

Bending tolerances and additional information

Description	Tolerance	Description	Tolerance
Bending angle	± 1°	Finished product size	± 1,5 mm
Angular displacement	± 1°	Bending radius < 500 mm	not applicable *(2)
Out of roundness or flattening: R/D < 2,0	max. 12%	Out of roundness or flattening: R/D > 2,0	max. 10%
Wall thickness R/D > 1,5	max. 17% *(1)	Tolerance for rolling: radius	± 2,5%

(1) if R/D < 1,5 to be agreed upon

(2) radius cannot be determined in advance

Explanation of processes as indicated on the quotation / confirmation of order

- Cutting:** pre-cutting of tubes to product length incl. overlength for bending
- Bending:** bending of the required bending angle
- Deburring:** deburring of the tube ends after cutting
- Cutting :** cutting to required product length incl. tolerance
- Degreasing:** cleaning of finished products by washing / flushing
- Packing:** protecting finished products for transport

Remarks

- **Folds:** it is possible that at the end of the bend a fold will occur on the inside.
- **Wrinkles:** allowed with a minimum of ± 1 mm height over 10 mm. For the rest in consultation, depending on application.
- **Damages:** bends have to be free from damages as much as possible, however, minor damages caused by bending tools are allowed (if not otherwise agreed upon in the order).
- No other processes than stated in our quotation / confirmation of order will be executed by us.

TTB requirements regarding free issue of tubes by clients and drawings

- Customers to supply a sufficient quantity to perform test bending (i.e. 2% extra, with a minimum of 2 and a maximum of 6 spare lengths).
- Tubes need to be straight, free of rust, dents and burrs and in case fixed lengths are supplied tubes must have a tolerance on length -0/+3 mm; tolerance on cut perpendicularity ± 0,5°.
- Tube material has to be of a good bending quality (min. yield in % = 1/2 OD/R x 100).
- Drawings, if provided, have to be clear from a dimensional point of view and have to be provided with the center-to-center measurements (NEN norm 2351 or 2536).
- Loading and unloading times:
Monday – Thursday between 08.00 – 16.00 hrs.
Friday between 08.00 – 15.00 hrs.