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Technical Data Sheet
Adjustable Clamps
Product Group 109, 159 & 163

OETIKER®

Connecting Technology

PG 109

PG 163

PG 159

Choice of engagement positions: clamp can be adjusted to several nominal diameters
Inner ring with radial guidance: effective and powerful all-round sealing
Clamp ear: simple and fast installation, visible deformation provides evidence of proper closure
Burr-free strip edges: reduced risk of damage to parts being clamped
Connecting technology: ideal for soft materials

Adjustable Clamps Product Group 109, 159 & 163

Material
PG 109 zinc-plated steel band
PG 159 & 163 Stainless Steel, Material no. 1.4301/UNS S30400

Corrosion resistance according to DIN EN ISO 9227
PG 109 ≥ 96 h
PG 159 ≥ 1000 h
PG 163 ≥ 1000 h

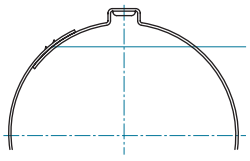
Adjustable Clamps PG 109	
Size range	width x thickness
29.5 – 122.0 mm	7.0 x 0.75 mm
29.5 – 122.0 mm	9.0 x 0.75 mm

Adjustable Clamps PG 159	
Size range	width x thickness
25.0 – 50.0 mm	7.0 x 0.8 mm*
40.0 – 110.0 mm	7.0 x 0.8 mm*

Adjustable Clamps with radial guiding PG 163	
Size range	width x thickness
30.0 – 116.0 mm	7.0 x 0.6 mm
72.0 – 132.0 mm	9.0 x 0.6 mm

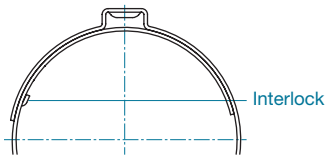
* Diameter range covered by a single clamp
Some sizes are only available if an appropriate minimum quantity is ordered.

PG 159 – Adjustable Clamps:



Version with interlock outside
May make installation easier

PG 109/159 – Adjustable clamp:



Version with interlock inside

The data in this catalog are based on many years experience. They are intended for reference, not as design specifications.

Clamp ear (closing element)
Using tools designed by Oetiker, the clamp is closed by drawing together the lower radii of the “ear”. The maximum diameter reduction is proportional to the open “ear” width (s).
The theoretical maximum reduction in diameter is given by the formula:

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

Multi-position interlock
The interlock consists of one or two load-retaining hooks that withstand tensile loading during closure and a lock tab designed to hold the hooks in their windows prior to closure. With both designs the interlock can be engaged in several positions within the published range. This feature allows a single part to cover a range of diameters.

Adjustable Clamps with radial guiding (self-aligning design)
A tab formed on the inner portion of the clamp locates in a slot in the outer band surface. During assembly and closure, the tab slides in the slot and so avoids any step around the inner circumference of the clamp.

Assembly Recommendations

Product Group 163 – Adjustable Clamps with radial guiding
The clamp can be installed axially on the application prior to assembly or alternatively, radially around the assembled components. For either method, it is important that the hooks and lock tab are engaged in windows giving the smallest possible diameter, so that the maximum clearance between the assembled components and the inside diameter of the clamp before closure is no greater than 1.5 mm. Each incremental step of the interlock reduces the diameter before closure by 1.6 mm on the “3-step” series, and by 1.05 mm on the “6- step” design.

Product Group 109&159 – Adjustable Clamps
PG 109 Adjustable Clamps are supplied pre-shaped and engaged at mid-diameter. PG 159 clamps are supplied flat. The clamp must be shaped prior to assembly. Each incremental step of the interlock reduces the diameter before closure by approximately 1.6 mm. The following assembly steps demonstrate how best to achieve an effective geometry.

The clamp ear of both variants should be closed with 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 application with a constant tensile force on the mechanical interlock.

Clamp installation monitoring and process data collection are available by incorporating an “Electronically Controlled Pneumatic Power Tool Oetiker ELK” 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 maximum applied closing force for clamp and material dimensions.

Important
Single tool stroke closure only, do not apply secondary crimping force.

Installation data

Material dimensions (mm)	Size (mm)	Closing force max. (N)	Installation tools force-monitored[1]: Manual	Pneumatic	Cordless	Electronically controlled
PG 109						
7 x 0.75	29.5 – 122.0	1400	HMK 01/S01	HO ME 2000	CP 01	HO EL 2000
9 x 0.75	29.5 – 122.0	1800	HMK 01/S01	HO ME 2000	CP 01	HO EL 2000
PG 159						
7 x 0.8	25.0 – 50.0	2400	HMK 01	HO ME 3000	CP 01	HO EL 3000
7 x 0.8	40.0 – 110.0	2400	HMK 01	HO ME 3000	CP 01	HO EL 3000
PG 163						
7 x 0.6	30.0 – 50.0	1800	HMK 01/S01	HO ME 2000 – 3000	CP 01	HO EL 2000 – 3000
7 x 0.6	56.0 – 116.0	2400	HMK 01	HO ME 3000	CP 01	HO EL 3000
9 x 0.6	72.0 – 132.0	2800	-	HO ME 3000	CP 01	HO EL 3000

For an alternative option, see our manual pincers on page 104
[1] Further information on page 84

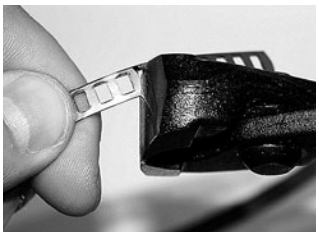
Important note
These figures are intended as a guide, they may vary depending on the type and tolerances of parts being clamped. To ensure optimum clamp selection, we recommend making functional tests with several assemblies.

Assembly instructions

PG 159 – Version with interlock outside

Step 1
Pre-shape clamp.

Step 2
Determine the clamp length.



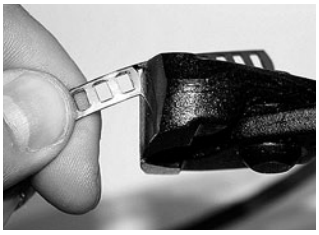
Step 3
Cut off the remaining material. To avoid possible injury deburr cut edges with a file.

Step 4
Place the clamp over object. Engage interlocking hooks in tightest window position. Firmly crimp the ear with Oetiker pincers.

PG 109 & 159 – Version with interlock inside

Step 1
Pre-shape clamp.

Step 2
Determine the clamp length. Make sure the end of the clamp passes the “ear”, as shown.



Step 3
Cut off the remaining material. To avoid possible injury deburr cut edges with a file.

Step 4
Place the clamp over object. Engage interlocking hooks in tightest window position. Firmly crimp the ear with Oetiker pincers.

Order information

Item No.	Ref. size*	Diameter range (mm)
Product Group 109		
Band width 7 mm, thickness 0.75 mm, Ear width 10 mm		
10900012	29.5	24.5 – 29.5
10900016	34.2	29.5 – 36.0
10900018	42.3	36.0 – 45.5
10900020	55.1	45.5 – 61.5
10900022	74.3	61.5 – 85.5
10900014	106.1	85.5 – 122.0
Band width 9 mm, thickness 0.75 mm, Ear width 10 mm		
10900013	29.5	24.5 – 29.5
10900017	34.2	29.5 – 36.0
10900019	42.3	36.0 – 45.5
10900021	55.1	45.5 – 61.5
10900023	74.3	61.5 – 85.5
10900015	106.1	85.5 – 122.0
Product Group PG 159		
Band width 7 mm, thickness 0.8 mm, Ear width 8.5 mm		
Version with interlock outside		
15900002		25.0 – 50.0
15900004		40.0 – 110.0
Version with interlock inside		
15900005		25.0 – 50.0
15900007		40.0 – 110.0

Item No.	Ref. size*	Diameter range (mm)	Diameter range (inch)
Product Group 163			
3 adjustment positions Band width 7 mm, thickness 0.6 mm, Ear width 10 mm			
16300022	30	23.6 – 30.0	0.929 – 1.181
16300179	32	25.6 – 32.0	1.008 – 1.260
16300023	35	28.6 – 35.0	1.126 – 1.378
16300251	37	30.6 – 37.0	1.205 – 1.457
16300024	40	33.6 – 40.0	1.323 – 1.575
16300025	45	38.6 – 45.0	1.520 – 1.772
16300026	50	43.6 – 50.0	1.717 – 1.969
6 adjustment positions Band width 7 mm, thickness 0.6 mm, Ear width 10 mm			
16300027	56	47.5 – 56.0	1.870 – 2.205
16300028	62	53.5 – 62.0	2.106 – 2.441
16300029	68	59.5 – 68.0	2.343 – 2.677
16300030	74	65.5 – 74.0	2.579 – 2.913
16300031	80	71.5 – 80.0	2.815 – 3.150
16300032	86	77.5 – 86.0	3.051 – 3.386
16300033	92	83.5 – 92.0	3.287 – 3.622
16300051	94	85.5 – 94.0	3.366 – 3.701
16300034	98	89.5 – 98.0	3.524 – 3.858
16300035	104	95.5 – 104.0	3.760 – 4.094
16300250	107	98.5 – 107.0	3.878 – 4.213
16300036	110	101.5 – 110.0	3.996 – 4.331
16300037	116	107.5 – 116.0	4.232 – 4.567
4 adjustment positions Band width 9 mm, thickness 0.6 mm, Ear width 10 mm			
16300038	72	64.0 – 72.0	2.520 – 2.835
16300039	78	70.0 – 78.0	2.756 – 3.071
16300040	84	76.0 – 84.0	2.992 – 3.307
16300041	90	82.0 – 90.0	3.228 – 3.543
16300042	96	88.0 – 96.0	3.465 – 3.780
16300043	102	94.0 – 102.0	3.701 – 4.016
16300044	108	100.0 – 108.0	3.937 – 4.252
16300046	114	106.0 – 114.0	4.173 – 4.488
16300045	120	112.0 – 120.0	4.409 – 4.724
16300053	126	118.0 – 126.0	4.645 – 4.961
16300129	132	124.0 – 132.0	4.882 – 5.197

* Ref. size = Condition as supplied:
Formed and engaged at the mid-diameter.

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