



Spring Hose Clamp

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard covers the materials and performance requirements for spring band hose clamps.

1.2 Applicability. This specification covers five (5) types of Constant Tension Band (CTB) Clamps:

- Normally Closed, Regular Profile (see Figure 1).
- Pre-opened with Clip, Regular Profile (see Figure 2).
- Pre-opened Clipless (see Figure 3).
- Normally Closed, Low Profile (Space Saver) (see Figure 4).
- Pre-opened with Clip, Low Profile (Space Saver) (see Figure 5).



Figure 1: Clamp Type A, Normally Closed, Regular Profile
(see Figure A1 for specifications)

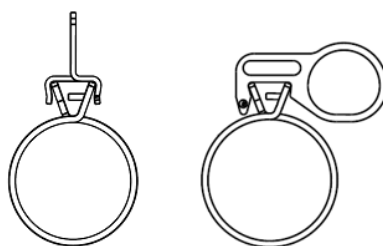


Figure 2: Clamp Type B, Pre-opened with Clip, Regular Profile
(see Figure A2 for specifications)



Figure 3: Clamp Type C, Pre-opened Clipless
(see Figure A3 for specifications)



Figure 4: Clamp Type D, Normally Closed, Low Profile (Space Saver)
(see Figure A4 for specifications)



Figure 5: Clamp Type E, Pre-opened with Clip, Low Profile (Space Saver)
(see Figure A5 for specifications)

1.3 Remarks. Spring band hose clamps must function with hose/nipple connections of a variety of dimensional ranges and must have a full open diameter which is large enough to install the hose clamp over a bead when the hose clamp is already assembled. Clamp size will be designated by its Nominal Diameter (Dn) to distinguish between different hose clamp working ranges.

The material used is an austempered carbon steel. Generally, a coating, per GMW14083, is applied for resistance against corrosion and general automotive fluids.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM E18	EN 10132-4	SAE J403	SAE J404
ASTM E140			

2.2 GM Standards/Specifications.

GMW3059	GMW14083
---------	----------

3 Requirements

3.1 Material. The hose clamps may be produced from either cold rolled chromium-vanadium alloy steel or SAE J403 Grades 1074 and 1075 or JIS Grade SK5. See Table 1 for acceptable materials.

Table 1: Steel Grades

Standard	Chemical Composition
EN 10132-4 51CrV4	C: 0.50 to 0.55 Mn: 0.8 to 1.1 V: 0.1. to 0.25
EN 10132-4 C75S	Optional: Cr: 0.15 to 0.40
EN 10083-1 50CrV4	C: 0.47 to 0.55 Mn: 0.7 to 1.10 V: 0.1 to 0.25
SAE J404 Grade 6150	
SAE J404 Grade 6150 modified	C: 0.50 to 0.55 Mn: 0.8 to 1.1 V: 0.1. to 0.2
SAE J403 Grade 1074	-
SAE J403 Grade 1075	Optional: Cr: 0.15 to 0.40
JIS Grade SK5	C (0.80 to 0.90), Si (Max. 0.35), Mn (Max. 0.5), P (Max. 0.03), S (Max. 0.03), Cr (Max. 0.3), Cu (Max. 0.25), Ni (Max. 0.25)

Note: C = Carbon; Cr = Chromium; Cu = Copper; Max = Maximum; Mn = Manganese; Ni = Nickel; Si = Silicon; S = Sulfur; V = Vanadium

3.1.1 Grain flow of the metal must be in the longitudinal direction of the part (see Figure 6). Phosphate-type coating as a processing aid for the manufacture of cold rolled steel band is not allowed.



Figure 6: Clamp Shape and X-Y Directions of Hose Clamps

3.2 Material Hardness.

3.2.1 Clamps shall be austempered to a hardness of 470 Hardness Vickers (HV10/HV30) to 580 HV10/HV30 or 47 Hardness Rockwell C (HRC) to 54 HRC.

3.2.2 Hardness shall be taken on the ground edge (side surface) after 0.3 mm cold grinding or on the tang, the side opposite the stamped number per ASTM E18.

Note: For thinner material, use Hardness Rockwell 45N (HR45N) per ASTM E18 and convert results to HV or HRC values per ASTM E140.

3.3. Protective Coatings and Colors. Hose clamps shall be coated per GMW14083 to prevent corrosion.

3.4 Dimensions, Closed and Full Open Diameter. See Figure 7 and Figure 8

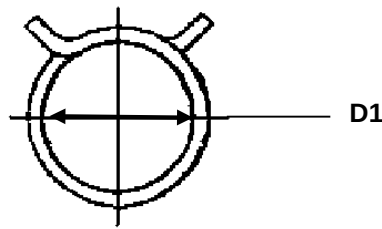


Figure 7: Example - Maximum Closed Diameter (D1)

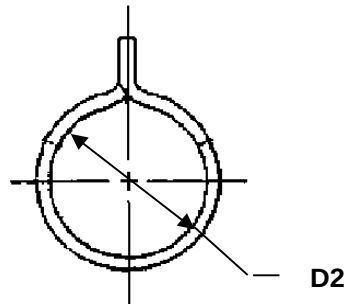


Figure 8: Example - Minimum Full Open Diameter (D2)

3.4.1 The hose clamps must meet the dimensional requirements, as shown on the part drawings.

3.4.2 The closed diameter (D1) is to be measured in the X-direction (see Figure 6) by using a dial gage.

3.4.3 The full open diameter (D2) is to be measured on a step gage or gage pin with 0.1 mm increments.

Note: The full open position occurs at an appropriate force when the stop just contacts the opposite tang. Excessive force can distort the clamp and cause variation in clamp load and dimensions.

3.5 Dimensional Measurements.

3.5.1 Prior to measuring, the hose clamps must be opened to their full open diameter once for 5 s to 10 s.

3.5.2 It is important that clamps are deflected evenly. This can be achieved only by using an appropriate tool that does not deform or damage parts during use.

3.5.3 Clamps Type B, C and E supplied in the pre-opened condition shall be released while the base is held in rubber padded jaw or over a mandrel.

3.5.4 A set of random samples (30 minimum) when tested shall meet a statistical spread with -3 sigma values greater than the D1 Maximum shown in Appendix A.

3.6 Performance Requirements.

3.6.1 Clamping Force.

3.6.1.1 Hose clamps shall meet minimum clamping forces as shown in Appendix A.

Part sizes and styles not mentioned in Appendix A are to be specified on individual part drawing or part catalog.

3.6.1.2 The testing frequency is to be determined by supplier with GM approval.

3.6.1.3 Clamping Force Measurement.

3.6.1.3.1 The clamping force of the hose clamp must be measured on a three (3) segment load cell.

3.6.1.3.2 For submission of test data, a three (3) segment tester that has been shown to correlate with the Master Tester at GM must be used.

3.6.1.3.3 Contact Fastening Engineering for information concerning this tester.

3.6.1.3.4 The load cell must be calibrated on frequency as per International Organization for Standardization (ISO) certification requirements.