

Technical Data Sheet

Stepless® Ear Clamps

Product Group 167



Connecting Technology



Narrow band: concentrates transmission of clamping force, less weight

Stepless over 360°: uniform compression or uniform surface pressure

Clamp ear: compensates for component tolerances, adjustable surface pressure

Dimple: increases clamping force, spring-effect compensates for changes in diameter due to thermal expansion

Specially formed strip edges: reduced risk of damage to parts being clamped

Stepless® Ear Clamps Product Group 167

Material

167 Stainless Steel, Material no. 1.4301/UNS S30400

Optional alternative materials

Standard Series

Size range	width x thickness
6.5 – 11.8 mm	5.0 x 0.5 mm
11.9 – 120.5 mm	7.0 x 0.6 mm
21.0 – 120.5 mm	9.0 x 0.6 mm

Heavy Duty Series

Size range	width x thickness
24.5 – 120.5 mm	10.0 x 0.8 mm
62.0 – 120.5 mm	10.0 x 1.0 mm

Some sizes are only available if an appropriate minimum quantity is ordered. Customer specific sizes available on request.

Material thickness

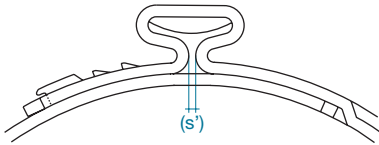
Stepless® Ear Clamps are produced in nominal widths and thicknesses. The selected material dimensions for a specific application are based on the stress required to obtain an adequate seal or load.

Clamp ear (closing element)

The maximum diameter reduction is proportional to the open “ear” width (s).

The theoretical maximum reduction in diameter is given by the formula:

$$\text{Max. diameter reduction} = \frac{\text{Ear-width (s)}}{\pi}$$



Note: the above sketch shows the appearance of a closed “ear” (s’); it does not necessarily indicate an effective closed assembly.

As a rule, the clamp nominal diameter should be selected so that the outside diameter of the hose, after it has been pushed on to the component to which it is to be fastened (e.g. a hose nipple), is approximately in the middle of the diameter range of the chosen clamp. A clamp can only be considered adequately closed when the ear width (s) has been reduced by at least 40%, and the correct closing force was used for assembly. Further information with assembly recommendations and closing force is available.

Mechanical interlock

The interlock is a mechanical system for joining the clamp ends to permit closure. Some interlock designs can be opened for radial installation prior to closure.

Assembly recommendations

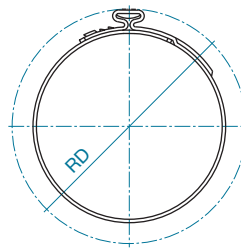
The clamp “ear” is deformed with a constant tool jaw force – this practice is referred to as “force priority closure”. This assembly method ensures that a uniform and repeatable stress is applied to the joint in addition to a consistent tensile force on the clamp interlock. Employing this methodology when closing a 167 series clamp will compensate for any component tolerance variations, and ensure that the clamp applies a constant radial force to the application. Fluctuations in component tolerances are absorbed by variations in the “ear” gap (s’). Clamp installation monitoring and process data collection are available by incorporating an “Electronically Controlled Pneumatic Power Tool” OETIKER ELK 01 in the assembly process.

Closing force

The closing force must be chosen to give the required material compression or surface pressure and should be qualified by dimensional evaluation and experiment. The resistance against the clamp equals the applied force, so the closing force is greatly reduced when compressing a soft material. The table below gives the average applied closing force for clamp and material dimensions when compressing and sealing relatively hard synthetic materials.

Rotation diameter

The rotation diameter (RD) of an assembled clamp can be critical design information for applications that rotate in close proximity to adjacent components. Many factors can influence this final assembly diameter including compression, “ear” gap “s” and material thickness. It is recommended that all variables be considered and evaluated prior to specifying a rotating diameter.



Important

Adding a depressor to the installation tool, for the purpose of reducing the ear height, can cause excessive stress in the ear radii and is not recommended.

Average applied closing force

Material dimensions	Size	Closing force	Manual pincer*	Recommended pneumatic pincer**
5 x 0.5 mm	6.5 – 11.8	1000 N	14100082, 14100083	HO 2000
5 x 0.6 mm	18.5 – 100.0	1700 N	14100082, 14100083	HO 2000
7 x 0.6 mm	11.9 – 17.5	2100 N	14100082, 14100083	HO 2000 – HO 3000
	17.8 – 120.5	2400 N	14100082, 14100083	HO 3000
7 x 0.8 mm		2800 N	14100082, 14100083	HO 3000 – HO 4000
9 x 0.6 mm		2800 N	14100082, 14100083	HO 3000 – HO 4000
9 x 0.8 mm		4100 N	14100097, 14100098	HO 5000 – HO 7000
10 x 0.6 mm		2900 N	14100097, 14100098	HO 5000 – HO 7000
10 x 0.8 mm		5000 N	14100097, 14100098	HO 5000 – HO 7000
10 x 1.0 mm		7000 N	14100097, 14100098	HO 7000
12 x 1.0 mm		8500 N	14100097, 14100098	HO 7000

* 14100082 Standard pincer

14100097 Clamping Tool

14100083 Standard pincer with side jaws

14100098 Torque wrench

** With appropriate closing force setting

Important note

These figures are intended as a guide, they may vary depending on the type and tolerances of parts being clamped. To ensure optimum clamp selection, we recommend making functional tests with several assemblies.

Order information

Item No.	Ref. No.	Ear width inside (mm)	Size range (mm)	Item No.	Ref. No.	Ear width inside (mm)	Size range (mm)
Band width 5 mm, thickness 0.5 mm (505R)				Band width 7 mm, thickness 0.6 mm (706R)			
16702488	006.5-505R	4	5.3 – 6.5	16700054	042.5-706R	10	39.3 – 42.5
16700001	007.0-505R	4	5.8 – 7	16700055	044.0-706R	10	40.8 – 44
16700002	008.0-505R	4	6.8 – 8	16700056	045.5-706R	10	42.3 – 45.5
16700003	008.7-505R	5.5	7 – 8.7	16700057	047.0-706R	10	43.8 – 47
16702491	009.0-505R	5.5	7.3 – 9	16700058	048.5-706R	10	45.3 – 48.5
16700004	009.5-505R	5.5	7.8 – 9.5	16700059	050.0-706R	10	46.8 – 50
16700005	010.0-505R	5.5	8.3 – 10	16700060	051.5-706R	10	48.3 – 51.5
16700006	010.5-505R	5.5	8.8 – 10.5	16700061	053.0-706R	10	49.8 – 53
16702492	010.9-505R	5.5	9.2 – 10.9	16700062	054.5-706R	10	51.3 – 54.5
16700007	011.3-505R	5.5	9.6 – 11.3	16700063	056.0-706R	10	52.8 – 56
16700008	011.8-505R	5.5	10.1 – 11.8	16700064	057.5-706R	10	54.3 – 57.5
Band width 7 mm, thickness 0.6 mm (706R)				16700065	059.0-706R	10	55.8 – 59
16702951	011.9-706R	8	9.4 – 11.9	16700066	060.5-706R	10	57.3 – 60.5
16700009	012.3-706R	8	9.8 – 12.3	16700067	062.0-706R	10	58.8 – 62
16702493	012.8-706R	8	10.3 – 12.8	16700068	063.5-706R	10	60.3 – 63.5
16700010	013.3-706R	8	10.8 – 13.3	16700069	065.0-706R	10	61.8 – 65
16700011	013.8-706R	8	11.3 – 13.8	16700070	066.5-706R	10	63.3 – 66.5
16700012	014.0-706R	8	11.5 – 14	16700071	068.0-706R	10	64.8 – 68
16702864	014.2-706R	8	11.7 – 14.2	16700072	069.5-706R	10	66.3 – 69.5
16700013	014.5-706R	8	12 – 14.5	16700073	071.0-706R	10	67.8 – 71
16700014	014.8-706R	8	12.3 – 14.8	16700074	072.5-706R	10	69.3 – 72.5
16700015	015.3-706R	8	12.8 – 15.3	16700075	074.0-706R	10	70.8 – 74
16700016	015.7-706R	8	13.2 – 15.7	16700076	075.5-706R	10	72.3 – 75.5
16702998	016.0-706R	8	13.5 – 16	16700077	077.0-706R	10	73.8 – 77
16702494	016.2-706R	8	13.7 – 16.2	16700078	078.5-706R	10	75.3 – 78.5
16702495	016.6-706R	8	14.1 – 16.6	16700079	080.0-706R	10	76.8 – 80
16702496	016.8-706R	8	14.3 – 16.8	16700080	081.5-706R	10	78.3 – 81.5
16700017	017.0-706R	8	14.5 – 17	16700081	083.0-706R	10	79.8 – 83
16702497	017.5-706R	8	15 – 17.5	16700082	084.5-706R	10	81.3 – 84.5
16700018	017.8-706R	10	14.6 – 17.8	16700083	086.0-706R	10	82.8 – 86
16700019	018.0-706R	10	14.8 – 18	16700084	087.5-706R	10	84.3 – 87.5
16700020	018.5-706R	10	15.3 – 18.5	16700085	089.0-706R	10	85.8 – 89
16700110	019.2-706R	10	16 – 19.2	16700086	090.5-706R	10	87.3 – 90.5
16702498	019.8-706R	10	16.6 – 19.8	16700087	092.0-706R	10	88.8 – 92
16700024	021.0-706R	10	17.8 – 21	16700088	093.5-706R	10	90.3 – 93.5
16700026	022.6-706R	10	19.4 – 22.6	16700089	095.0-706R	10	91.8 – 95
16700028	023.5-706R	10	20.3 – 23.5	16700090	096.5-706R	10	93.3 – 96.5
16700029	024.1-706R	10	20.9 – 24.1	16700091	098.0-706R	10	94.8 – 98
16700031	025.6-706R	10	22.4 – 25.6	16700092	099.5-706R	10	96.3 – 99.5
16700033	027.1-706R	10	23.9 – 27.1	16700093	101.0-706R	10	97.8 – 101
16700035	028.6-706R	10	25.4 – 28.6	16700094	102.5-706R	10	99.3 – 102.5
16702047	030.1-706R	10	26.9 – 30.1	16700095	104.0-706R	10	100.8 – 104
16700039	030.8-706R	10	27.6 – 30.8	16700096	105.5-706R	10	102.3 – 105.5
16700040	031.6-706R	10	28.4 – 31.6	16700097	107.0-706R	10	103.8 – 107
16700042	033.1-706R	10	29.9 – 33.1	16700098	108.5-706R	10	105.3 – 108.5
16700044	034.6-706R	10	31.4 – 34.6	16700099	110.0-706R	10	106.8 – 110
16700046	036.1-706R	10	32.9 – 36.1	16700100	111.5-706R	10	108.3 – 111.5
16700048	037.6-706R	10	34.4 – 37.6	16700101	113.0-706R	10	109.8 – 113
16700050	038.1-706R	10	34.9 – 38.1	16700102	114.5-706R	10	111.3 – 114.5
16700052	039.6-706R	10	36.4 – 39.6	16700103	116.0-706R	10	112.8 – 116
16700053	041.0-706R	10	37.8 – 41	16700104	117.5-706R	10	114.3 – 117.5
				16700105	119.0-706R	10	115.8 – 119
				16700106	120.5-706R	10	117.3 – 120.5

Order information

Item No.	Ref. No.	Ear width inside (mm)	Size range (mm)	Item No.	Ref. No.	Ear width inside (mm)	Size range (mm)
Band width 9 mm, thickness 0.6 mm (906R)				Band width 9 mm, thickness 0.6 mm (906R)			
16700196	021.0-906R	10	17.8 – 21	16700262	096.5-906R	10	93.3 – 96.5
16700198	022.6-906R	10	19.4 – 22.6	16700263	098.0-906R	10	94.8 – 98
16703877	023.5-906R	10	20.3 – 23.5	16700264	099.5-906R	10	96.3 – 99.5
16700201	024.1-906R	10	20.9 – 24.1	16700265	101.0-906R	10	97.8 – 101
16700203	025.6-906R	10	22.4 – 25.6	16700266	102.5-906R	10	99.3 – 102.5
16700205	027.1-906R	10	23.9 – 27.1	16700267	104.0-906R	10	100.8 – 104
16700207	028.6-906R	10	25.4 – 28.6	16700268	105.5-906R	10	102.3 – 105.5
16700209	030.1-906R	10	26.9 – 30.1	16700269	107.0-906R	10	103.8 – 107
16700211	030.8-906R	10	27.6 – 30.8	16700270	108.5-906R	10	105.3 – 108.5
16700212	031.6-906R	10	28.4 – 31.6	16700271	110.0-906R	10	106.8 – 110
16700214	033.1-906R	10	29.9 – 33.1	16700272	111.5-906R	10	108.3 – 111.5
16700216	034.6-906R	10	31.4 – 34.6	16700273	113.0-906R	10	109.8 – 113
16700218	036.1-906R	10	32.9 – 36.1	16700274	114.5-906R	10	111.3 – 114.5
16700220	037.6-906R	10	34.4 – 37.6	16700275	116.0-906R	10	112.8 – 116
16702499	038.1-906R	10	34.9 – 38.1	16700276	117.5-906R	10	114.3 – 117.5
16700224	039.6-906R	10	36.4 – 39.6	16700277	119.0-906R	10	115.8 – 119
16700225	041.0-906R	10	37.8 – 41	16700278	120.5-906R	10	117.3 – 120.5
16700226	042.5-906R	10	39.3 – 42.5				
16700227	044.0-906R	10	40.8 – 44	Band width 10 mm, thickness 0.8 mm (1008R)			
16700228	045.5-906R	10	42.3 – 45.5	In the diameter range 24.5 mm to 120.5 mm, these clamps are available in 0.5 mm steps on request.			
16700229	047.0-906R	10	43.8 – 47	Band width 10 mm, thickness 1.0 mm (1010R)			
16700230	048.5-906R	10	45.3 – 48.5	In the diameter range 62 mm to 120.5 mm, these clamps are available in 0.5 mm steps on request.			
16700231	050.0-906R	10	46.8 – 50	Other diameters available on request.			
16700232	051.5-906R	10	48.3 – 51.5				
16700233	053.0-906R	10	49.8 – 53				
16700234	054.5-906R	10	51.3 – 54.5				
16700235	056.0-906R	10	52.8 – 56				
16700236	057.5-906R	10	54.3 – 57.5				
16700237	059.0-906R	10	55.8 – 59				
16700238	060.5-906R	10	57.3 – 60.5				
16700239	062.0-906R	10	58.5 – 62				
16700240	063.5-906R	10	60.3 – 63.5				
16700241	065.0-906R	10	61.8 – 65				
16700242	066.5-906R	10	63.3 – 66.5				
16700243	068.0-906R	10	64.8 – 68				
16700244	069.5-906R	10	66.3 – 69.5				
16700245	071.0-906R	10	67.8 – 71				
16700246	072.5-906R	10	69.3 – 72.5				
16700247	074.0-906R	10	70.8 – 74				
16700248	075.5-906R	10	72.3 – 75.5				
16700249	077.0-906R	10	73.8 – 77				
16700250	078.5-906R	10	75.3 – 78.5				
16700251	080.0-906R	10	76.8 – 80				
16700252	081.5-906R	10	78.3 – 81.5				
16700981	083.0-906R	10	79.8 – 83				
16700254	084.5-906R	10	81.3 – 84.5				
16700255	086.0-906R	10	82.8 – 86				
16700256	087.5-906R	10	84.3 – 87.5				
16700257	089.0-906R	10	85.8 – 89				
16700258	090.5-906R	10	87.3 – 90.5				
16700259	092.0-906R	10	88.8 – 92				
16700260	093.5-906R	10	90.3 – 93.5				
16700261	095.0-906R	10	91.8 – 95				

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