This Technical Bulletin provides detailed information on how to establish and test proper clamp force for a Cascade Carton Clamp. Cascade recommends that clamp force be checked regularly at a minimum of weekly intervals.

**NOTE:** Test the clamp force of a carton clamp and then calibrate other clamps to be within the same clamp force. Clamp arm wear, oil temperature, bearing condition and lubrication interval can affect clamp force readings.

The following methods can be used to establish and maintain clamp force for the loads being handled:

- Use documented clamp force data printed on the product carton (this is usually not to be exceeded and tested on site).
- Use a documented manufacturers database for each product.
- On site testing of the product in the actual warehouse and recording the data.
- Use starting points for testing based on Cascade's historical Clamp Force Factors for Carton Clamps. Contact Cascade for additional information.

**Clamp Force Indicator—Analog**
35G-CFI-8RF – Precision Calibrated for 3500 lbs or less

**Clamp Force Indicator—Digital**
35G-DFI-8RF – Precision Calibrated for 3500 lbs or less

For Technical Support . . .
Call: 1-800-227-2233  Fax: 1-888-329-8207
Internet: www.cascorp.com
Write: Cascade Corporation, PO Box 20187, Portland, OR 97294

To Order Parts . . .
Call: 1-888-227-2233  Fax: 1-888-329-0234
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Write: Cascade Corporation, 2501 Sheridan Ave., Springfield, OH 45505
Establishing Clamp Force using a Clamp Force Indicator

1. Position the clamp arms inside of the fully open position.

2. Position the Clamp Force Indicator between the contact pads in the location shown below. It is important that the indicator position on the pads be consistent each time a reading is taken.

3. Clamp the indicator for several seconds, release and record the display value. The reading is in pounds force (Lbf) or kilo-newtons force (KN). Determine if the value is correct for the loads you are handling.

4. If clamp force needs to be adjusted, see Adjust Clamp Force on the following page.

Establishing Clamp Force without a Clamp Force Indicator

1. Install a 5000 psi (345 bar) pressure gauge in the clamp valve gauge port (G).

2. Clamp on a typical load and slowly lift. If slippage occurs, increase truck system pressure in 100 psi (7 bar) increments until load does not slip.

3. Lift load 3 ft. (1 meter) and quickly lower load, alternately stopping and lowering the carriage to determine if load is slipping:
   - If load does slip, increase truck system pressure in 100 psi (7 bar) increments until load stops slipping.
   - If load does not slip, the pressure may be set accurately. Go to Step 4.

4. Check load for damage to determine if there is excessive clamp force. If the load is damaged, decrease truck system relief pressure in 100 psi (7 bar) increments until adequate clamp force is determined without damage.

5. Test the Carton Clamp in a variety of operating conditions representing normal day to day operation. If load slippage is reported by the driver, increase system pressure 100 psi (7 bar) and test again for secure clamping.

6. Keep a log of any load slippage, pressure adjustments, and hydraulic system maintenance.
Adjust Clamp Force

Clamps with Valve Pressure Relief
1. Clamp the arms on the clamp force indicator.
2. Adjust the clamp relief valve pressure until the correct force is indicated on the clamp force indicator.

Clamps without Pressure Relief
1. Clamp the arms on the clamp force indicator.
2. Adjust truck auxiliary valve clamp relief pressure until the correct force is indicated on the clamp force indicator.

Clamps with Accessory Pressure Regulator
1. Clamp the arms on the clamp force indicator.
2. Adjust the accessory relief valve(s) until the correct force is indicated on the clamp force indicator.
**Check Clamp Force Retention**

1. Clamp on the clamp force indicator. Record the display value. Wait 2 minutes and record display value. Wait 5 more minutes and record display value. Use these readings to determine if clamp force is within tolerance as follows:

2. Divide 2-minute value by initial value:
   - If value is **greater than** or equal to .95 (95%), clamp force is within specification. Note value for future reference.
   - If value is **less than** .95 (95%), the clamp hydraulic system requires troubleshooting (see Clamp Service Manual).

3. Divide 7-minute value by 2-minute value:
   - If value is **greater than** or equal to .95 (95%), clamp force is within specification.
   - If value is **less than** .95 (95%), the clamp hydraulic system requires troubleshooting (see Clamp Service Manual).

**Example:** Clamp force within tolerance

\[
\frac{7800 \text{ lbs. force (2-minute value)}}{8000 \text{ lbs. force (initial value)}} = 0.97 \ (97%) \\
\frac{7500 \text{ lbs. force (7-minute value)}}{7800 \text{ lbs. force (2-minute value)}} = 0.96 \ (96%)
\]

**Periodic Inspection for Clamp Force Indicators**

Prior to using a Clamp Force indicator to measure clamp force, inspect these areas to make sure the indicator is in proper working order:

- Inspect for loose fasteners.
- Inspect the liquid filled gauge. If the gauge is cracked, fluid has drained from the gauge or other damage is visible, do not use the clamp force indicator.
- Inspect the pads. If the pad surfaces are damaged or do not articulate freely, do not use the clamp force indicator.
- Inspect the frame and cylinder. If the frame, cylinder shell or cylinder rods are damaged, do not use the clamp force indicator.