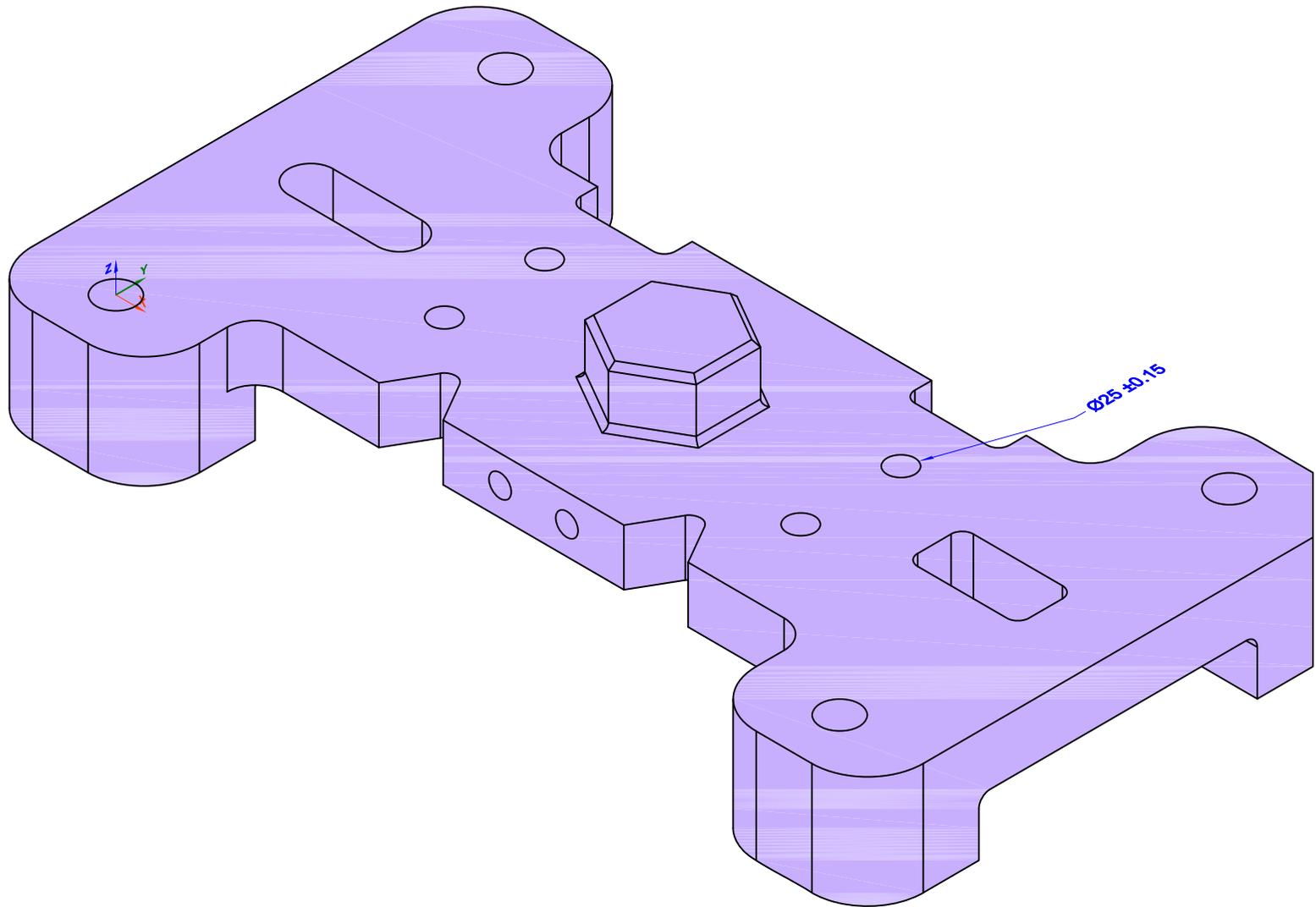


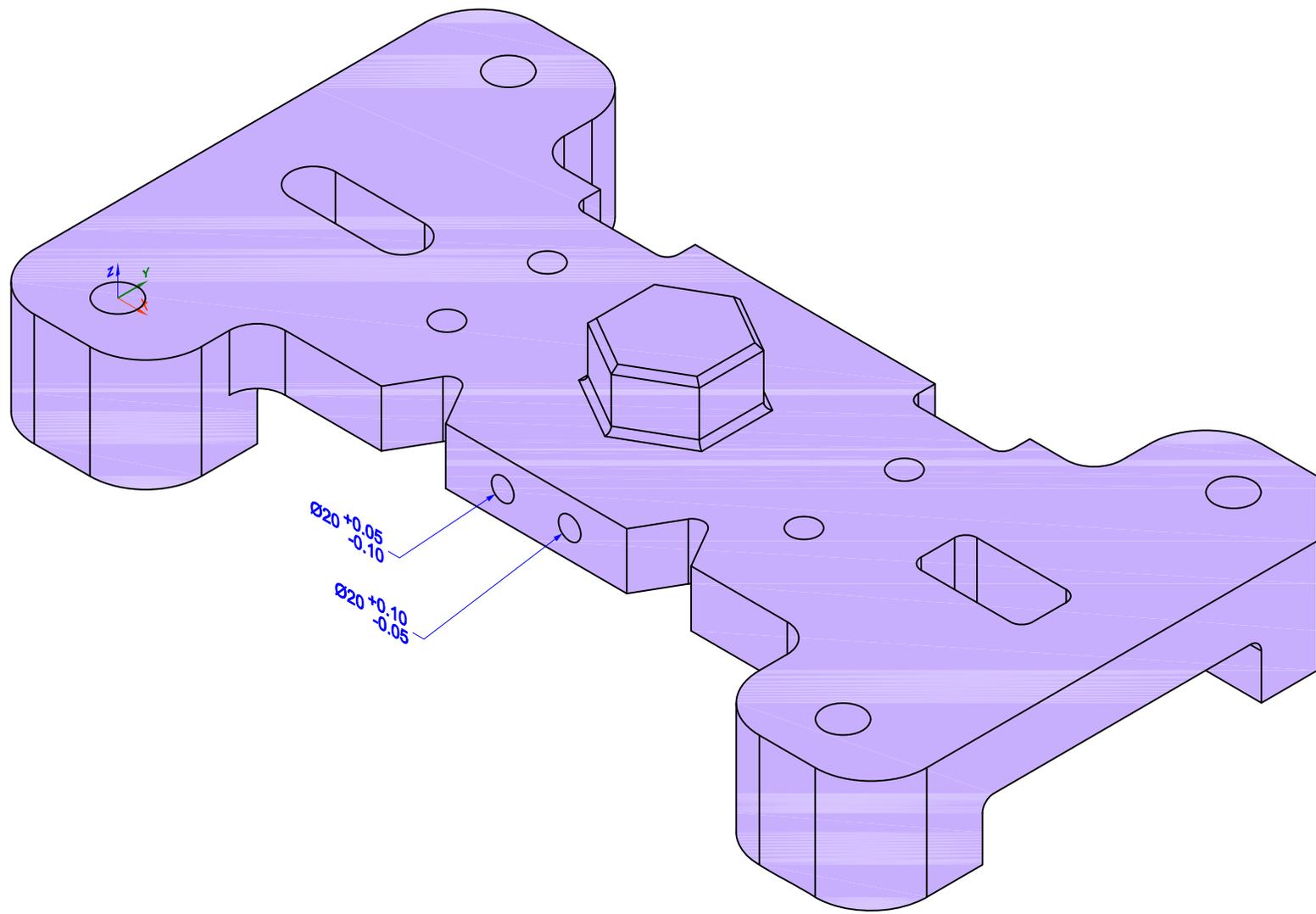
PMI Complex Test Case 1

Includes Atomic Test Cases - 1, 2, 3, 4, 7, 8, 17, 21, 33, 48



Measurand:
Dimension and equal-bilateral
tolerance.

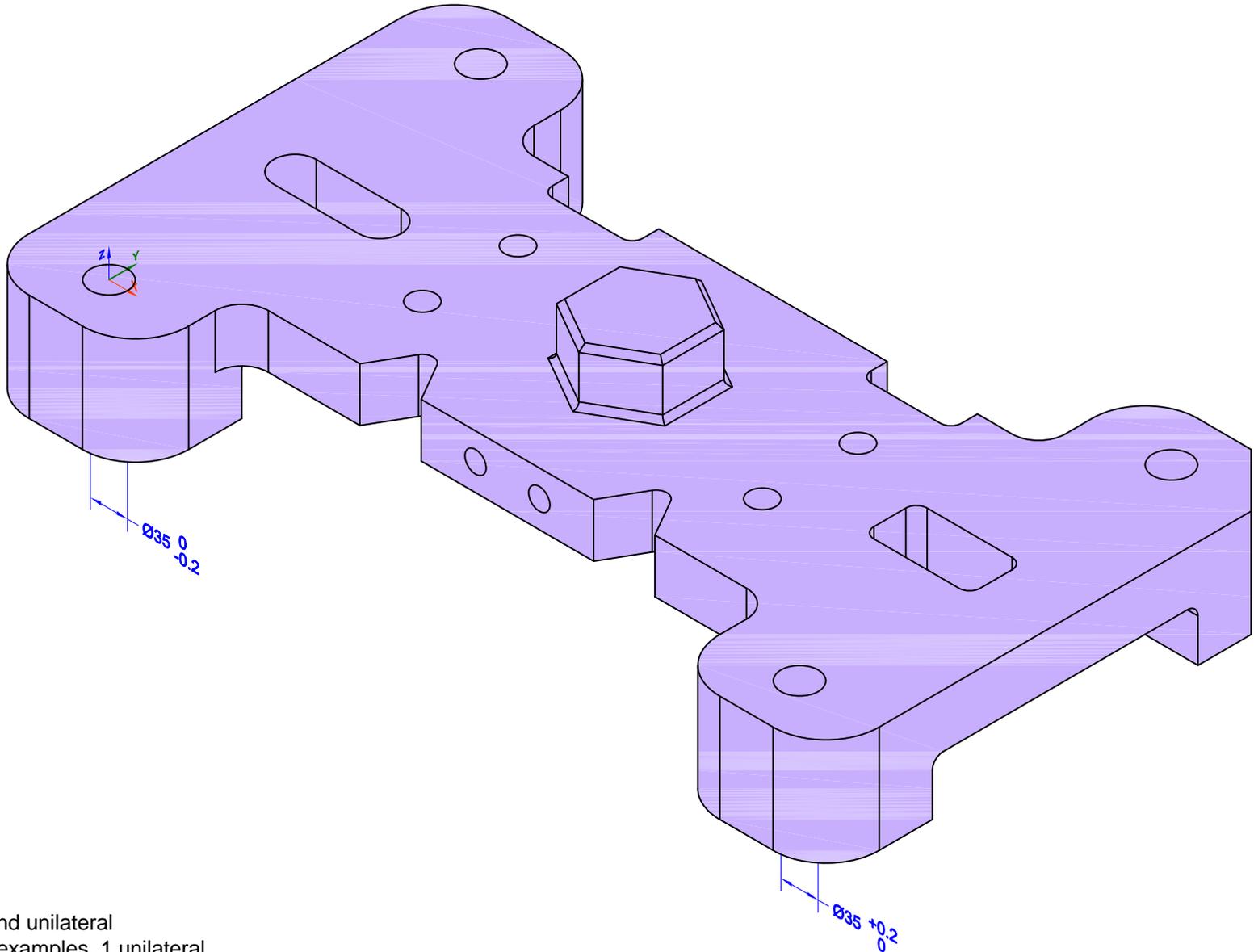
PMI Atomic Test Case 1
Dimension with Equal-Bilateral Tolerance: Feature of Size



Measurand:
Dimension and unequal-bilateral tolerance.
2 examples, + more - less, + less - more.

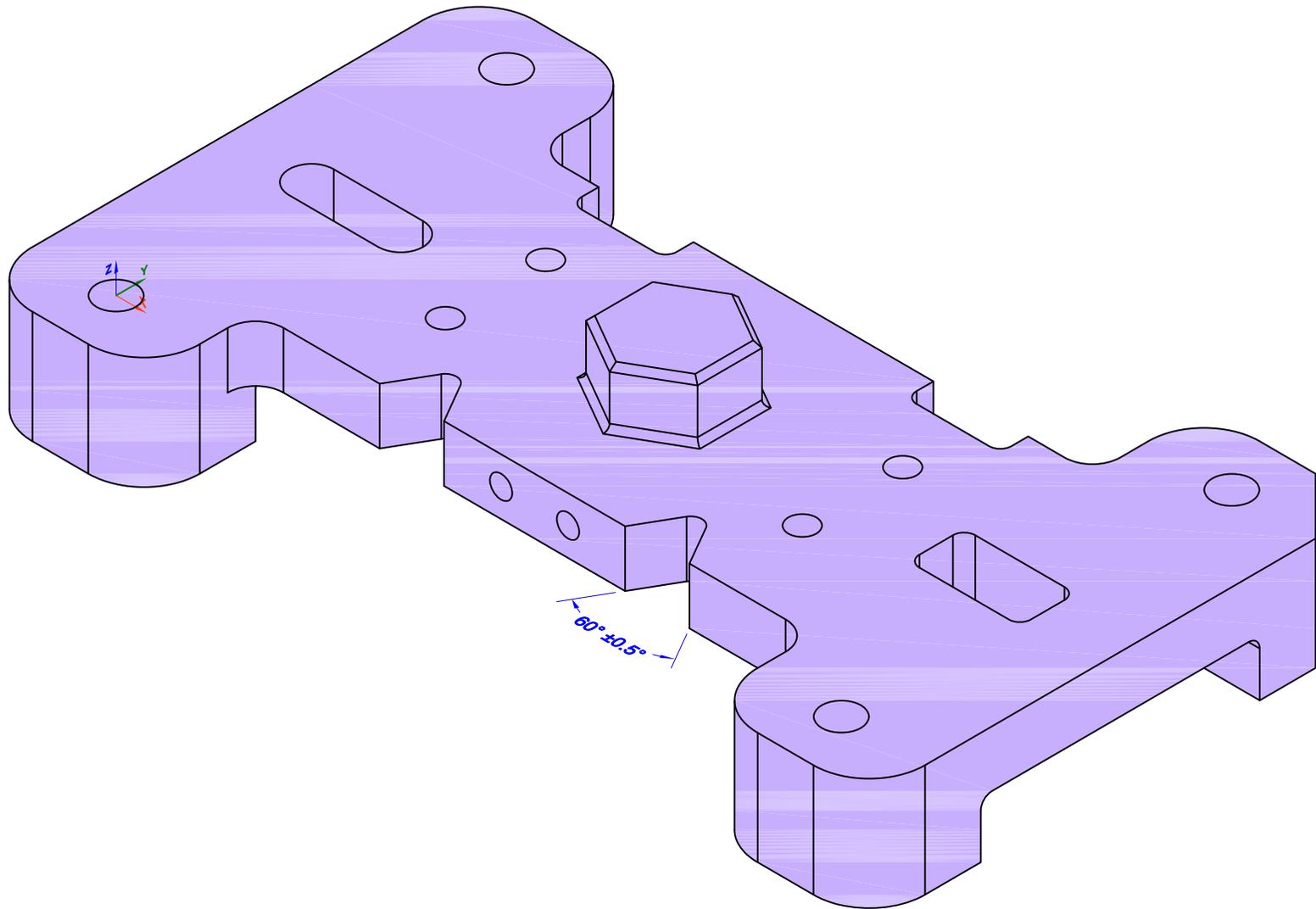
PMI Atomic Test Case 2

Dimension with Unequal-Bilateral Tolerance: Feature of Size (2)



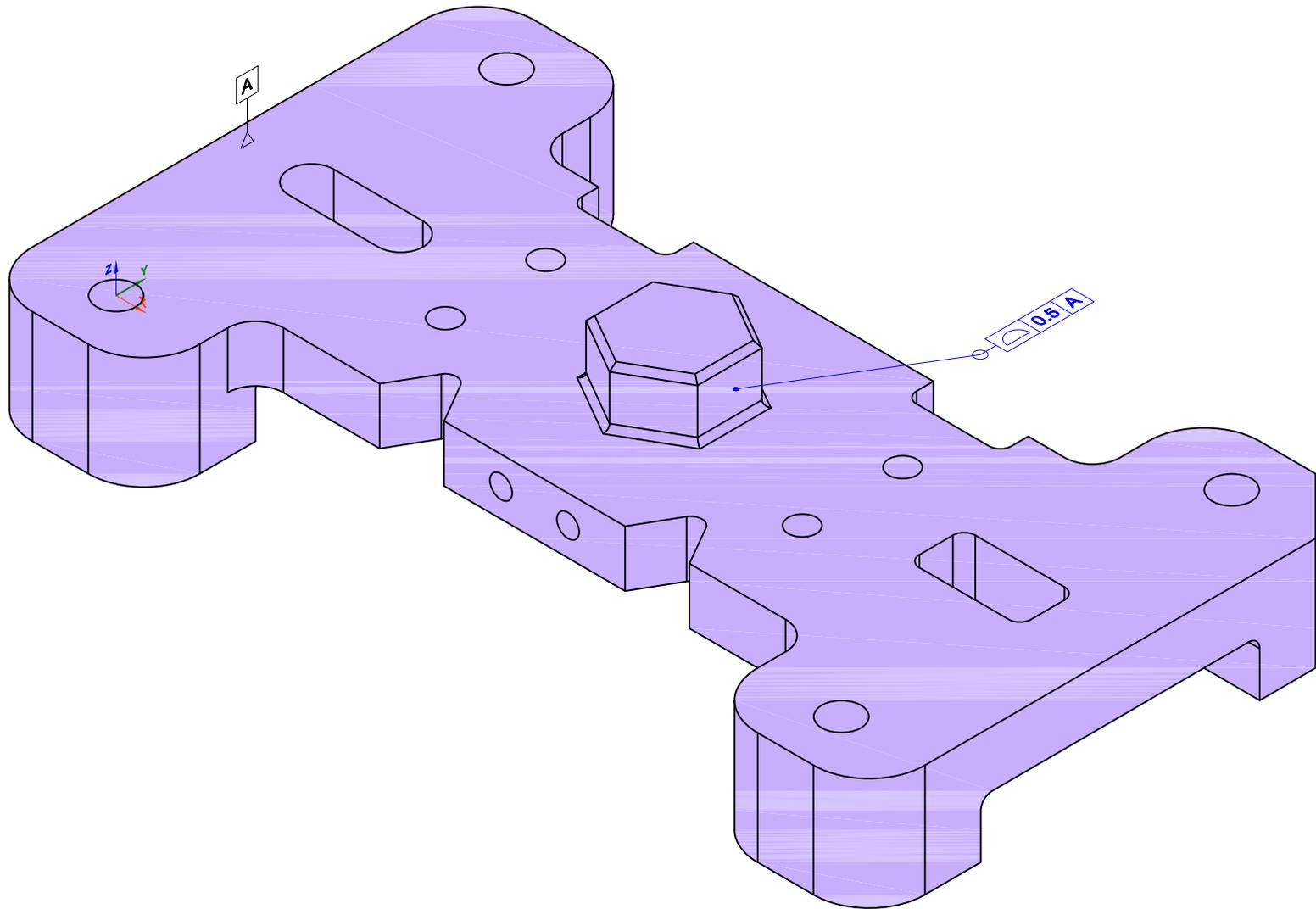
Measurand:
Dimension and unilateral
tolerance. 2 examples, 1 unilateral
positive, 1 unilateral
negative.

PMI Atomic Test Case 3
Dimension with Unilateral Tolerance: Feature of Size (2)



Measurand:
Angular dimension and
equal-bilateral tolerance.

PMI Atomic Test Case 4
Angular Dimension with Equal-Bilateral Tolerance: Simple

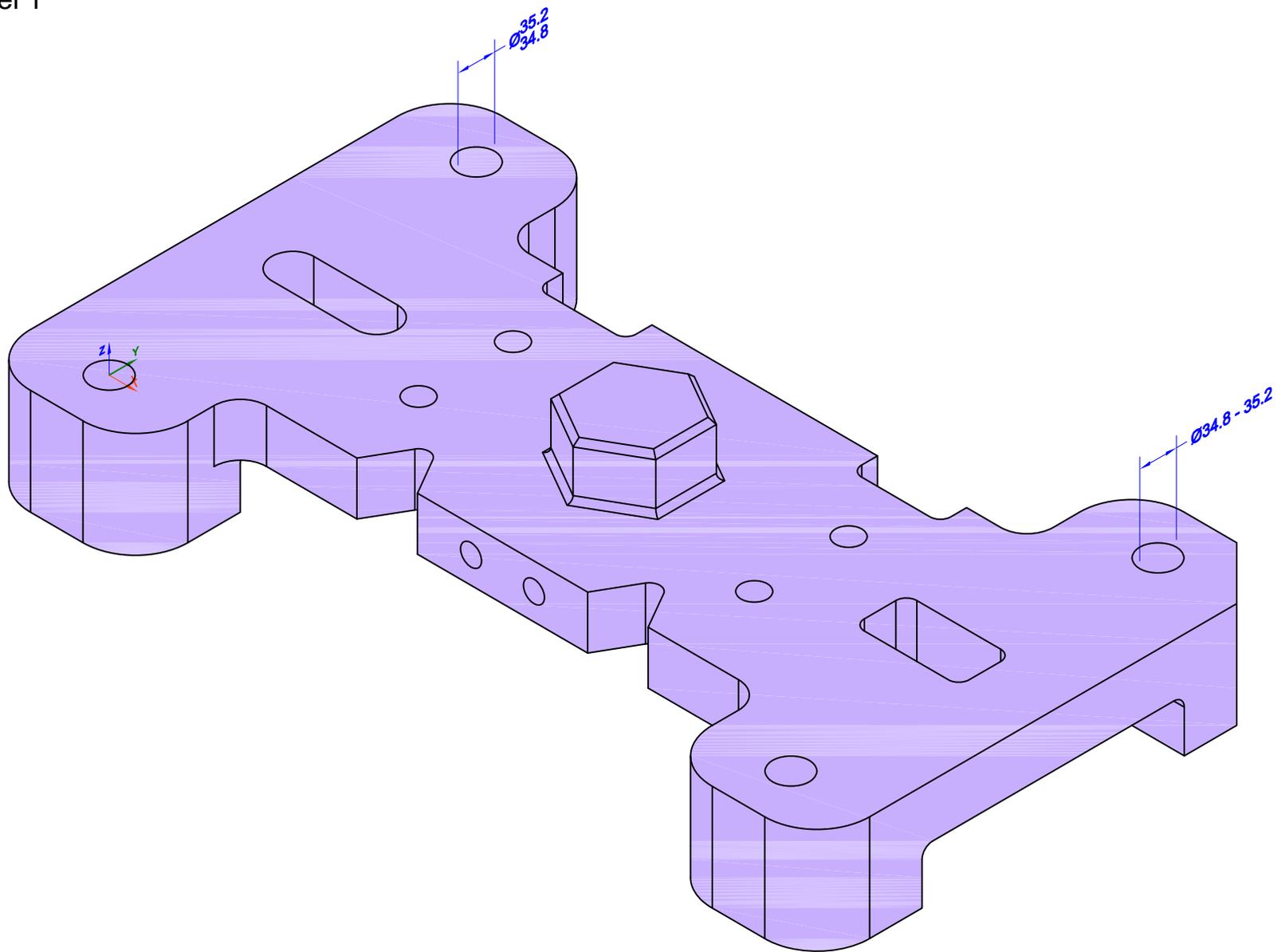


Measurand:
Leader-directed feature control frame -
Profile of a Surface. Applied all around.

PMI Atomic Test Case 7

Symbol: All Around (Applied with a Leader-Directed Profile Tolerance)

Test Model 1

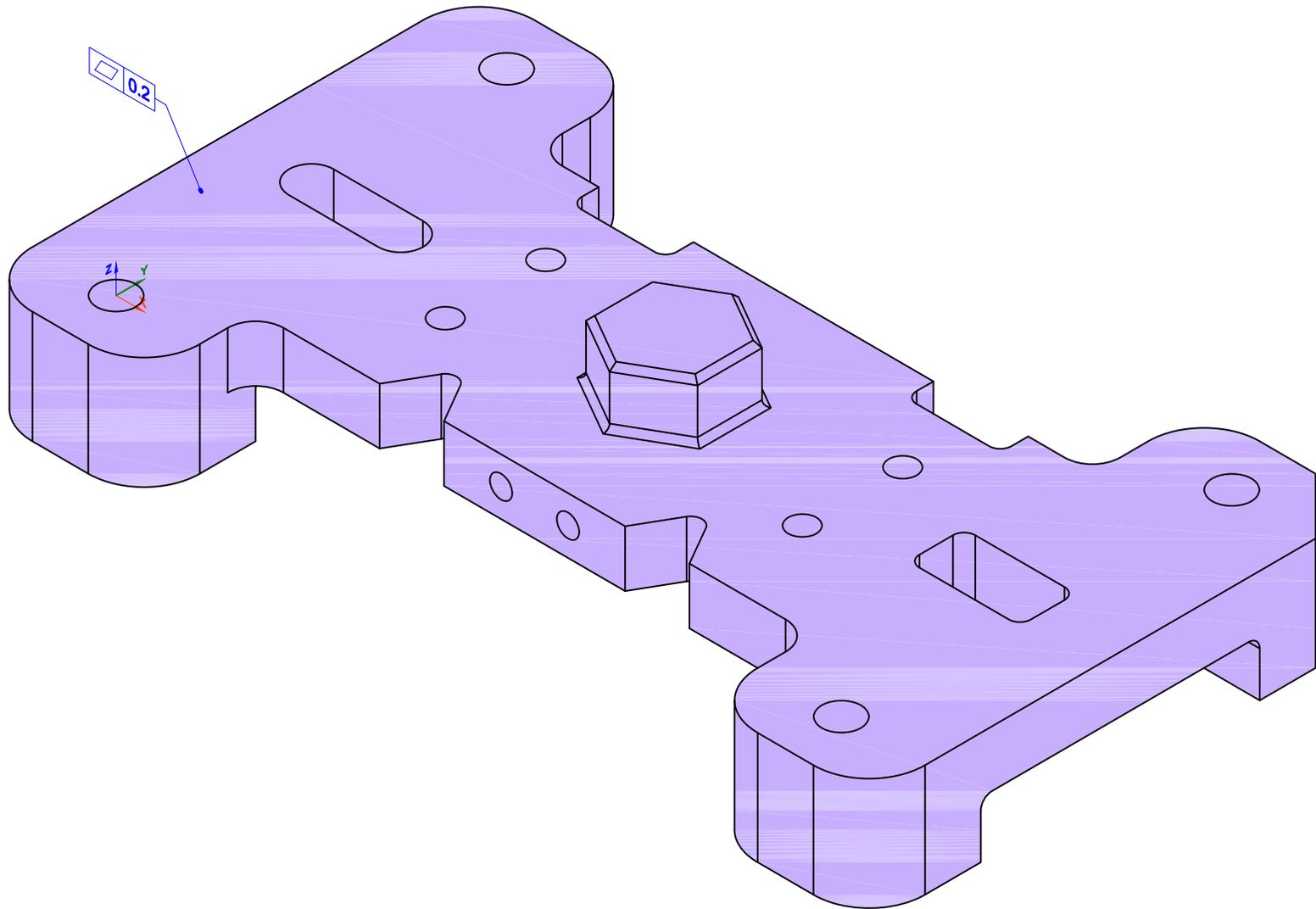


Measurand:
Limit dimension with diameter symbol. 2
examples, 1 horizontal format, 1 vertical format.

PMI Atomic Test Case 8

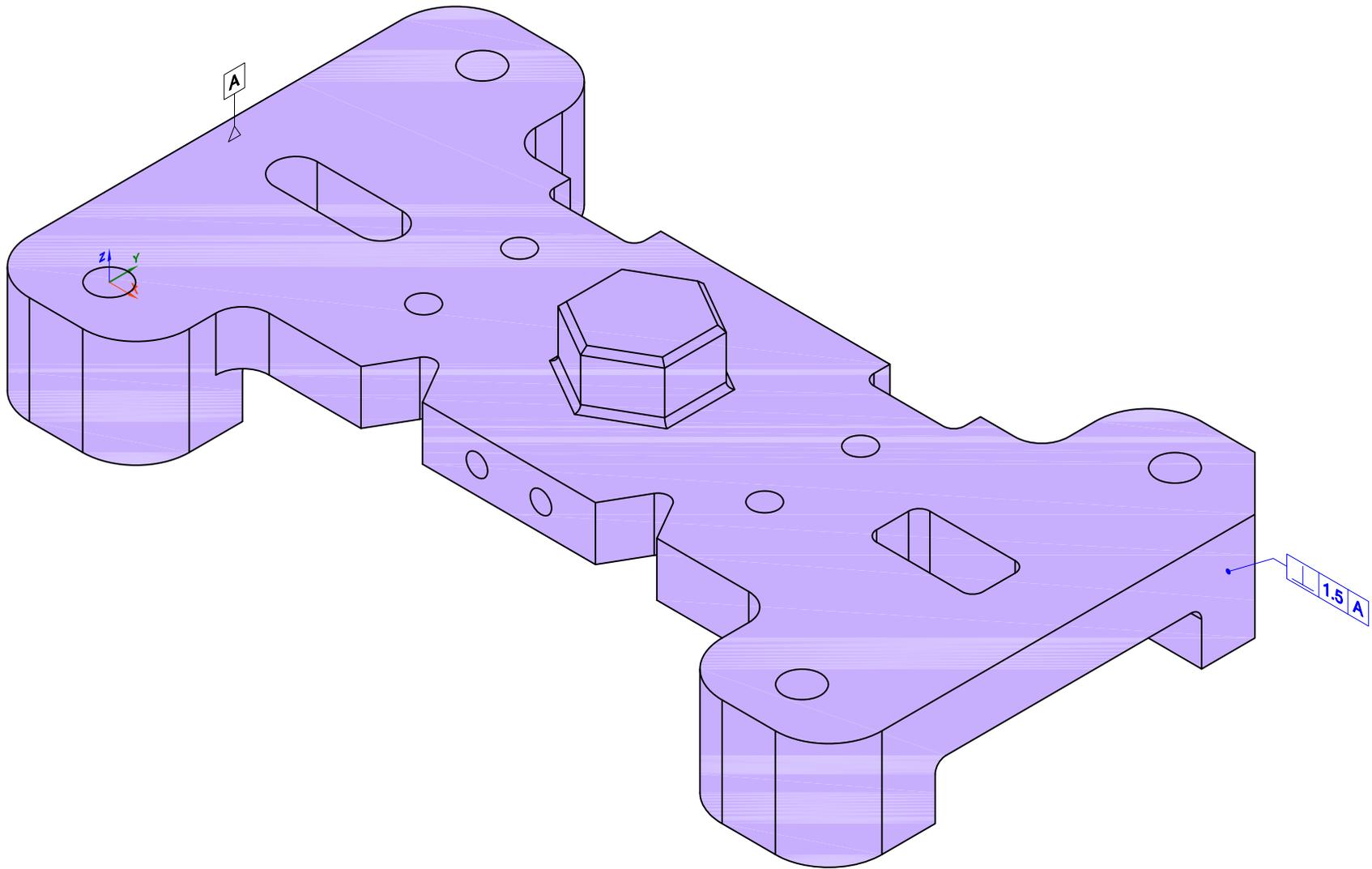
Dimension: Limit - Vertical (Stacked) and Horizontal with Diameter Symbol: Feature of Size (2)

Test Model 1



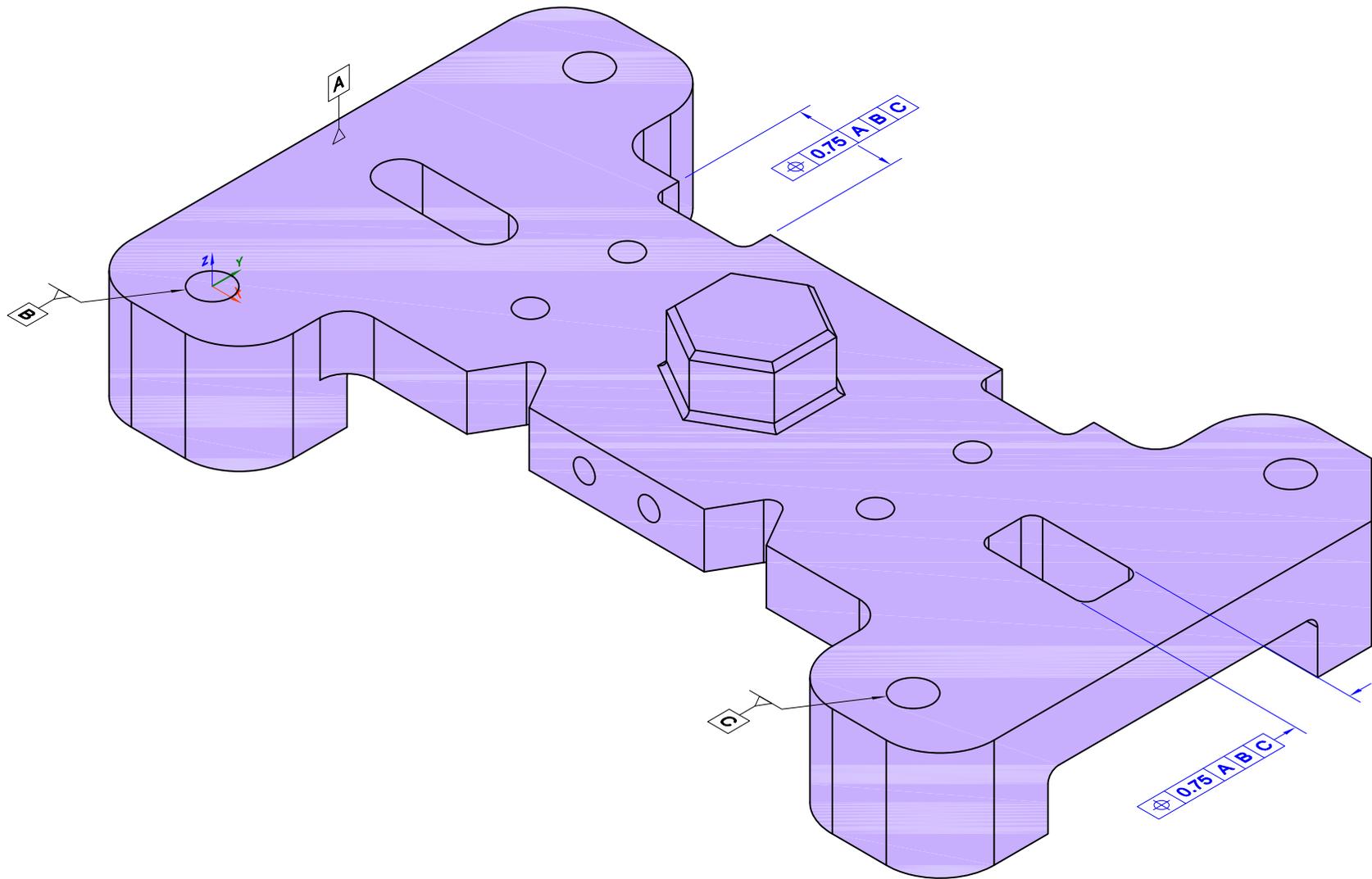
Measurand:
Leader-directed feature control
frame - Flatness.

PMI Atomic Test Case 17
Feature Control Frame Directed to Surface - Flatness



Measurand:
Leader-directed feature control
frame - Perpendicularity.

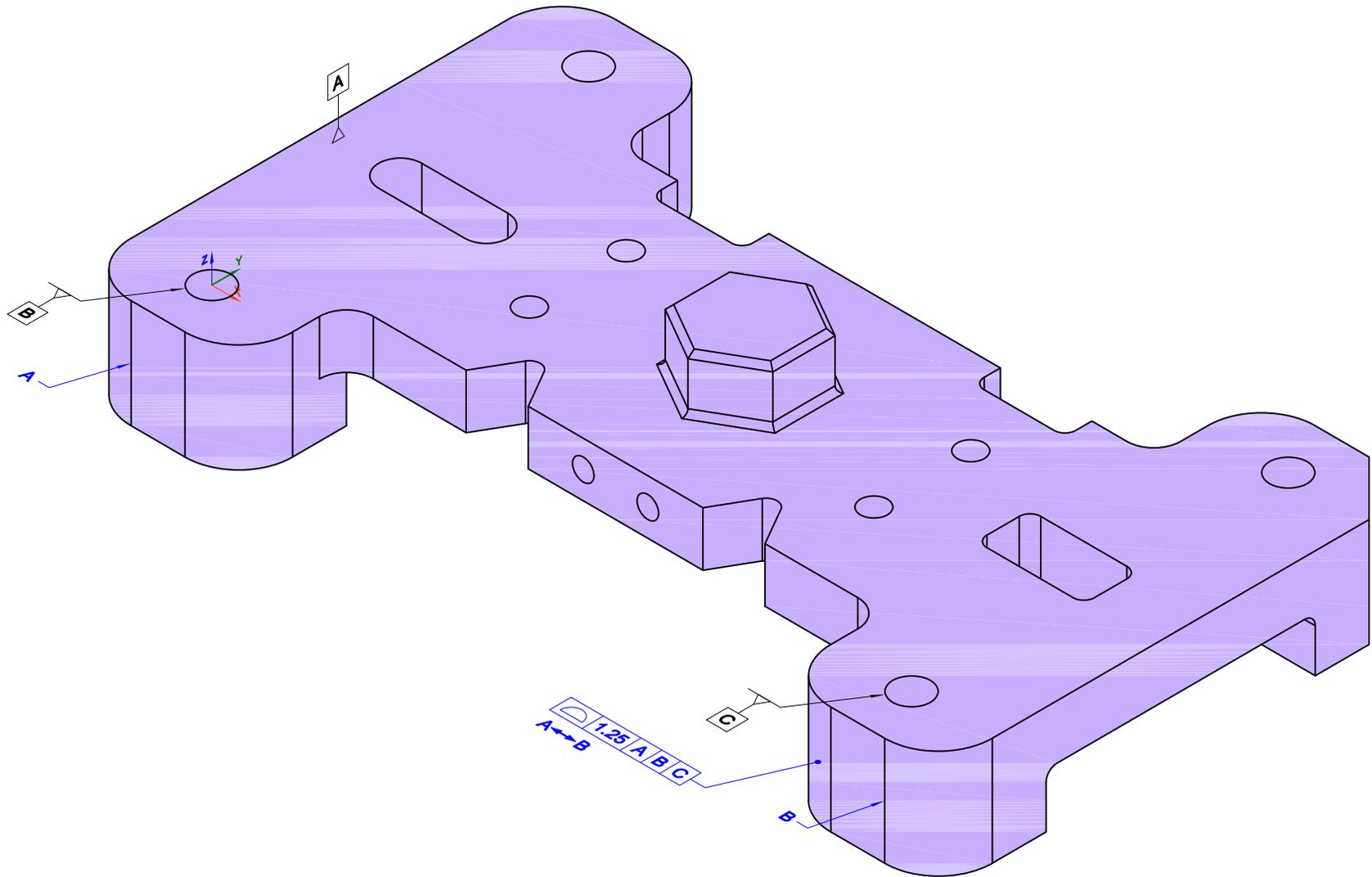
Test Model 1



Measurand:
Feature control frame attached to dimension
w/o dimension value - 2 examples, 1 inside,
1 outside extension lines.

PMI Atomic Test Case 33

Single Segment Feature Control Frame - Attached Directly to Dimension Lines - No Dimension Value (2)



Measurand:
Leader-directed feature control frame -
Profile of a Surface. Applied between
A and B.

PMI Atomic Test Case 48
Profile Tolerance: Applied on a Between Basis

Test Model 2

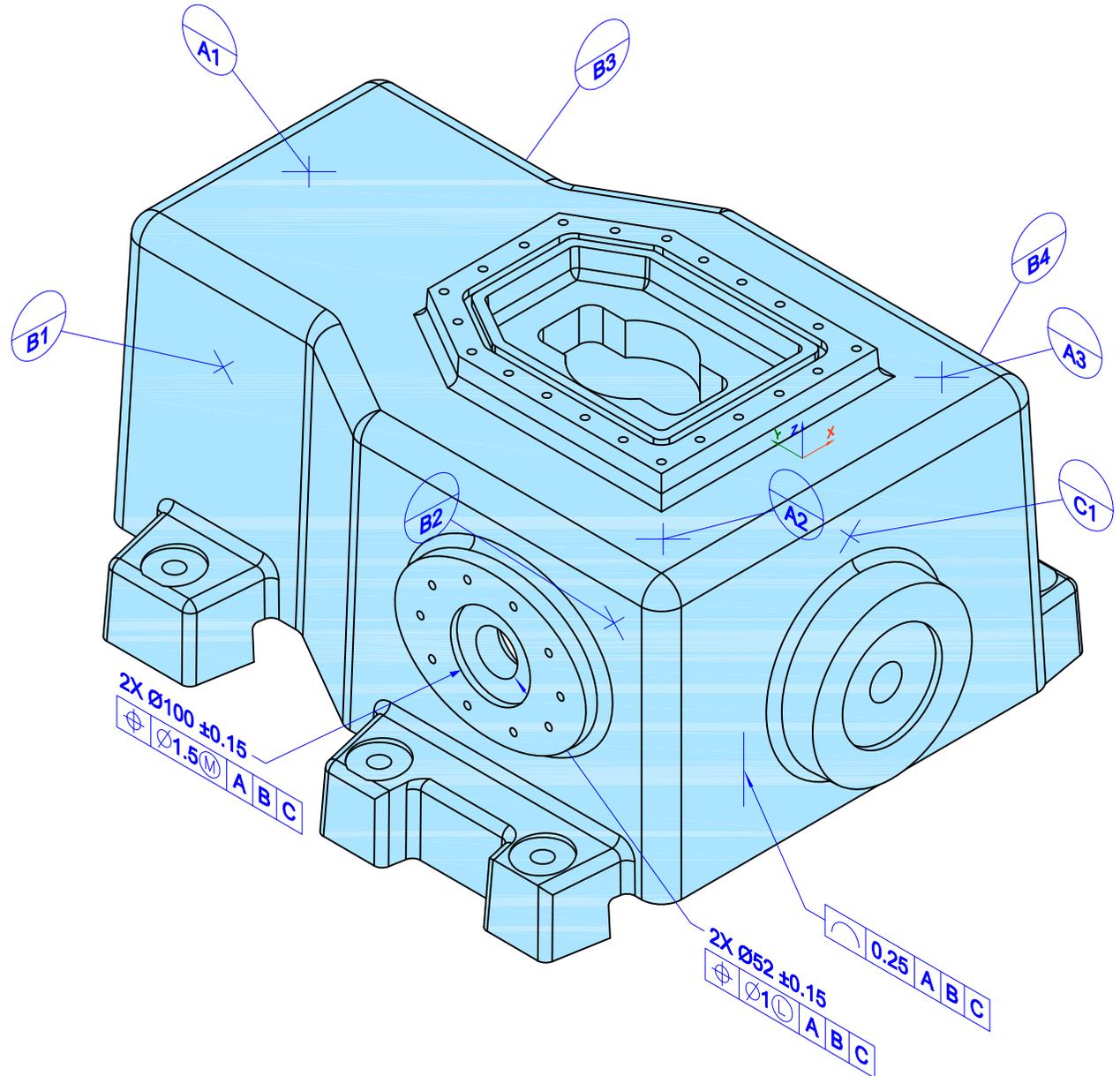
NOTES (UNLESS OTHERWISE SPECIFIED):

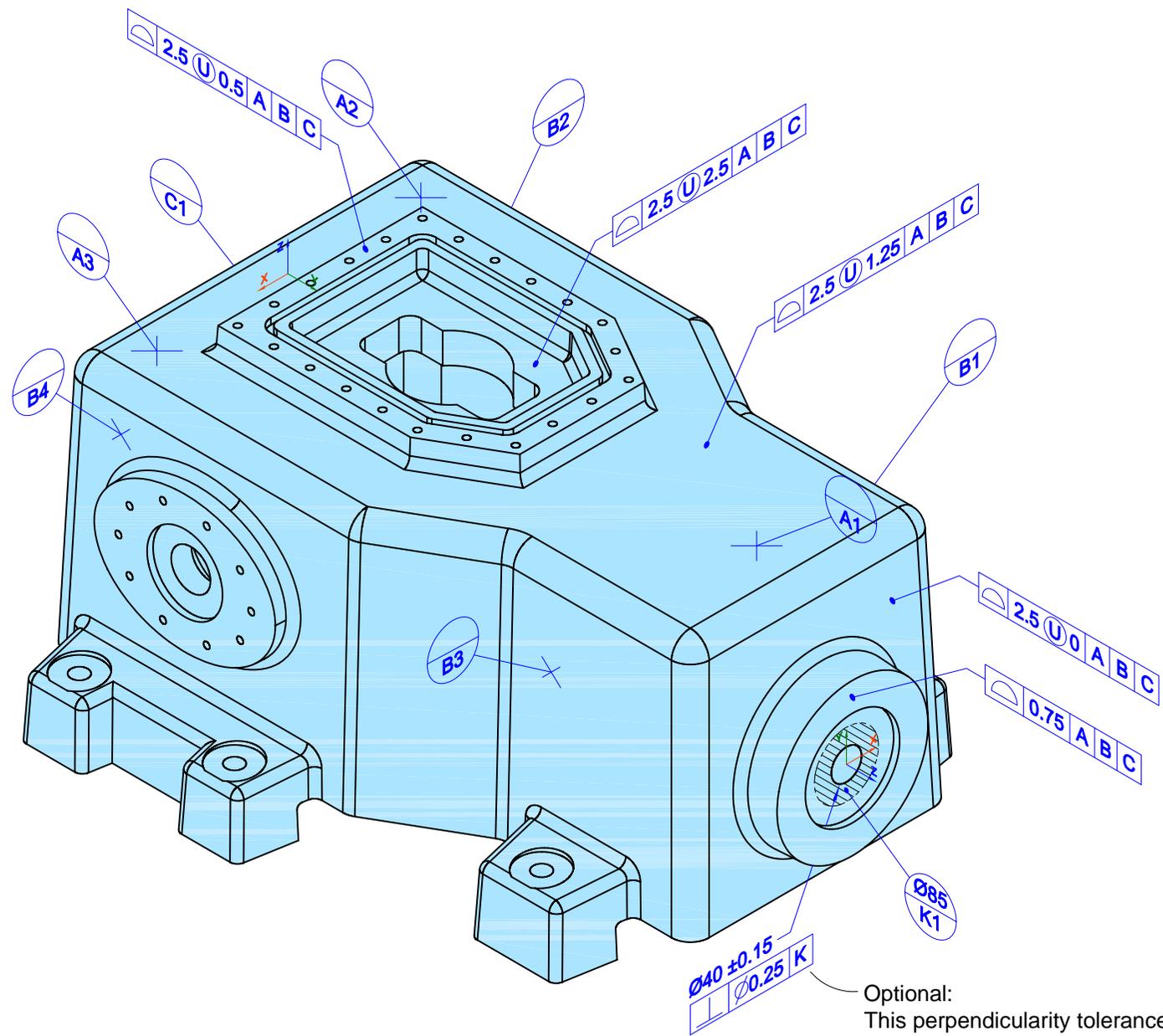
1. OBTAIN DIMENSIONS FOR ALL UNDIMENSIONED FEATURES FROM THE MODEL. ALL DIMENSIONS OBTAINED FROM THE MODEL ARE BASIC UNLESS OTHERWISE SPECIFIED.
2. ASME Y14.41-2003 APPLIES TO DATASET.
3. ASME Y14.5M-1994 APPLIES TO DIMENSIONING AND TOLERANCING.

↑
These notes shall be placed on a static annotation plane (the plane does not rotate with the model).

The intent of ATC50 is to test systems' support for static annotation planes.

Including a feature control frame in a general note will be a test case in the next round of testing.



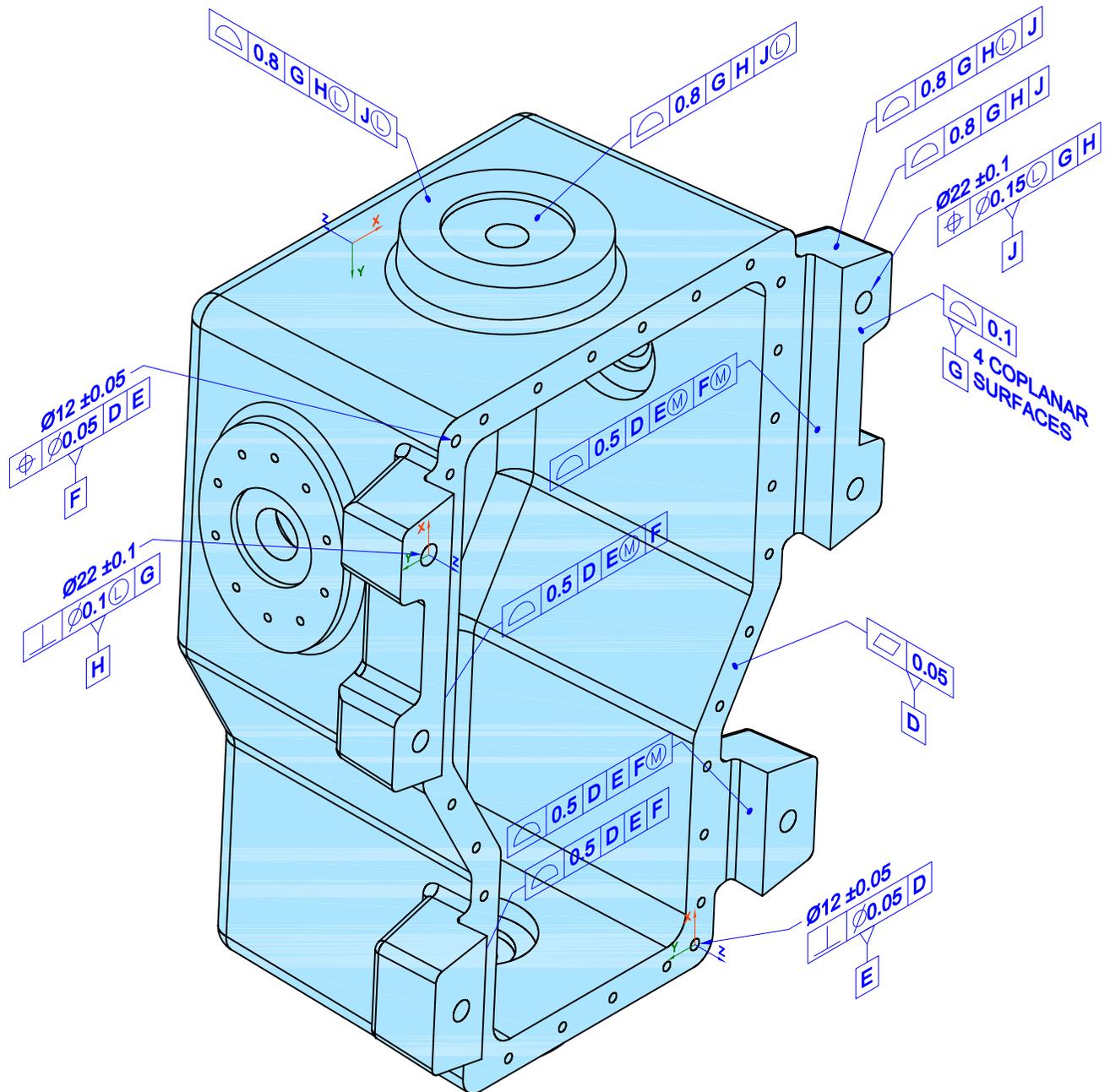


Optional:
This perpendicularity tolerance is included to legitimize specifying datum feature D.

PMI Complex Test Case 2 - View 2 (of 3)
Includes Atomic Test Cases - 26, 31, 41

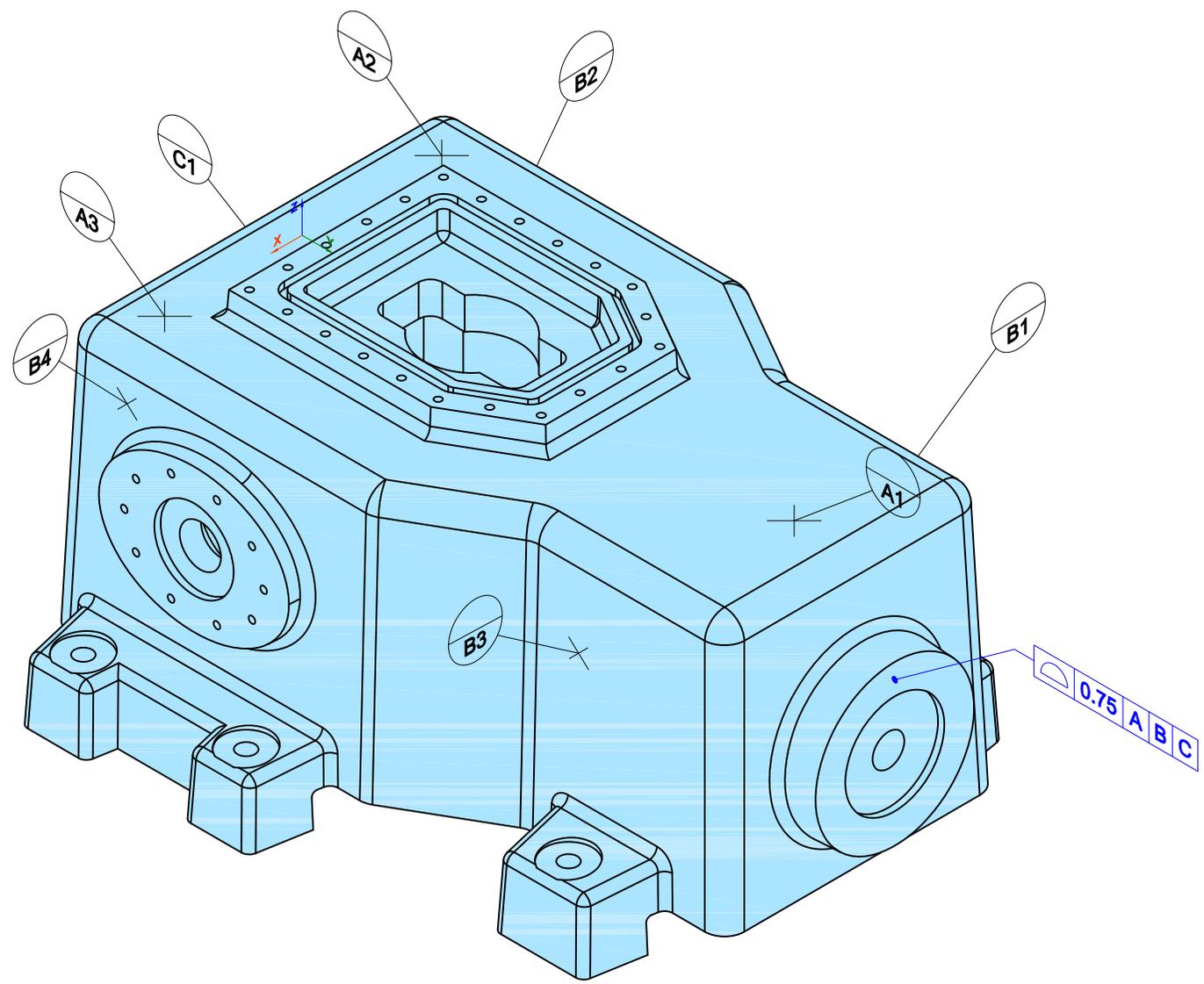
Test Model 2

Optional:
The geometric tolerances applied to datum features D, E, F, G, H, and J are not required for the test case. However, the geometric tolerances applied to datum features E, F, H, and J help to legitimize the MMB and LMB datum feature references in the geometric tolerances related to D|E|F and G|H|J. The tolerances are mainly important in calculating the MMB or LMB of the datum feature simulators for E, F, H, and J. The geometric tolerances specified at LMC for datum features H and J are particularly important, as they also make it easier to understand the LMB of the datum features, as a geometric tolerance specified at LMC changes Rule #1 to require perfect form at LMC instead of MMC.

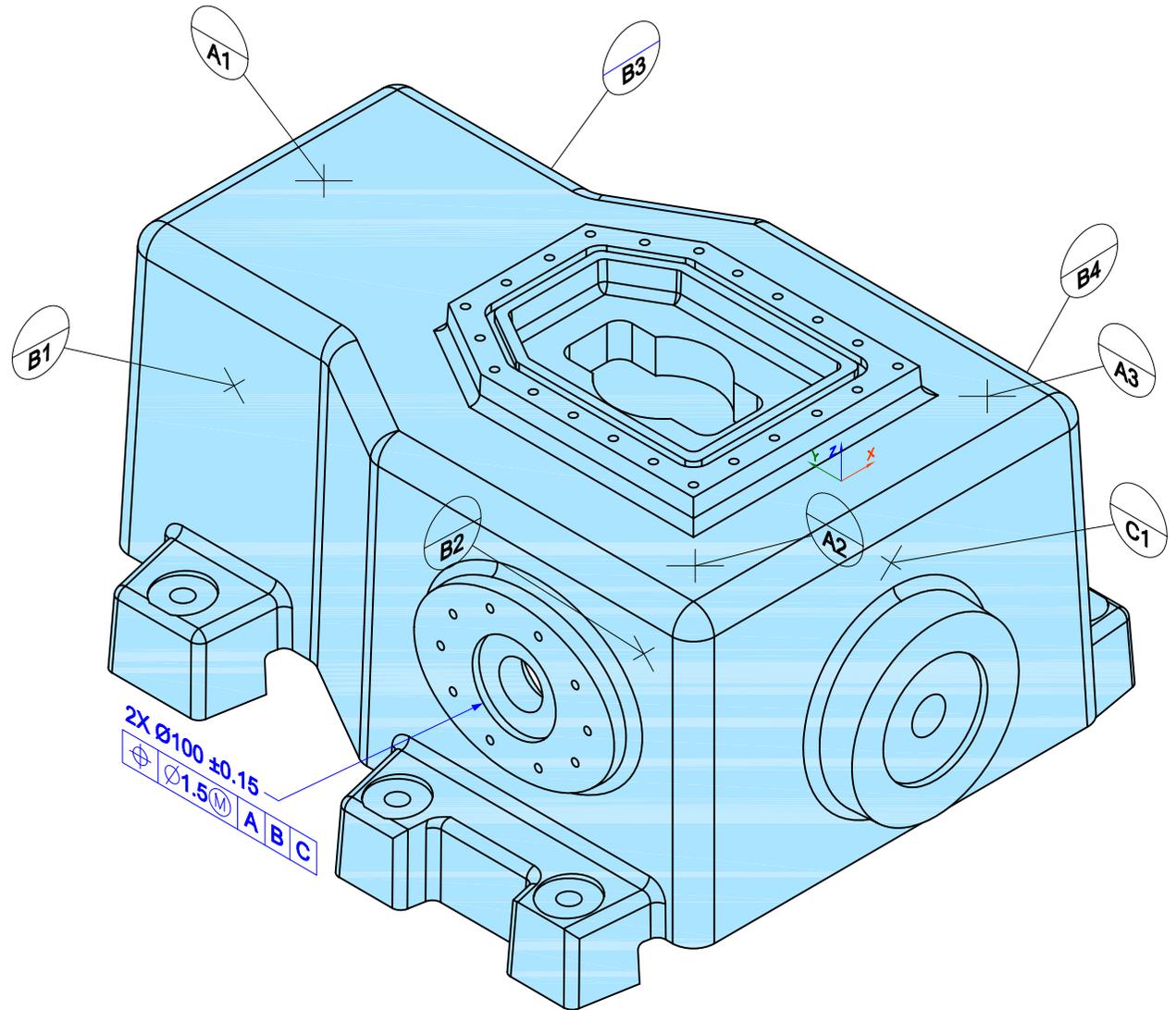


PMI Complex Test Case 2 - View 3 (of 3)

Includes Atomic Test Cases - 34, 35



Measurand:
Leader-directed feature control
frame - Profile of a surface.



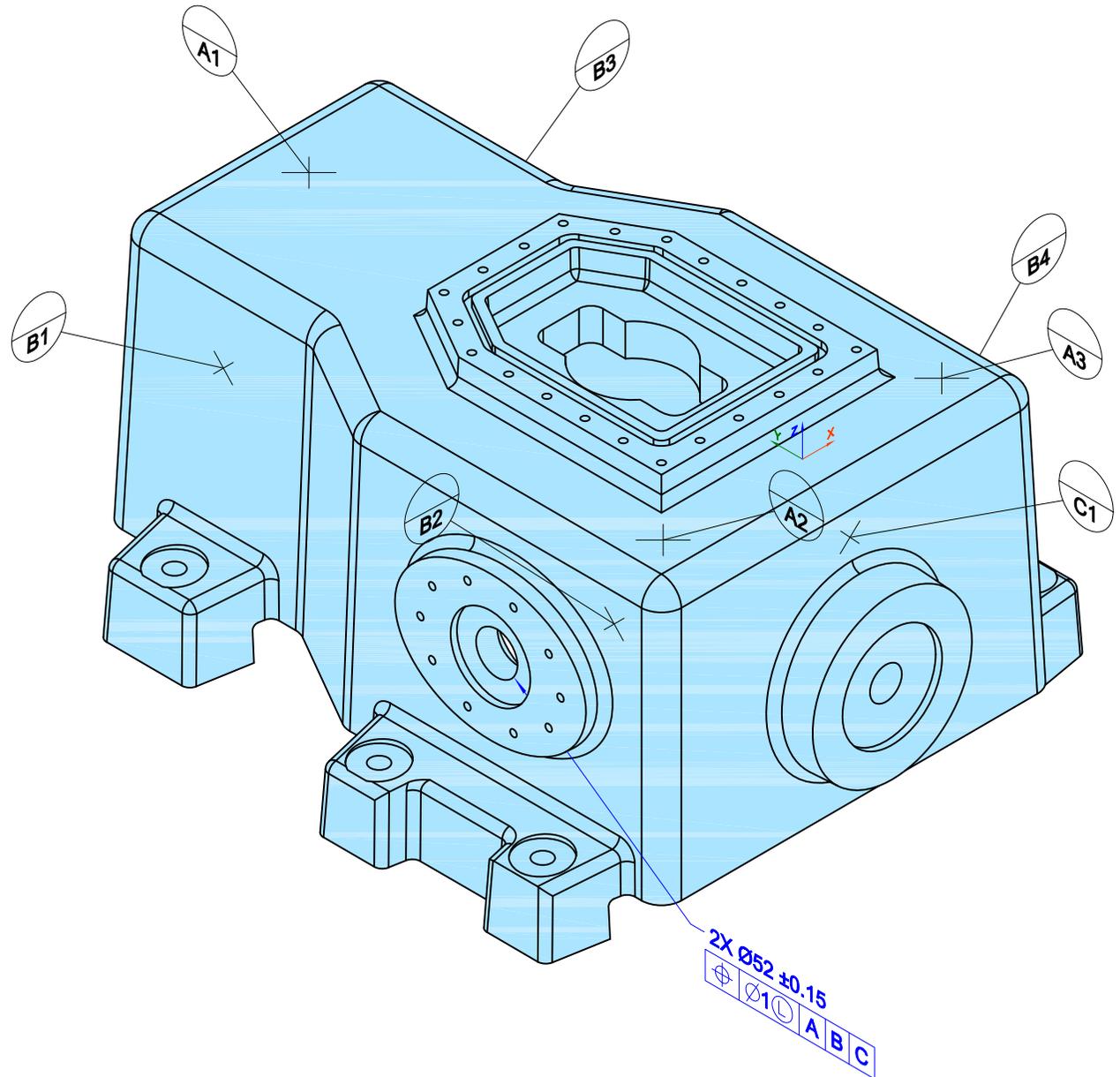
Measurand:
Feature control frame - Position
with MMC modifier.

Test Model 2

Note:

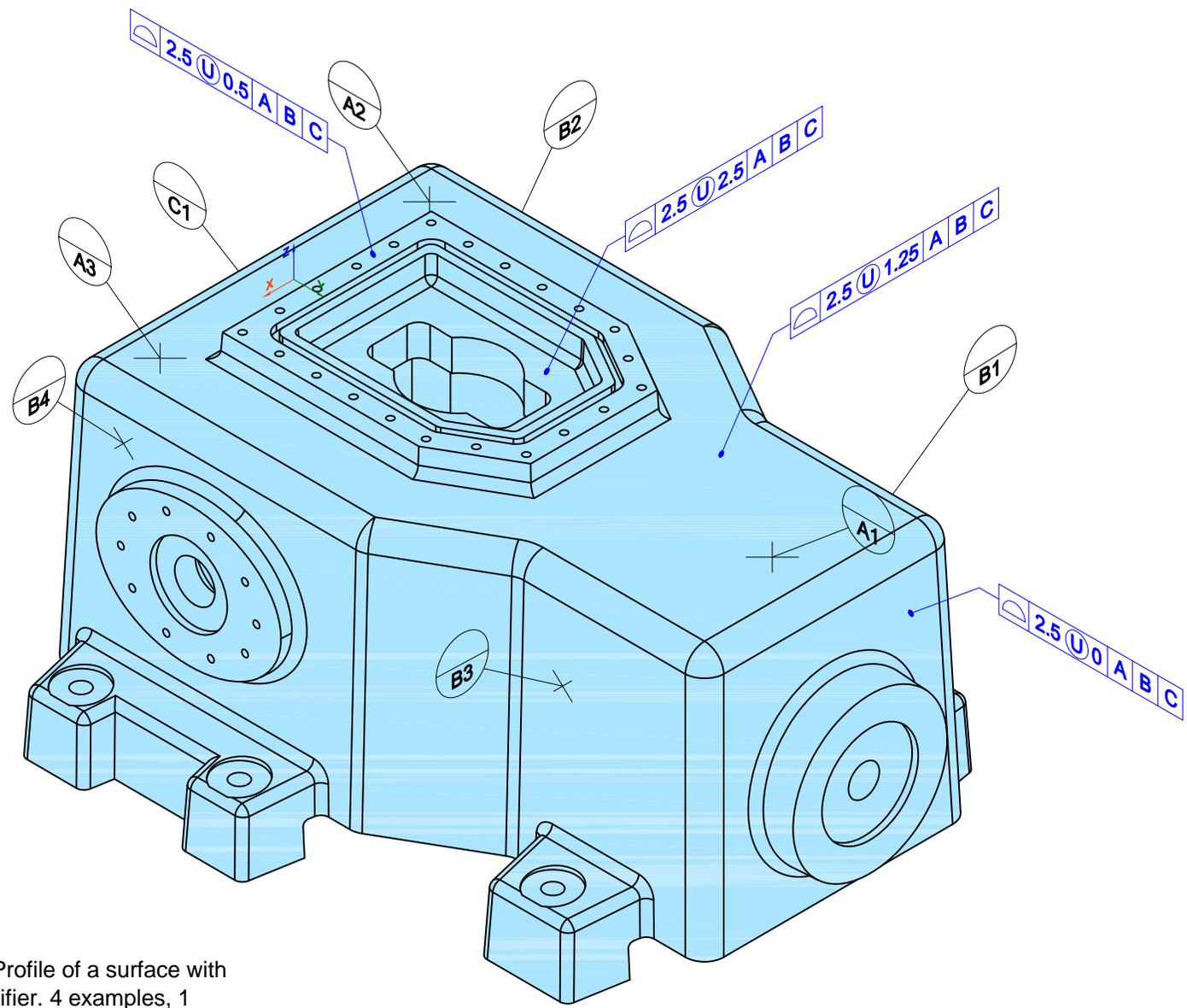
Justification for LMC:

The holes will be machined after casting.



Measurand:

Feature control frame - Position with LMC modifier.

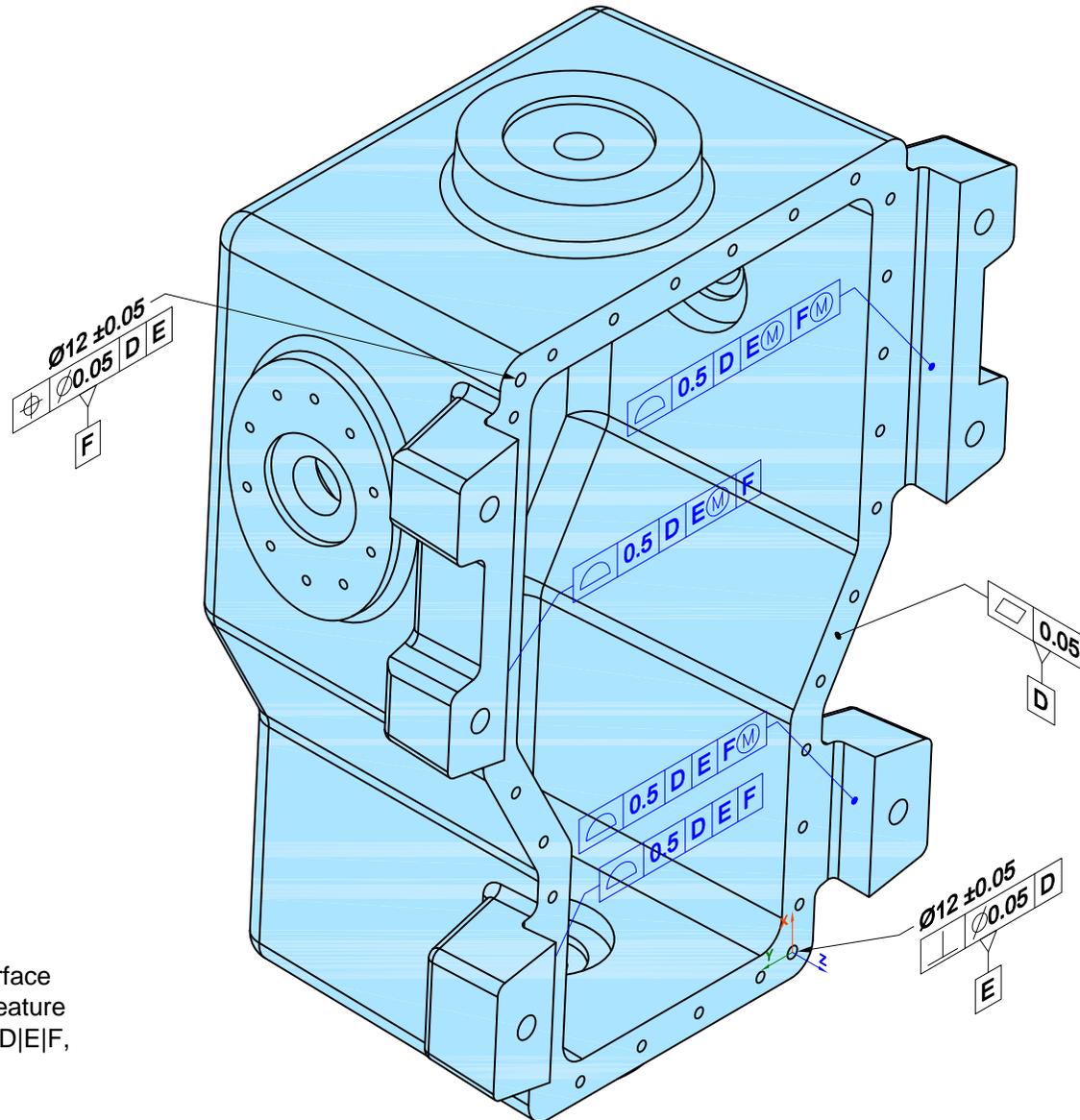


Measurand:
Feature control frame - Profile of a surface with
unequally-disposed modifier. 4 examples, 1
equal-bilateral, 1 unilateral positive, 1 unilateral
negative, 1 unequal-bilateral. Tests ASME
Y14.41-2003 requirement.

Test Model 2

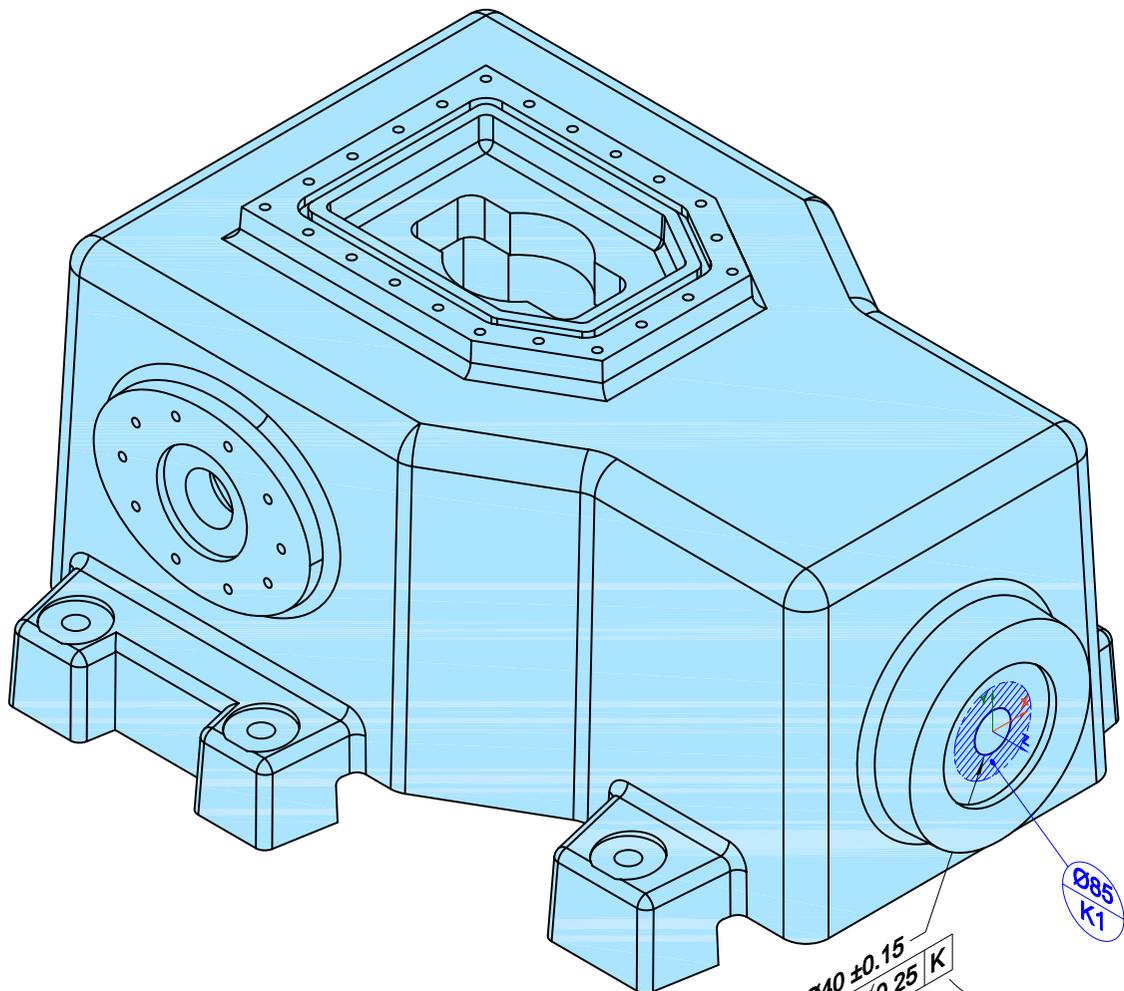
Optional:

The geometric tolerances applied to datum features D, E, and F are not required for the test case. However, the geometric tolerances applied to datum features E and F help to legitimize the MMB datum feature references in the geometric tolerances related to D|E|F. The tolerances are mainly important in calculating the MMB of the datum feature simulators for E and F.



Measurand:

Feature control frame - Profile of a surface with MMB modifier applied to datum feature E and/or F references. 4 examples, 1 D|E|F, 1 D|E^(M)|F, 1 D|E|F^(M), 1 D|E^(M)|F^(M).

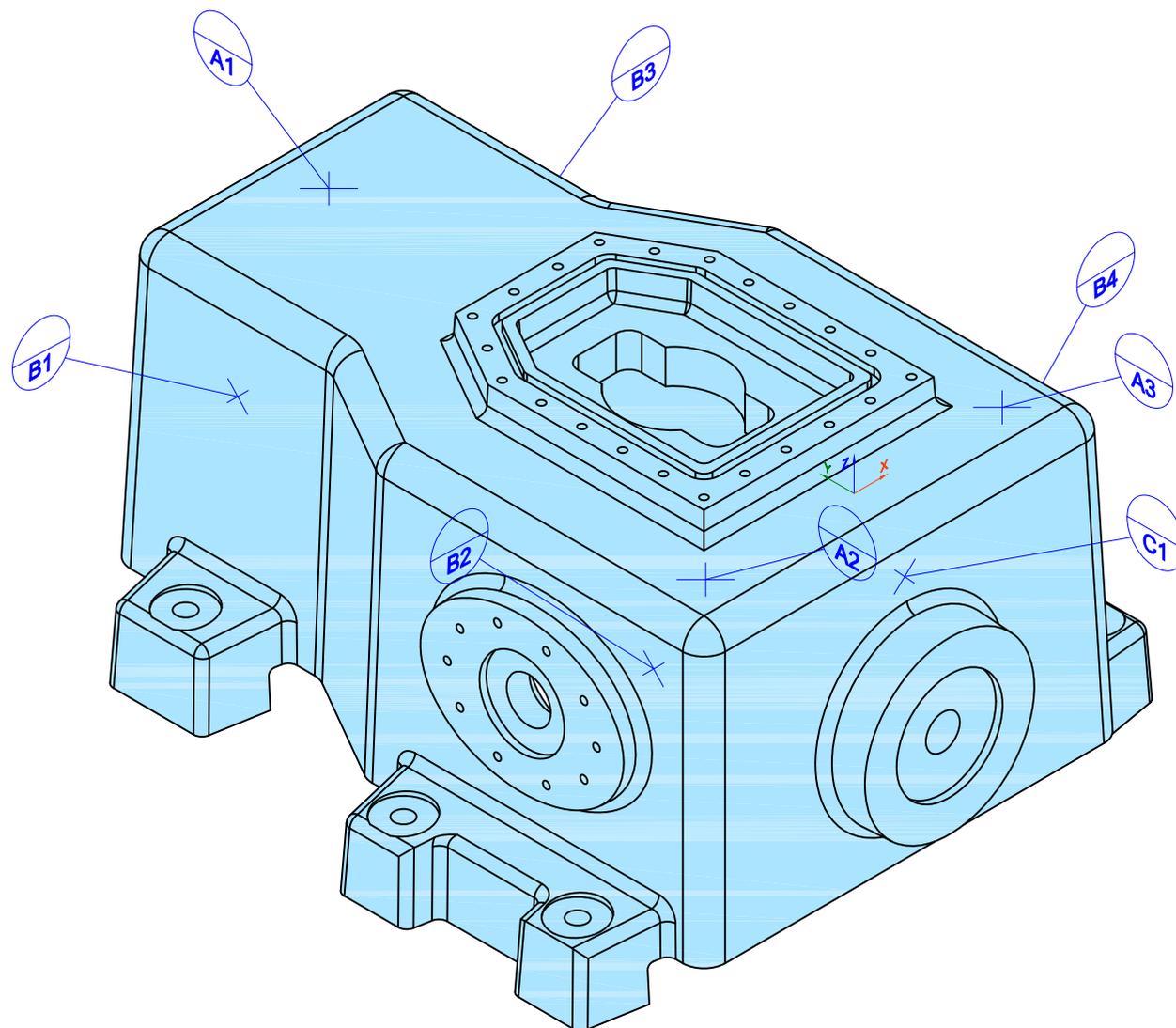


Measurand:
Datum target symbol and circular datum target area. Diameter of area defined in datum target symbol. Datum target area shown on part.

Ø40 ±0.15
Ø0.25 | K

Optional:
This perpendicularity tolerance is included to legitimize specifying datum target K1.

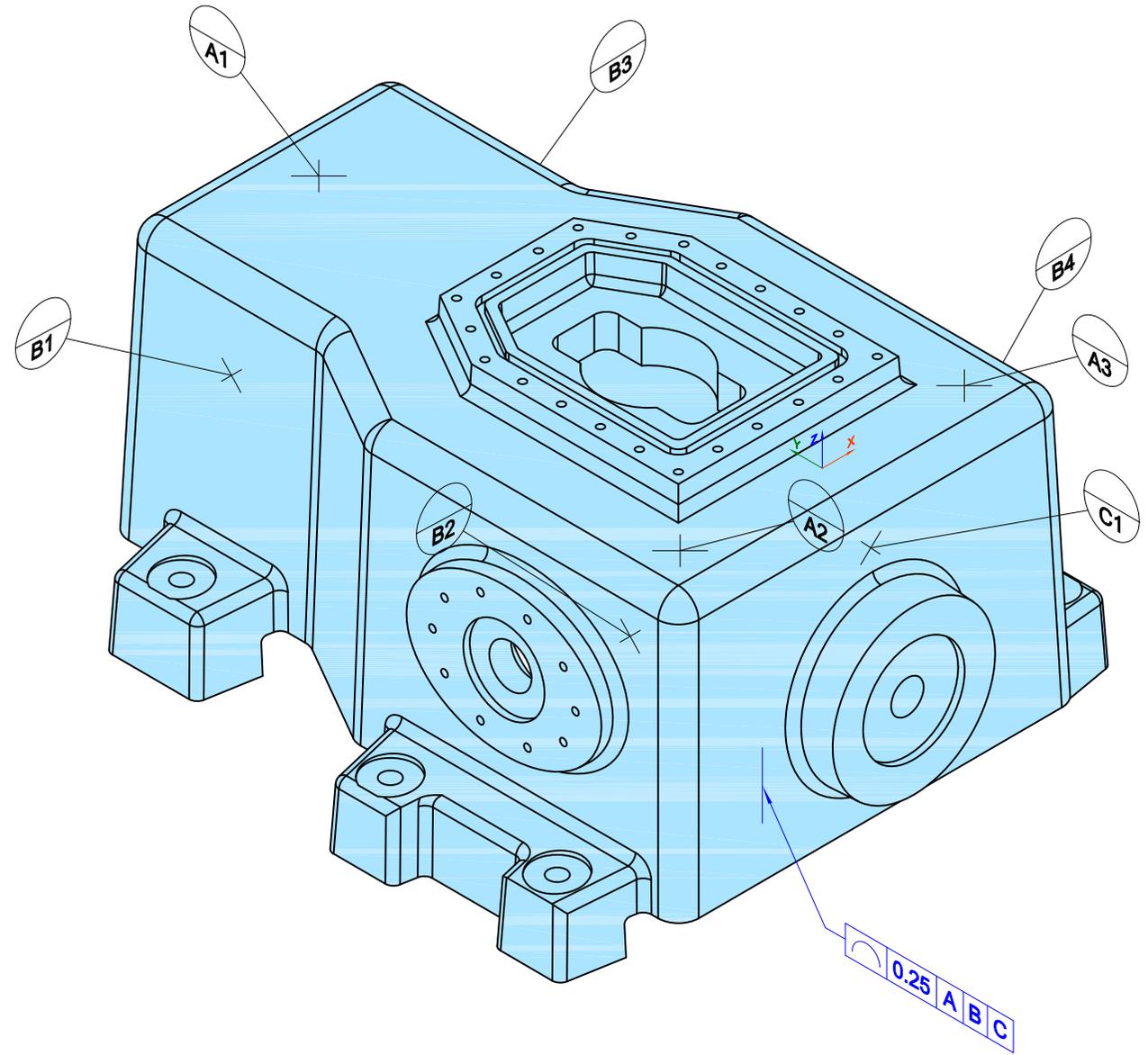
PMI Atomic Test Case 41



Measurand:
Leader-directed datum target symbols and
target point symbols applied to surfaces.
A1, A2, A3, B1, B2, B3, B4, C1.

PMI Atomic Test Case 43

Set of Datum Target Symbols and Target Point Symbols Applied to Surfaces



Measurand:
Leader-directed feature control frame -
Profile of a line. Directed to supplemental
geometry (represented line element).

Test Model 2

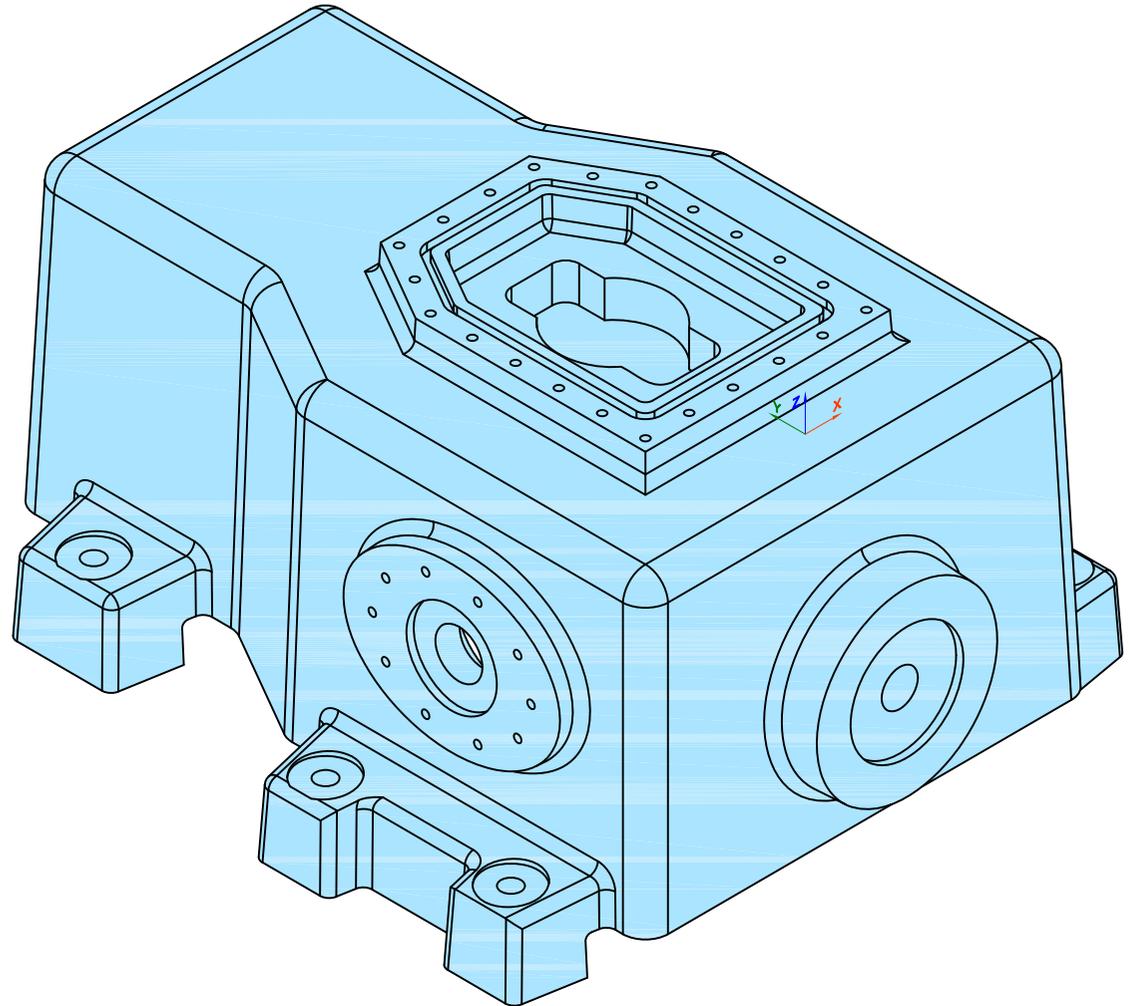
NOTES (UNLESS OTHERWISE SPECIFIED):

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-1994 APPLIES TO DIMENSIONING AND TOLERANCING.

↑
These notes shall be placed on a static annotation plane (the plane does not rotate with the model).

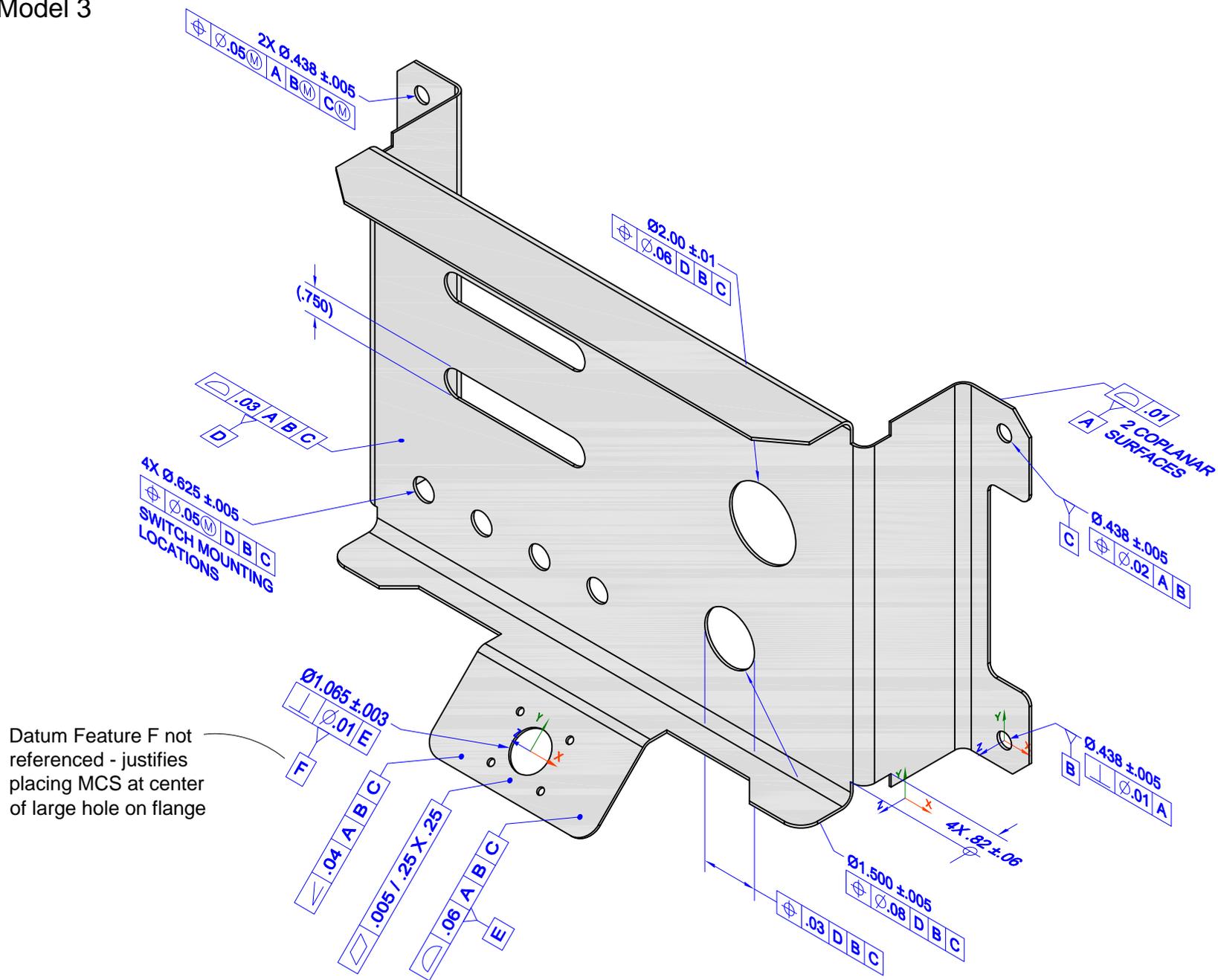
The intent of ATC50 is to test systems' support for static annotation planes.

Including a feature control frame in a general note will be a test case in the next round of testing.



Measurand:

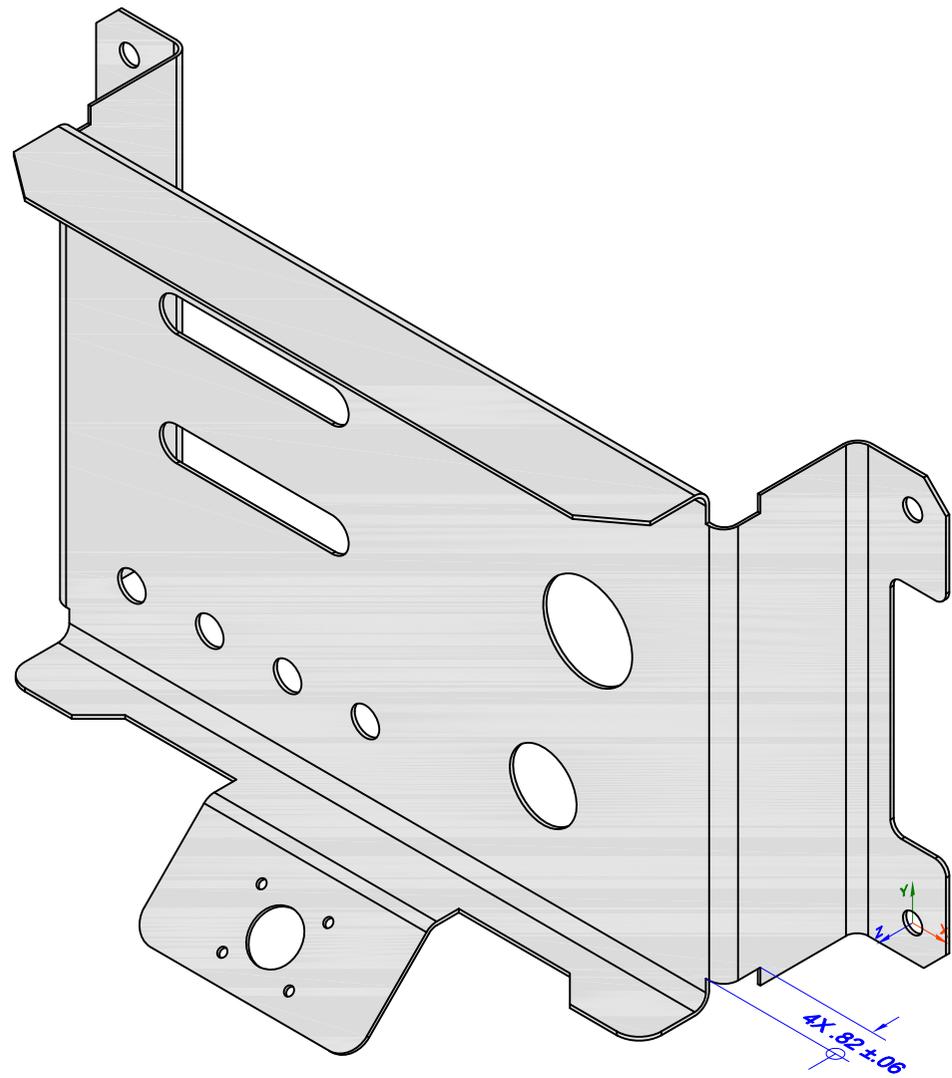
Annotation on a static annotation plane. Static annotation plane.



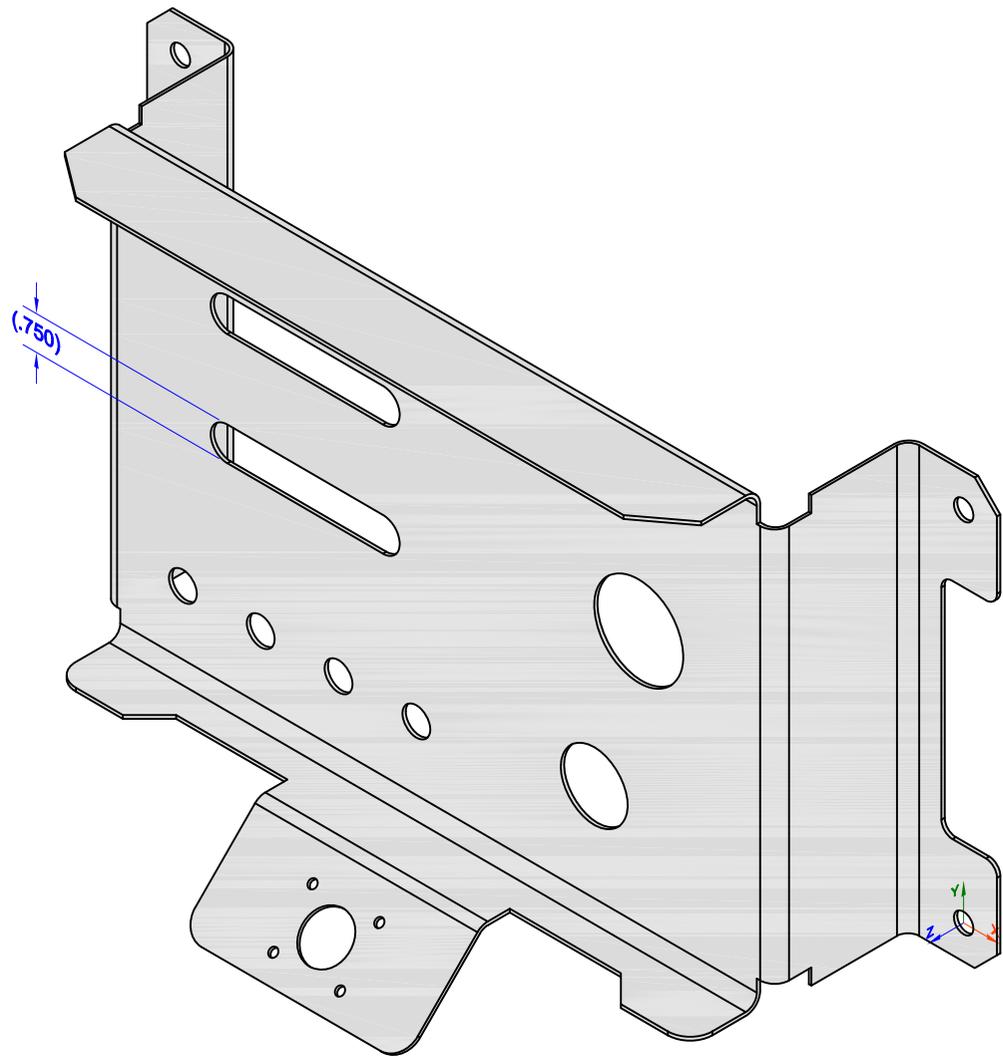
Datum Feature F not referenced - justifies placing MCS at center of large hole on flange

PMI Complex Test Case 3

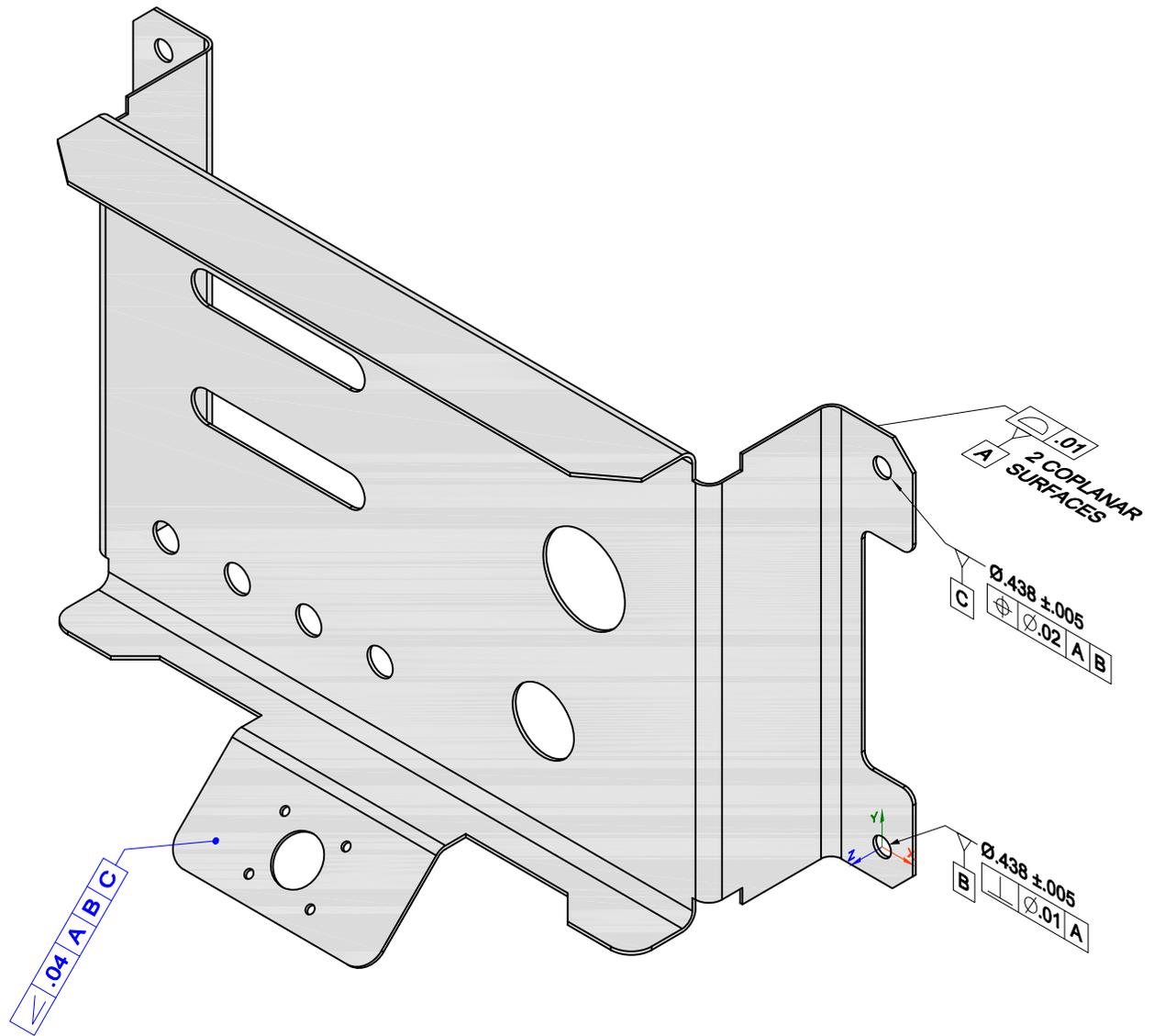
Includes Atomic Test Cases - 6, 13, 14, 20, 27, 32, 36, 39, 45, 46



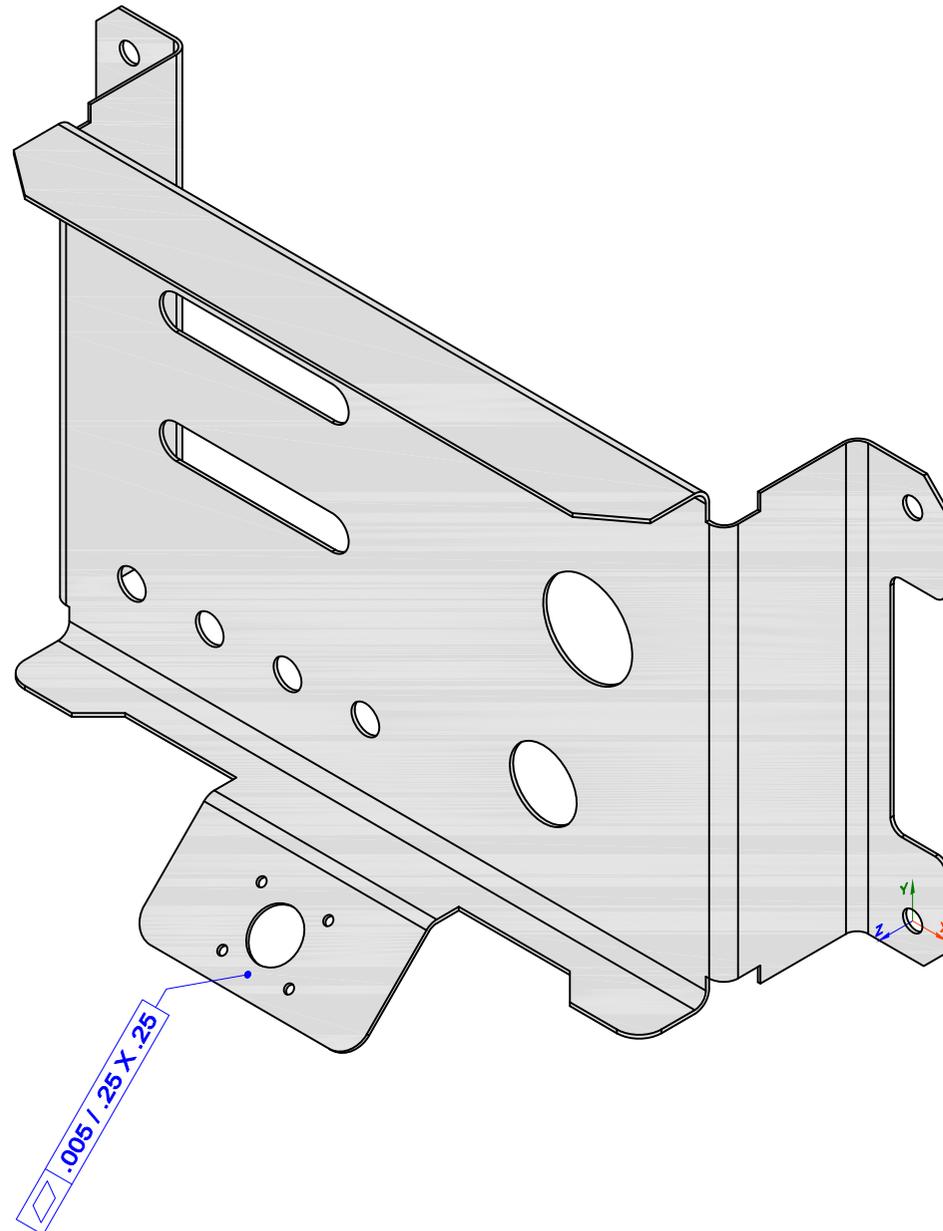
Measurand:
Directly-toleranced dimension
with dimension origin symbol.



Measurand:
Reference dimension.

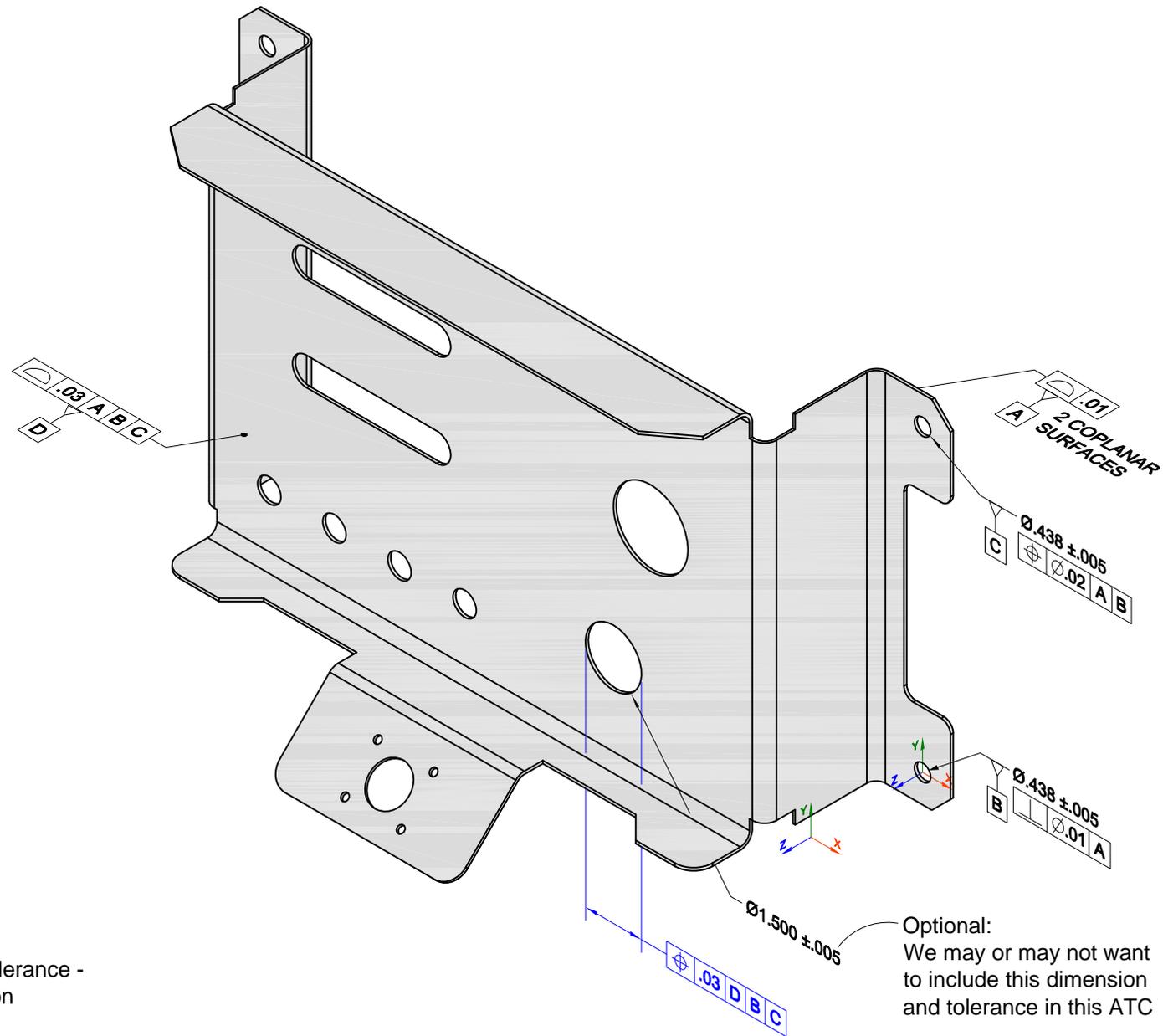


Measurand:
Leader-directed feature control
frame - Angularity.



Measurand:
Leader-directed feature control
frame - Flatness applied on a
unit-basis.

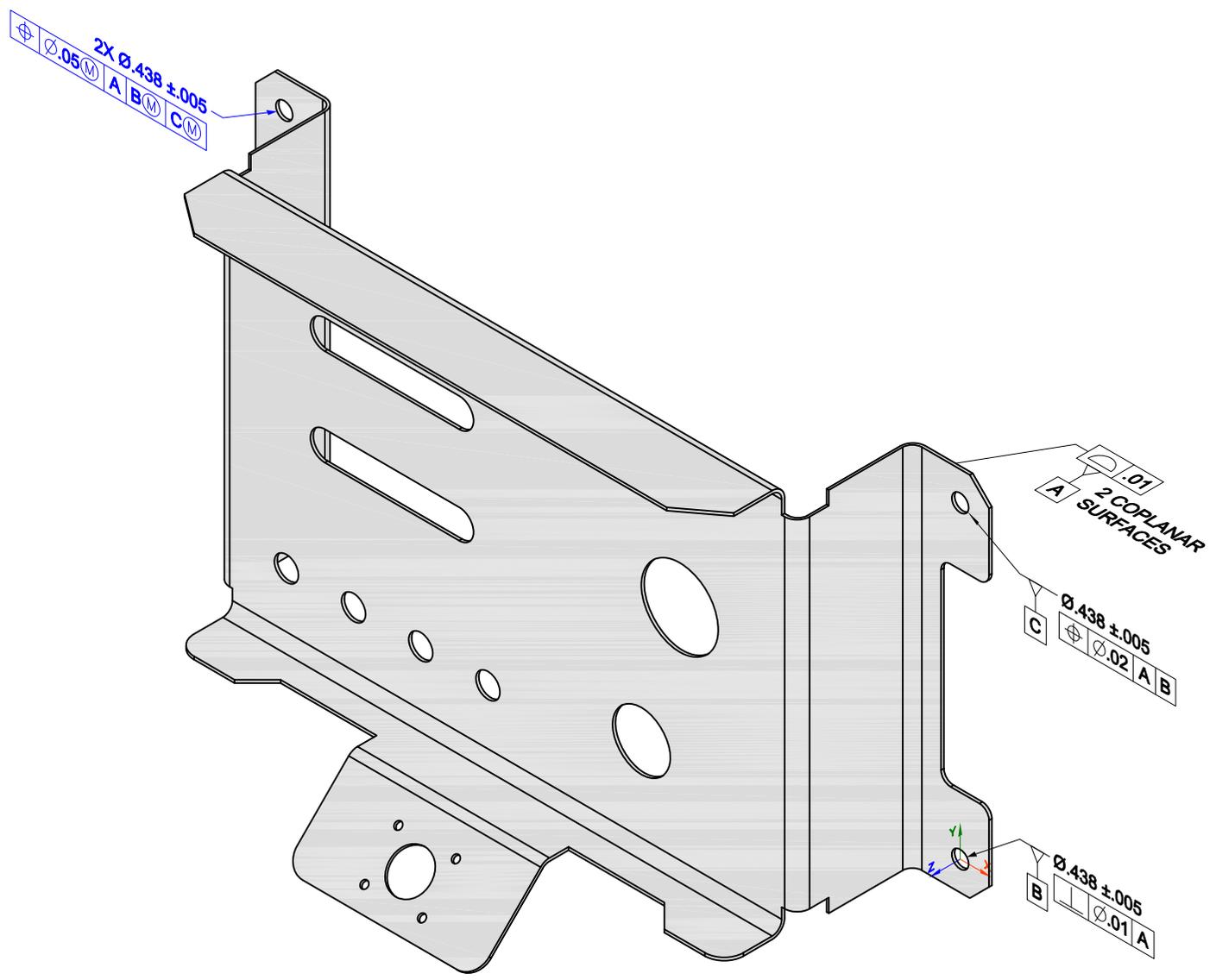
PMI Atomic Test Case 27
Feature Control Frame with Unit-Basis Tolerance - Flatness



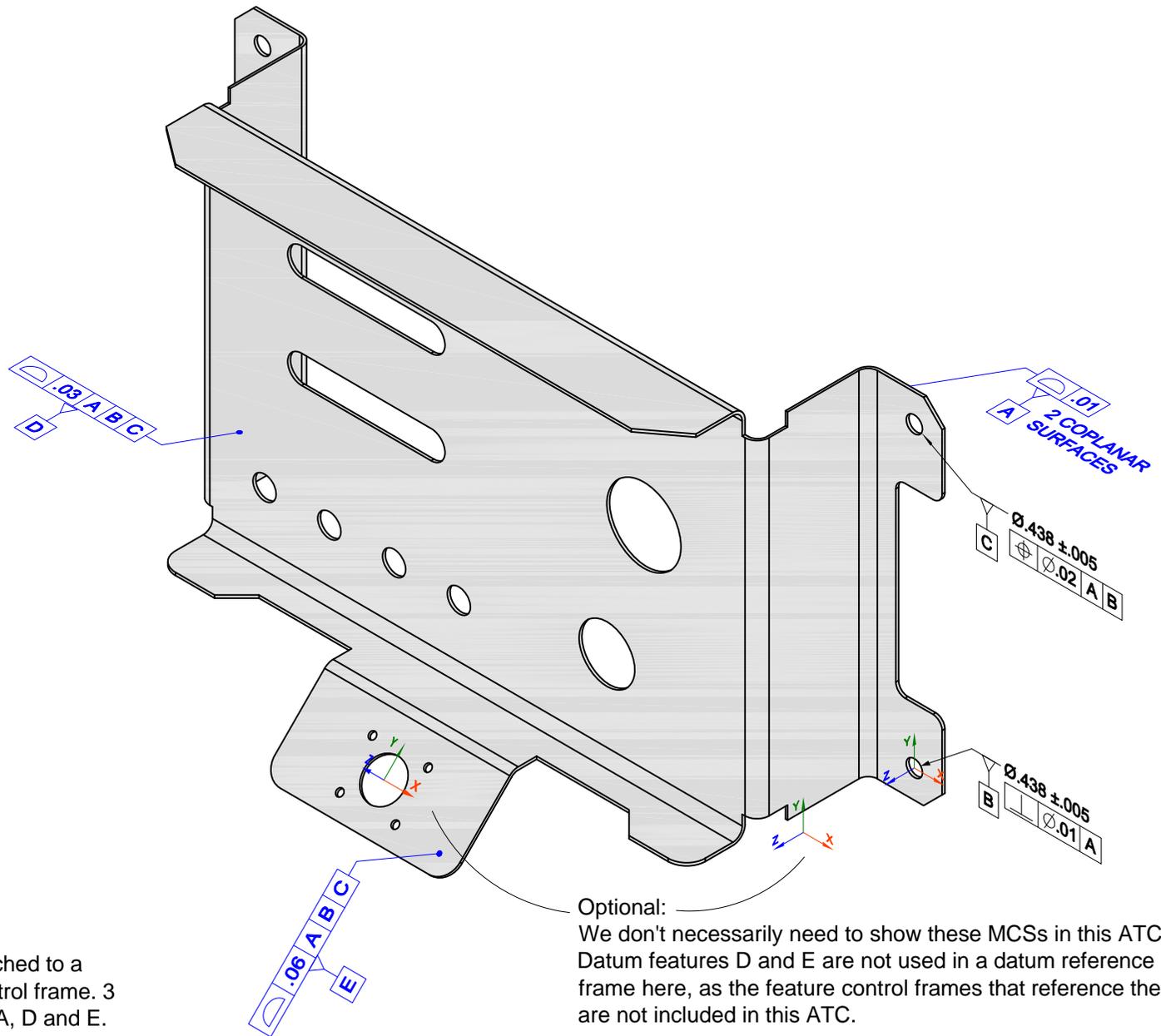
Measurand:
 Unidirectional geometric tolerance -
 Position. Note: presentation
 indicates direction.

Optional:
 We may or may not want
 to include this dimension
 and tolerance in this ATC

PMI Atomic Test Case 32

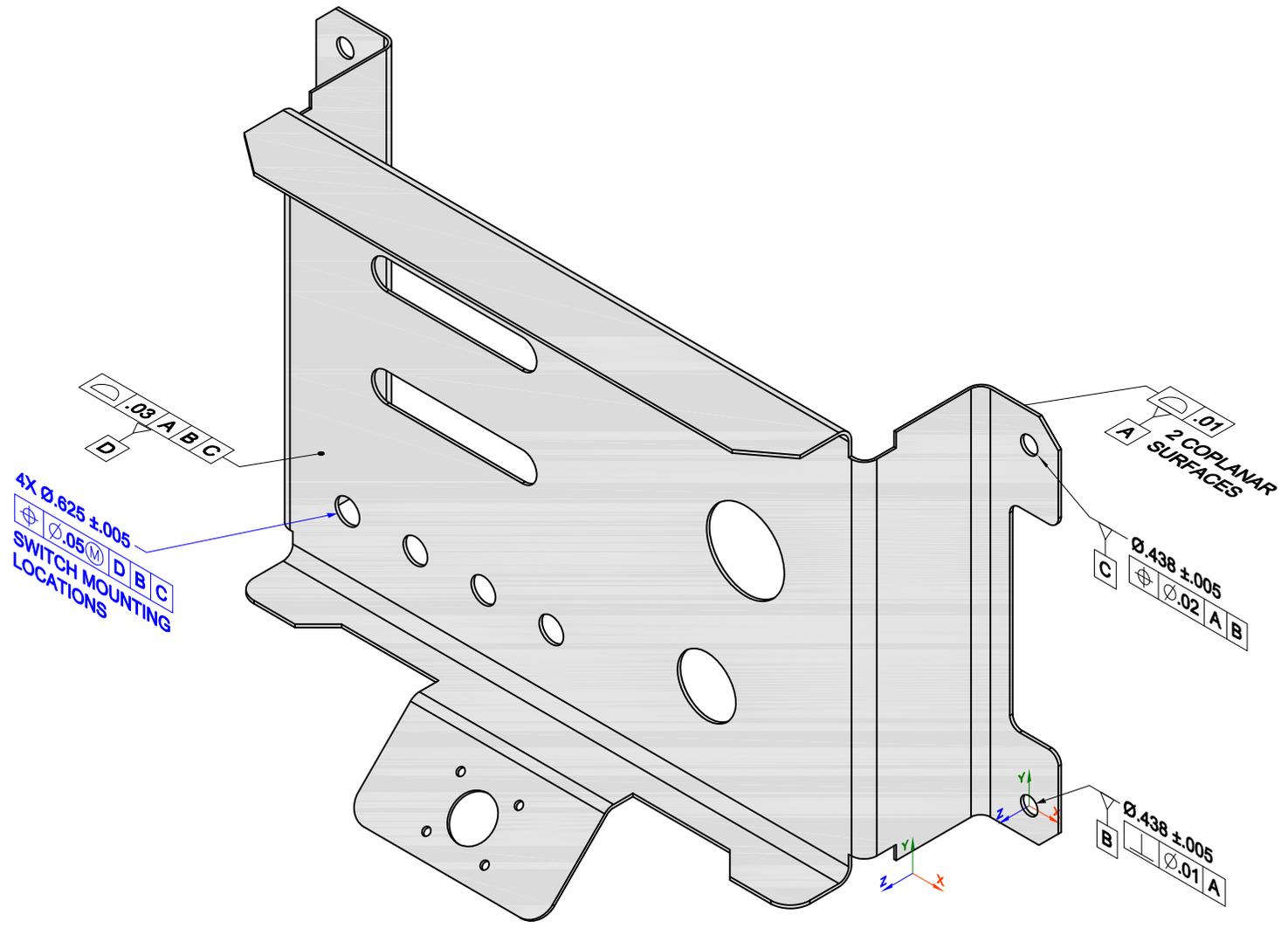


Measurand:
Feature control frame - Position
with MMC and MMB modifiers.

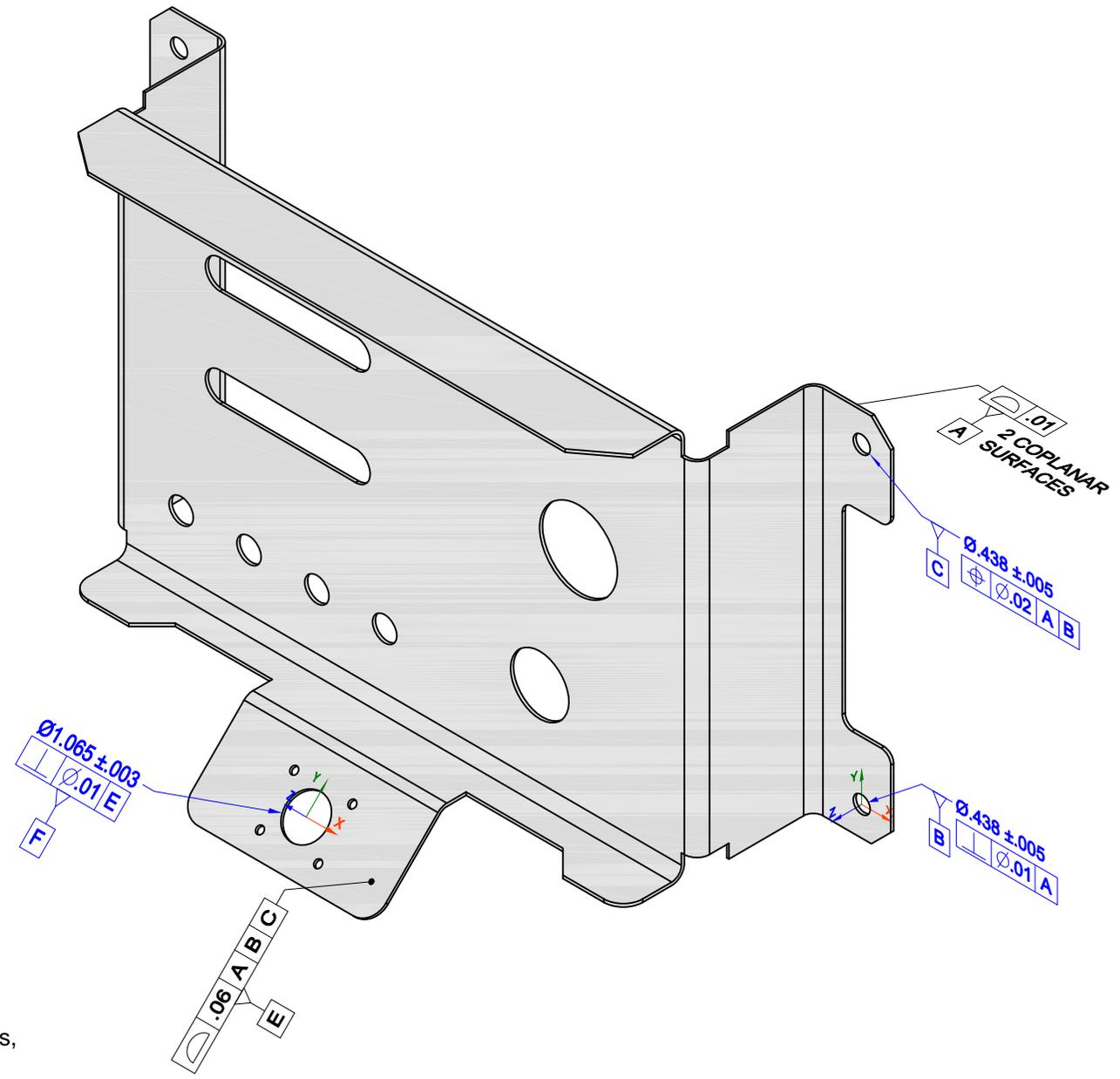


Measurand:
Datum feature symbol attached to a leader-directed feature control frame. 3 examples, datum features A, D and E.

PMI Atomic Test Case 39



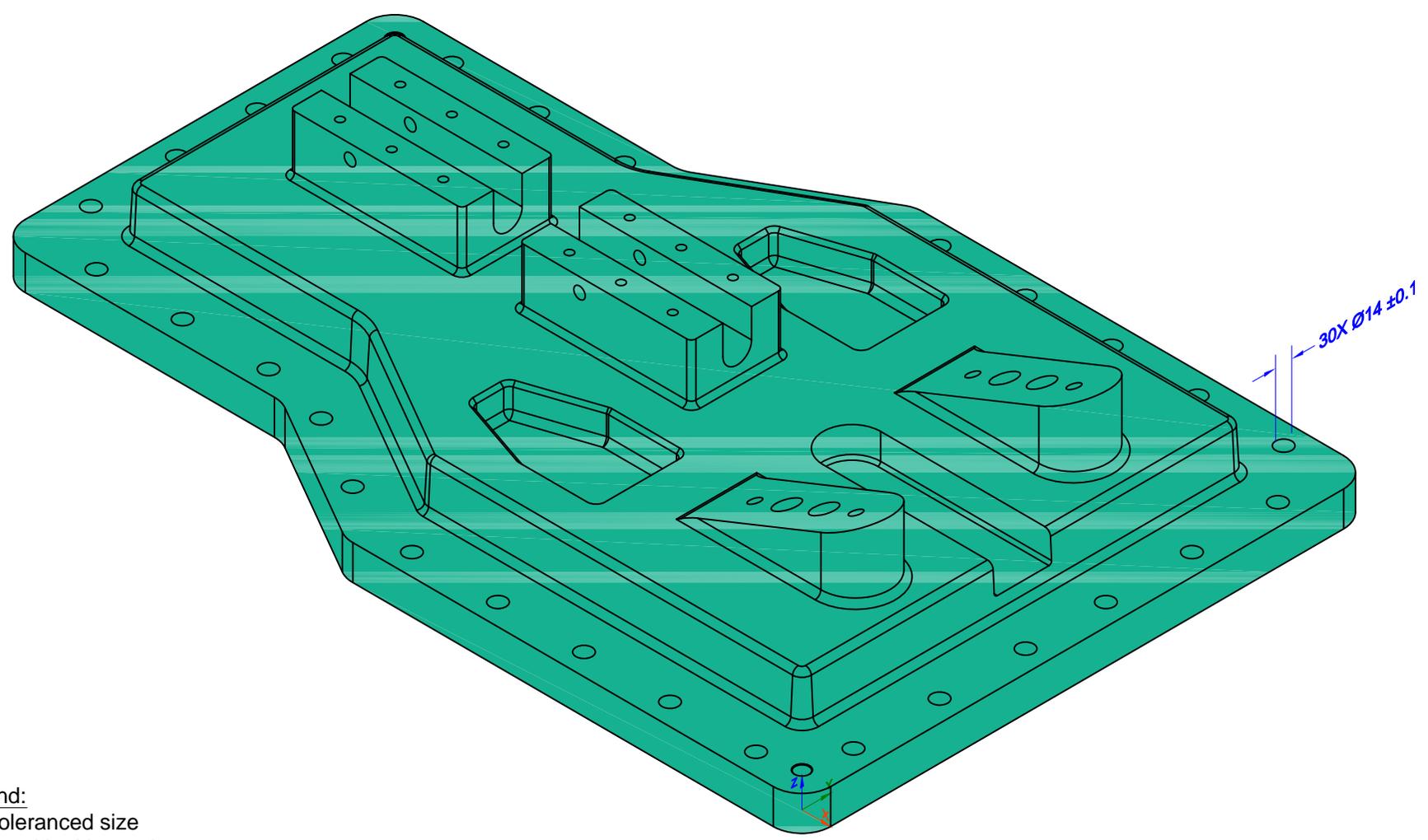
Measurand:
Size dimension with feature control frame and string attached, applied nX.



Measurand:
Size dimension and tolerance with feature control frame and datum feature symbol attached. 3 examples, datum features B, C, and F.

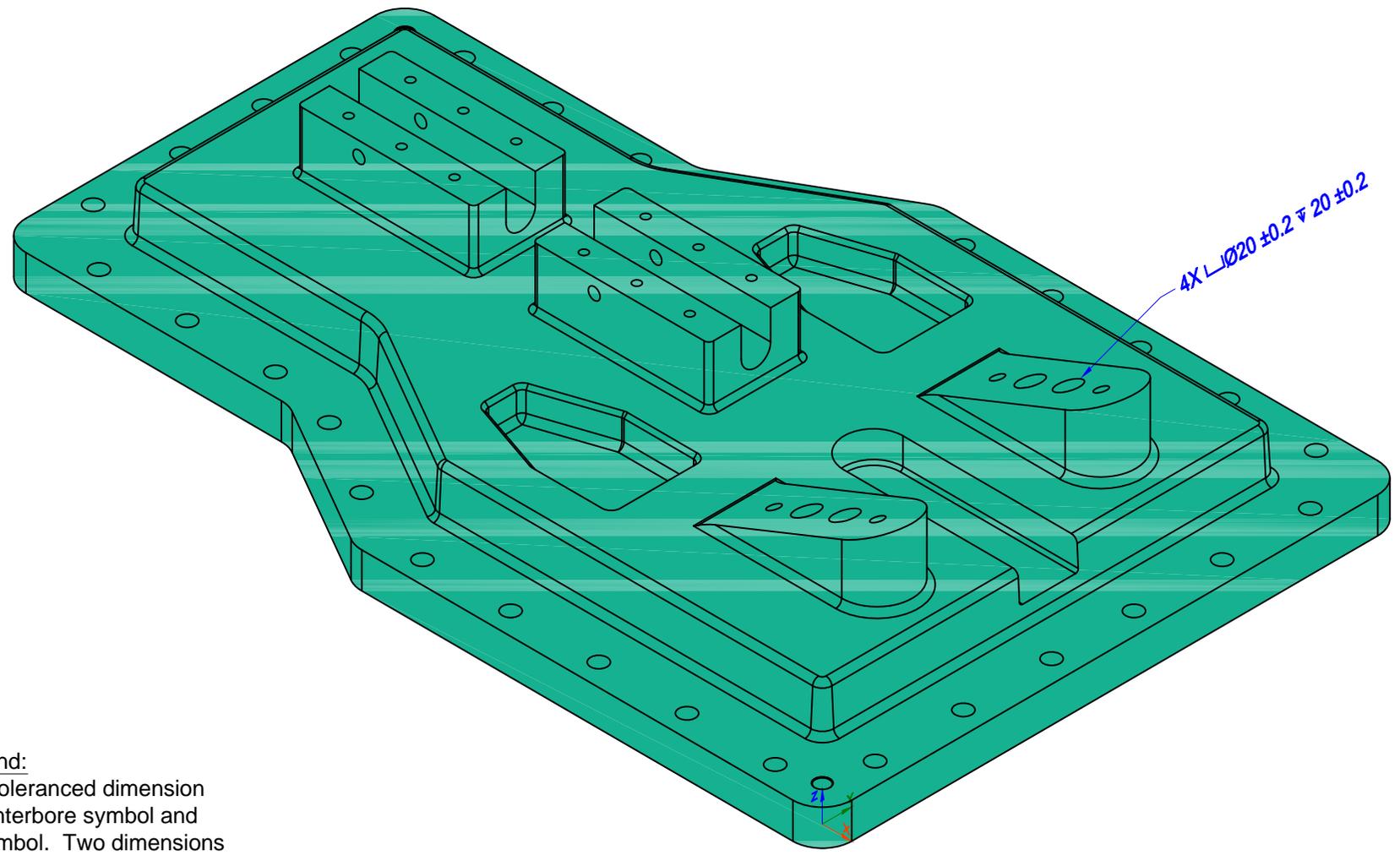
PMI Atomic Test Case 46

Size Dimension with Feature Control Frame and Datum Feature Symbol Attached (3)



Measurand:
Directly-toleranced size
dimension with nX quantity.

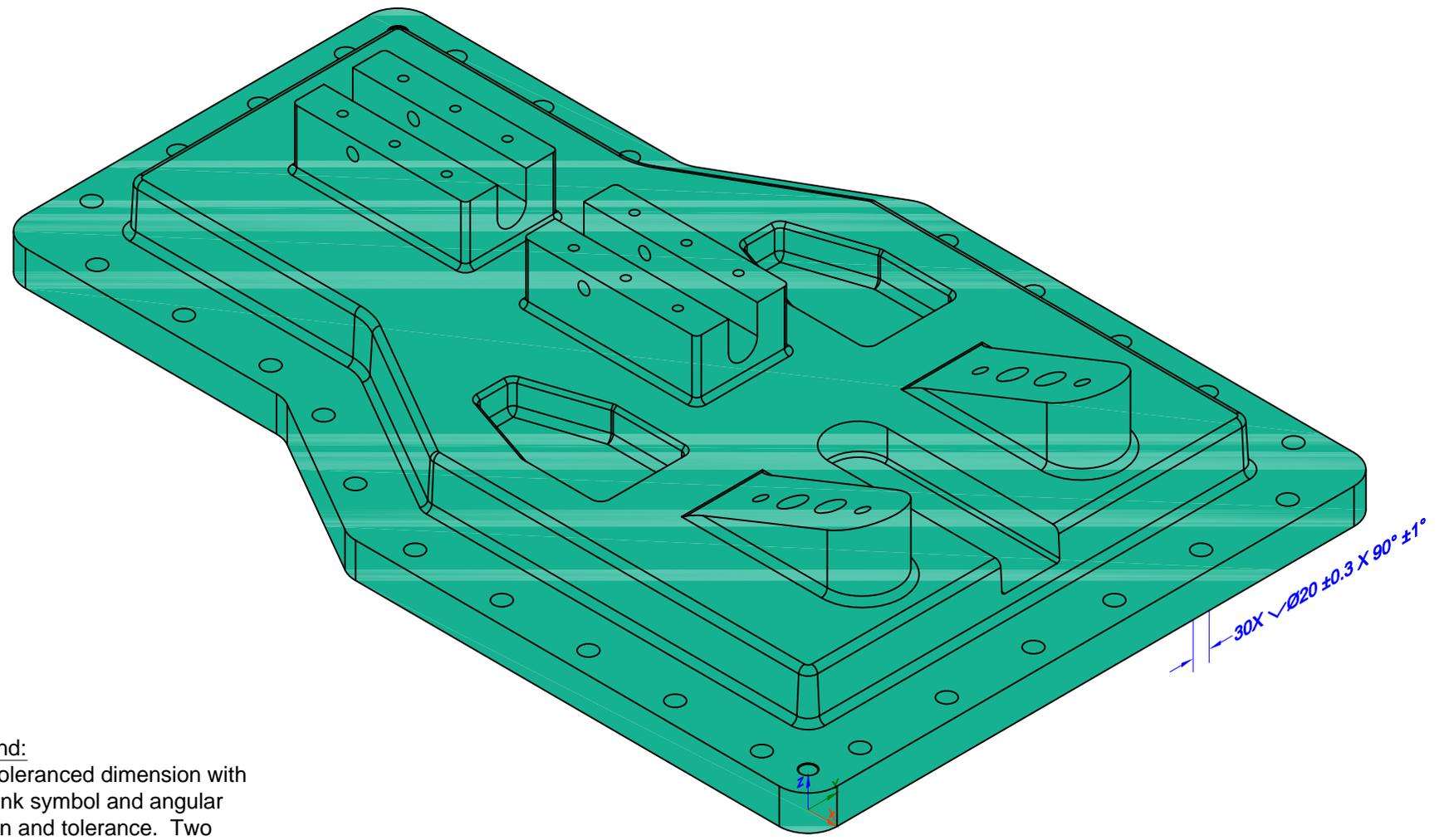
PMI Atomic Test Case 5
Directly-Toleranced Dimension with nX (Quantity Designation)



Measurand:
Directly-toleranced dimension
with counterbore symbol and
depth symbol. Two dimensions
and two tolerances in one
specification.

PMI Atomic Test Case 9

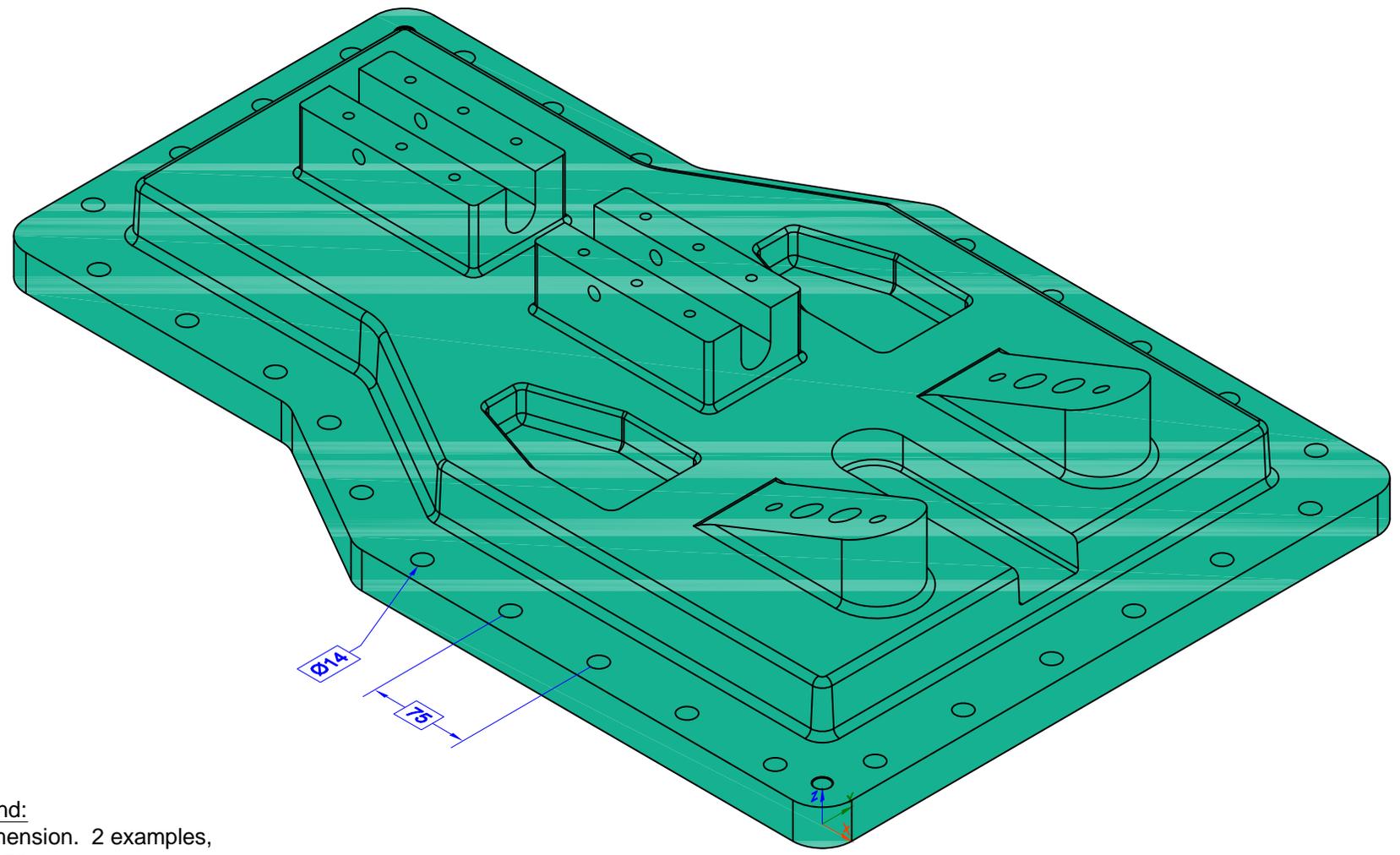
Symbol: Counterbore; Symbol: Depth - Single-Line Specification of Two Dimensions and Tolerances - Complex



Measurand:
Directly-toleranced dimension with
countersink symbol and angular
dimension and tolerance. Two
dimensions and two tolerances in
one specification.

PMI Atomic Test Case 10

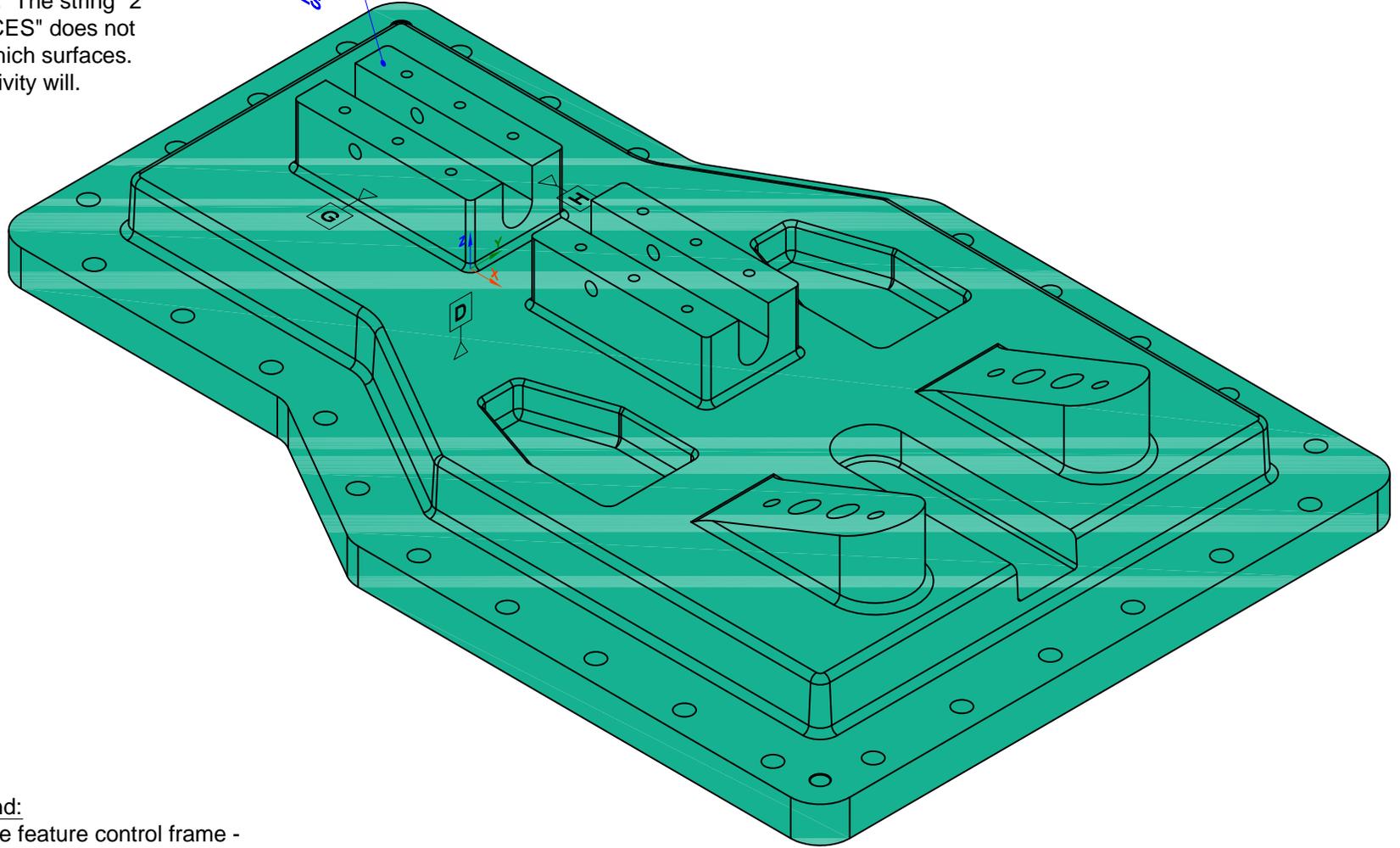
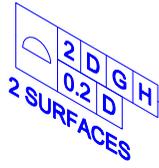
Symbol: Countersink - Single-Line Specification of Two Dimensions and Tolerances - Complex



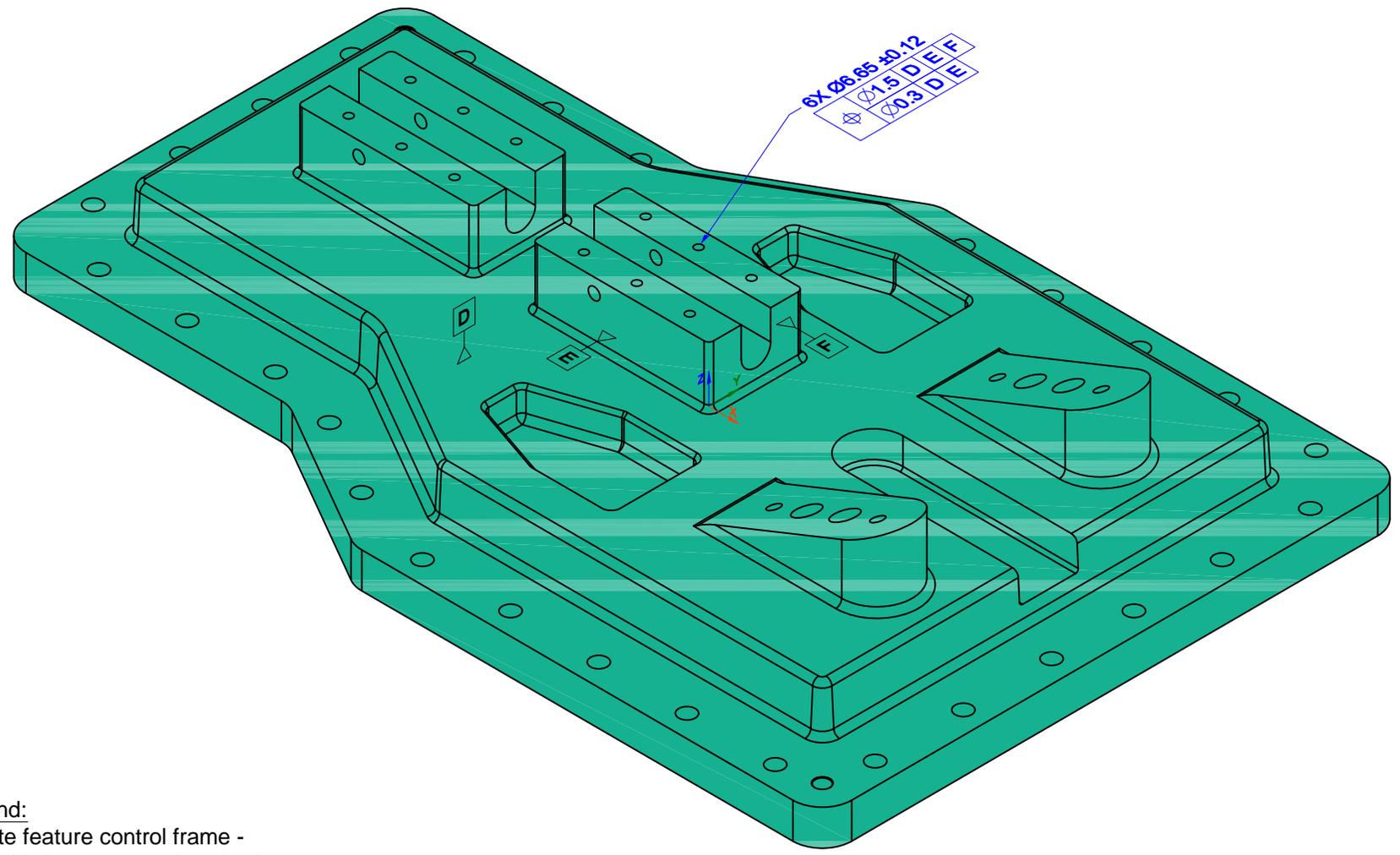
Measurand:
Basic dimension. 2 examples,
 $\varnothing 14$ and 75.

Test Model 4

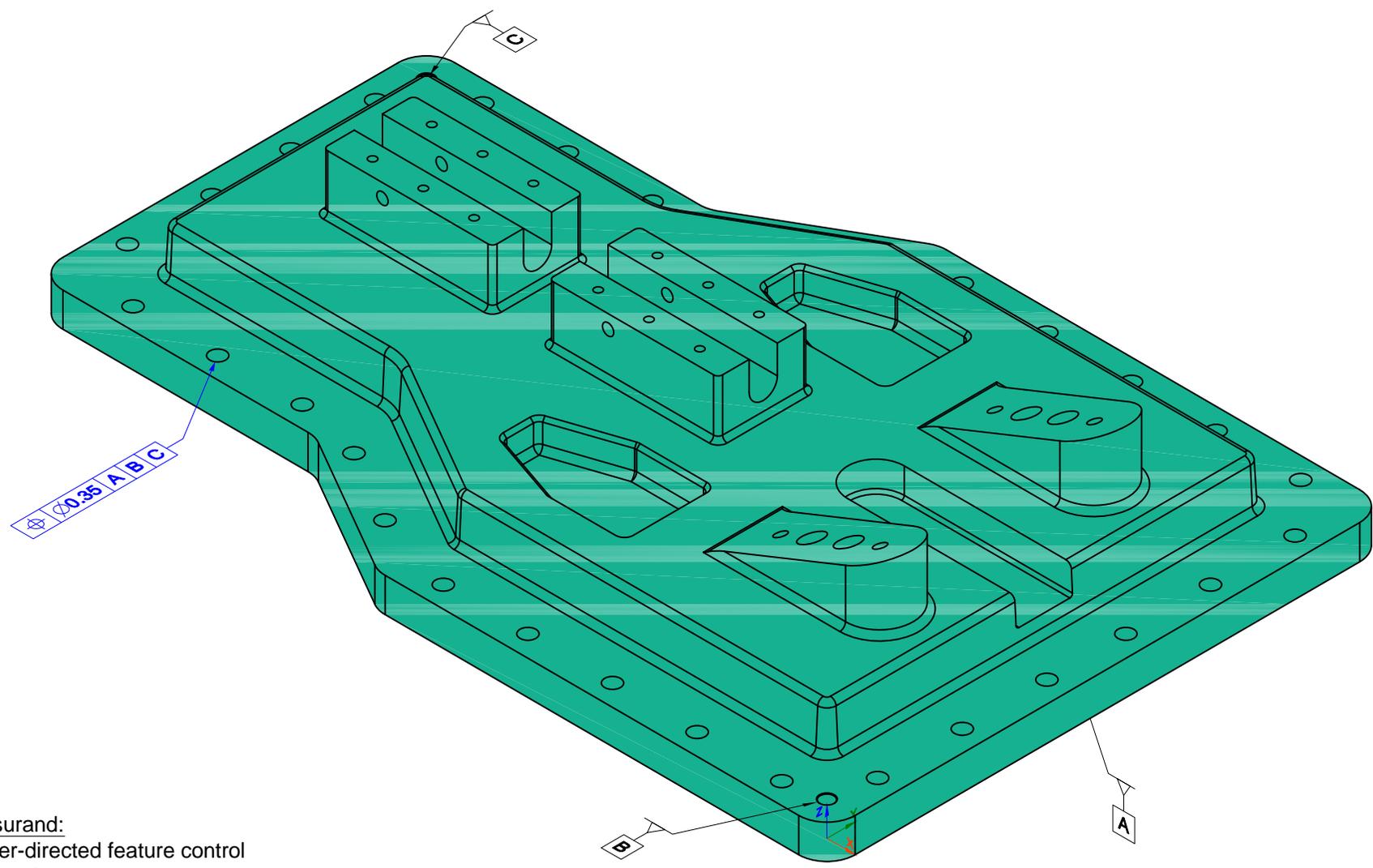
This tolerance applies to the top surfaces above datum features G and H. The string "2 SURFACES" does not clarify which surfaces. Associativity will.



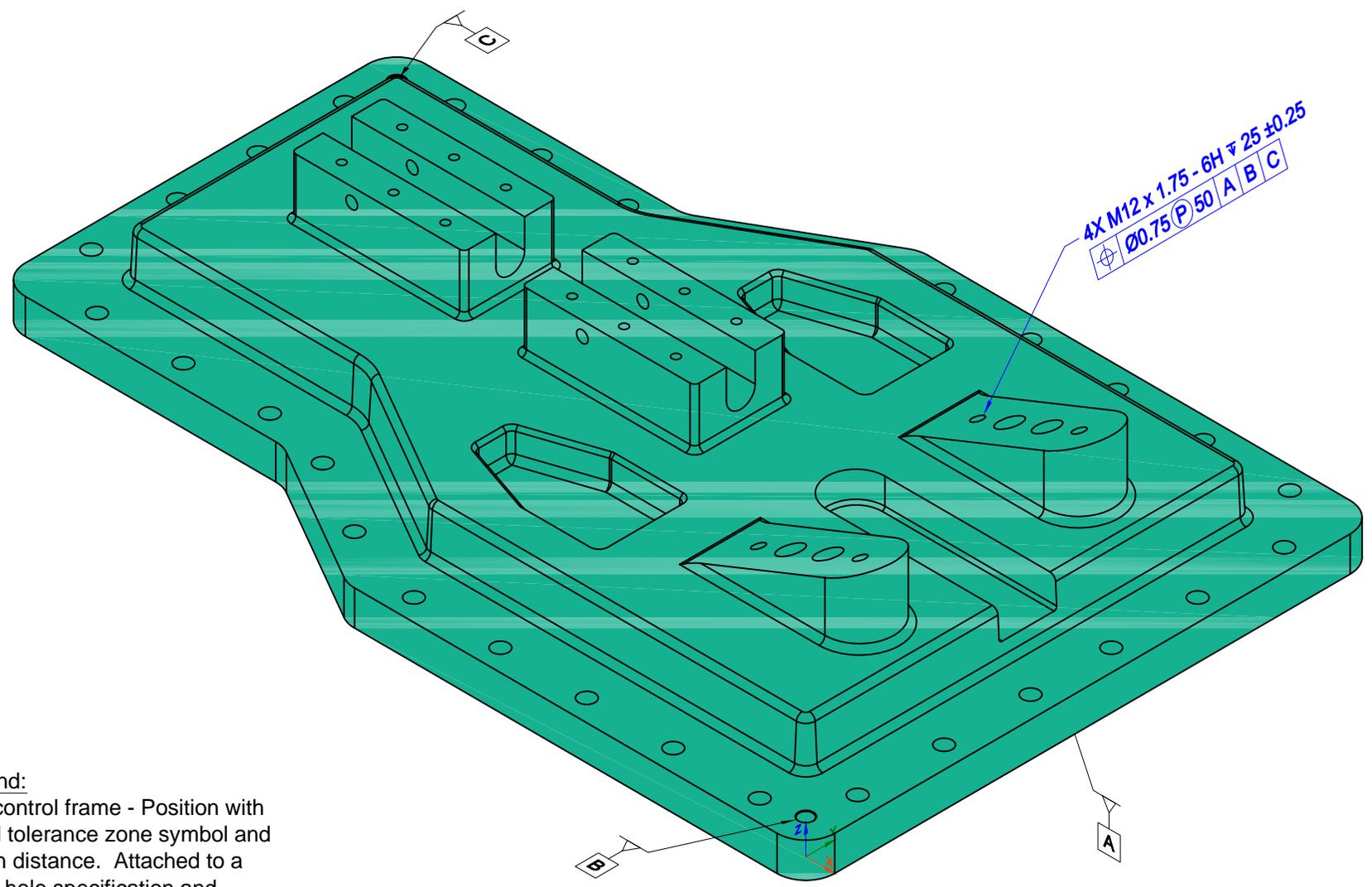
Measurand:
Composite feature control frame -
Profile of a surface, With string
grouping mechanism.



Measurand:
Composite feature control frame -
Position with 2 segments. Attached to
a directly-toleranced dimension.



Measurand:
Leader-directed feature control
frame - Position. Not attached
to a dimension.

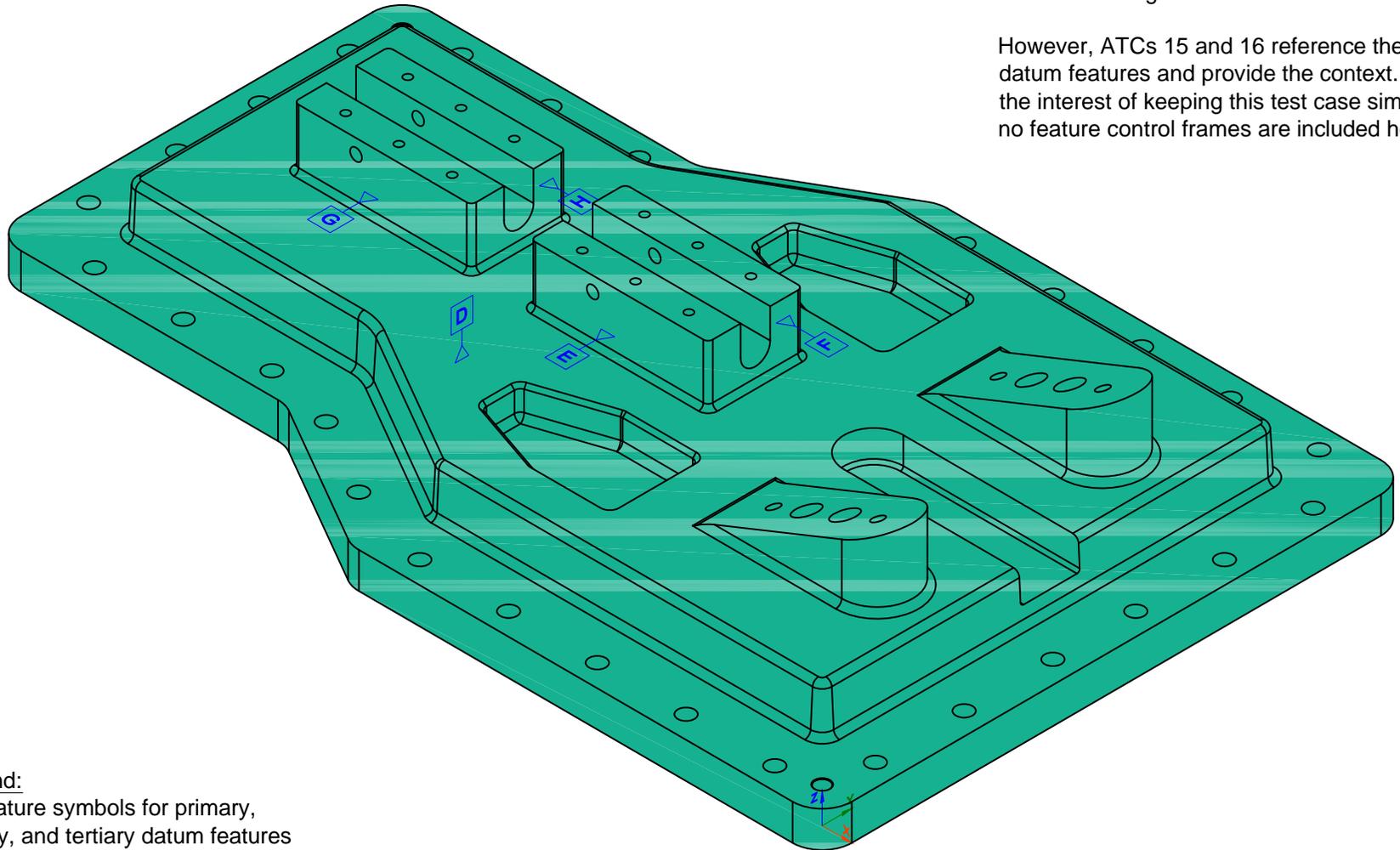


Measurand:
Feature control frame - Position with projected tolerance zone symbol and projection distance. Attached to a threaded hole specification and depth dimension and tolerance.

Note:

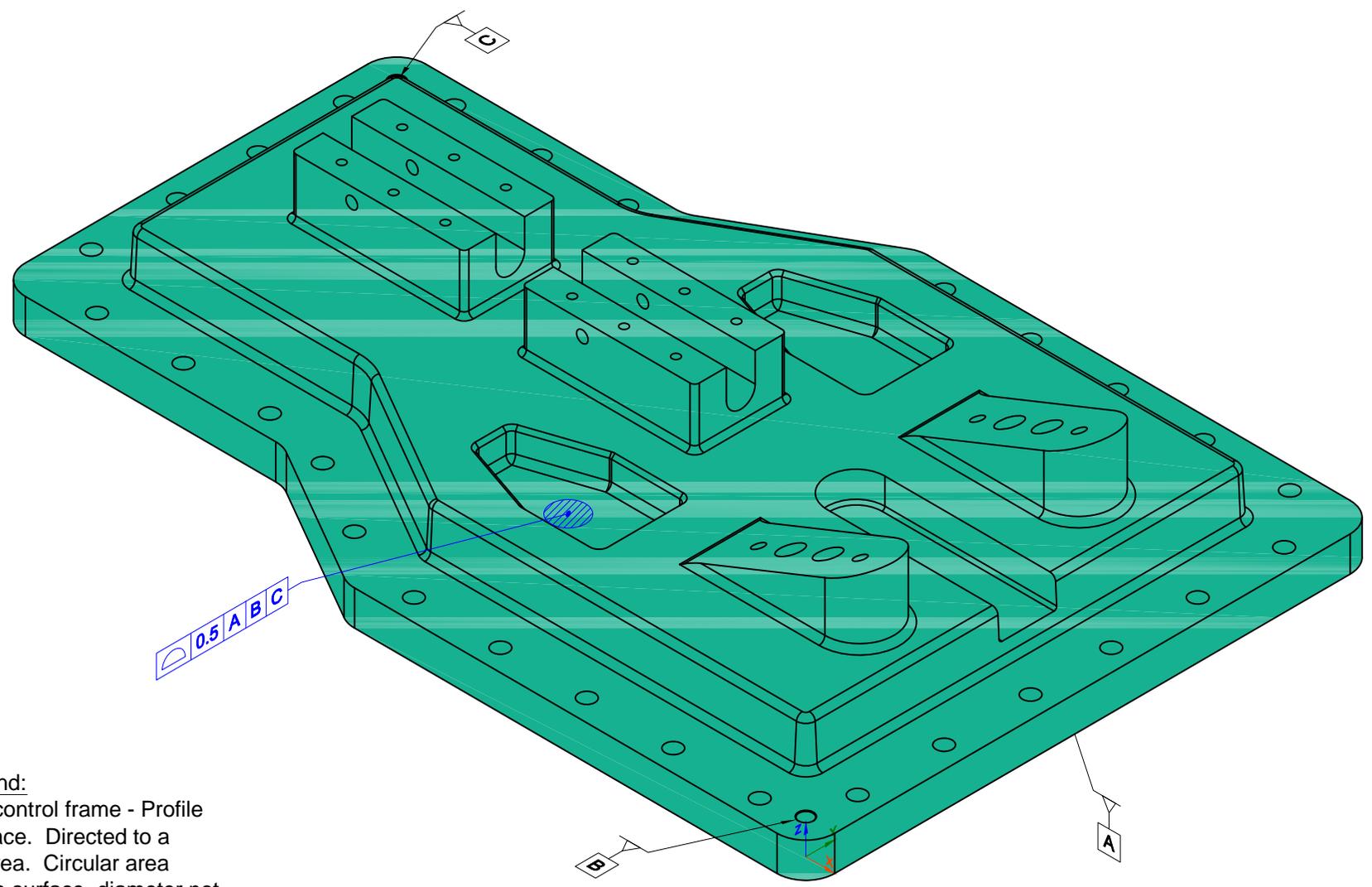
To say that these datum feature symbols represent primary, secondary, or tertiary datum features is meaningless without a feature control frame to define their contextual usage.

However, ATCs 15 and 16 reference these datum features and provide the context. In the interest of keeping this test case simple, no feature control frames are included here.



Measurand:

Datum feature symbols for primary, secondary, and tertiary datum features attached directly to surfaces. 5 examples, datum features D, E, F, G and H

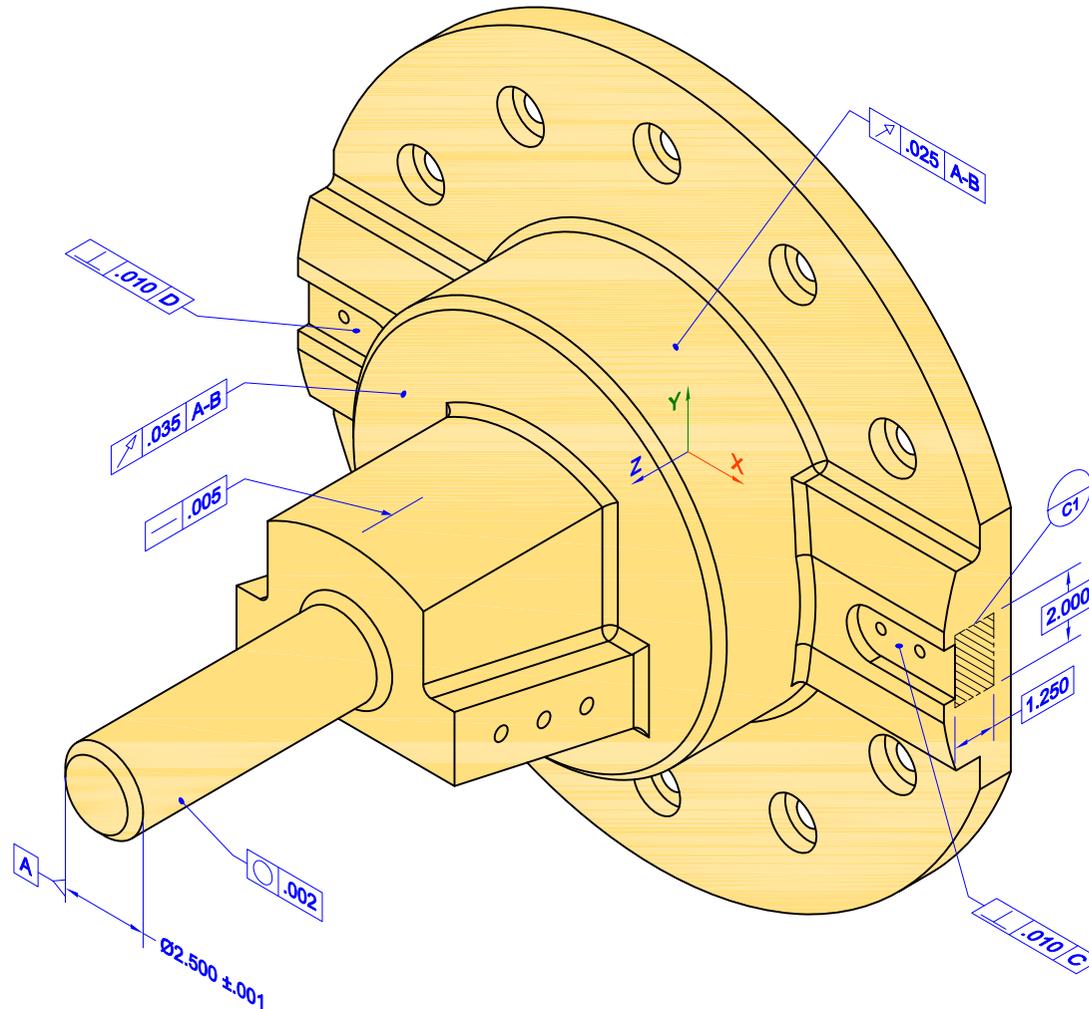


Measurand:
Feature control frame - Profile
of a surface. Directed to a
limited area. Circular area
shown on surface, diameter not
explicitly dimensioned.

PMI Atomic Test Case 49

Profile Tolerance Applied to a Limited Area (Circular Area) - Area Not Explicitly Dimensioned

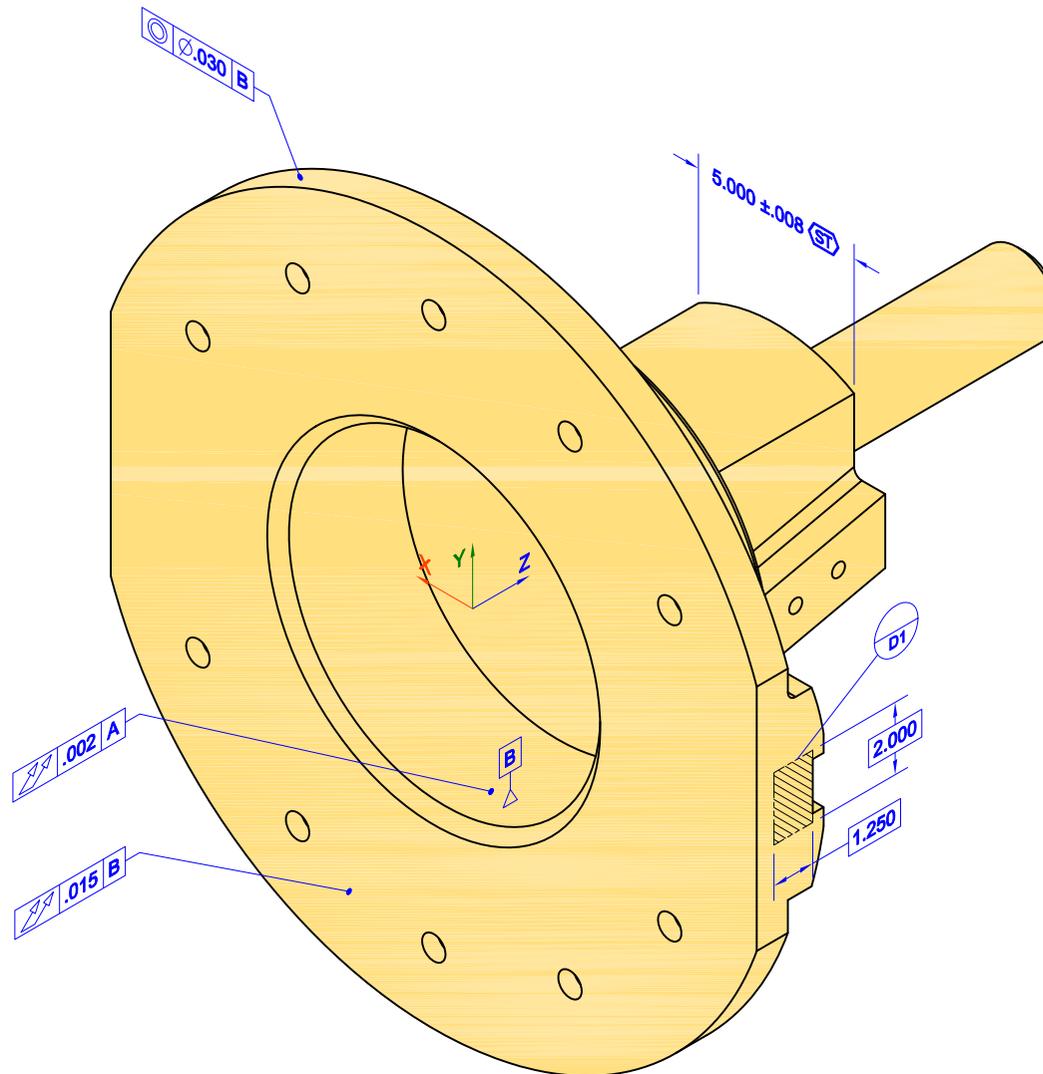
Test Model 5



Notes

Datum feature B and
Datum target D1 defined
in View 2 (of 2).

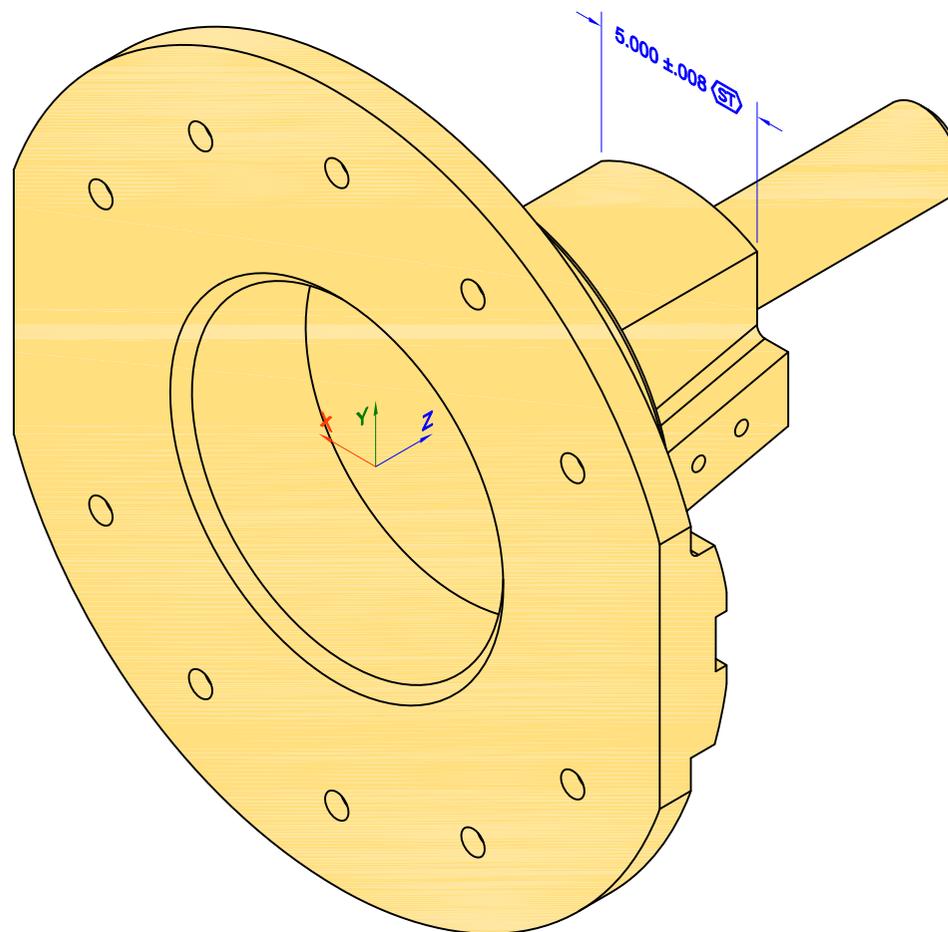
Test Model 5



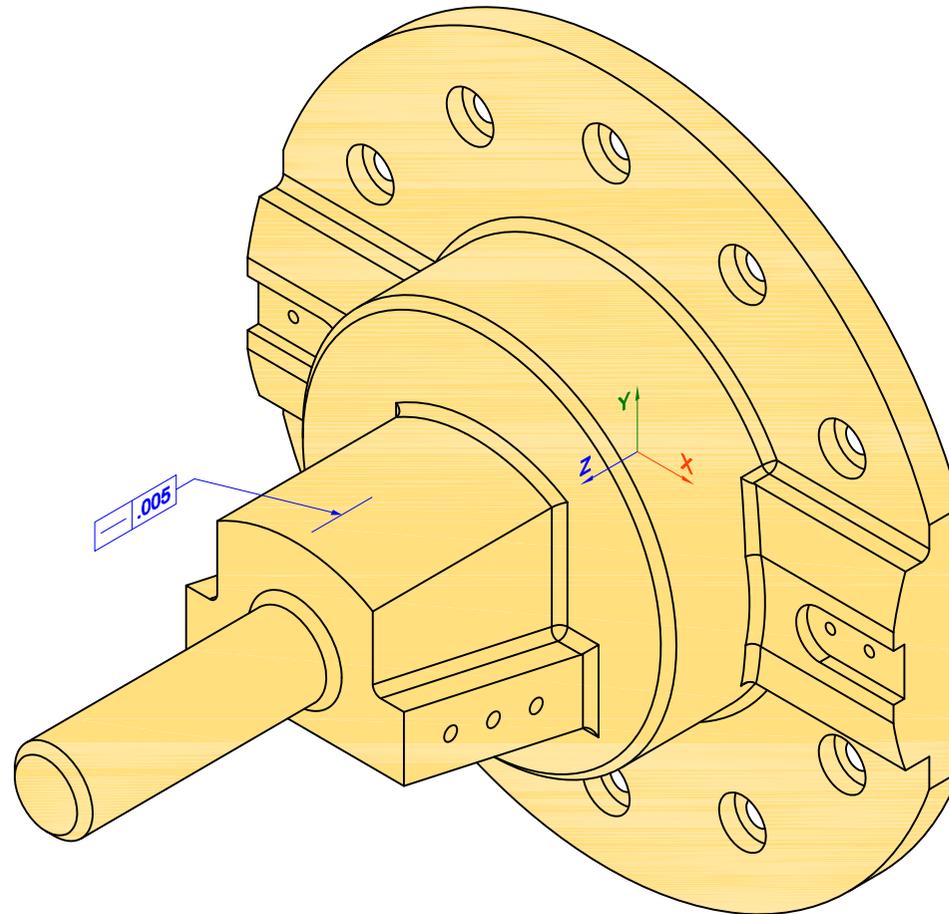
Notes

Datum feature A defined in View 1 (of 2).

Datum target D1 referenced in View 1 (of 2).



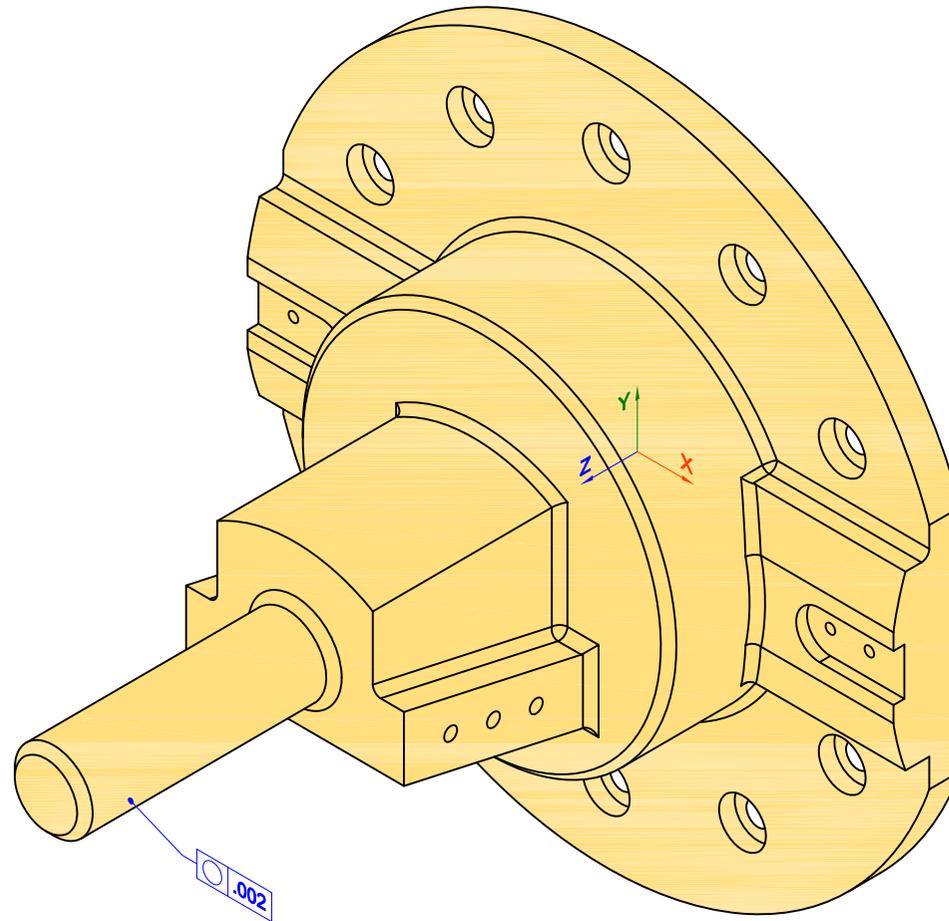
Measurand:
Directly-toleranced dimension
with statistical tolerancing
symbol.



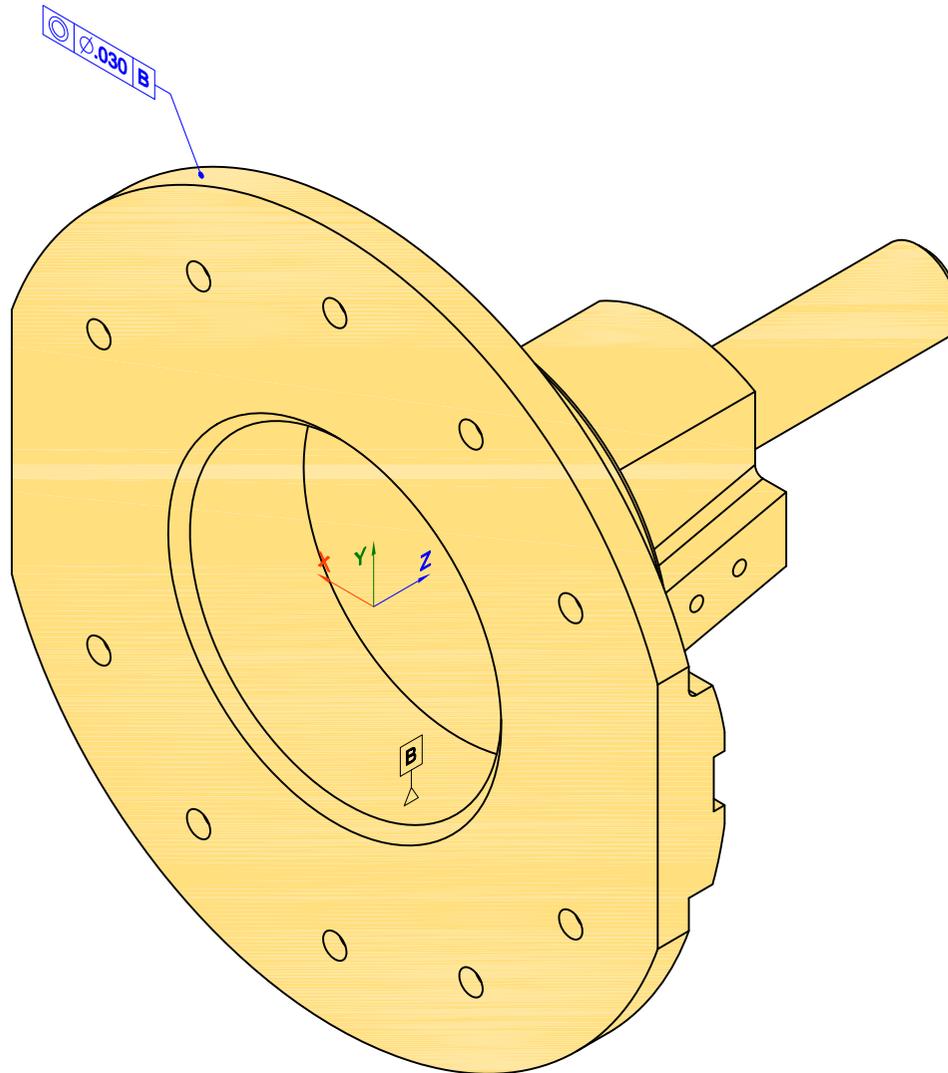
Measurand:
Leader-directed feature control frame -
Straightness. Directed to supplemental
geometry (represented line element).

PMI Atomic Test Case 18

Feature Control Frame Directed to Surface - Straightness - with Represented Line Element

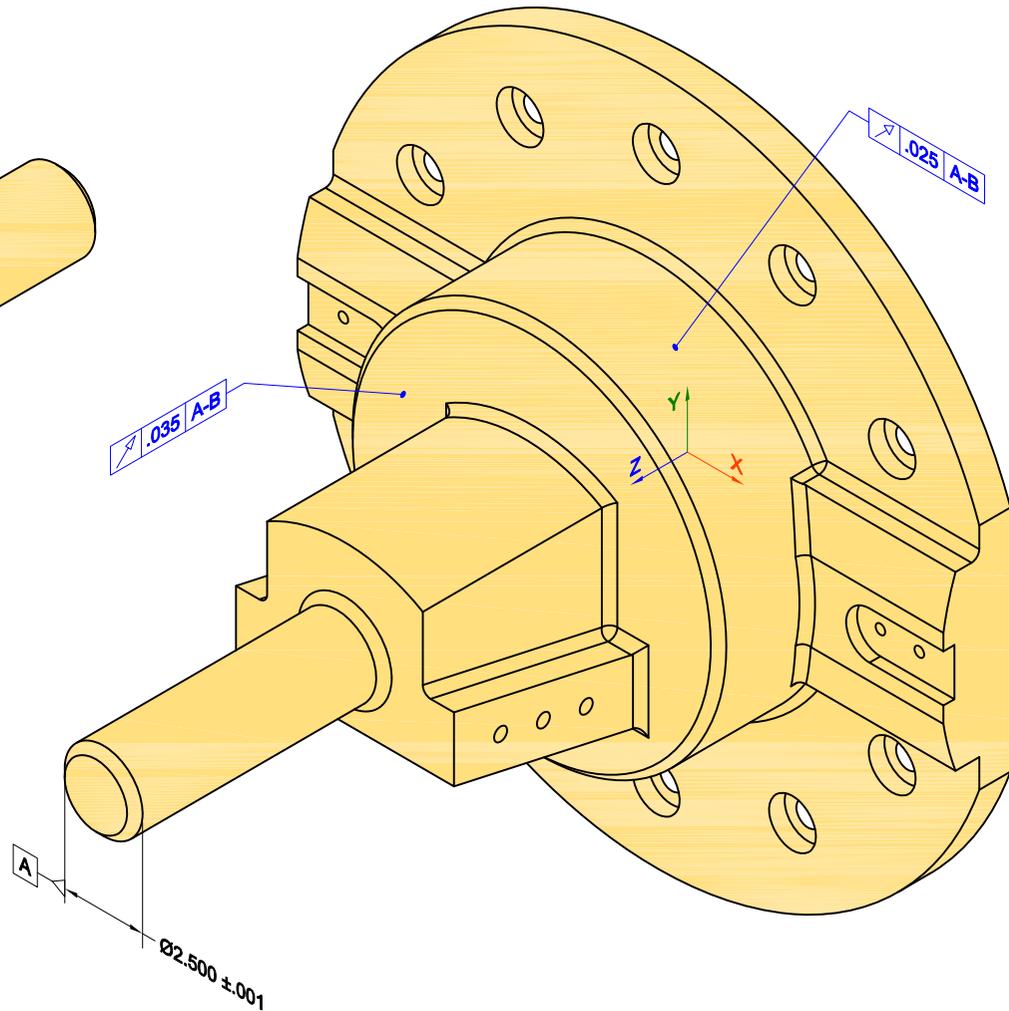
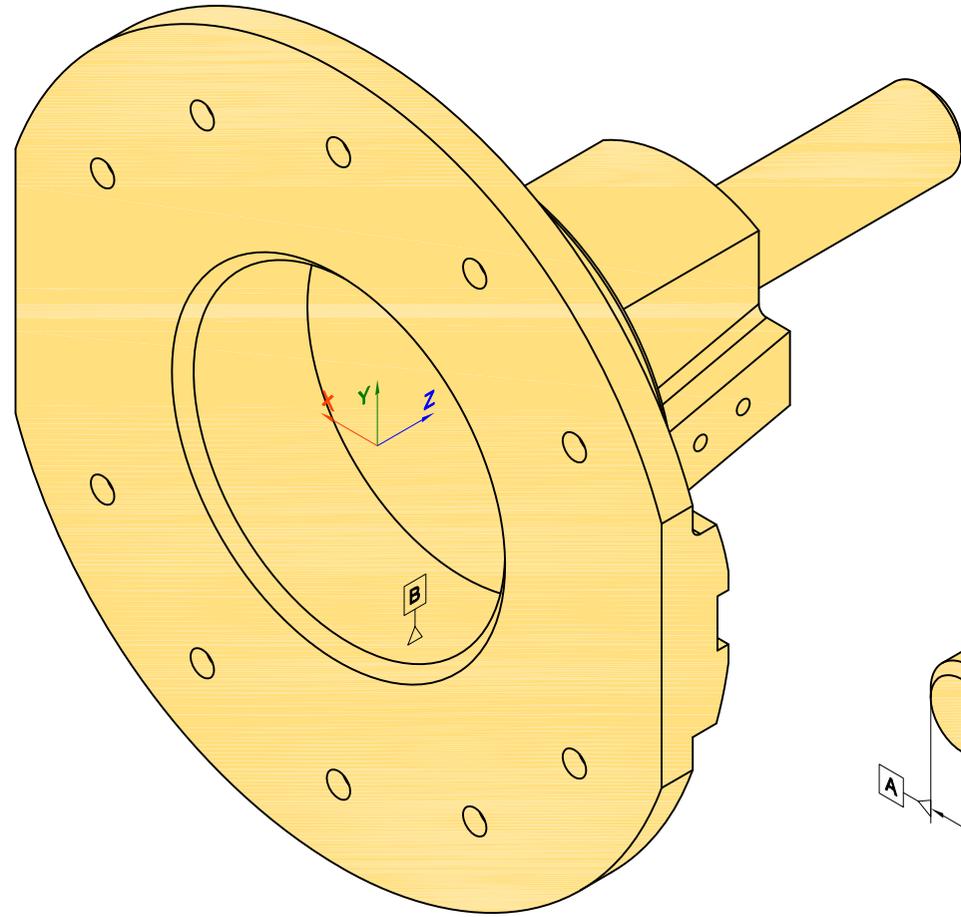


Measurand:
Leader-directed feature control
frame - Circularity.

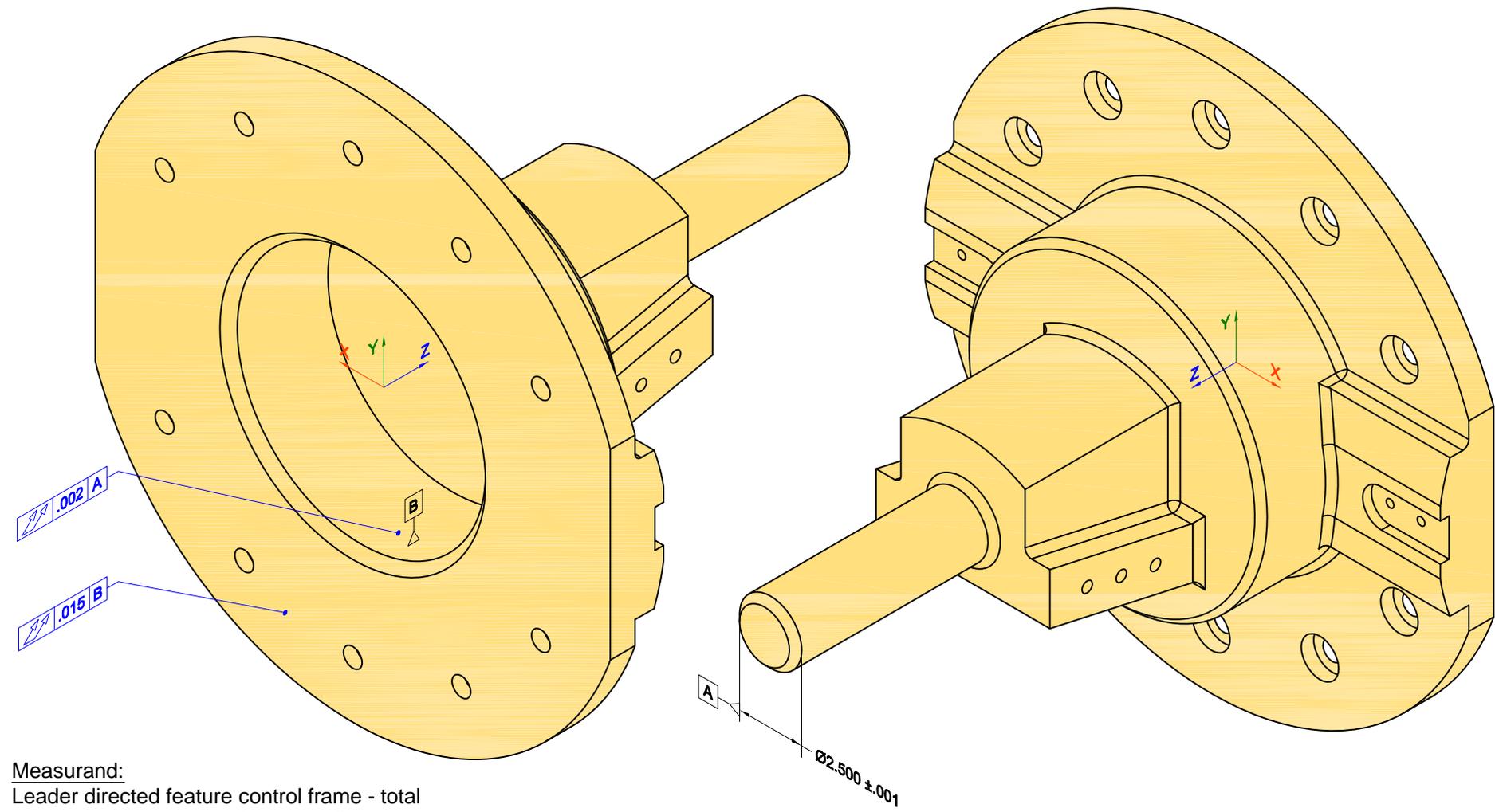


Measurand:
Leader-directed feature control
frame - Concentricity.

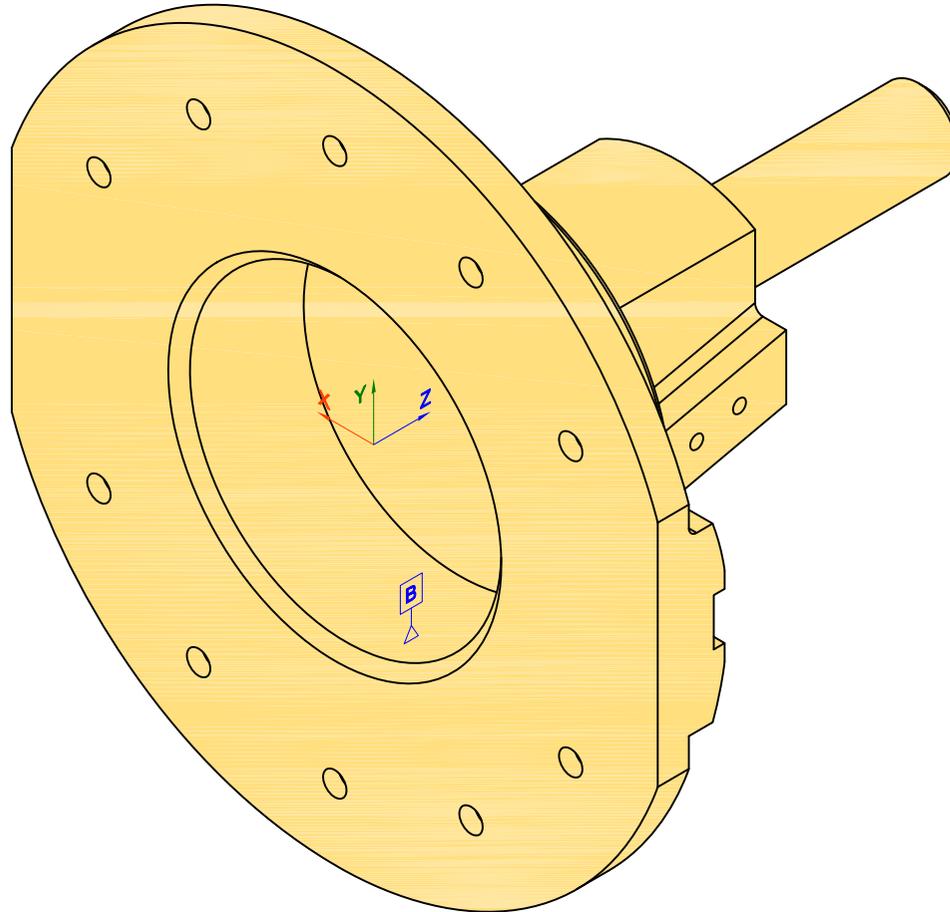
Test Model 5



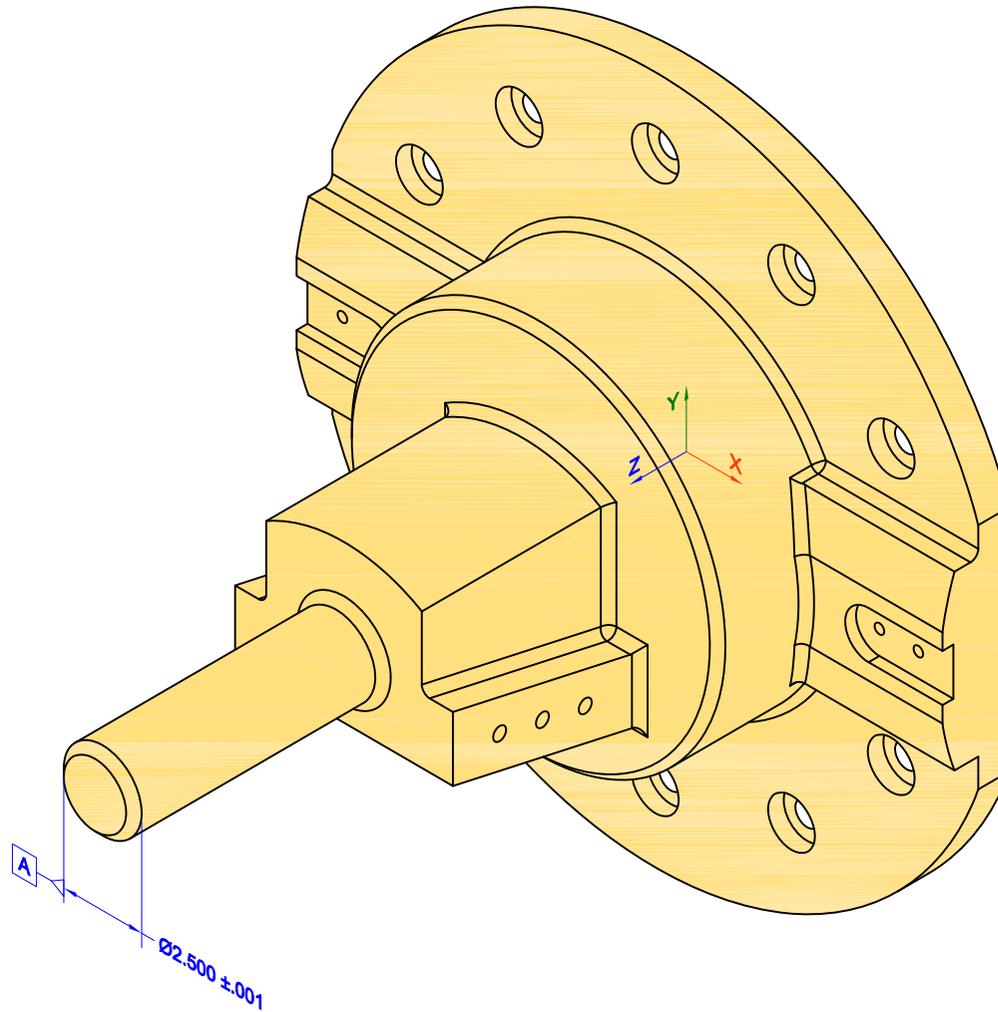
Measurand:
Leader directed feature control frame -
circular runout. 2 examples, 1 directed to
flat surface, 1 directed to cylindrical surface.



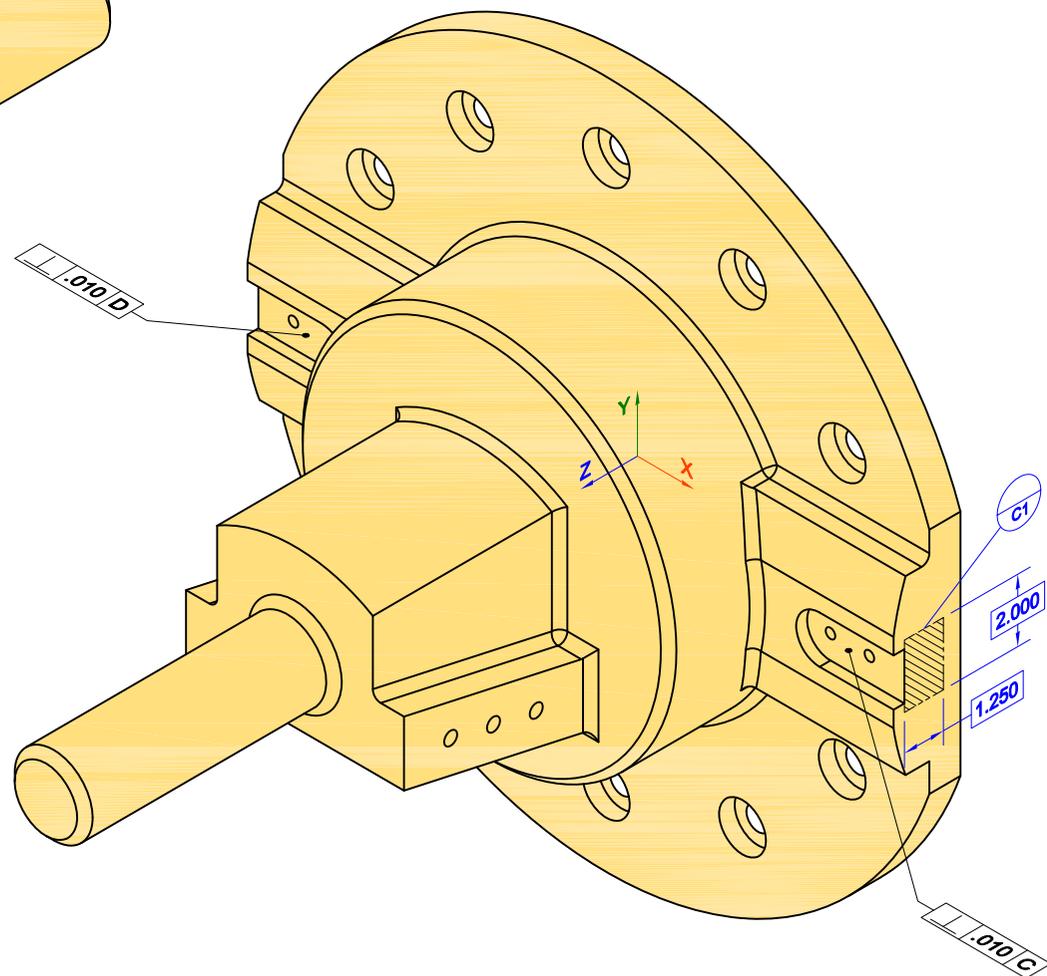
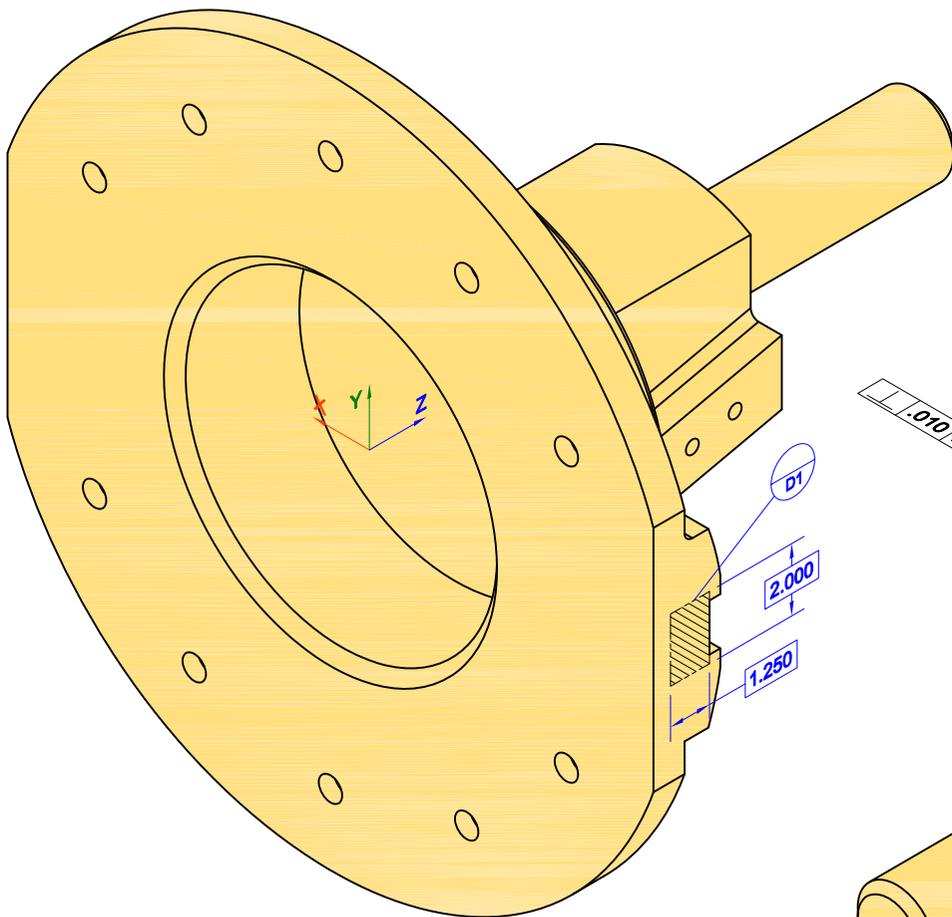
Measurand:
Leader directed feature control frame - total runout. 2 examples, 1 directed to flat surface, 1 directed to cylindrical surface.



Measurand:
Datum feature symbol attached
to surface of feature of size.

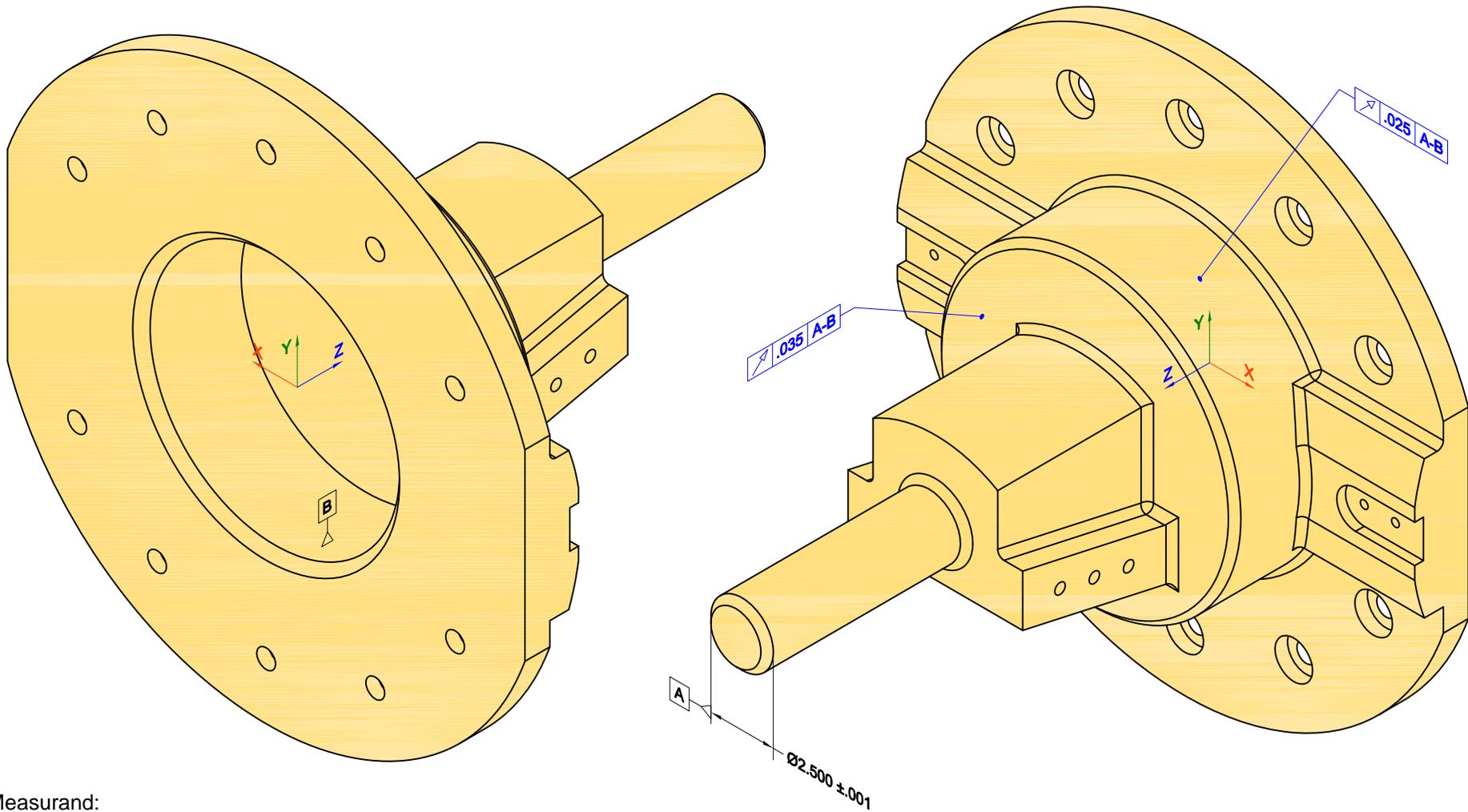


Measurand:
Datum feature symbol attached
to a size dimension.



Measurand:
Datum target symbol and rectangular datum target area. Datum target area shown on part. Dimensions for area explicitly-dimensioned, not shown in datum target symbol. 2 examples, datum targets C1 and D1.

Test Model 5



Measurand:
Multiple datum feature - referenced in a feature control frame. 2 examples, circular runout applied to a flat surface, and applied to a cylindrical surface - both reference A-B. This is essentially the same as ATC 24, which tested circular runout.