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Piston Pin Circlip Fitting and Failures

Retention of diesel engine piston pins is typically by circlips of one of four designs. They are:

Figure 1. - Tangless wire circlip

Figure 2. - Tanged wire circlip (one or two tang)

Figure 3. - Tanged rectangular circlip

Figure 4. - Seeger circlip

Never twist a circlip during fitting. The circlip must enter the pin bore and groove squarely and be under sufficient tension when fitted to prevent rotation by finger pressure. *The open end of the circlip should be installed towards the bottom of the piston.* Under *no* circumstances should the open end of the circlip be positioned to either side of the vertical. Installation in this manner could result in their becoming dislodged owing to the compressive forces of inertia acting on them.

The tangs on tanged wire circlips are usually slightly offset from the plane of the circlip. When installing this style circlip, ensure the tang offset points away from the piston pin. This ensures pin contact with the body of the circlip and not just the tang should pin shuttle develop. Seeger circlips are manufactured by 'stamping' and in the process, one side of the circlip typically has a slightly convex radius face. The opposite face will usually be quite flat. When installing this style circlip, ensure the radius face is towards the piston pin. This ensures the flat face of the circlip comes up against the flat face of the piston circlip groove should pin shuttle develop.

The most common cause of failure of circlips is due to overstressing when fitting. A circlip should only be compressed just small enough to slip into the piston pin boss. *Never* butt the ends, as this will overstress the circlip causing cracking or permanent set and loss of tension. *Always* use circlip pliers of the correct type, particularly when fitting Seeger circlips. It should be noted that most Seeger type circlips now have metric sized holes for the pliers.

Circlips should never be re-used having once been in service. In certain instances, the piston pin may be retained by circlips during transit. Care should be taken when removing and refitting these circlips to allow installation of the piston onto the conrod.

Other causes of circlip displacement resulting in an engine failure include:

- tight fit of piston pin in conrod small end bush
- bent or twisted conrod
- excessive crankshaft float

Figure 1. Tangless Wire

Figure 2. Tanged Wire

Figure 3. Tanged rectangular

Figure 4. Seeger