Flange Calculation (Preliminary Sizing)

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project Part/Position: no real part Prepared by: Sample, not released

8 x M16, utilization 11 %

Overall assessment: OK (bolt utilization <= 1)

Inputs

Internal pressure p	16 bar
Test pressure p'	22.88 bar
Gasket diameter dD	134 mm
effective width bD	8 mm
Bore di	107 mm
Gasket seating stress k0·KD	20 N/mm²
Operating gasket factor k1	10 N/mm²
Safety factor SD (operation)	1.2
external axial force	0 kN
external bending moment	0 Nm

Bolt pattern (EN 1092-1)

Outside diameter D	220 mm
Bolt circle k	180 mm
Number of bolts / thread	8 x M16
Property class	8.8
Hole diameter	18 mm

Forces per load case (in kN)

Condition	hydrostatic end force	Gasket force	Total bolt force
Assembly (seating)	0	67.4	67.4
Operation (with pe)	22.6	40.4	63
Test (p')	32.3	33.7	65.9

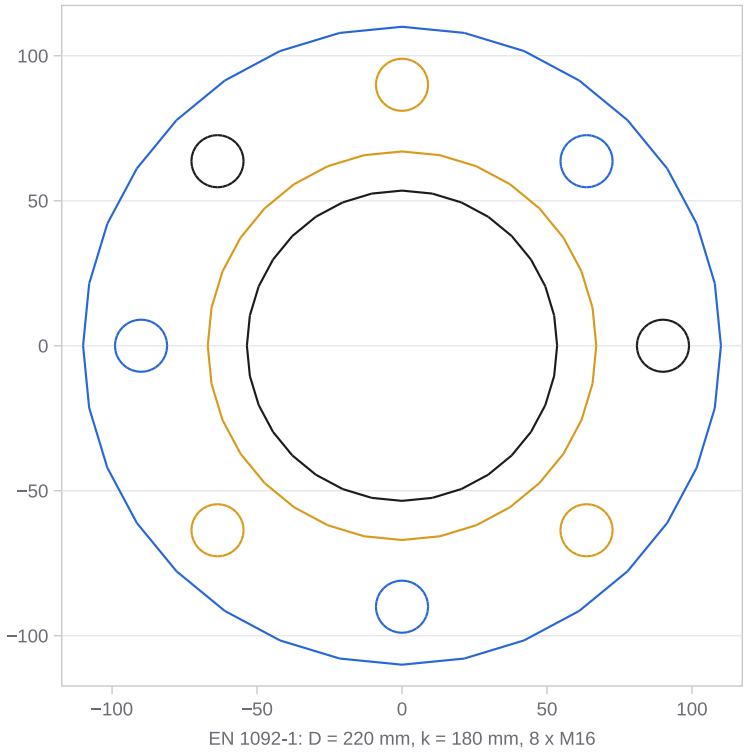
Result

Equivalent pressure pe	16 bar
governing load case	Assembly (seating)
required total bolt force FS,erf	67.4 kN
Force per bolt	8.4 kN
permissible assembly preload force FM,zul	78.9 kN
Tightening torque MA per bolt	230 Nm

Utilization of the bolted joint

Criterion	Value	Limit	Status
FS,erf <= n·FM,zul (utilization)	0.107	1	● OK

Flange top view (bolt circle with bolts)



EN 1092-1: D = 220 mm, k = 180 mm, 8 x M16

Calculation basis

Preliminary sizing per EN 1092-1 (connection dimensions) and AD 2000 code of practice B7 (bolt forces from internal pressure). The required bolt force is the maximum of the assembly (seating), operating (hydrostatic end force plus residual gasket force) and test conditions. External piping loads are accounted for via the Kellogg equivalent pressure pe. Tightening torque and permissible assembly preload follow the VDI 2230 methodology.

This calculation is a leak-tightness and force estimate. It replaces neither the flange-plate strength check nor the full EN 1591-1 verification with gasket parameters per EN 13555. The gasket parameters are reference values; a robust verification requires manufacturer-specific data. Responsibility for the design remains with the user.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing