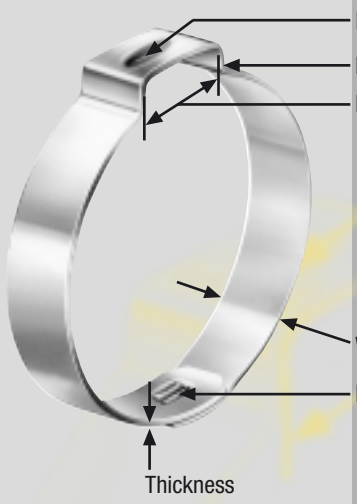
OETIKER

Technical Data Sheet

1-Ear Clamps with Mechanical Interlock

Product Group **105 & 155**



OETIKER®

Connecting Technology

Technical Data
1-Ear Clamps with Mechanical Interlock

Product Group 105 & 155

Economical, quality clamp for low-pressure applications. Developed for a variety of applications in automotive systems, general industry and fluid distribution systems that incorporate plastic transition fittings and tubes.

With this design of clamp, the mechanical interlock practically eliminates the potential for localized corrosion, a potential failure mechanism at the heat-affected zone of a welded connection.

Material
– **105** Low Carbon steel with ZA GALFAN® corrosion protection
– **155** Stainless steel DIN 1.4301 or UNS S30400

Diameter range	*Width x thickness*
10.5 - 99.5 mm	7.0 x 0.6 / 0.75 mm

Size
See pages 3/4.

Installation
See page 6.

The information provided in this data sheet is intended for reference purposes only and should not be considered a specification. OETIKER invites customers to submit samples with relevant application information, to determine the best suited clamp product and installation method.

Features
- Narrow band, only 7 mm wide
- Lightweight
- Smooth edged band steel prevents damage to mating component
- Fast, simple, secure installation
- Mechanical Interlock permits use of precoated material
- Deformation of the ear provides visual indication of closure

Installation tools
OETIKER supplies pincers for manual closure.

OETIKER recommends pneumatic pincers with electronic gauging, to ensure repeatable assembly and uniform closure, particularly for mass production applications.

The innovative OETIKER ELK 01 pneumatic tool guarantees error-proof installations with electronic monitoring of all necessary parameters. This method practically eliminates the potential for defective or inaccurate closures.

For further information, please see the OETIKER Tool Catalogue.

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Item No.	Ref. No.	Size range (mm)
1-Ear Mechanical Interlock Clamp, GALFAN®		
10500001	0113.3	9.7 - 11.3
10500002	0123.3	10.4 - 12.3
10500003	0133.3	11.4 - 13.3
10500004	0135.3	11.5 - 13.5
10500005	0138.3	11.9 - 13.8
10500006	0140.3	11.9 - 14
10500007	0145.3	12.6 - 14.5
10500008	0157.3	13.5 - 15.7
10500009	0170.3	15.1 - 17
10500010	0185.3	15.7 - 18.5
10500011	0198.3	17 - 19.8
10500012	0210.3	18.2 - 21
10500013	0226.3	19.8 - 22.6
10500014	0241.3	21.3 - 24.1
10500015	0256.3	22.8 - 25.6
10500016	0271.3	24 - 27.1
10500017	0286.3	25.5 - 28.6
10500018	0301.3	27 - 30.1
10500019	0316.3	28.5 - 31.6
10500020	0331.3	30 - 33.1
10500021	0346.3	31.5 - 34.6
10500022	0361.3	33 - 36.1
10500023	0376.3	34.5 - 37.6
10500024	0381.3	35 - 38.1
10500025	0396.3	36.5 - 39.6
10500026	0410.3	37.9 - 41
10500027	0425.3	39.4 - 42.5
10500028	0440.3	40.9 - 44
10500029	0455.3	42.4 - 45.5
10500030	0470.3	43.9 - 47
10500031	0485.3	45.4 - 48.5
10500032	0500.3	46.9 - 50
10500033	0515.3	48.4 - 51.5
10500034	0530.3	49.9 - 53
10500035	0545.3	51.4 - 54.5
10500036	0560.3	52.9 - 56
10500037	0575.3	54.4 - 57.5
10500038	0590.3	55.9 - 59
10500039	0605.3	57.4 - 60.5
10500040	0620.3	58.9 - 62
10500041	0635.3	60.4 - 63.5
10500042	0650.3	61.9 - 65
10500043	0665.3	63.4 - 66.5
10500044	0680.3	64.9 - 68
10500045	0695.3	66.4 - 69.5
10500046	0710.3	67.9 - 71
10500047	0725.3	69.4 - 72.5
10500048	0740.3	70.9 - 74
10500049	0755.3	72.4 - 75.5
10500050	0770.3	73.9 - 77
10500051	0785.3	75.4 - 78.5
10500052	0800.3	76.9 - 80
10500053	0815.3	78.4 - 81.5

Item No.	Ref. No.	Size range (mm)
1-Ear Mechanical Interlock Clamp, GALFAN®		
10500054	0830.3	79.9 - 83
10500055	0845.3	81.4 - 84.5
10500056	0860.3	82.9 - 86
10500057	0875.3	84.4 - 87.5
10500058	0890.3	85.9 - 89
10500059	0905.3	87.4 - 90.5
10500060	0920.3	88.9 - 92
10500061	0935.3	90.4 - 93.5
10500062	0950.3	91.9 - 95
10500063	0965.3	93.4 - 96.5
10500064	0980.3	94.9 - 98
10500065	0995.3	96.4 - 99.5
10500066	1010.3	97.9 - 101
10500067	1025.3	99.4 - 102.5
10500159	1040.3	100.9 - 104
10500068	1055.3	102.4 - 105.5
10500142	1070.3	103.9 - 107
10500164	1085.3	105.9 - 109
10500165	1100.3	106.9 - 110
10500166	1115.3	108.4 - 111.5
10500167	1130.3	109.9 - 113
10500168	1145.3	111.4 - 114.5
10500069	1160.3	112.9 - 116

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Item No.	Ref. No.	Size range (mm)
1-Ear Mechanical Interlock Clamp, stainless		
15500000	0105.0R	8.9 - 10.5
15500001	0113.0R	9.7 - 11.3
15500002	0123.0R	10.4 - 12.3
15500003	0133.0R	11.4 - 13.3
15500004	0135.0R	11.5 - 13.5
15500005	0138.0R	11.9 - 13.8
15500006	0140.0R	11.9 - 14
15500007	0145.0R	12.6 - 14.5
15500008	0157.0R	13.5 - 15.7
15500009	0170.0R	15.1 - 17
15500010	0185.0R	15 - 18.5
15500011	0198.0R	17 - 19.8
15500012	0210.0R	18.2 - 21
15500013	0226.0R	19.8 - 22.6
15500014	0241.0R	21.3 - 24.1
15500015	0256.0R	22.8 - 25.6
15500016	0271.0R	24 - 27.1
15500017	0286.0R	25.5 - 28.6
15500018	0301.0R	27 - 30.1
15500019	0316.0R	28.5 - 31.6
15500020	0331.0R	30 - 33.1
15500021	0346.0R	31.5 - 34.6
15500022	0361.0R	33 - 36.1
15500023	0376.0R	34.5 - 37.6
15500024	0381.0R	35 - 38.1
15500025	0396.0R	36.5 - 39.6
15500026	0410.0R	37.9 - 41
15500027	0425.0R	39.4 - 42.5
15500028	0440.0R	40.9 - 44
15500029	0455.0R	42.4 - 45.5
15500030	0470.0R	43.9 - 47
15500031	0485.0R	45.4 - 48.5
15500032	0500.0R	46.9 - 50
15500033	0515.0R	48.4 - 51.5
15500034	0530.0R	49.9 - 53
15500035	0545.0R	51.4 - 54.5
15500036	0560.0R	52.9 - 56
15500037	0575.0R	54.4 - 57.5
15500038	0590.0R	55.9 - 59
15500039	0605.0R	57.4 - 60.5
15500040	0620.0R	58.9 - 62
15500041	0635.0R	60.4 - 63.5
15500042	0650.0R	61.9 - 65
15500043	0665.0R	63.4 - 66.5
15500044	0680.0R	64.9 - 68
15500045	0695.0R	66.4 - 69.5
15500046	0710.0R	67.9 - 71
15500047	0725.0R	69.4 - 72.5
15500048	0740.0R	70.9 - 74
15500049	0755.0R	72.4 - 75.5
15500050	0770.0R	73.9 - 77
15500051	0785.0R	75.4 - 78.5
15500052	0800.0R	76.9 - 80

Item No.	Ref. No.	Size range (mm)
1-Ear Mechanical Interlock Clamp, stainless		
15500053	0815.0R	78.4 - 81.5
15500054	0830.0R	79.9 - 83
15500055	0845.0R	81.4 - 84.5
15500056	0860.0R	82.9 - 86
15500057	0875.0R	84.4 - 87.5
15500058	0890.0R	85.9 - 89
15500059	0905.0R	87.4 - 90.5
15500060	0920.0R	88.9 - 92
15500061	0935.0R	90.4 - 93.5
15500062	0950.0R	91.9 - 95
15500063	0965.0R	93.4 - 96.5
15500064	0980.0R	94.9 - 98
15500065	0995.0R	96.4 - 99.5
15500066	1010.0R	97.9 - 101
15500067	1025.0R	99.4 - 102.5
15500101	1040.0R	100.9 - 104
15500068	1055.0R	102.4 - 105.5
15500102	1070.0R	103.9 - 107
15500103	1085.0R	105.4 - 108.5
15500104	1100.0R	106.9 - 110
15500105	1115.0R	108.4 - 111.5
15500106	1130.0R	109.9 - 113
15500107	1145.0R	111.4 - 114.5
15500069	1160.0R	112.9 - 116

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1-Ear Clamps with Mechanical Interlock

Product Group **105 & 155**

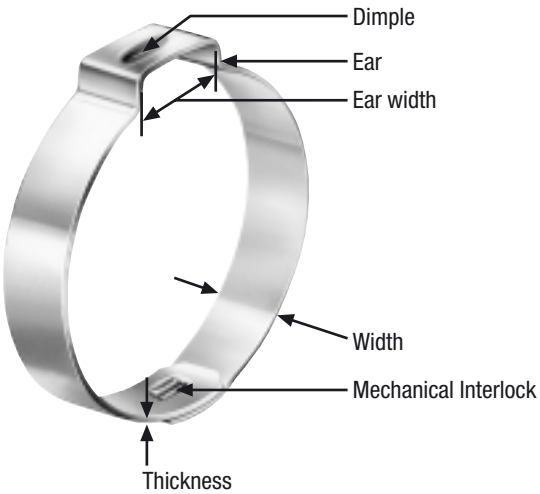
1.0 Material

OETIKER 1-Ear Clamps with the Mechanical Locking design are made, in the standard version, from SAE 1008/1010 – DIN 1.0338 with a ZA GALFAN® corrosion protection coating to EN 10214, or from an austenitic stainless steel. The latter material is designated DIN 1.4301 / UNS S30400, an 18% chromium, 8% nickel alloy.
This alloy acquires additional strength through cold working, during strip processing and clamp manufacture. The chemical composition and mechanical properties provide the exceptional combination of toughness and ductility, which are a prerequisite for the clamp closure process.

Edge condition
Stringent controls are maintained at the OETIKER strip processing facility, conditioning the slit material and forming a machined or rolled edge radius. This process reduces the potential for damage caused by sharp or square edges, when the clamp compresses adjacent material.

Corrosion-resistance
Carbon steel clamps coated with the ZA GALFAN® process provide a level of corrosion resistance expected by general industry standards. This coating ensures that the clamps will withstand a minimum of 96 hours neutral salt-spray when tested in accordance with DIN 50012SS/ ASTM B117, without base-metal corrosion.
The chemical composition of DIN 1.4301 / UNS S30400 is practically immune to the neutral salt-spray procedure and has excellent resistance to many alternative corrosive environments.

2.0 Clamp Design



1-Ear Clamps with the mechanical interlock closure are made in one standard width and two alternative gauge thickness, a factor of the grade of material selected. The dimensions and material grade should be selected taking into account the required radial force, the nature of the hose, and the need to maintain sealing and/or retaining properties under the applicable environmental conditions.

Ear Design
The integrated dimple in the ear effectively increases the retained radial force and provides a spring effect when the diameter or the application expands or contracts due to thermal or mechanical influences (i.e. vibration).

Closure
Using tools designed or endorsed by OETIKER, the clamp is closed by drawing together the lower radii of the “ear”. The maximum diameter reduction is proportionate to the open “ear” width. The theoretical maximum reduction in diameter is given by the formula:

$$\textbf{Max. diameter reduction} = \frac{\textbf{ear width (s)}}{\pi}$$

To ensure perfect sealing, clamp ears must be correctly closed during installation.

Clamp diameter
As a guide, 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.

Mechanical Interlock closure
The joining of the band material is a mechanical interlocking design, its purpose is to maintain the integrity of the interrupted strip and maintain the round geometry. The interlock is designed to withstand the recommended clamp “closing force” for the appropriate material grade and the anticipated resistance from typical applications.
The “resistance load” is closely related to the “closing force”, which is discussed in Section 3.0. Use of a mechanically jointed band connecting system, as opposed to a spot welding practice, eliminates the potential of induced high temperature corrosion.

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3.0 Assembly Recommendations

The clamp ear should be closed with a constant tool jaw force, this practice is refereed to as “force priority closure”. The assembly method assures that a uniform and repeatable stress is applied to the application in addition to a constant tensile force on the mechanical interlock. Employing this methodology when closing the 105 & 155 series clamp will compensate for any component tolerance variations, assuring that the clamp applies a constant radial force on the application. Fluctuations in component tolerances are absorbed by the changing inner “ear” gap (the space between the lower radii after installation). Clamp installation monitoring equipment and process data collection is available by incorporating the “Electronically Controlled Assembly Tool” OETIKER ELK01 within the assembly process.

Closing force

The closing force is a factor established by the preferred material compression or surface pressure and should be qualified through dimensional evaluations and experimentation. The resistance against the clamp should equal that of the applied force, therefore, when compressing malleable materials the closing force is reduced to the lower range of the recommendation. The table below shows the average required closing forces for different clamp-material dimensions. When determining the closing-force setting, a safety factor corresponding to the accuracy of the closing tool must always be added.

Average required closing forces

Material-dimensions	Closing force (N) GALFAN	Stainless	Manual closure tool*	Recommended pneumatic pincer**
10.5 - 17.0	1200 - 1500	1200 - 1500	14100082	HO 2000
		or	14100083	
18.5 - 116.0	2000 - 2300	2000 - 2400	14100082	HO 2000
		or	14100083	

* 14100082 Manual pincer – standard, 14100083 Manual pincer with side cutter.

** With appropriate closing-force setting!

Important note

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

Internet: www.oetiker.com

OETIKER has been developing connecting technology for over 50 years. OETIKER products are manufactured by its own companies in line with ISO/TS 16949 and sold worldwide by subsidiary companies or agents in over 40 countries. Numerous patents are proof of continuous innovation.

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