TENUTE - TR/CS sealing rings

This type of seals is used when two opposed seals have to necessarily be used due to an aggressive environment. The typical installation is on cylinders' neck in millstands.
The TR/CS assembly*, the first turned towards the bearing, the second opposed to it, outwards, prevents the fluid/lubricating grease leakage and, at the same time, the external pollution caused by water, emulsions, scales and anything else.*

The TR/CS *housing shall be provided with ducts for lubrications injection for seal lips. While the seal section is already provided with a circular and radial duct for the lubricant.*

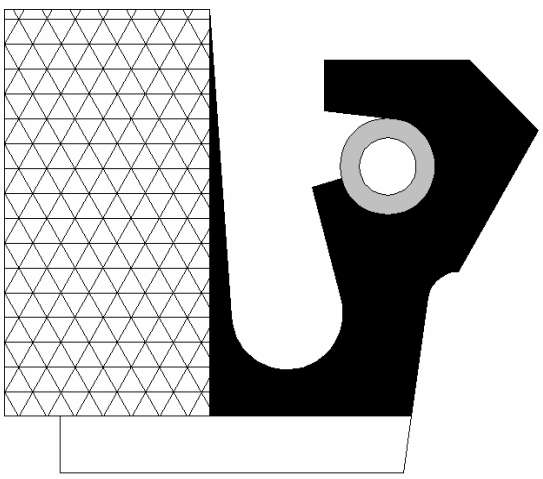

Figure 1

The technical features of TR/CS *sealing rings are the same as* TR/1 – TR/2 – TR/3 *models, where you can find the above mentioned lubricant passage.*
An important version of the TR/CS *model is the* TR/CS Split *–endless form- to facilitate the assembly.*
Obviously, this production offers to installers the opportunity to work in limit situations, where it would be difficult or even impossible to use normal endless rings.
Both solutions, TR/CS *endless,* TR/CS *split, require a retaining plate for a correct operation.*
TR/CS *can be manufactured – as endless form – up to a 2500 mm diameter.*
The enclosed size list summarizes the seals modified up to now with the purpose to make them TR/CS.
In case you did not find the desired one, it is advisable to look for it among TR/1 – TR/2 – TR/3 *models*.

The standard production is in Nitril elastomer NBR added with Ptfe, but for particular condition of employ, it can be produced in: HNBR hydrogenated nitril elastomer, MQ silicon elastomer, FKM fluoro carbon elastomer.
In the table 1 there are the admissible working temperature (minimum, maximum and maximum point) for this kind of material.

MATERIAL	TEMPERATURE C°
NBR	-30° +100°(120°)
HNBR	-40° +150°(175°)
MQ	-50° +200°(250°)
FKM	-20° +200°(250°)

table 1

Assembly of TR/CS sealing rings

The drawing shown in figure 2 details the size of housings and the assembly of the above mentioned model.
Peculiar applications or requirements different from those detailed are to be agreed with our Technical Department.

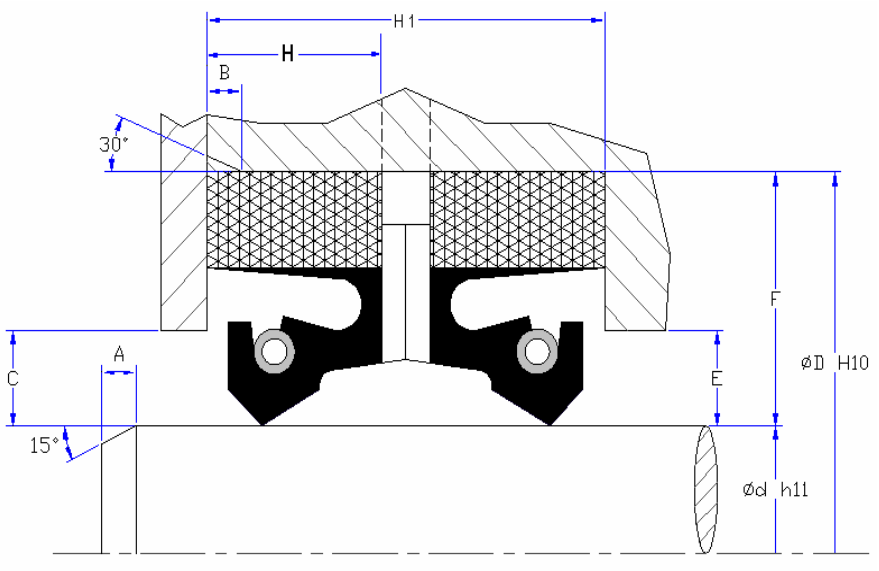

Figura 2

Tolerance and roughness of the metallic parts

Housing Height tolerance			Shaft chamfers			Housing chamfer	
H (mm)	(mm)		Ød(mm)		**A minimum**	**H**(mm)	**B**(mm)
UP TO 15	0 / -0,1		OVER	UP TO	(mm)	10	1
OVER	+ / -0,1		3	50	5	15	1.5
			50	250	10	20	2
			250	800	15	30	3
			800	1500	20	40	4
			1500	2500	25		
C maximum = 3mm.						**E** maximum =0,5F	

SURFACES FINISHING

A roughness of Ra 0.2/0.6 µm is recommended for the shaft, in normal applications, while in case of high speeds, a finishing of 0.2/0.4 µm is recommended.
Furthermore, in case of water, it is advisable to perform chromium plating of the shaft/sealing lip contact surfaces, in order to avoid a rapid wear due to iron oxides that are removed by the sealing lip. A finish turning is enough for housings.

We suggest to ask our Technical Department for more information, for the assembling and the applications.

Tooling List Up-To Date on 04_05_2005

Ø d	Ø D	H	PROFILE
35	50	**10**	TR/1-CS
50	75	**11**	TR/1-CS
55	76	**12**	TR/3-CS
64	85	**12**	TR/1-CS
80	100	**10**	TR/3-CS
88	126	**12**	TR/3-CS
90	110	**12**	TR/3-CS
95	115	**10**	TR/3-CS
95	120	**13**	TR/3-CS
95	127	**12,5**	TR/3-CS
95	127	**12,5**	TR/3-CS
105	130	**12**	TR/3-CS
110	130	**9**	TR/3-CS
126	160	**15**	TR/3-CS
140	168	**21**	TR/3-CS
140	170	**15**	TR/1-CS
140	180	**16**	TR/3-CS
145	180	**12**	TR/3-CS
158,75	184,15	**12,7**	TR/3-CS
160	188	**21**	TR/3-CS
160	188	**21**	TR/3-CS
161,9	187,3	**12,7**	TR/1-CS
165	195	**15**	TR/1-CS
170	192	**10,7**	TR/1-CS
170	210	**16**	TR/1-CS
175	215	**16**	TR/1-CS
180	210	**15**	TR/3-CS
180	210	**15**	TR/1-CS
180	210	**16**	TR/3-CS
180	220	**16**	TR/2-CS
185	225	**16,5**	TR/1-CS
190	220	**15**	TR/3-CS
190	225	**18**	TR/3-CS
190	228,8	**20,9**	TR/1-CS
190	230	**16**	TR/3-CS
210	250	**16**	TR/3-CS
216	247,8	**19,8**	TR/1-CS
219	250	**12**	TR/3-CS

Ø d	Ø D	H	PROFILE
220	250	**12**	TR/3-CS
220	260	**16**	TR/3-CS
230	270	**18**	TR/3-CS
230	280	**22,5**	TR/3-CS
235	265	**15**	TR/3-CS
239,71	280,19	**15,875**	TR/1-CS
240	275	**18**	TR/1-CS
240	280	**16**	TR/1-CS
240	280	**16**	TR/3-CS
240	280	**20**	TR/3-CS
244	284	**16**	TR/1-CS
245	285	**16**	TR/1-CS
250	280	**15**	TR/2-CS
250	281,7	**12,7**	TR/3-CS
250	290	**16**	TR/3-CS
250	290	**16**	TR/1-CS
254	298	**16**	TR/1-CS
255	290	**16**	TR/3-CS
255	295	**16**	TR/1-CS
260	300	**16**	TR/1-CS
260	304	**20**	TR/3-CS
260,75	300,03	**13,89**	TR/1-CS
266,7	311,15	**19,05**	TR/3-CS
270	310	**16**	TR/1-CS
270	310	**18**	TR/3-CS
273	317	**19**	TR/1-CS
274,8	320	**16**	TR/3-CS
280	310	**15**	TR/3-CS
280	320	**20**	TR/3-CS
280	324	**20**	TR/3-CS
290	315,4	**12,7**	TR/3-CS
290	334	**20,5**	TR/1-CS
295	335	**16**	TR/3-CS
295	339	**20**	TR/1-CS
300	330	**14**	TR/3-CS
300	335	**18**	TR/3-CS
300	340	**18**	TR/3-CS
300	344	**20**	TR/3-CS

Ø d	Ø D	H	PROFILE
300,03	343,67	**19,84**	TR/3-CS
300,04	344,48	**19,84**	TR/3-CS
310	350	**18**	TR/2-CS
310	350	**20**	TR/2-CS
310	355,6	**20**	TR/3-CS
315	355	**16**	TR/2-CS
320	350	**15**	TR/3-CS
320	355	**16**	TR/1-CS
320	360	**15**	TR/3-CS
320	364	**20**	TR/3-CS
325	375	**22,8**	TR/1-CS
325,43	374,64	**22,6**	TR/1-CS
330	370	**20**	TR/1-CS
330	374	**19**	TR/1-CS
330,19	373,06	**19,05**	TR/1-CS
330,2	368,3	**19,05**	TR/1-CS
334,96	374,64	**17,85**	TR/3-CS
335	375	**18**	TR/3-CS
340	380	**18**	TR/3-CS
340	380	**20**	TR/3-CS
342,9	387,3	**20**	TR/3-CS
350	390	**20**	TR/1-CS
355,61	393,71	**17,46**	TR/3-CS
355,61	393,71	**20**	TR/3-CS
356	400	**20**	TR/1-CS
360	404	**20**	TR/3-CS
365	405	**18**	TR/3-CS
365	409	**20**	TR/1-CS
365,12	408,76	**19,84**	TR/1-CS
367	405	**18**	TR/3-CS
368,3	419,1	**29,25**	TR/3-CS
370	410	**18**	TR/3-CS
370	414	**20**	TR/3-CS
380	424	**20**	TR/1-CS
380	429	**24**	TR/3-CS
387	431	**22**	TR/1-CS
387,34	430,98	**21,82**	TR/1-CS
387,4	438,15	**25,4**	TR/2-CS
390	434	**20**	TR/1-CS
393,7	433,7	**18**	TR/3-CS

Ø d	Ø D	H	PROFILE
395	430	**18**	TR/3-CS
396,875	444,5	**22,225**	TR/3-CS
400	440	**14**	TR/1-CS
400	440	**20**	TR/3-CS
400	444	**20**	TR/1-CS
400	444	**20**	TR/3-CS
400	450	**20**	TR/3-CS
400	450	**20**	TR/3-CS
400	450	**22**	TR/2-CS
400	450	**22**	TR/3-CS
400,04	444,48	**19,84**	TR/1-CS
406,2	444,5	**17**	TR/1-CS
410	450	**18**	TR/3-CS
419,09	469,89	**22,22**	TR/3-CS
420	460	**18**	TR/2-CS
420	470	**22**	TR/3-CS
420	470	**22**	TR/2-CS
430	474	**20**	TR/1-CS
430	480	**22**	TR/2-CS
439,73	490,53	**22,22**	TR/2-CS
440	490	**22**	TR/3-CS
440	490	**22**	TR/2-CS
445	495	**22**	TR/3-CS
446	486	**16**	TR/3-CS
450	500	**22**	TR/2-CS
460	510	**22**	TR/1-CS
469,89	519,09	**21,82**	TR/2-CS
470	520	**22**	TR/2-CS
470,7	519,9	**21,82**	TR/2-CS
480	520	**20**	TR/3-CS
480	530	**22**	TR/3-CS
480	530	**25**	TR/1-CS
480	530	**25**	TR/3-CS
490	540	**22**	TR/3-CS
495	545	**22**	TR/1-CS
495,29	546,09	**22,22**	TR/1-CS
495,5	546	**22**	TR/1-CS
498,47	549,27	**22,22**	TR/3-CS
500	540	**20**	TR/3-CS
500	545	**20,5**	TR/3-CS

Ø d	Ø D	H	PROFILE
500	550	**22**	TR/3-CS
505	535	**15**	TR/1-CS
509,58	549,26	**19,84**	TR/3-CS
509,58	550,06	**17,46**	TR/3-CS
510	550	**17,5**	TR/3-CS
510	550	**20**	TR/3-CS
520	570	**22**	TR/3-CS
520,7	571,5	**25,4**	TR/2-CS
530	590	**38**	TR/3-CS
540	584	**20**	TR/2-CS
540	590	**22**	TR/3-CS
549,27	600,07	**21,82**	TR/3-CS
550	600	**19**	TR/1-CS
550	600	**22**	TR/3-CS
560	604	**20**	TR/3-CS
560	610	**20**	TR/3-CS
560	610	**22**	TR/1-CS
569,9	619,12	**21,82**	TR/3-CS
570	620	**22**	TR/3-CS
574	610	**16**	TR/3-CS
579,43	628,63	**21,82**	TR/1-CS
580	630	**22**	TR/1-CS
587	637	**22**	TR/2-CS
600	640	**20**	TR/1-CS
600	650	**25**	TR/2-CS
615,95	679,84	**25**	TR/1-CS
616	680	**25**	TR/1-CS
620	684	**25**	TR/3-CS
635	699	**25**	TR/3-CS
639,75	680,23	**19,84**	TR/1-CS
640	680	**20**	TR/1-CS
647,72	698,53	**23,81**	TR/2-CS
649,28	712,78	**25**	TR/3-CS
650	700	**22**	TR/3-CS
650	714	**25**	TR/3-CS
660,4	711,2	**25,4**	TR/1-CS
665	729	**25**	TR/2-CS
670	734	**25**	TR/3-CS

Ø d	Ø D	H	PROFILE
680	730	**22**	TR/3-CS
680	744	**25**	TR/3-CS
700	750	**25**	TR/3-CS
700	764	**25**	TR/3-CS
710	760	**22**	TR/3-CS
730	794	**25**	TR/3-CS
735	799	**25**	TR/3-CS
748	812	**25**	TR/3-CS
749,29	809,61	**25**	TR/1-CS
749,3	812,8	**25,4**	TR/3-CS
750	810	**25**	TR/1-CS
750	814	**25**	TR/3-CS
750	814	**28**	TR/3-CS
780	830	**25**	TR/1-CS
780	844	**25**	TR/1-CS
800	864	**23**	TR/1-CS
810	874	**25**	TR/3-CS
850	914	**25**	TR/3-CS
860	920	**22**	TR/2-CS
890	954	**25**	TR/1-CS
914,4	965,2	**20,624**	TR/2-CS
914,4	965,2	**23,81**	TR/2-CS
950	1014	**25**	TR/3-CS
960	1040	**28**	TR/3-CS
970	1020	**22**	TR/3-CS
970	1030	**21,5**	TR/3-CS
970	1034	**25**	TR/3-CS
985	1045	**25**	TR/3-CS
990	1040	**25**	TR/3-CS
1000	1064	**25**	TR/3-CS
1105	1155	**22**	TR/3-CS
1200	1250	**22**	TR/3-CS
1250	1314	**25**	TR/1-CS
1610	1670	**20**	TR/3-CS
2350	2414	**25**	TR/3-CS