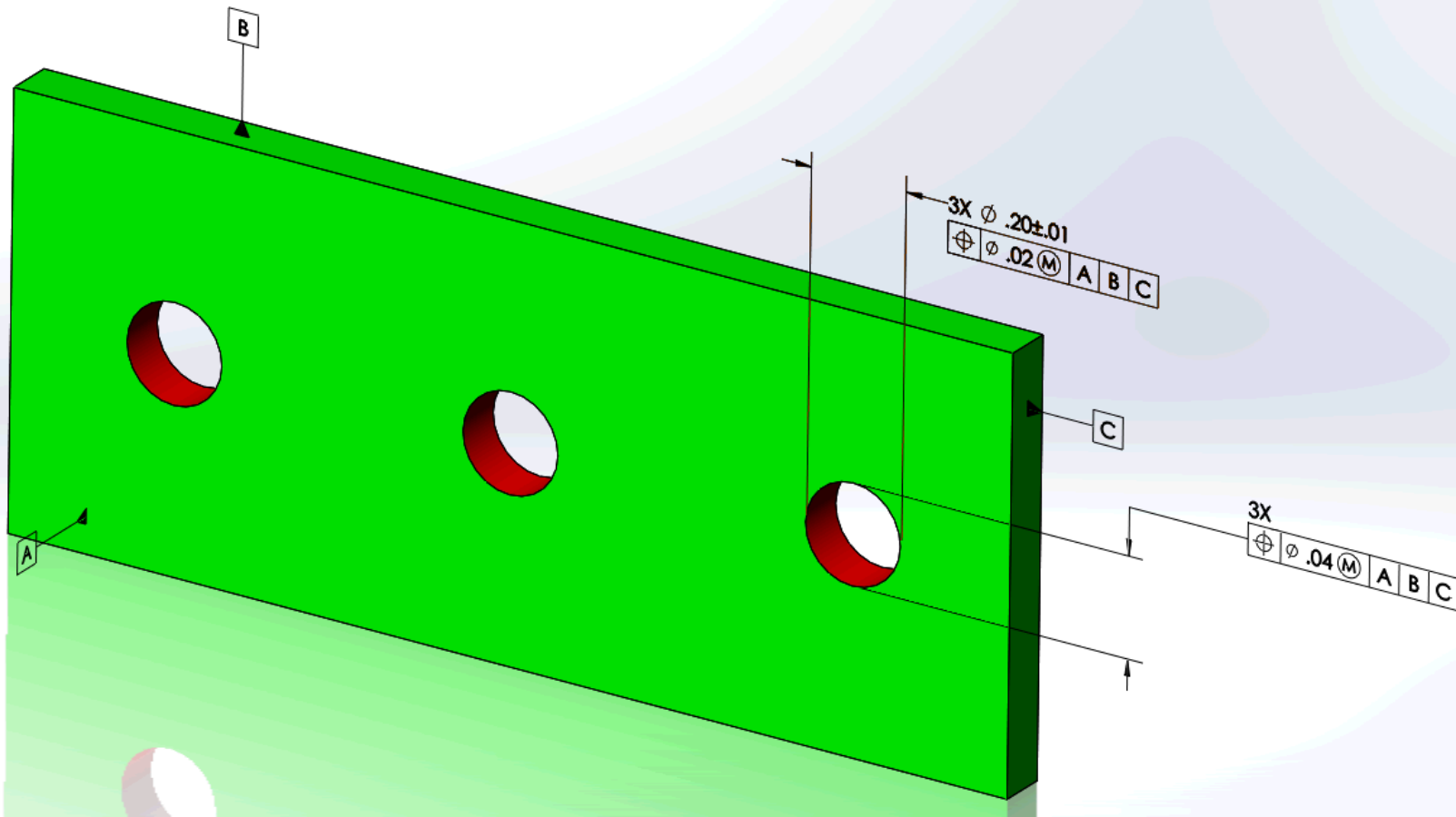


7.4.6  
7.4.4.1

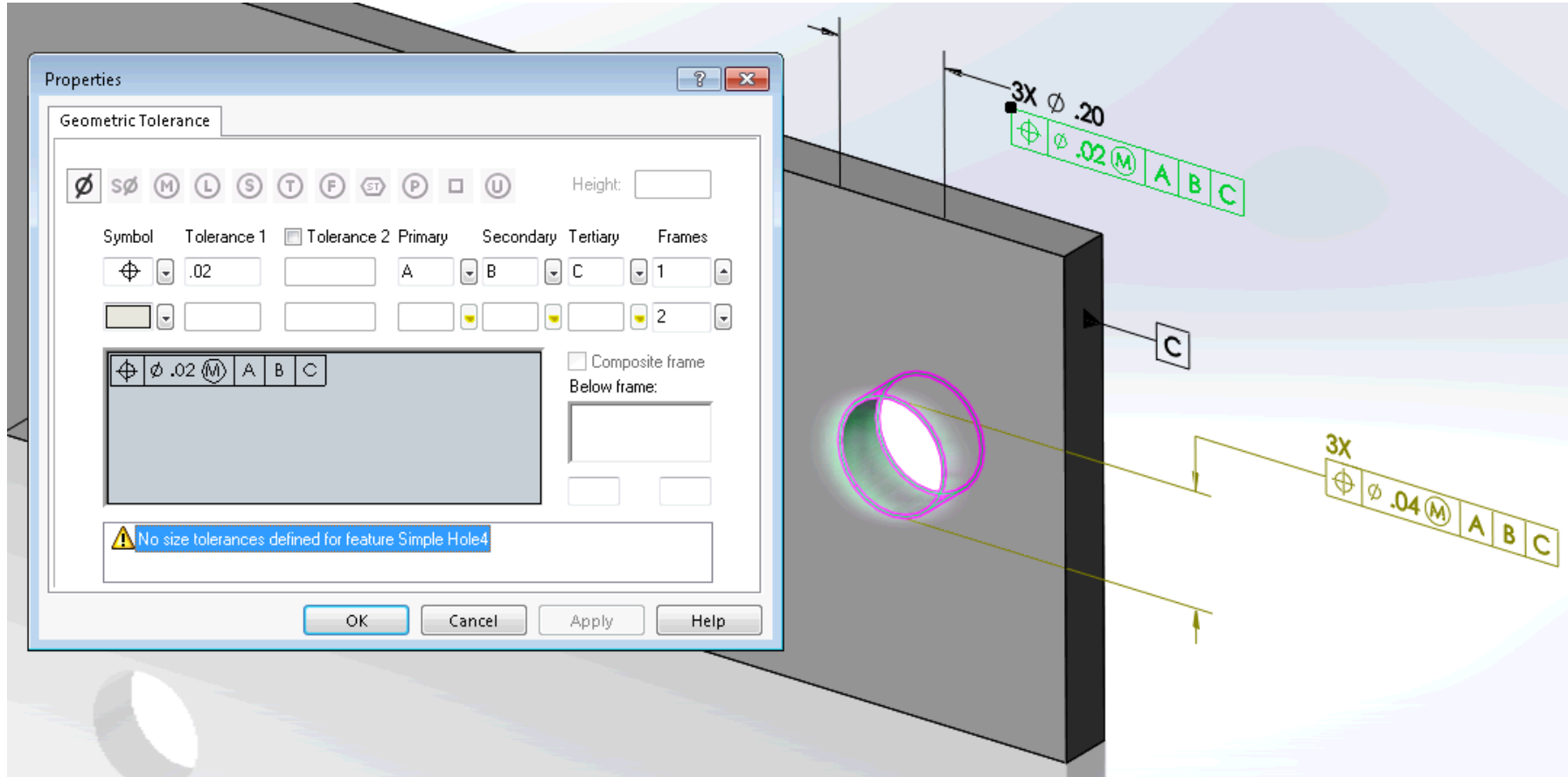
Means this



# Flag Conflicting Tolerance Zones



# Flag Invalid Maximum Material Conditions

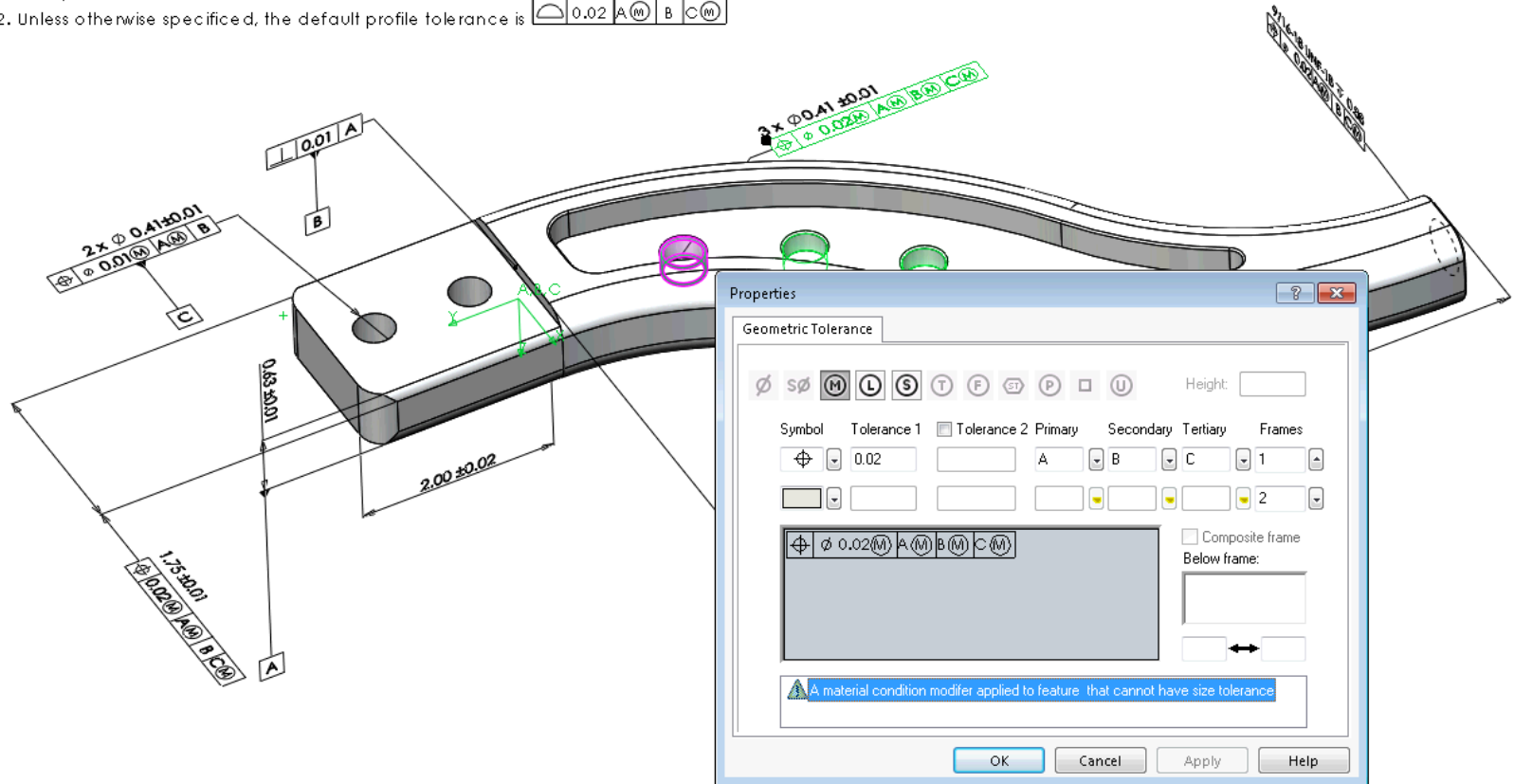


# Flag Invalid Maximum Material Conditions

Notes:

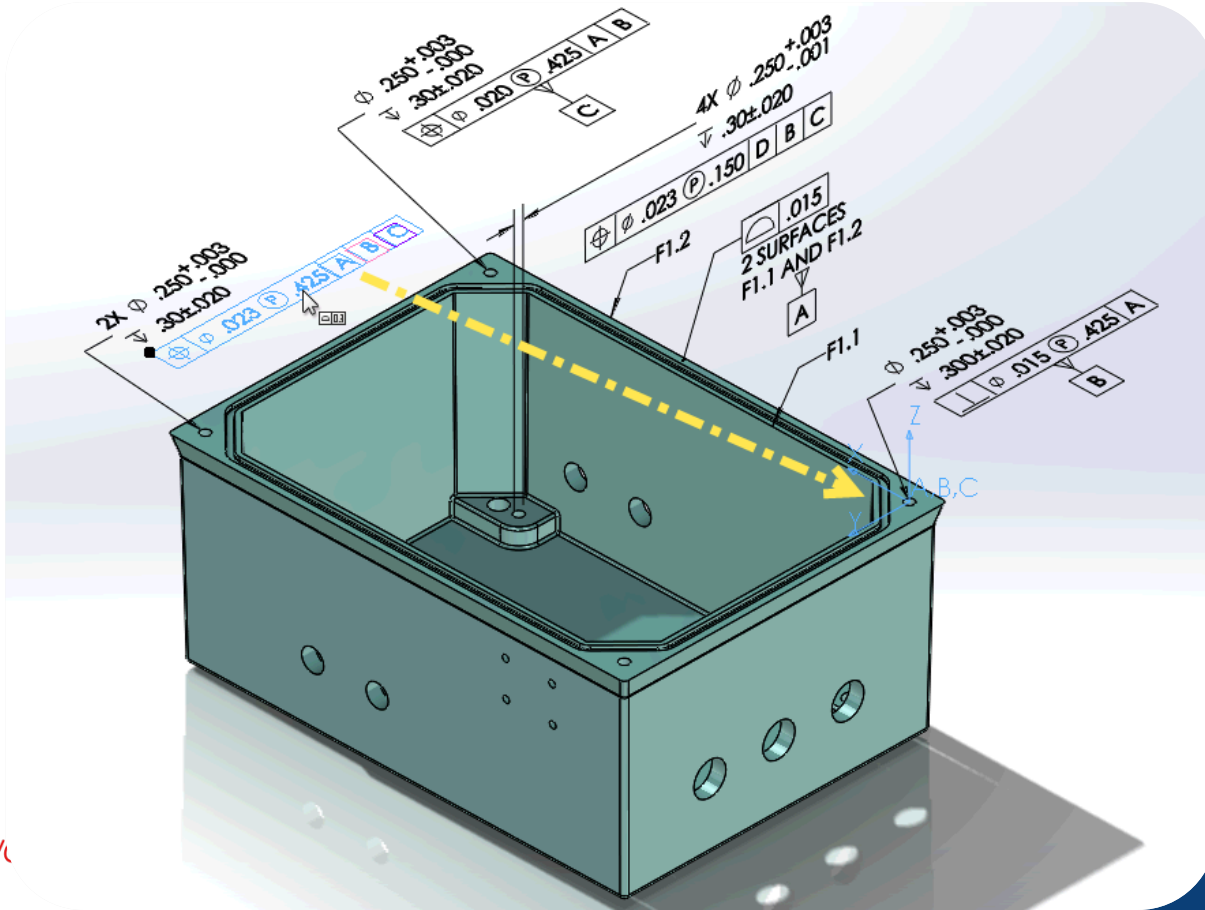
1. Query the CAD model for basic dimensions.

2. Unless otherwise specified, the default profile tolerance is  $\boxed{\text{M}} 0.02 \boxed{\text{A}} \boxed{\text{M}} \boxed{\text{B}} \boxed{\text{C}} \boxed{\text{M}}$



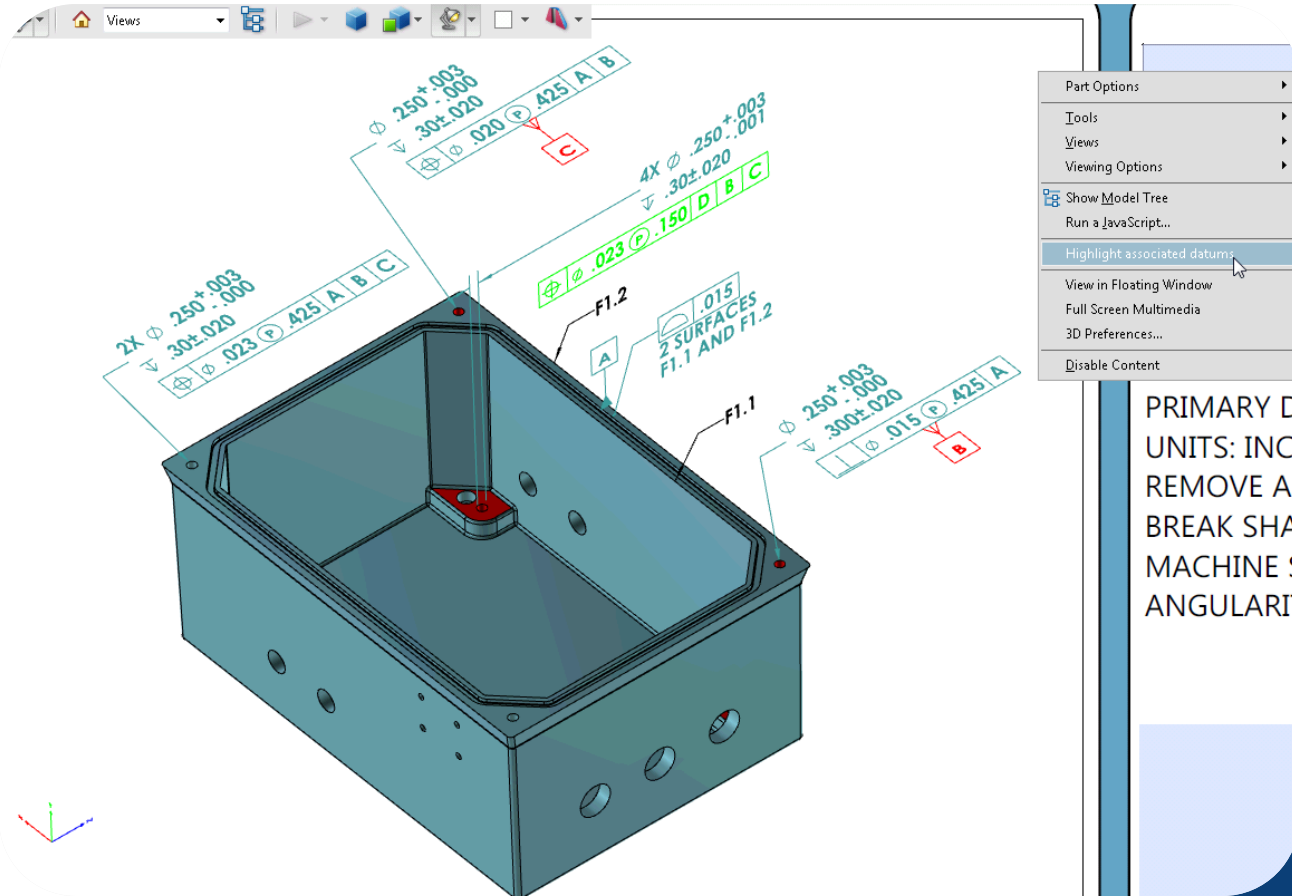
# Facilitate Communications with Visual Aids

# Automatically Create and Display Coordinate Systems





# Locate Datum Features from References Automatically

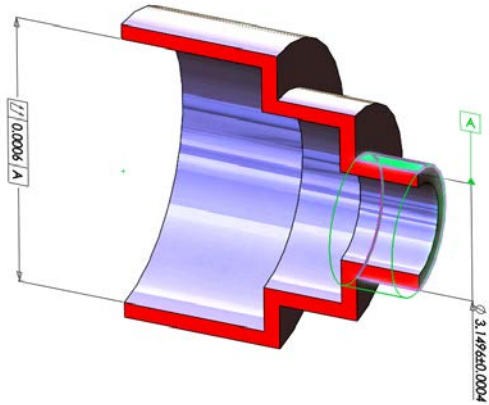


PRIMARY D  
UNITS: INCI  
REMOVE AI  
BREAK SHA  
MACHINE S  
ANGULARIT

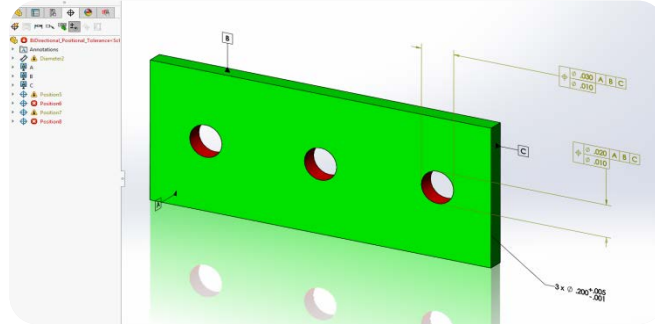




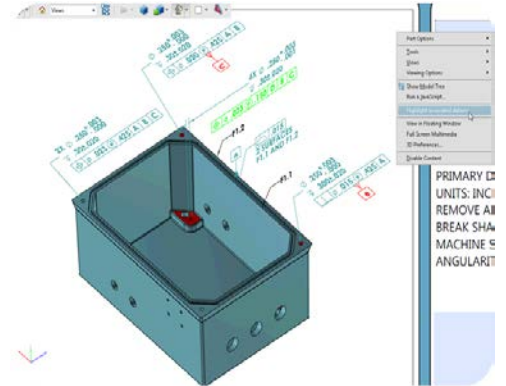
# Summary



Define features unambiguously



Ensure compliances with built-in GD&T intelligence

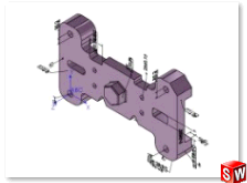


Facilitate communications with visual aids

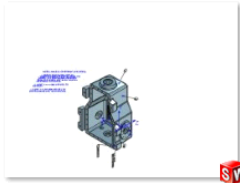
# Expect a Learning Curve



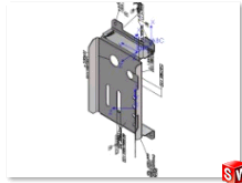
# An Exercise Idea: MBD Test Models by NIST



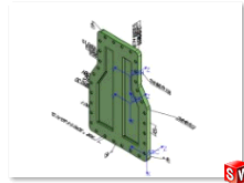
nist\_ctc\_01\_asme1\_rd\_sw1802.SLDPRT



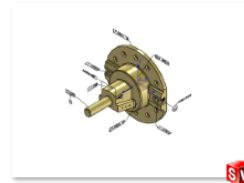
nist\_ctc\_02\_asme1\_rc\_sw1802.SLDPRT



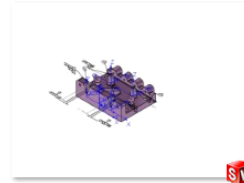
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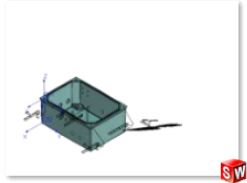
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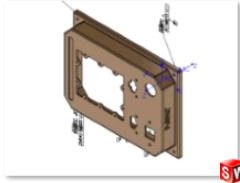
nist\_ctc\_05\_asme1\_rd\_sw1802.SLDPRT



nist\_ftc\_06\_asme1\_rd\_sw1802.SLDPRT



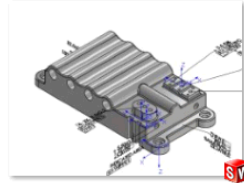
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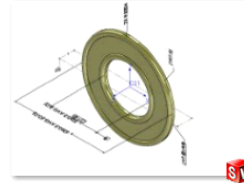
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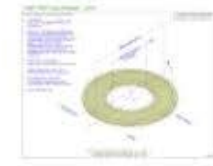
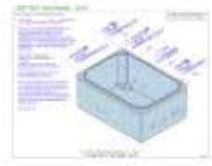
nist\_ftc\_09\_asme1\_rd\_sw1802.SLDPRT



nist\_ftc\_10\_asme1\_rb\_sw1802.SLDPRT



nist\_ftc\_11\_asme1\_rb\_sw1802.SLDPRT



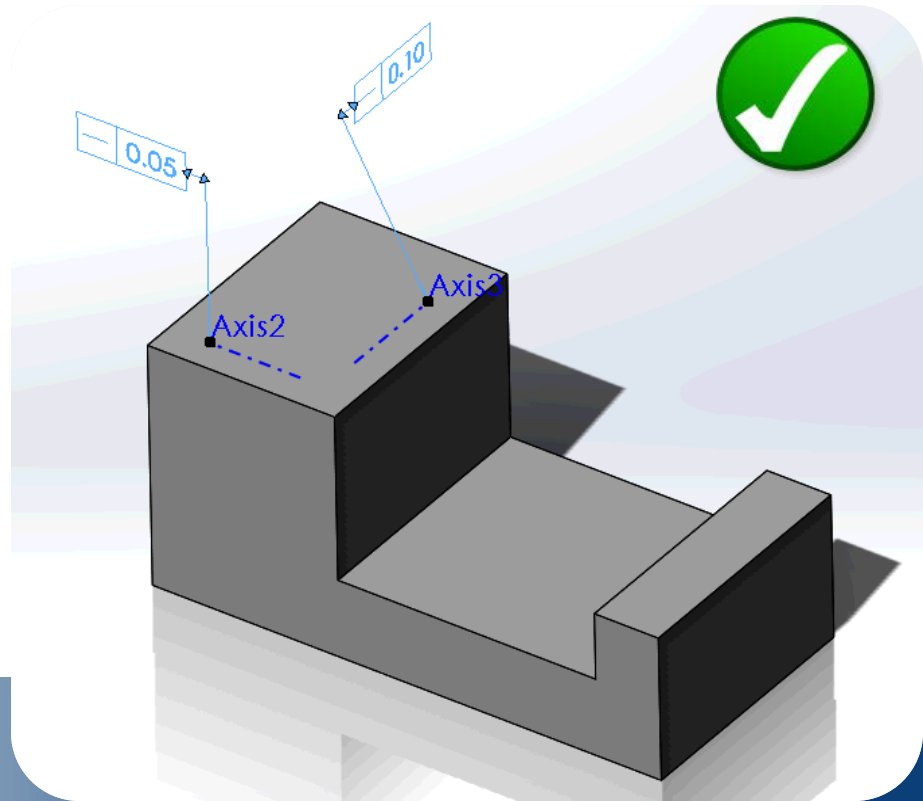
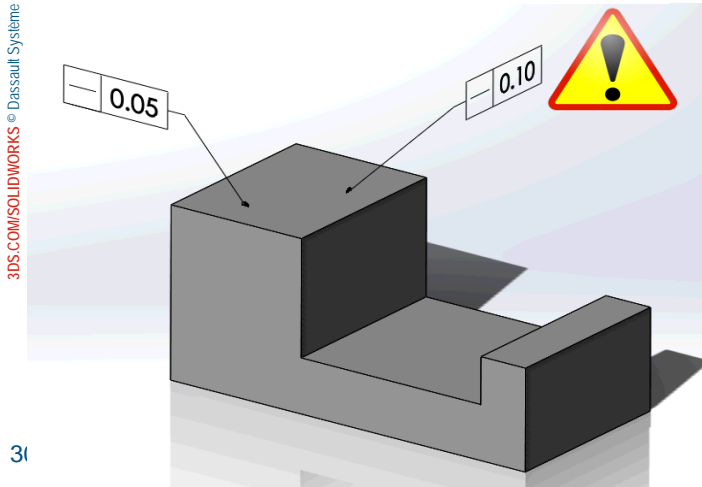
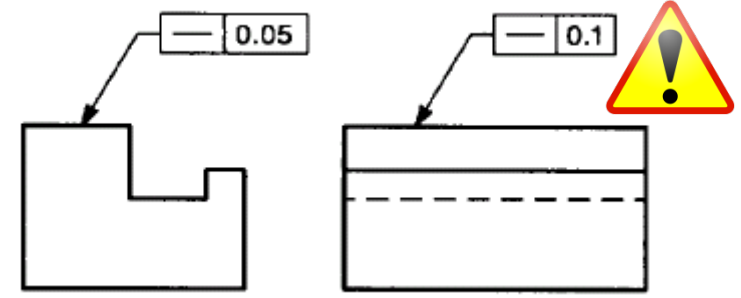


# Backup Slides



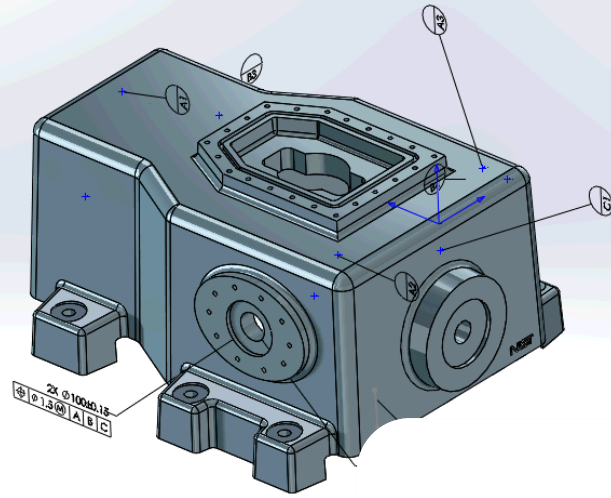
# Avoid "view dependent tolerances"

hent\_2014



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# Angled notes or flat notes?

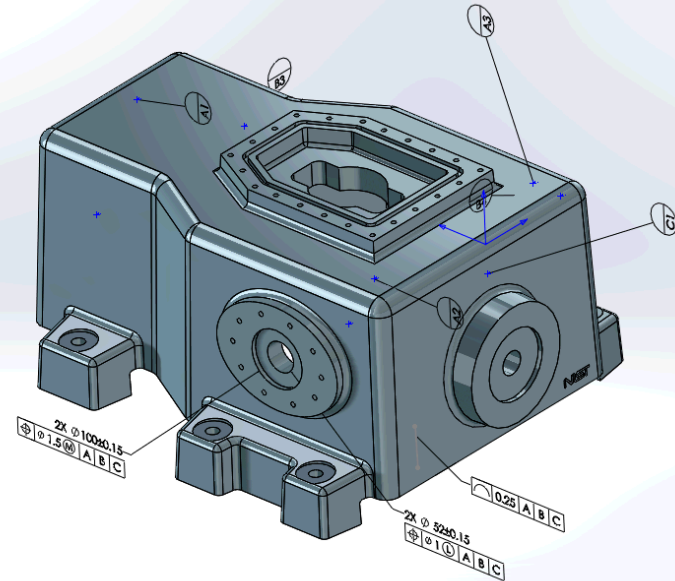


## NOTES (UNLESS OTHERWISE SPECIFIED):

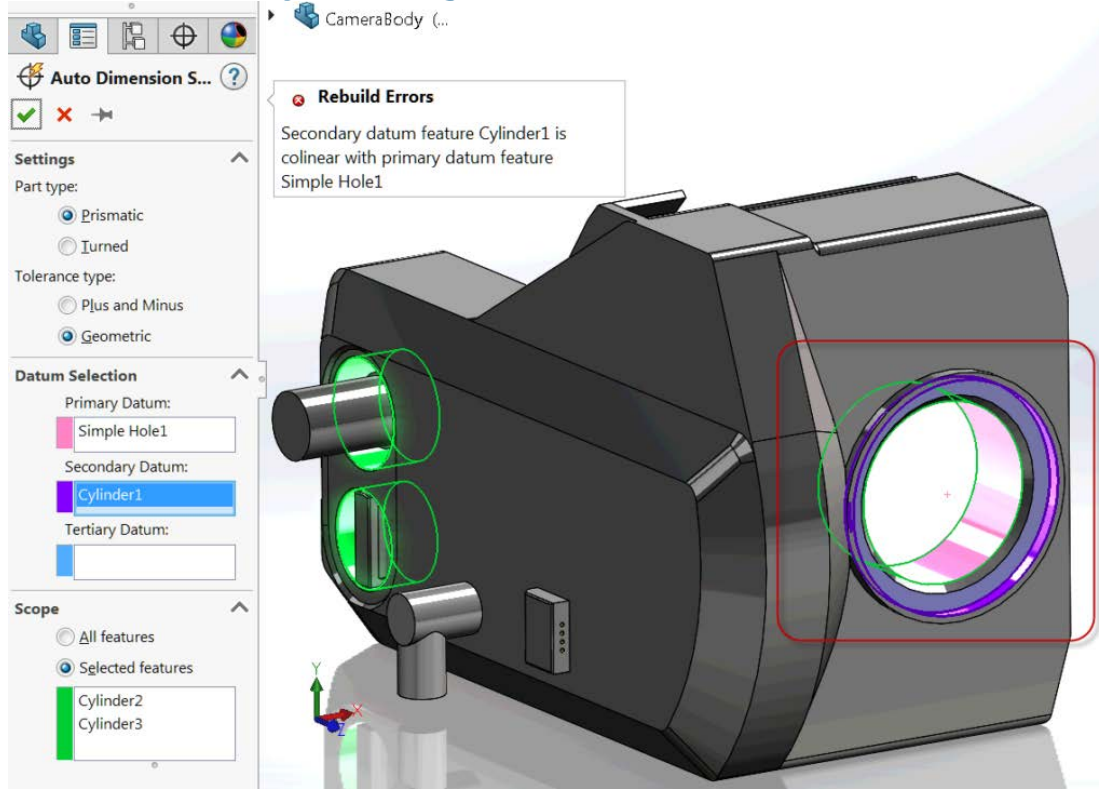
1. OBTAIN DIMENSIONS FOR ALL UNDIMENSIONED FEATURES FROM THE MODEL. ALL DIMENSIONS OBTAINED FROM THE MODEL ARE BASIC UNLESS OTHERWISE SPECIFIED.

2. ASME Y14.41-2003 APPLIES TO DATASET.

3. ASME Y14.5M-2009 APPLIES TO DIMENSIONING AND TOLERANCING.



# Automatically Flag GD&T Issues (Datum Features)



# Datum, Datum Feature, and Datum Feature Simulator

