

Clamp connections

How to calculate flanges and covers having screw clamps, hinged or eye-bolts.

Online version: <https://nextgen.sant-ambrogio.it/KB351600>

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The flange calculation methods in the calculation codes normally require that the bolt circle and the relative bolt hole are completely inside the external diameter of the flange. However, if it is necessary to use closing devices with clamps or slots on the external diameter, it is necessary to apply some changes to the calculation of the flange.

In the case of clamp connections, the calculation module according to the Appendix 24 of ASME VIII Division 1 is available in NextGen. This type of component can only be calculated as an additional component.

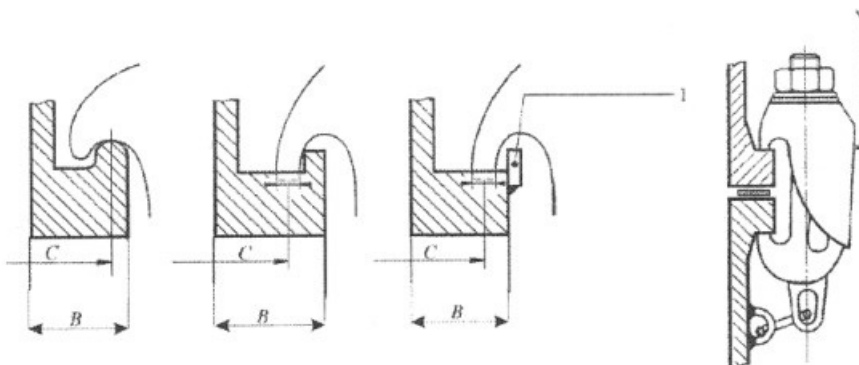
In other cases it is possible to perform a flange calculation based on the standard method of the code, modifying the calculation diameters.

To enable this procedure you must first select the "Screw clamp, hinged bolt or other closing device" option in the "Bolts" section of the flange or flat cover. In this way the checks of geometric coherence between the external diameter of the flange and the bolt circle and the overlap between bolts and gasket are disabled. Design mode is also disabled.

Screw clamps

The position of the bolt circle in a flange tightened with screw clamps depends upon the shape of the clamp.

Example of screw clamps, from EN13445-5 Appendix C:



Key

1: Hold ring

B: Flange width (mm)

C: Bolt circle diameter (mm)

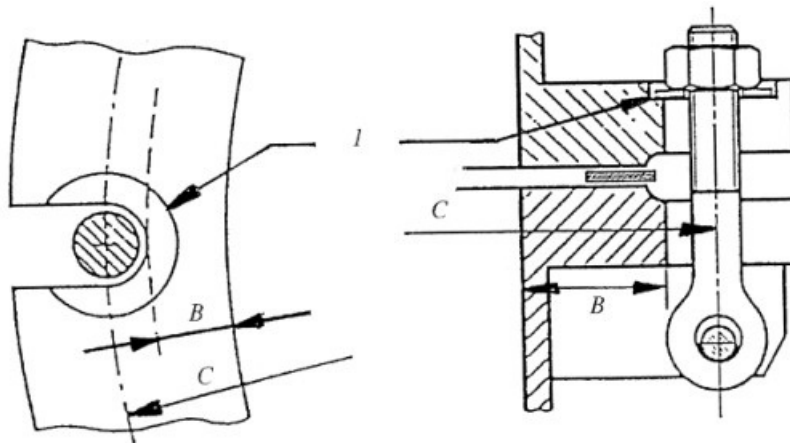
Figure C.5.4-1 — Flanges assembled by screw clamps with typical examples of security against slipping off

Hinged bolts

Flanges using hinged bolts have a tie circle smaller than the outside diameter, unlike flanges with standard bolts. However, as shown in the image below or indicated in ASME interpretation number BC06-1122, the flange outside diameter can be set to the inside edge of the slotted bolt holes; this

operation is not performed automatically by the software, therefore the user must set A to a value lower than C.

Example of hinged bolts, from EN13445-5 Appendix C:



Key

- l*: Security against sliding
- B*: Flange width (mm)
- C*: Bolt circle diameter (mm)

Figure C.5.5-1 — Flanges assembled by hinged bolts

This type of modifications are normally accepted in the design phase, see for example **ASME Interpretation BC06-1122**:

Question: For a flange with slotted bolt holes (to accommodate swing bolts), is the flange outside diameter “A” to be used in the design calculations equal to the diameter at the inner edge of the slotted bolt holes even though this diameter is less than the bolt circle diameter?

Reply: Yes.

In any case we always recommend checking the validity of the method with the authorized inspector or notified body.