Design a body/girth flange automatically using the Flange Designer tool

NextGen's Flange Designer allows you to design and optimize a body flange in minutes, creating the best possible geometry that satisfies the input conditions.
Online version: https://nextgen.sant-ambrogio.it/KB470771
Latest update: 29 gen 2025

NextGen's *Flange Designer* allows you to design and optimize a body flange in minutes, creating the best possible geometry that satisfies the input conditions.

This is an often overlooked, but extremely powerful feature.

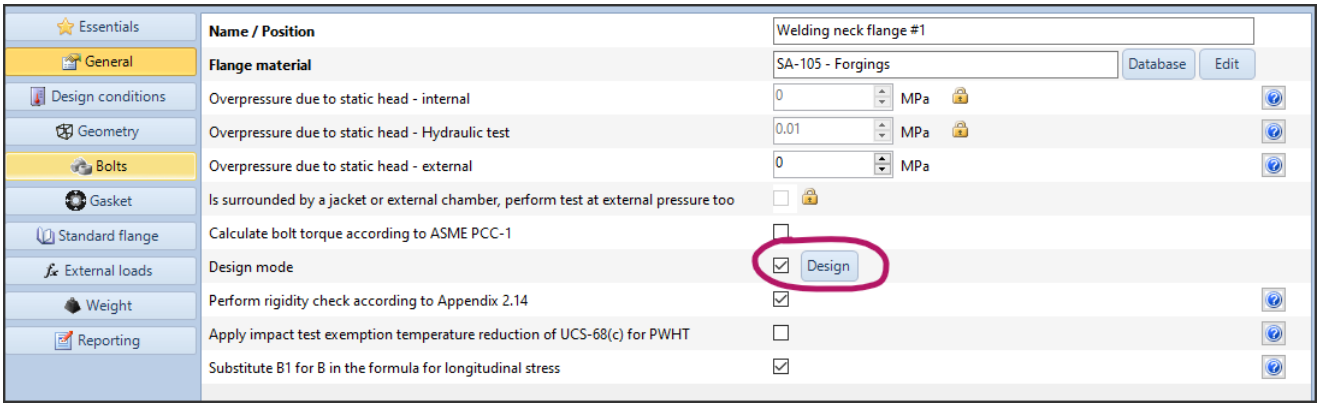
Requirements

The Flange Designer is available for all major design codes (ASME, EN 13445, AD 2000, VSR) and covers flange design with traditional methods (Appendix 2, Clause 11, B 7). Alternative design methods such as EN 13445 Annex G and EN 1591 are excluded.

The supported flange types are the most diverse, from classic welding neck and loose to slip-on and reverse.

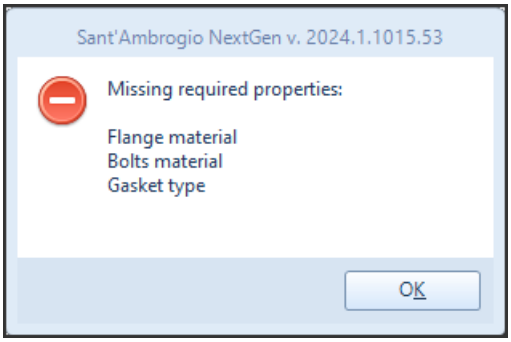
Where to find the *Designer*

For all flanges that support it, within the calculation codes covered, the *Flange Designer* can be enabled in the "General" category:



Minimum initial data

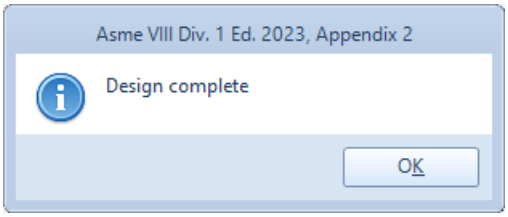
By creating a flange from scratch, enabling the *Designer* and pressing the *Design* button, a list of the minimum data required to perform automatic design will be presented:



These are essentially the materials to be used for the flange, gasket and bolts. The example in question deals with a welding neck flange in ASME VIII Div. 1, while for different types of flanges the data required may vary.

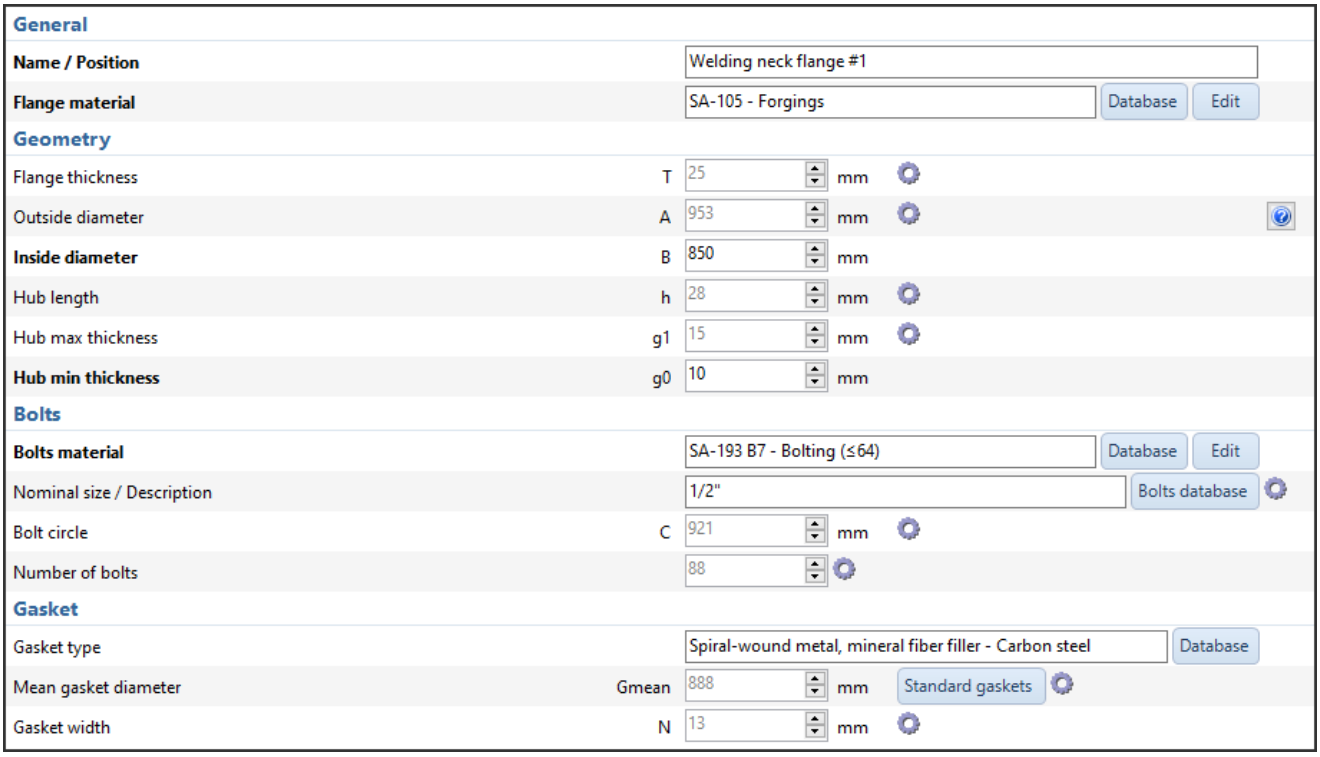
Setting materials and starting the design

After setting the required data, pressing the *Design* button will start a process that can take several seconds. At the end, if the design was successful, a confirmation message will appear:

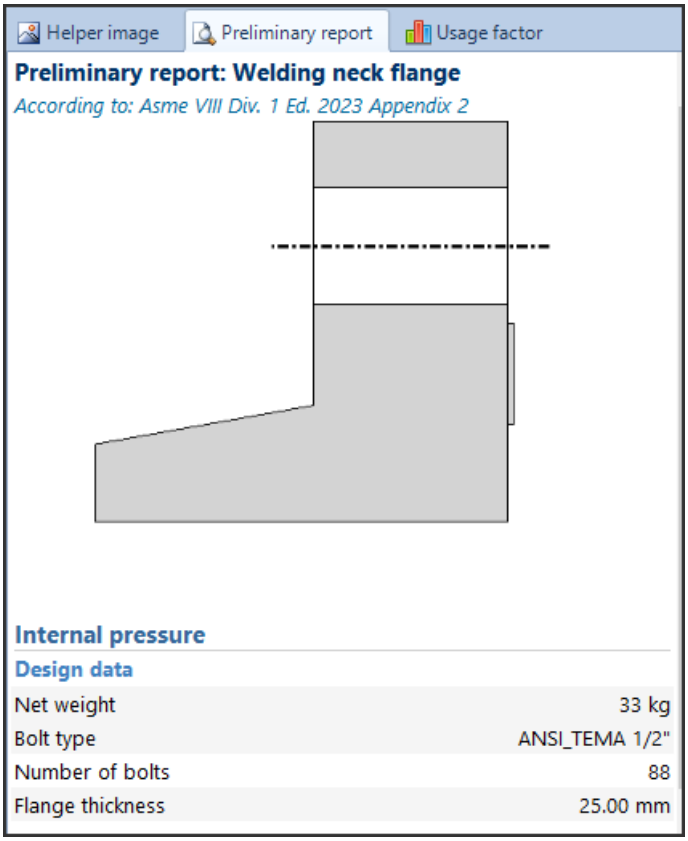


Checking the project

It is now possible to consult the various categories to check what was obtained through the *Designer*; since the design mode is still enabled, the interface shows with a gear-shaped icon the values that were obtained from the automatic calculation.



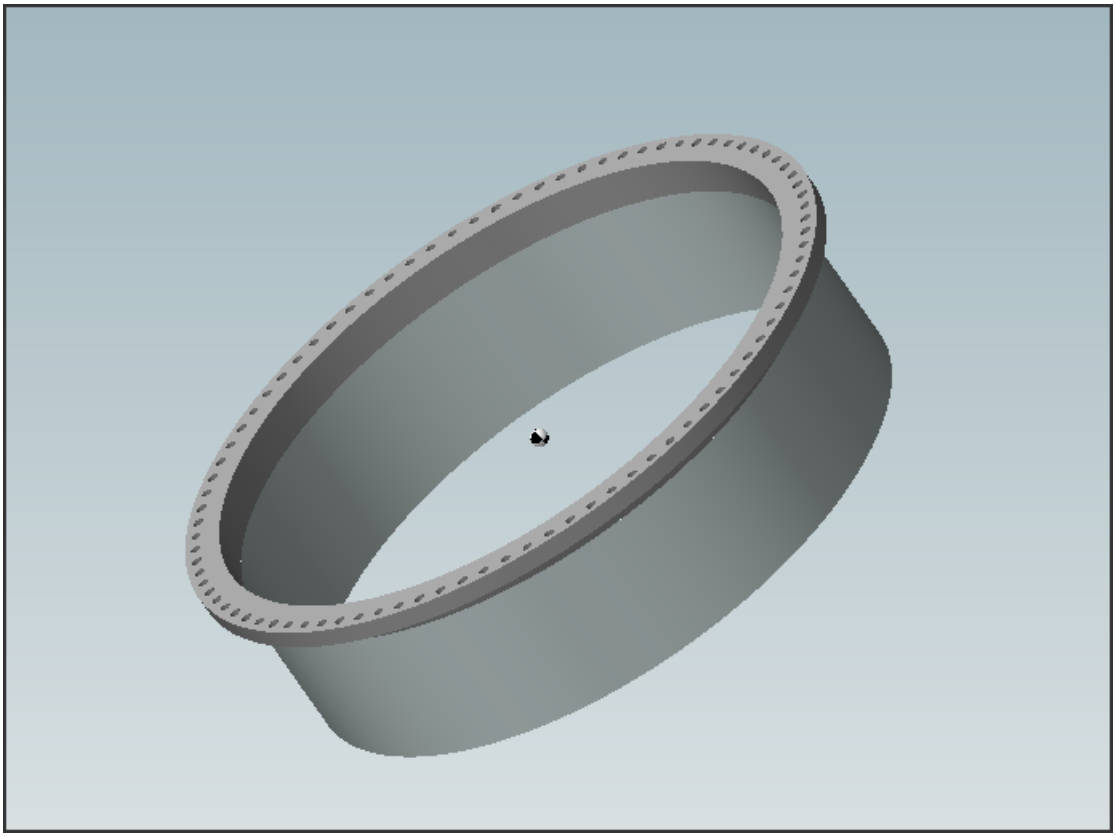
The preliminary report contains important indicative information about the obtained project, including the weight of the flange, the number of bolts and a sketch of its section.



Re-execution of the *Design*

The first execution of the *Design* provides us with the best possible flange, but some information provided or obtained may not be suitable for our context.

In this case, for an internal diameter of 850 mm we obtained a flange with a very high number of bolts.



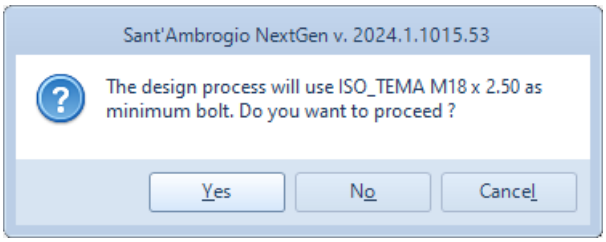
Therefore, we want to re-execute the design providing a different type of bolt as a starting point,

compared to the one adopted by default in the previous iteration.

We are therefore moving from ANSI TEMA 1/2" to ISO M18.

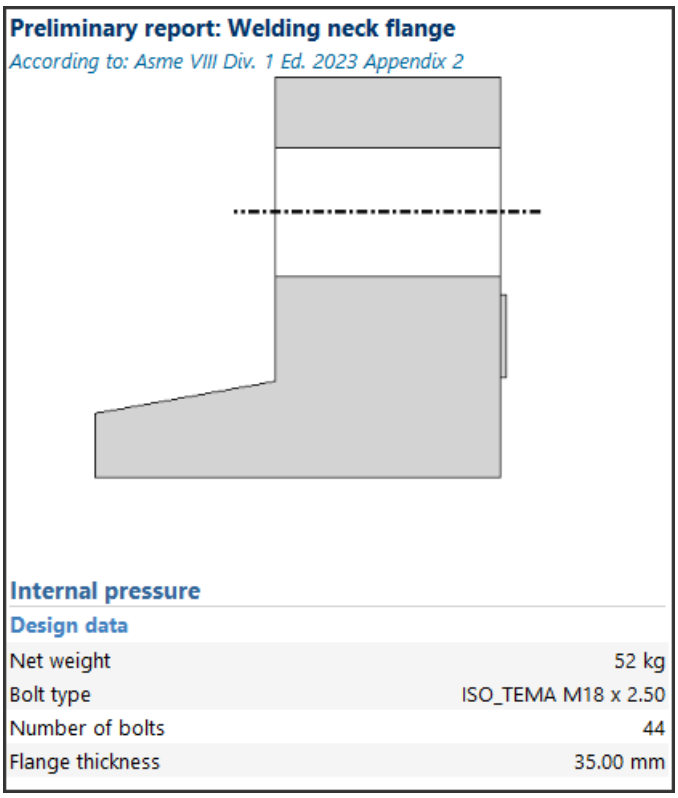
> *Any variation, even of a small nature, will cause the flange validation to emit errors. This is normal and expected behavior.*

Pressing the *Design* button will confirm the use of the new bolt as the starting size.



> *This is a "starting" size since the Designer, in searching for the best possible flange, will not go below this one; however, it could be increased, switching to a larger bolt, of the same specification.*

At the end of the design, it is possible to verify the new geometry through the preliminary report:



Preliminary report: Welding neck flange

According to: Asme VIII Div. 1 Ed. 2023 Appendix 2

Internal pressure

Design data

Net weight	52 kg
Bolt type	ISO_TEMA M18 x 2.50
Number of bolts	44
Flange thickness	35.00 mm

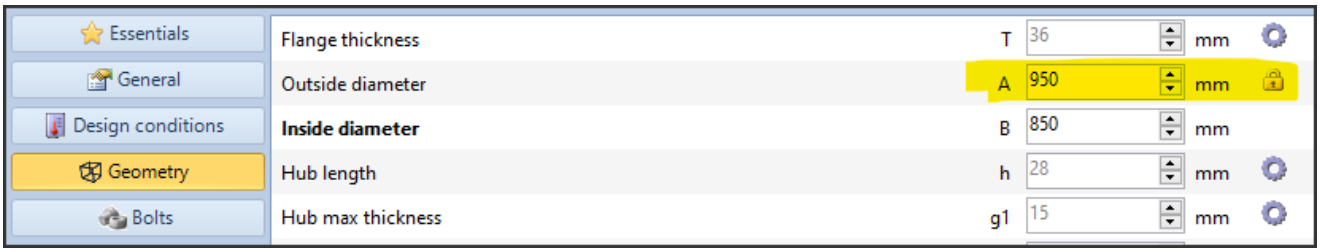
The increase in the size of the bolts has led to a reduction in their number, more manageable in terms of tightening, but it has also naturally led to an increase in thickness and overall weight.

The design procedure can be re-run whenever necessary, to optimize and balance the flange according to your needs.

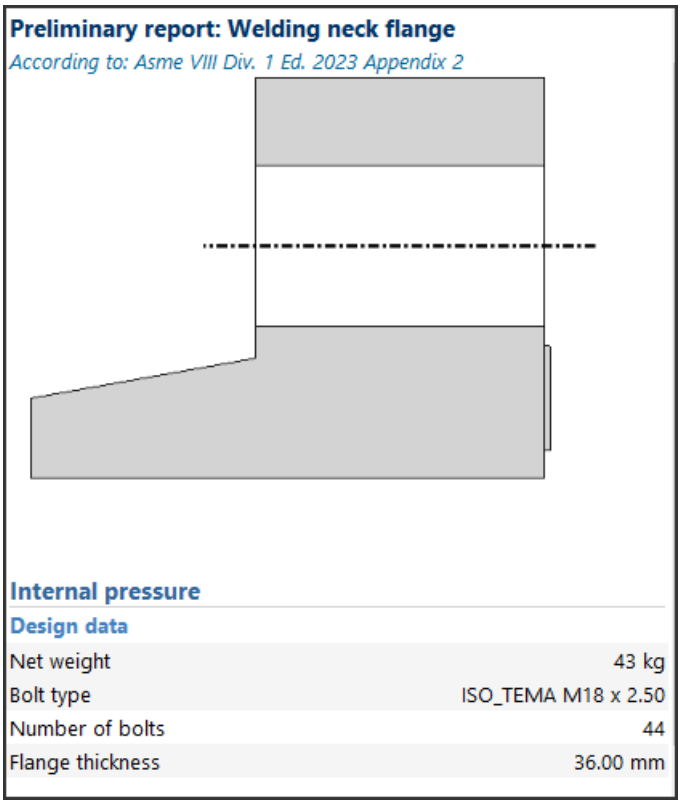
Adding geometric constraints

The *Designer* is set up to search for the best possible flange by varying all the data identified with the gear icon. By clicking on this icon you can communicate to the *Designer* your intention to constrain that specific input to a certain value: the *Designer* will then keep that value fixed, varying the others.

In the following example, let's assume that for space reasons the flange body must be limited to an external diameter of 950 mm.



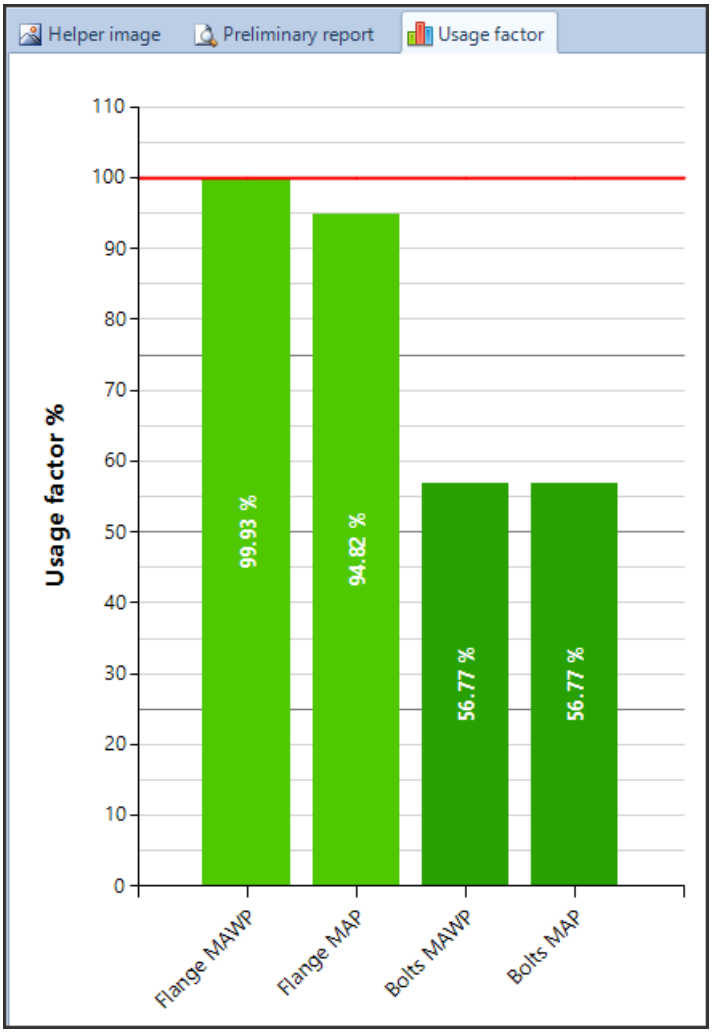
After constraining the dimension A and re-running the design, we get a flange of these dimensions:



You can notice a reduction in the total weight, the maintenance of the same number of tie rods and a slight increase in thickness.

Conclusions

The *Flange Designer* is a simple and fast tool for designing non-standard body flanges; its use can be useful both to obtain the final flange in a design context, and to start having some rough dimensions on which to then operate. The flanges obtained are extremely optimized, as can be observed from their Usage factor:



The tool is available to all users with a flange module and is the same one used by the Heat Exchanger Wizard in the context of heat exchanger design.