# Why are allowable stresses in the WRC calculation under AD 2000 so low?

Analysis of the reasons that lead to having low admissible loads in the calculation of localized WRC loads in the AD 2000 context.
*Online version: https://nextgen.sant-ambrogio.it/KB499248*
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AD 2000 refers to the WRC bulletins regarding the calculation of local loads on nozzles (Merkblatt S 3/6).

In the procedure, it is indicated to calculate a utilization factor of the nozzle by relating its design pressure with the maximum allowable pressure.

| | | | |
|---|---|---|---|
| Calculation pressure | p | = | 7.66 MPa |
| Opening maximum allowable internal pressure | pmax | = | 8.21 MPa |
| Allowable stress coefficient | arf= MAX[0, 1-(p/pmax)] | = | 0.06737 |

This coefficient is then used to reduce the allowable values used in the WRC context. There is a note with the reference to the norm regarding this operation.

| **Allowable stresses** | | | |
|---|---|---|---|
| *A reduction factor is applied according to AD 2000 S 3/6 5.3* | | | |
| Shell allowable stress at design temperature | Ss·arf | = | 10.15 MPa |
| Shell yield strength at design temperature | Sys·arf | = | 15.23 MPa |
| Shell local membrane allowable stress | Slms=Ss·1.5 | = | 15.23 MPa |
| Shell combined allowable stress | Sts=Ss·3 | = | 30.45 MPa |
| Nozzle or attachment allowable stress at design temperature | Sn·arf | = | 11.18 MPa |
| Nozzle or attachment yield strength at design temperature | Syn·arf | = | 16.78 MPa |
| Nozzle or attachment local membrane allowable stress | Slmn=Sn·1.5 | = | 16.78 MPa |
| Nozzle or attachment combined allowable stress | Stn=Sn·3 | = | 33.55 MPa |

Basically, the standard tells us that the material used to resist pressure must not be considered again in terms of resistance to local loads: to increase the allorable value it is necessary to intervene on the pressure calculation of the opening, thus increasing the maximum allowable pressure to reduce the coefficient that leads to lower material allowables.