



# RAILWAY DAMPER

FIELD INSPECTION  
MANUAL



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### Damper Life Cycle

KONI Railway dampers are designed with a robust construction to insure a long life in an environment of continual high force inputs. KONI components are machined with great precision to ensure an exceptionally long and problem free life. KONI tests 100% of all Railway dampers to guarantee they produce the desired damping forces. **If there is no sign of oil leakage, it is highly unlikely that the damper is not working properly.** Dampers should be inspected any time a car so equipped, is inspected. Dampers should be reconditioned during major truck overhaul.

### Damper Reconditioning

KONI has the equipment and knowledge to recondition any KONI Railway damper.

We support companies who wish to recondition the dampers with parts lists, adjustment instructions and supply of spare parts.

KONI can be contacted for reconditioning information at:

KONI B.V.  
Langeweg 1  
3261 LJ Oud-Beijerland  
The Netherlands

Phone: +31-186-635500  
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In most cases, dampers can remain in service until truck overhaul. However, the service intervals will depend to a large extent on the track conditions and running speed. It is recommended that damper reconditioning coincide with scheduled truck overhauls. If KONI Railway dampers are maintained properly, they will live for the life of the vehicle.

For tracking purposes and to better serve our customers, KONI requests that dampers be tagged with the locomotive or car number and the mileage at the time that the damper is removed.

## Damper Leakage

### Assembly Oil

Several different lubricants and fluids are used in the construction of Railway dampers. Assembly oils are yellow or black in color, and can be easily distinguished from the red hydraulic damping fluid. When the damper is new, the assembly lube may cause a slightly moist rod or body. If this occurs, simply wipe off the excess oil and return the damper to service. If a new damper has red oil droplets, the damper should not be installed but returned under warranty.

### Sweating

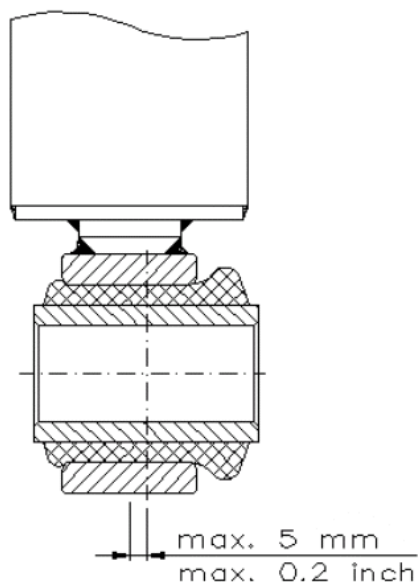
For a long service life, it is necessary for the rod oil seal to remain lubricated. The continuous inward and outward movement of the piston rod may cause oil "sweat" from the rod oil seal. This loss of oil can be recognised by the outside of the damper being slightly moist and dirty. However, there are no droplets of oil clinging to the damper. This damper may remain in service.

### Droplets

If droplets of oil are clearly formed on the body, the damper must be reconditioned. Return the damper to an approved service centre for reconditioning.



It is possible for attachments to be replaced in the field, if the proper tools are available. KONI should be consulted for replacement instructions. When installing dampers with new attachments, care should be taken to insure the proper hardware and torque are applied.



Pay special attention to the position of the rubber blocks, trunnions, etc. They should never be further than 0.2 inches (5mm) from the centre of the eye.

**Caution:**  
Do not use a torch on or near damper bushings. Excessive heat will damage the rubber bushing and attachment pin.

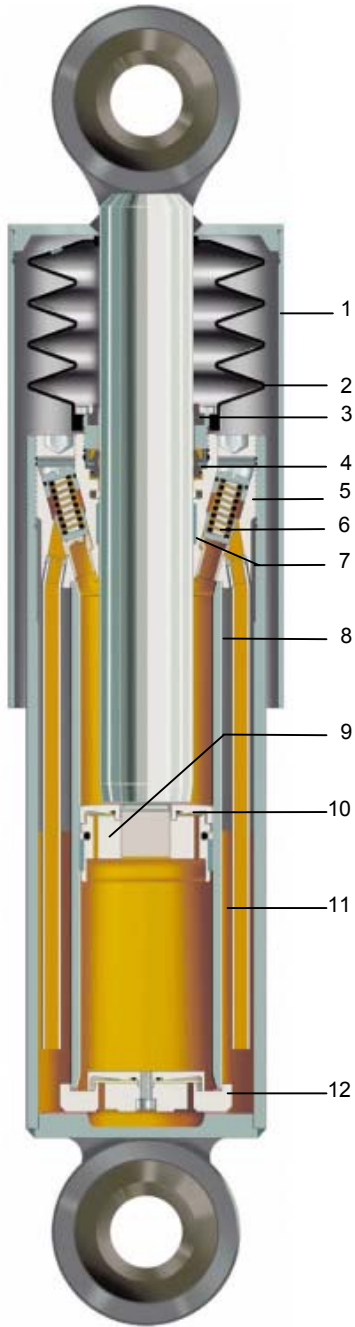


**Damper with Road  
Dirt Accumulation**



**New Damper**

The environment that Railway dampers are exposed may subject the dampers to dirt and oil from outside sources. Road dirt accumulation covering the entire damper is normal and there will be no adverse effects on the damper's performance. The dust cover and rubber bellow are parts of KONI's rugged construction that protect the piston rod and rod seals from flying particles and penetrating dirt.



1. Dust cover: Protects the piston rod and bellow against flying particles from outside.
2. Dust bellow: Gives extra protection to the piston rod and the rod seals from penetrating dirt.
3. Wiper ring: Removes dirt film from the rod surface during the piston rod movements.
4. Piston rod oil seal: long-life piston rod oil seal, providing excellent fluid sealing while reducing the friction on the piston rod, even after long use.
5. Piston rod guide: Made from special perlitic cast-iron for minimal wear. The precision-ground working surfaces ensure maximum life.  
The oil pressure relief ports in the guide to the reservoir ensure that the rod oil seals are never overloaded by pressure.
6. Adjustable damping valve: By turning the adjusting screw the compression and rebound forces can be altered. The pressure on the spring-loaded valve is changed to offer a higher or lower resistance to the oil as it flows out of the cylinder, through the damping valves, into the reservoir.
7. Synthetic (non-metallic) ring in the guide: With this synthetic bearing ring there is no metal-to-metal contact between piston rod and guide, thus further reducing wear.
8. Cylinder: Made from seamless precision steel. Special attention is paid to the roundness and the superfinish of the bore.
9. Piston: Made from special perlitic cast-iron.  
Around the piston a synthetic (non-metallic) ring is fitted, ensuring there is no metal-to-metal contact between piston rod and cylinder, thus further reducing wear.
10. Non-return valve: Special flat valves are used in both foot valve and piston, ensuring a perfect seal.
11. Oil reservoir: Ample capacity for adequate oil reserve, ensuring the proper functioning of the damper and lubrication of the oil seals.  
For yaw dampers with a positive fitting angle (min 1°) KONI can supply dampers with or without dome. The performance of a damper without a dome is the same as a yaw damper with a dome.  
For yaw dampers with a negative or lateral fitting position a construction is available with a dome and rubber diaphragm to prevent the possible mixture of air and oil
12. Foot valve assembly: Machined from solid steel, the body is provided with large oil-flow ports, to ensure efficient damper functioning at the high damping velocities required in today's railroad environment.

All KONI dampers have a data plate that contains the following information:



- KONI Part Number
- Customer part number (optional)
- Serial number
- Production date
- Nominal piston speed
- Damping forces bump
- Damping force rebound



**KONI Packing Fluid**



**KONI Fluid-A**

Two types of fluid are used in the construction of KONI dampers. During the manufacturing process, the piston rod seals are primed with a packing fluid to insure a tight seal and prevent oil leakage. Occasionally, excess packing fluid will be displaced when the oil seal nut is tightened and will then appear on the reservoir tube. This fluid can simply be wiped off and will have no adverse effects on the damper's performance.

KONI has developed a unique mineral hydraulic oil that will withstand the large number of cycles experienced in the life span of KONI Railway dampers. KONI "Fluid-A" plays a crucial role in the transfer of kinetic energy into heat. If enough of this oil has leaked out of the damper to form droplets on the reservoir tube, or if the reservoir tube is wet, the damper should be sent to KONI North America for inspection and possible reconditioning.

All Railway dampers supplied by KONI contain hydraulic fluid. The damper should **never** be heated with a torch or other heat source above 150°F (65°C). If the damper is supplied with a fluid level sight glass on the reservoir, a heat source of any kind should **never** be applied on or near the sight glass.

KONI does not supply any Railway dampers that contain oil or gas under pressure and cannot extend or compress without an external force being applied.

## General Information

### De-Aeration

After delivery or storage of the damper, it is possible that small amounts of air may have escaped from the reservoir tube into the cylinder. KONI dampers are self-priming so any air inside the pressure cylinder is quickly removed, therefore, no action is necessary for the damper to remain in service.

### Dust Covers

If a threaded dust cover is found to have backed off, the following installation procedure must be carried out with due care in order to achieve the required strength:

1. Remove all loose dirt
2. Clean and degrease all components.
3. Apply Loctite 221 to the outside threads and torque the dust cover to 110 ±22 ft lb. (150 ±30 Nm.).
4. After assembly, the locking agent must cure for 2 hours at a minimum temperature of 68°F (20°C): do not put any load on the threads during this period.

It is important never to weld a dust cover to the top plate; this will make the damper difficult or impossible to recondition. Welding may also cause internal damage to the damper components and will void the warranty.

When inspecting a bolted dust cover, the top plate should be examined to insure that there is no evidence of cracking. If applicable, the weld between the top plate and dust cover should also be inspected for any signs of deterioration.



**Wet Film Below Dust Cover  
With Defined Oil Droplets**

If a damper is found to have a wet film below the dust cover, it is possible that the damper is leaking and should be sent to the workshop for inspection. If enough oil has leaked to form droplets on the reservoir tube, the damper may not be producing the desired forces, and should be reconditioned.

When a damper is found to have a moist film covering the entire damper, it is most likely the result of an outside source of oil and dirt. In this case, the damper may remain in service.



**Moist Film Covering  
Entire Damper**

## Damper Bushings



**Good Bushing**



**Worn Bushing**

It is important to visually check the condition of all rubber attachments. Worn or deteriorated bushings may affect the damper's performance and cause internal damage to the damper. Bushings should be replaced when the rubber develops a cut or a split. If the bushing has only developed small cracks on the surface of the rubber, no action is necessary. If the bushing is deteriorated or the end securement pin is loose in the bushing, the damper must be removed and the bushing replaced. Deterioration includes charring from heat damage, rubber extrusion or offset rubber of securement pin. Using a torch to remove the damper may damage the rubber composition of the bushing and should be avoided.

While inspecting the bushings, it is a good idea to examine any welds between the bushing eye and the damper body. The welds should show no evidence of cracking or deterioration.

If bushing failure problem persists it may indicate that the allowable angle of rotation of the bushing is being exceeded. Contact KONI for field service support.