

OETIKER

Technical Data Sheet

1-Ear Clamps

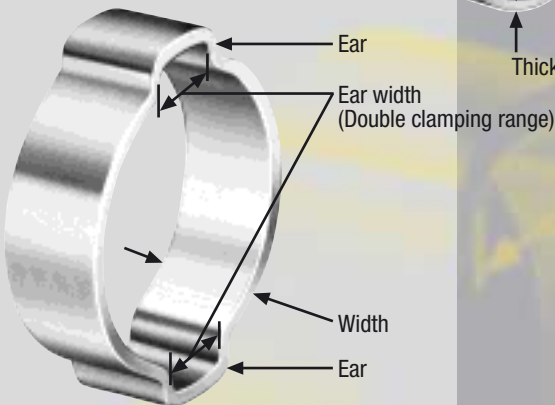
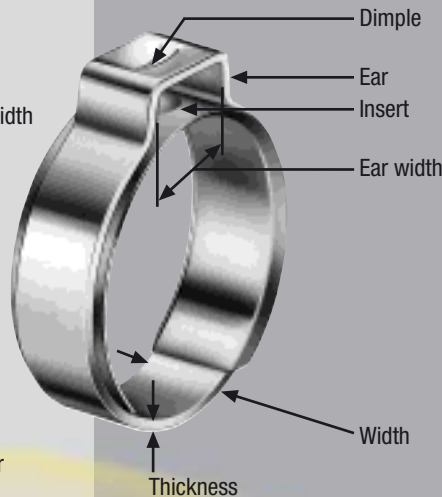
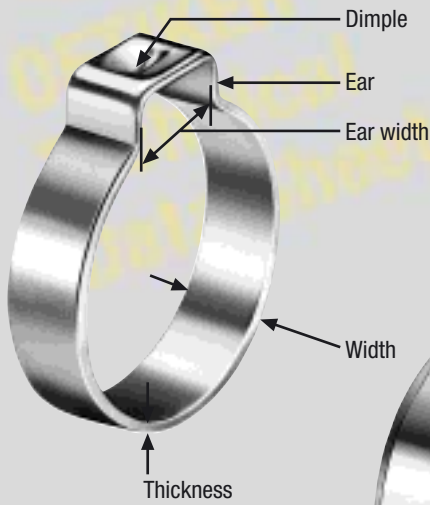
Product Group **153**

1-Ear Clamps with Insert

Product Group **154**

2-Ear Clamps

Product Group **101 & 151**



Connecting Technology

Technical Data

1-Ear Clamps

Product Group **153 / 154**



1-Ear Clamps

OETIKER 1-Ear Clamps are generally used where a quick, repeatable and compact assembly is important in addition to the necessity for only a small clamping range.

OETIKER 1-Ear Clamps are suitable for use by OEMs, but are also ideal for maintenance, repair and service purposes. With this design of clamp, rubber hoses, plastic tubing, electrical cables, welding hoses, and numerous other materials can be rapidly and securely fastened.

OETIKER System – the ear with the integrated dimple. This concept ensures that the geometry of the closed ear remains as low as possible, in addition to maintaining the effective clamping force. The closed ear geometry provides an inherent spring action in the clamp, permitting expansion and contraction during thermocycling conditions without excessive loss in retention.

For optimum sealing performance, it is essential that the ear is correctly closed during installation.

Material

– 153 Stainless Steel, Material no. 1.4301 / UNS S30400

Size

See page 4.

Installation

See page 6.



Actual size

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

- Fast, simple, secure installation
- Smooth de-burred edges prevent damage to clamped parts
- Deformation of ear provides visual indication that clamp is closed

1-Ear Clamps with Insert

- For diameters as low as 2.9 mm
- Insert ring with curled edges, bridges the gap created by the ear to ensure complete circumferential sealing

1-Ear Clamps with Insert

OETIKER 1-Ear Clamps with Insert are ideal for critical joints that incorporate soft or hard rubber, or plastic materials. The insert bridges the gap created by the ear and the curled edges of the insert prevent the material being compressed from superficial damage.

The thin-walled insert incorporates an oval, deep drawn protrusion situated within the ear cavity to ensure that the insert maintains its circular profile while preventing the hose material from extruding into the ear. The prevention of this condition is critical when compressing soft materials. The double dimple combination ensures permanent all-round sealing.

OETIKER System – the ear with the integrated dimple. This concept ensures that the geometry of the closed ear remains as low as possible, in addition to maintaining the effective clamping force. The closed ear geometry provides an inherent spring action in the clamp, permitting expansion and contraction during thermocycling conditions without excessive loss in retention.

For optimum sealing performance, it is essential that the ear is correctly closed during installation.

The 1 Ear Clamp-with-Insert is compatible to numerous automotive applications, medical equipment, in addition to electrical and electronic components.

Material

– 154 Clamp:

Stainless Steel, Material no. 1.4301 / UNS S30400

Insert:

Stainless Steel, Material no. 1.4310 / UNS S30100

Size range

See page 4.

Installation

See page 6.



Technical Data

2-Ear Clamps

Product Group **101 & 151**



The first OETIKER "Original" ear clamp

On the market since 1951, Hans Oetiker's innovative design caused a worldwide revolution in connecting technology and this type of clamp is still frequently used today.

OETIKER 2-Ear Clamps are suitable for use by OEMs, but also for maintenance, repair and service purposes. With this type of clamp, rubber hoses, plastic tubing, electrical cables, welding hoses, and other materials can be securely fastened.

Compared to 1-ear clamps, 2-ear clamps are suitable for a wider diameter range. The geometry of the closed ears increases the effective clamping force, and provides a degree of elasticity to accommodate changes in size of the parts being joined, such as may be caused by thermal expansion or vibration.

For perfect sealing, it is essential that the ears are correctly closed during installation.

Material

- **101** Steel, Material no. 1.0338 / SAE 1008/1010, zinc-plated
- **151** Stainless Steel, Material no. 1.4301 / UNS S30400

Size range

See page 4.

Installation

See page 6.



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Features

- Robust design for good, permanent sealing
- Ideal for air and liquid lines
- Fast, simple, secure installation
- 2-Ear design gives increased clamping range
- De-burred edges prevents damage to clamped parts
- Deformation of ears provides visual indication that clamp is closed

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 "Electronically Controlled Pneumatic Power Tool OETIKER ELK 01" guarantees reliable installation with electronic monitoring of all necessary parameters. It practically eliminates the possibility of any unnoticed defective closures.



For further information, please see the OETIKER Tool Catalogue.



1.0 Material

OETIKER 1-Ear and 2-Ear Clamps are made from zinc-plated steel to DIN 1.0338 / SAE 1008/1010, or from an 18% chromium 8% nickel, austenitic grade of stainless steel to specifications DIN 1.4301 / UNS S30400.

Process

The manufacturing process for the OETIKER 1-Ear and 2-Ear Clamps commences with the spiral roll-forming and welding of raw material into lengths of tube, a technique developed to obtain a robust, continuous welded ring.

Flat strip is rolled at approximately 45° into a tube forming die and the spiral edge TIG welded (Tungsten Inert Gas). The welded tube is drawn to precise inside and outside diameters prior to being cut into rings and the final formation of the ear configuration. An annealing process reduces the internal stresses produced during the manufacturing process and ensures uniform mechanical properties.

Edge condition

Burrs generated during the shearing and forming process are entirely eliminated in a barrel-finishing operation.

Corrosion resistance

To ensure the level of corrosion resistance expected by industry, all clamps made of DIN 1.0338 / SAE 1008/1010 are zinc-plated and chromated. This coating ensures that the clamps will withstand a 96-hour salt-spray test to DIN 50021 / ASTM B117 without red rust formation.

Due to the chemical composition of the material, all clamps made from the stainless steel grade DIN 1.4301 / UNS S30400 have excellent resistance to many corrosive environments without additional protection.

2.0 Clamp Design

OETIKER 1-Ear Clamps:

The ear of OETIKER 1-Ear Clamp incorporates the integrated dimple, which has the effect of not only maintaining a low overall height but maintains the highest possible clamping force.

Closure

By using an OETIKER closing tool to pinch the clamp ear, the diameter of the clamp is reduced. This diameter reduction is proportional to the ear width. The maximum reduction in diameter is given by the formula:

$$\text{Max. diameter reduction} = \frac{\text{ear-width}}{\pi}$$

OETIKER 1-Ear Clamps with Insert:

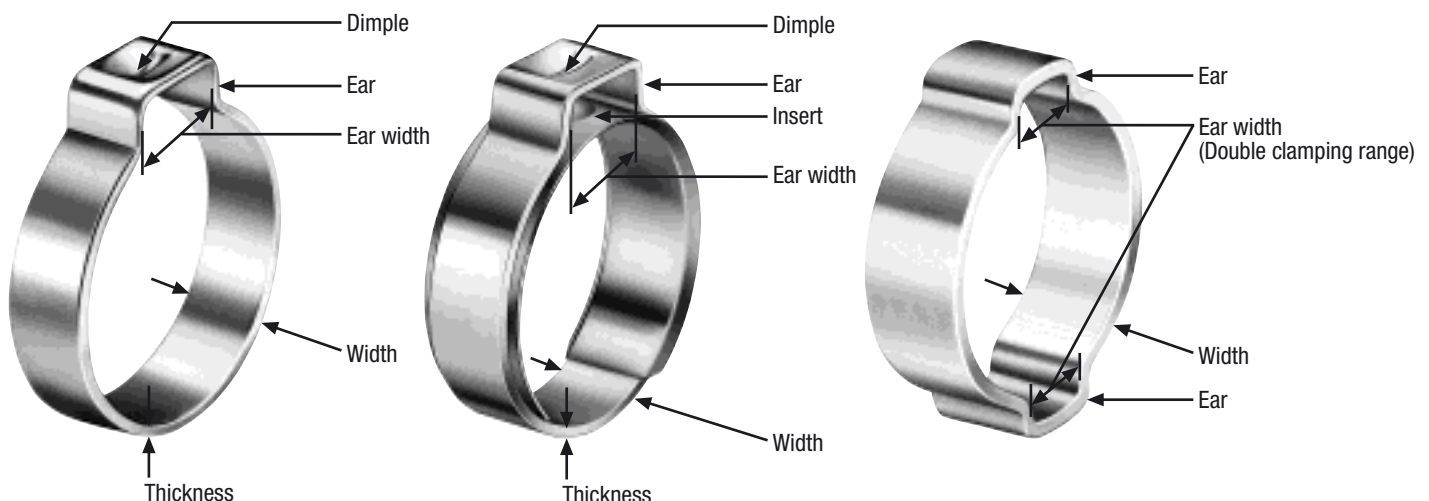
This type of clamp combines the geometry and properties of the 1-Ear Clamp with an additional insert made of stainless steel to DIN 1.4310 or UNS S30100.

These clamps are ideal for demanding applications involving soft or hard rubbers and plastics. The thin-walled insert ring (up to 0.3 mm thick) with the oval protrusion located within the ear cavity, bridges the ear gap and ensures almost uniform compression around the whole circumference of a clamp.

OETIKER 2-Ear Clamps:

Due to the two-ear design, the clamping range is greater – up to twice that of a 1-Ear Clamp – therefore, these clamps are more suitable for applications that contain thick wall hoses and require higher compression factors. Installation techniques are typical to that of the 1-Ear Clamp, however, the stress applied when closing the second ear may react against the opposing closed ear and a secondary “crimp” may be necessary.

For perfect sealing, the ears must be adequately closed during installation.



Technical Data

1-Ear Clamps / 1-Ear Clamps with Insert / 2-Ear Clamps

Product Group **153 / 154 / 101 & 151**

3.0 Assembly recommendations

The ears of these clamps should be closed with the recommended, uniform force (known as force priority). This method will result in a constant, reproducible stress within the clamp material, without overloading either the clamp or the parts being assembled.

On principle the nominal diameter of the clamp should be chosen so that once installed with the adequately defined clamping force, you have an almost closed ear.

Complete process monitoring and 100% process documentation is available using the "Electronically Controlled Pneumatic Power Tool" OETIKER ELK 01.

Alternatively, the appropriate manually operated hand tool is applied to the ears and closed with sufficient force to draw the lower radii together to a position where obvious component compression is evident and the clamp ear assumes a symmetrical "omega" shaped formation.

Closing force

The table below shows the average applied 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 applied closing forces

Material- dimensions	Closing force (N)		Manual closure tool*	Recommended pneumatic pincer**
	Zinc-plated steel	Stainless		
1-Ear Clamps				
03.3 - 11.0	-	1400	14100082, 14100083	HO 2000
11.3 - 20.7	-	2300	14100082, 14100083	HO 3000
21.0 - 30.7	-	2800	14100082, 14100083	HO 3000
1-Ear Clamps with Insert				
03.3 - 11.8	-	1500	14100082, 14100083	HO 2000
12.0 - 20.7	-	2500	14100082, 14100083	HO 3000
21.0 - 30.7	-	3600	14100082, 14100083	HO 4000
2-Ear Clamps				
0041 - 1720	2200	2500	14100082, 14100083	HO 3000
1922 - 4346	3400	3600	14100082, 14100083	HO 4000

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

** With appropriate closing-force setting!

Important

This data is intended only as a guide and may require validation by means of trial assemblies with sample components prior to implementing a system assembly specification.



The addresses of all OETIKER companies and agencies are included on our website.

www.oetiker.com



Connecting Technology

OETIKER has been developing connecting technology for over 60 years. OETIKER products are manufactured by its own companies in line with ISO/TS 16949 and sold worldwide in over 40 countries. Numerous patents are proof of continuous innovation.

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