



Epic Enterprises, Inc.

TEXTILE MACHINERY PARTS & SERVICE

P.O. Box 979 • Southern Pines, NC 28388-0979 USA

(910) 695-5441 • (910) 692-9013 Fax

E-Mail: epic@epicenterprises.com • Website: www.epicenterprises.com

RING MAINTENANCE TIP #6 CONTROLLING RING OIL USAGE WITH SINTERED RINGS

REVIEW: Ring Tip #1 covered the extreme importance of regular chemical cleaning of the ring's internal structure. Ring Tip #2 covered the importance of the external cleaning of the surfaces of the ring, holder, rails, and separators. Ring Tip #3 covered the avoidance of ring breakage. Ring Tip #4 covered avoiding ring breakage with sintered rings. Ring Tip #5 dealt with reducing ring heat and the plant electric bill.

Oil usage should, in theory, increase with increasing denier, or, more correctly, increasing heat from the heavier travelers and higher tensions found with heavier yarns. The internally clean ring, with its open porosity, should only feed enough oil through the ring to quell a dry or hot spot on the ring.

In practice, this is only very generally the case. Oil use from plant to plant varies greatly.

The chart below gives oil usage, based on empirical observations in many plants. The scale is in US gallons*/year/1000 rings and assumes 120 hours per week of operation, for 50 weeks on a mid-range 5.5" (140mm) ring.

OIL USE IN US GALLONS/YEAR/1000 RINGS						
Yarn Type	Denier	Count	Excellent	Good	Fair	Poor
Tire Cord	~2000	~3 Ne	<10	30	125	>250
Carpet Yarn	~1500	~4 Ne	<10	25	100	>200
Wool	~800	~10 Nw	<6	15	50	>100
Worsted	~160	~50 Nw	<4	10	40	>75
Fine Manmade	<100	>60 Ne	<2	6	25	>50

To convert to liters, multiply by 3.76

As can be seen, the difference in oil usage from one plant to another, running the same yarn types, typically varies by a factor of 20 or more. In plants where oil usage is high, the greatest loss is from oil leaking onto the frame and down to the floor, causing housekeeping problems.

THE RIGHT AMOUNT OF OIL ON THE RING: A good scale for judging whether the right amount of oil is present on the ring face is rubbing the finger around the ring ID:

Way Too Much Oil:	Oil droplets observed on the finger
Too Much Oil:	Shiny oil film on the finger
About Right:	Smooth feeling with scarcely observable oil film on finger
Too Dry:	Dry, unsmooth, sticky feeling

CONTROLLING AND REDUCING OIL FLOW:

- INTERNAL RING CLEANING**, a service performed by Epic Ring Service, has probably the greatest effect on reducing wasted oil, as it means that oil flows as designed through the ring to exactly where the oil is needed, without the waste from leakage. The internally clean or plugged ring means higher ring heat and oil usage where most of the oil reaching the ring face reaches it through leakage around the ring, pulled there by the partial vacuum created by the rotating package; this also creates leakage onto the frame and onto the floor.
- OIL RESERVOIR TYPES:** There are three basic methods used to feed oil to the ring, each with their own separate control problems.
 - Injected Rings:** There are very few of these systems in North America; the system uses pulsed injections of oil through a pressurized manifold; there is no wick. The greatest problem is maintenance and cleaning of the hundreds of orifices and valves to assure a consistent flow of oil to the ring. The rings plug easily because

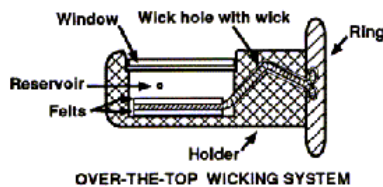
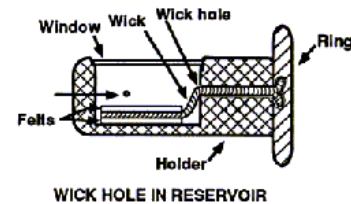
there is no wick to filter out fine particulate matter in the oil. Oil control can be achieved with frequent internal ring cleaning, close feed system maintenance and selection of oil viscosity.

B) Manifold Rings: These rings are fed oil from a central reservoir on the frame, through a carburetor to a manifold; a wick lying in the manifold feeds the oil through capillary action to the ring above. Lowering the level of oil in the manifold does tend to retard oil flow slightly, but the greatest control is found by changing oil viscosity. Heavier oils wick more slowly than light oils. It should be noted that if the wick breaks or becomes fouled by oil oxidation or particulate matter in the oil, oil flow to the ring either totally stops or is severely retarded. Almost all ring manufacturers recommend rewicking every 18 to 36 months; this is a service performed by Epic Ring Service.

C) Individual Reservoir Rings: Holder designs vary here with wick hole location.

a) Wick Hole Height in Reservoir: Most wick holes are located at 50% of the height of the reservoir, others at about 75%. WITH A NEW OR INTERNALLY CLEANED RING, THE OIL FILL SHOULD NEVER BE ABOVE THE WICK HOLE HEIGHT. Obviously, if the reservoir is completely filled, this means that oil runs directly through the wick hole and floods the ring with oil and causes leakage; further, the wick's secondary capability to strain particulate matter from the feed oil is bypassed. The individual reservoir was intended to operate with only a moist felt pad or a slight excess of oil in the bottom of the reservoir. Training personnel not to fill new or cleaned ring reservoirs to the top of the reservoir is, indeed, a task. Yet, many plants have succeeded and have reaped rewards not only in reducing oil flow, leakage and housekeeping, but also in reducing ends-down and stained yarn from excess oil on the ring. Note that filling a reservoir to full capacity also means that frame vibration causes oil to be thrown from the overfilled reservoir.

However, there is a safety feature in locating the wick hole part way up the reservoir. When the ring internally plugs from petroleum oxidation or particulate matter, overfilling induces leakage around the ring, so that at least some oil reaches the ring face. Overfilling is an expedient to keep the ring running until the ring can be removed for internal cleaning.



b) Over-the-Top Reservoir: In this case (see drawing), the wick is fed over the top of the reservoir to the ring. Overfilling does not lead to flooding the ring and excessive oil usage as the oil is still fed by capillary action to the ring. However, this design means that, if the wick breaks or when the wick becomes fouled with ring oil oxidation or particulate matter, oil will no longer reach the ring face.

3) CONTROL THROUGH OIL VISCOSITY: With all ring oil feed designs, oil usage can be controlled through changes in oil viscosity. Viscosity is best understood in either ISO Grade or SUS (Sayboldt Universal Seconds at 100°F or 40°C); see chart. The higher the viscosity or ISO Number, the lower the oil usage.

VISCOSITY CONVERSION	
ISO	SUS
22	100
32	160
46	215
58	260
68	305
100	465

With a new or internally cleaned ring, most rings are run on ISO 32, 46 or 68. It should be noted that there have been two reactions in North America to a gradually plugged ring. One has been to slowly reduce

the oil viscosity or ISO Number because the lighter oils will travel more easily through the partly blocked porosity; the danger here is going too low in viscosity (e.g., to an ISO 10 or 60 SUS) so that film strength is lost and damage (usually chattermarking) occurs to the ring. Conversely, other plants have recognized that the ring is plugged and have gone to higher viscosities to maintain film strength, but this is done at the expense of higher KW usage by forcing the traveler to plow through the heavy oil. The real solution here is to have the ring internally cleaned.

4) FINDING THE BEST TRAVELER for the operating conditions has many rewards. One of these rewards is found in reduced oil use. An ill-fitting, shaking traveler causes excessive conditions and also produces high heat. By reducing heat, the ring demands less oil.

5) PURE SYNTHETIC RING OILS also reduce oil consumption. Pure synthetic ring oils show about 1/5th the vapor pressure of the same viscosity petroleum ring oil, so almost no oil is lost to vaporization. The pure synthetic oil very significantly reduces the rate of ring plugging and oil loss from leakage; it also contains about 1/20th the amount of fine particulate matter. The synthetic oil is more slippery than petroleum ring oil and reduces running temperature and the demand for oil. Given an internally clean ring, pure, synthetic oil typically reduces ring oil usage 2 to 3 times, which easily justifies its additional cost.

If you did not receive Ring Maintenance Tips #1, 2, 3, 4, and/or 5, contact Epic.