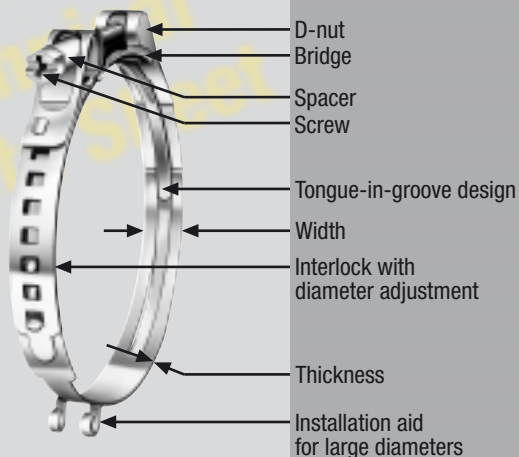


OETIKER

Technical Data Sheet

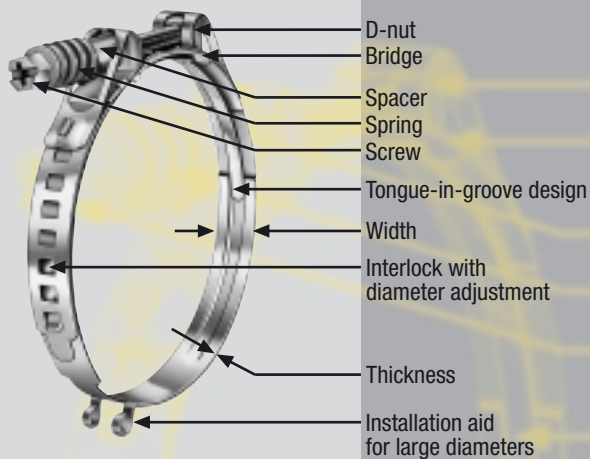
Stepless® Screw Clamps

Product Group **178**



Self-Tensioning Stepless® Screw Clamps

Product Group **178**



Connecting Technology

Technical Data

Stepless® Screw Clamps

Self-Tensioning Stepless® Screw Clamps

Product Group **178**



OETIKER Stepless® Screw and Self-Tensioning Clamps are size adjustable and were specifically developed for motor vehicle cooling systems (gasoline and diesel engines) – particularly for use with EPDM rubber and silicone hoses.

The narrow width of these OETIKER clamps in comparison with alternative clamps of similar design, coupled with the low installation torque, combine to ensure a precisely defined clamping pressure on the hose. The term “Stepless®” refers to the absence of steps and / or overlaps around the inner circumference. The ingenious stepless design means that the clamp is in full contact with the coolant hose around the entire inner circumference and so ensures complete 360° sealing.

Coolant leakage from vehicle engines generally occurs as the coolant transfer units cool down after the engine has been switched off during sub-zero temperatures. Components such as hoses and the connecting metallic or plastic stems contract during this process allowing the opportunity for coolant loss should the clamping system not compensate for the reduced diameter, a common occurrence with conventional clamping systems. This temporary system failure will cause loss of coolant, unnecessary damage to the environment in conjunction with the potential of permanent engine damage due to inadequate cooling performance. By utilizing OETIKER Stepless® Self-Tensioning Screw Clamps for all cooling system connections, cold coolant leakage can be totally prevented due to the ability to compensate for component contraction during exposure to thermal cycling conditions.

Material

- **178** Band, spacer, retaining elements (D-nut):
Stainless Steel, Material no. 1.4301 / UNS S30400
- Screw:
Stainless Steel, Material no. 1.4319 / UNS S30200
- Spring:
17-7PH (aerospace quality)

Size range *Width x Thickness*
19.0 - 255.0 mm 9.0 x 0.6 mm

Installation

See page 4.

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

- Compression spring reacts to diameter changes caused by thermal expansion and contraction, ensuring continual all-season sealing and a permanent system against leakage**
- 360° stepless design – no steps or overlaps around the internal circumference
- Specially formed strip edges prevent damage to adjacent hose
- Reusable
- Narrow band width provides localized clamping force
- Conforms to: SAE J1508 Type SSPC, TMC RP332 Type SSPC
- A single part number covers a wide range of hose diameters

Item No.* Ref. No.* Item No. Ref. No.** Size range (mm)**

Band width 9 mm, thickness 0.6 mm

17800120	024-9	17800170	024S9	18 - 24
17800122	028-9	17800172	028S9	22 - 28
17800124	032-9	17800174	032S9	26 - 32
17800125	036-9	17800175	036S9	30 - 36
17800126	040-9	17800176	040S9	34 - 40
17800127	045-9	17800177	045S9	37.5 - 45
17800128	050-9	17800178	050S9	42.5 - 50
17800129	055-9	17800179	055S9	47.5 - 55
17800130	060-9	17800180	060S9	49 - 60
17800131	065-9	17800181	065S9	54 - 65
17800132	070-9	17800182	070S9	59 - 70
17800133	075-9	17800183	075S9	64 - 75
17800134	080-9	17800184	080S9	69 - 80
17800135	085-9	17800185	085S9	74 - 85
17800136	090-9	17800186	090S9	79 - 90
17800137	095-9	17800187	095S9	84 - 95
17800138	100-9	17800188	100S9	89 - 100
17800139	105-9	17800189	105S9	94 - 105
17800140	110-9	17800190	110S9	99 - 110

* Stepless® Screw Clamps

** Self-Tensioning Stepless® Screw Clamps

For Self-Tensioning Stepless Screw Clamps, the minimum diameter of the clamping range is 1mm larger than that given in the above table.

Alternative diameters on request.

Technical Data

Stepless® Screw Clamps

Self-Tensioning Stepless® Screw Clamps

Product Group **178**



1.0 Material

OETIKER Stepless® Ear Clamps are made from austenitic stainless steel. The primary material employed is a nickel alloy designated DIN 1.4301 / UNS S30400, and contains ca. 18 % chromium and ca. 8 % nickel. This alloy acquires additional strength through cold working in the course of strip 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. In addition, this alloy ensures excellent resistance to numerous corrosive environmental conditions.

OETIKER Self-Tensioning Stepless® Screw Clamps conforms to specifications SAE J1508 Type SSPC and TMC RP332 Type SSPC.

Materials of components

- Pivot segments (D-nuts) DIN 1.4301 / UNS S30400
- Screw DIN 1.4310 / UNS S30200
- Spring 17-7PH (aerospace quality)
(only used on Stepless® Screw Clamps, Self-Tensioning)

Spring rate to Specification AMS 5678D

Uncoloured Spring: 88 N/mm average load rating

Green Spring: 193 N/mm average load rating

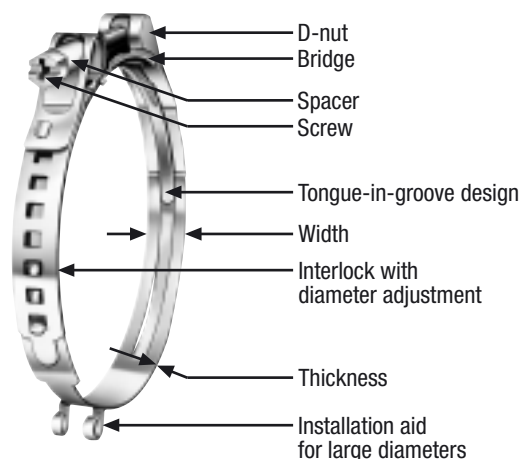
Edge condition

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.

2.0 Screw Clamp design

Material thickness

OETIKER Stepless® Screw Clamps and Self-Tensioning Stepless® Screw Clamps are made from strip material 9 mm wide and 0.6 mm thick. The dimensions of the strip ensure optimum sealing capabilities with EPDM rubber and silicone hoses, while taking into account the necessary radial force, the compressibility of the hose, the sealing / retaining properties and the environmental conditions.



Stepless® Screw Clamp

Interlock

The closure is a mechanical interlock with the function being to provide secure retention of the round screw clamp geometry. The design of the closure takes into account the mechanical properties of the material and the smallest cross-section of the screw clamp features.

The interlock can be opened to permit radial installation of the clamp, and at the same time provides a simple way of relocating the interlock features to obtain alternative diameters prior to applying torque to the screw.

Positions for diameter changes

Sizes 24 mm - 42 mm

- 3 different positions
- diameter change for each step 1.6 mm

Sizes 45 mm - 55 mm

- 3 different positions
- diameter change for each step 2.1 mm

Sizes 60 mm - 255 mm

- 5 different positions
- diameter change for each step 2.0 mm

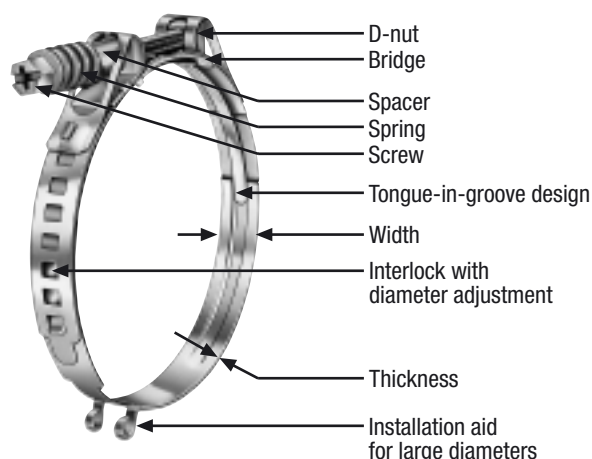
Screw: M4 x 0,7

Screw head: combination of hexagon head with socket for standard "Philips" screwdriver.

Stepless® design

The unique "Stepless® design" refers to the complete avoidance of steps and / or overlaps around the inner circumference of a clamp. This is achieved by a Tongue-in-groove design, ensuring uniform compression and surface pressure around the full 360° of the assembled parts. Continual engagement of the tongue within the groove during the diameter reduction forms an uninterrupted inner surface. The result is effective clamping system on a large variety of hose diameters and materials.

On the larger diameters, a reinforcing bridge is fitted to the band material below the tensioning screw, providing additional support to the exceptional sealing qualities.



Self Tensioning Stepless® Screw Clamp

Technical Data

Stepless® Screw Clamps

Self-Tensioning Stepless® Screw Clamps

Product Group **178**

3.0 Assembly Recommendations

1. Turn screw anti-clockwise until it stops at the "D" nut.
2. For radial installation, unlatch the interlock and position the open clamp around the hose.
3. Locate the tongue within the groove and position the apertures of the mechanical interlock over the mating features. Engage the interlock to create the smallest possible diameter.
4. Tighten the screw to the required torque. Do not exceed the maximum permissible tightening torque.
5. A gap of > 3 mm should exist between the D-nuts. This ensures that there is sufficient movement for the clamp to reduce in diameter when the spring of the self-tensioning clamp expands during contraction of the hose. If the gap between the D-nuts is less than the recommended 3 mm, proceed to step 6. (Only applicable to Self-Tensioning Spring Screw Clamps).
6. Turn the screw anti-clockwise to loosen the Self-Tensioning Screw Clamp.
7. Relocate the interlock in the next smaller diameter position.
8. Tighten the screw to the required torque. Do not exceed the maximum permissible tightening torque.

Torque guide – do not exceed the maximum values
Observe minimum gap > 3 mm between D-nuts*



Spring without colour identification (sizes 24.0 - 31.0 mm):
90 - 100 Ncm Max (8 - 9 inch pound-force Max).



Green spring (sizes 32.0 mm and larger):
135 - 200 Ncm Max (12 - 18 inch pound-force Max).

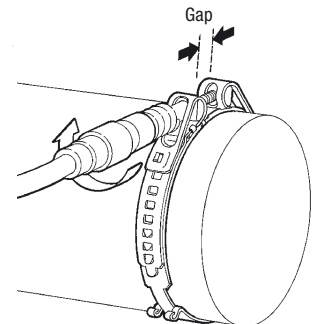
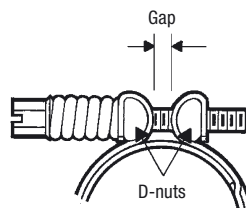
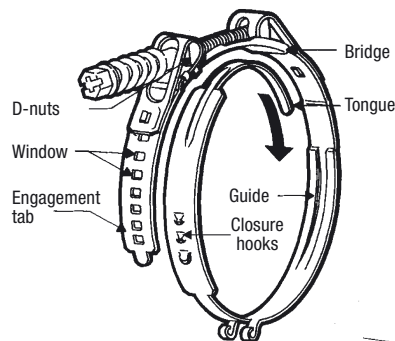
* Applies only to Self-Tensioning Stepless Screw Clamps

The values indicated above were established based on maximum clamp torque capacity and common hose materials. Low durometer hoses may require alternative or lower torque values and should be verified by means of product compatibility investigations.

Tolerance compensation with Stepless Screw Clamps

OETIKER Stepless® Screw Clamps and Self-Tensioning Stepless® Screw Clamps should be tightened with the optimum torque as specified in the guide. This torque takes into account the required degree of compression, the necessary radial force, and the maximum torque resistance of the screw and clamp band. By using a defined and constant torque at installation, compensation for component tolerances will always be available and the radial force will remain approximately the same.

The spring on OETIKER Self-Tensioning Stepless® Screw Clamp serves as a compensation element to accommodate changes in diameter resulting from thermal expansion and contraction or vibration. This feature gives Screw Clamps the optimum sealing performance even in applications where there are strong thermal influences.



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

www.oetiker.com

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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