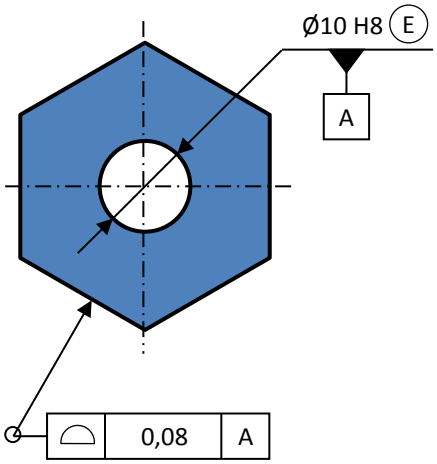
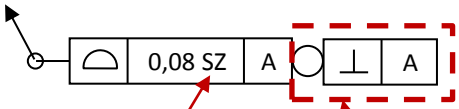
GENERAL NOTE:
In all cases hex shape is fully defined with basic (theoretically exact) dimensions – widths and angles.

A)



COMMENTS:

- Even though profile tolerance is applied on all-around basis, it creates 6 independent tolerance zones, meaning that angular relationship between 6 faces is uncontrolled.
- Profile tolerance zones are equally disposed about theoretically exact contour of the hex.
- This is the old way of defining all-around profile requirement, as given in ISO 1660:1987. Per the latest standards (ISO 1101:2017, ISO 1660:2017), if the intent is to treat all 6 faces independently, the specification shall be as follows:

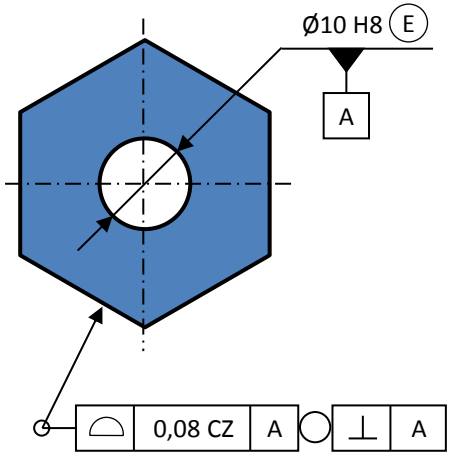


Separate Zone modifier

Collection plane indicator defines family of parallel planes (here perpendicular to datum axis A), which identifies the features covered by the all-around specification.

This indicator shall always be used when the all-around specification is applied.

B)

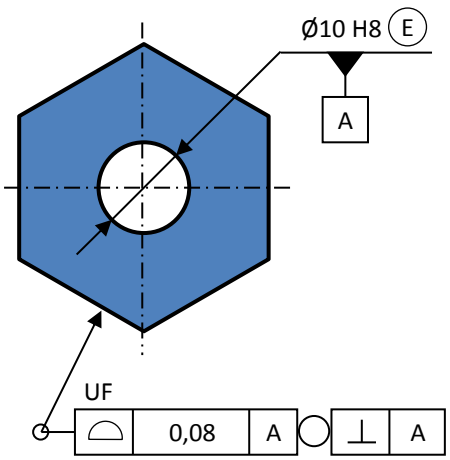


COMMENTS:

- Profile tolerance applied on all-around basis together with CZ (combined zone) modifier combines 6 tolerance zones into 1 zone with internal constraint of basic orientation and location between each sub-zone, meaning for example that angular relationship between 6 faces becomes controlled.
- Profile tolerance zone is equally disposed about theoretically exact contour of the hex.
- The resultant combined tolerance zone has sharp outside corners (like it would be by default in Y14.5).

GENERAL NOTE:
In all cases hex shape is fully defined with basic (theoretically exact) dimensions – widths and angles.

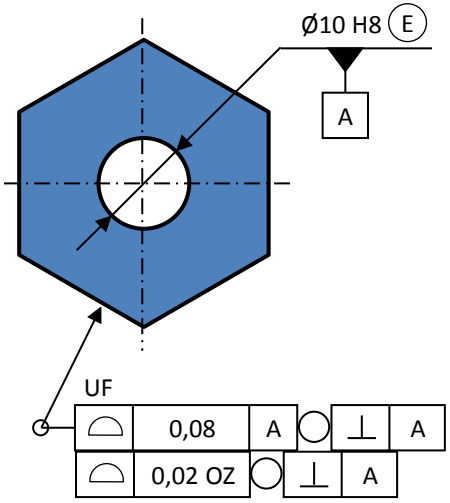
C)



COMMENTS:

- Profile tolerance applied on all-around basis together with UF (united feature) modifier creates a single feature from 6 faces of the hex with internal constraint of basic angle and distance between each face, meaning for example that angular relationship between 6 faces is controlled.
- Profile tolerance zones is equally disposed about theoretically exact contour of the hex.
- Because the periphery of the hex is considered one feature, the spheres that define the limits of the profile tolerance zone are rolled across the discontinuities in the feature and create round corners in the tolerance zone on the outside of the discontinuities.

D)

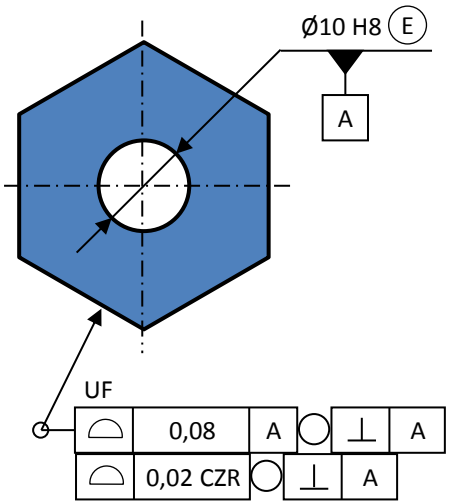


COMMENTS:

- Upper segment to be interpreted the same way as in case C).
- OZ (offset zone) modifier in the lower segment defines a tolerance zone of 0,02 width that is offset from the theoretically exact contour of the hex by an unspecified, but consistent value (this is the same concept as dynamic profile tolerance zone modifier introduced in Y14.5-2018).
- In this example, size of the hex and its orientation and location to datum axis A is controlled by the upper specification.
- Lower specification controls form of the hex only – the feature needs to be regular hexagon within 0,02.

GENERAL NOTE:
In all cases hex shape is fully defined with basic (theoretically exact) dimensions – widths and angles.

E)



COMMENTS:

- Upper segment to be interpreted the same way as in cases C) and D).
- In addition, CZR (combined zone rotational only) modifier in the lower segment combines 6 tolerance zones into 1 zone with internal constraint of basic orientation between each sub-zone, meaning that angular relationship between 6 faces is controlled, but location relationship is not.
- In this example, size of the hex and its orientation and location to datum axis A is controlled by the upper specification.
- Lower specification controls form of the hex only – the feature needs to be a hexagon with all 6 faces within 0,02 wide tolerance zone basically oriented to each other, but not basically located (see below for explanation of general difference between CZR and CZ).