

Product information.

Recommendations for dimensioning of the transport bracket for the draw rod system of the GOE transformer bushings.

- Draw rod** The draw rod is the mechanical system that brings the contact pressure on the bottom contact ,when the internal conductor is used for current transportation. See catalogue B COM 0025 E and product information 2750 515E-1.
- Bracket** Before shipping, the transformer, the lower part of the draw rod, complete with bottom contact (and end shield , option) is mounted in the same position as in service. During transportation, a bracket is needed to keep these parts in position . The bracket shall be dimensioned to withstand the mechanical forces that can be expected during the handling and the transportation. The conductor between windings and bushings is thus also fixed in its correct position during transport. The bracket can also be used during the process and the oil filling of the transformer.

Dimensioning recommendation.

This recommendation for dimensioning of the brackets has been made as a support for the transformer designer, for production of manufacturing drawings. The material of the items , the dimensions of profiles (tubes) and items for the cover screw joint, is chosen from our standard assortment. Hence, we recommend the manufacturer to pick the material, with similar dimensions and material properties, from the standard assortment of the own company.

Position The bracket can be used for mounting in vertical, inclined or horizontal position.

Tightening The nut position 10 shall be tightened with a torque of 100 Nm (10kpm, 70 foot-pound).

Special length on bushing oilside
If the bushing has a length of the flange extension that differs from our standard types, the dimensions L1(and L2)have to be calculated.

Bushing mounted on turrets:
If the bushings are mounted on turrets, and the turrets are dismantled from the tank during transport, the bottom part of the draw rod is divided . In such case, the bracket dimensions L1 (and L2) have to be reduced with the length of the turret.

Safety factor, Yield strength.

At horizontal mounting, with the static load from the mass of the bottom contact and end shield, the force $F = 200 \text{ N}$ added due to the weight of the flexible connector to the winding, the safety factor against the yield strength is:

- L5= 384 SF=60
- L5= 1035 SF=16
- L5= 1960 SF=10

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Table 1, Recommended dimensions
 Bracket for draw rod system.

Bushing type GOE	Flange extent. (m)	L1 (mm)	L2 (mm)	N2	D6 (mm)	D7 (mm)	D8 (mm)	Mass (kg)
250 to 450	0	273	385	6	300	20	350	13.5
	0.3	573	685					15.2
	0.6	873	985					16.9
550 to 900	0	423	535	8	350	20	400	16.0
	0.3	723	835					17.7
	0.6	1023	1135					19.4
950 to 1300	0	623	735	8	430	20	480	22.4
	0.3	923	1035					24.1
	0.6	1223	1335					25.8
1425 to 1800	0	873	985	12	660	24	720	45.4
	0.3	1173	1285					47.2
	0.6	1473	1585					48.9
1950 to 2550	0.	1248	1355	12	711	32	780	54.6
	0.3	1548	1655					56.3
	0.6	1848	1955					58.0

Table2, Items:

position	Number of Items.	Name of item	Dimensions	Material
1	1	Cover	(Thickness=12)	Structural steel 3/
2	1	Tube	$D_o/D_i=139 / 131,7$	Structural steel 1/
3	1	Plate	(Thickness=12)	Structural steel 3/
4	1	Tube	$D_o/D_i= 80 /74$	Structural steel 2/
5	1	Plate	(Thickness =12)	Structural steel 3/
6	6	Threaded Stud bolt	M12 x 30	Steel
7	1	Cover	(Thickness 6)	Structural steel 4/
8	6	Nut	M 12	
9	6	Washer	13 x 24 x 2	
10	1	Nut	M16	Property class 8.8
11	5	Spring washer	17 x 39 x4 Conical	(Bellewille spring)
12	1	Gasket		(Cork rubber)
13	1	Plate	(Thickness =12)	Structural steel 3/

Table3, Proposal of material types:

Note.	Yield strength (N/mm)	Norm: DIN	Norm: BS	Norm. ASTM
1/	(220)	1629 st.00	1387: 1967	A 53-81 a , type S
2/	(340)	2393 st.37-2 BK	6323: part1: 1982 Design CEW 2BK	512-79 Grade 1020 MD
3/	(350)	17100 st.52-3 N	4360: 1979 Grade 50 D	A 588-81
4/	(220)	17100 R st.37-2 V	4360:1979 Grade 40 B	A 284-84Grade D A 573-84 Grade 65

Figure 1. Transport bracket with the draw rod mounted.

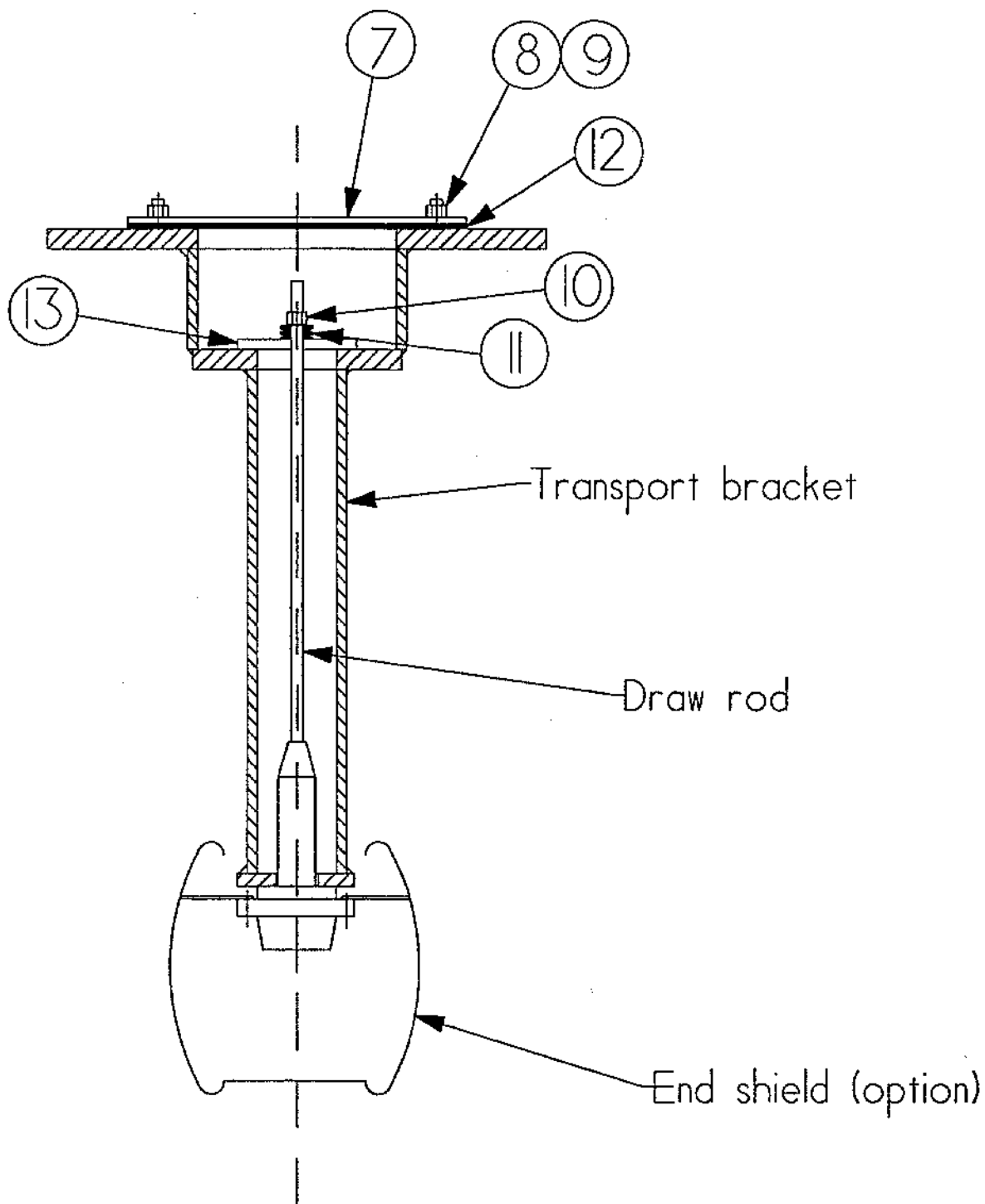


Figure 2. Recommendations for design of bracket.

