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RING MAINTENANCE TIP #4
PREVENTION OF PORE SMEARING, BLEED LINE CLOSURE & CHATTER MARKING

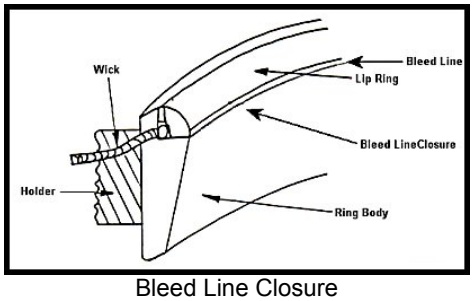
REFACING

REVIEW: Ring Tip #1 covered the extreme importance of regular chemical cleaning of the ring's internal structure every 2 to 3 years if run with petroleum ring oil, and every 3 to 5 years if run with pure synthetic ring oil. Ring Tip #2 covered the importance of the external cleaning of the surfaces of the ring, holder, rails, and separators every 2 to 3 months. Ring Tip #3 covered the avoidance of ring breakage.

The most common cause of pore smearing of sintered rings, closure of the bleed line of a Herr-type solid steel ring, or chatter marking of both ring types, is internal plugging of the ring by petroleum oxidation. Particulate matter in the oil and in the plant air, as well as traveler wear debris, are secondary causes. The practical consequences of these conditions is traveler skipping, resulting in broken-ends, scrap yarn, damaged fiber bundle, high ring heat, etc., and progressive destruction of the ring.

PORE SMEARING only occurs with sintered rings and is a direct result of plugging of the internal porous structure of the ring, choking off oil flow to the ring. Pore smearing is the dragging of surface metal particles by the un-lubricated traveler over the ring surface to seal surface porosity. It is observed initially as a shiny band across the dull ring face; gradually this band of smearing broadens. Pore smearing occurs more rapidly with metal travelers. The photomicrograph shows the new (or reground) ring face, and the bright, pore smeared ring face.

good ring with low reflectance — pore smearing ring with high reflectance



Bleed Line Closure

BLEED LINE CLOSURE is common to the Herr-type solid steel ring and is similar to pore smearing. In this case, the plugging of the ring internal passageways results in a loss of traveler lubrication; the traveler drags the surface metal across the ring and progressively seals the bleed line, further blocking oil flow. Solid steel rings are primarily used where steel travelers are used (e.g., fine denier worsted), so that the effect of the hard steel traveler worsens the situation. Bleed line closure is usually found with chatter marking.

CHATTER MARKING, another result of internal plugging, occurs more rapidly with steel travelers than nylon travelers, and is seen with both sintered and solid steel rings. (See photograph) The loss of lubrication causes the traveler to skip. Where the traveler lands, it digs into the ring face and pushes up metal next to it. Gradually, vertical, diagonal, wavy lines appear on the ring face, and the situation leads to progressive ring destruction. Chatter marking may also occur on the lower ring chamfer.

PREVENTING DAMAGE TO THE RING

With a new ring, or a ring that has been chemically cleaned and rebuilt, the best procedure is to use a pure, synthetic ring oil to prevent the onset of plugging. Pure, synthetic, ring oil is almost totally resistant to oxidation. It contains about 1/20th to 1/25th the amount of particulate matter found in petroleum ring oils, and is recommended by all ring manufacturers.

Sintered rings that have already been run with petroleum ring oil will show, in well over 95% of all cases, complete ring plugging, within two years. Herr-type solid steel rings will demonstrate this total plugging from petroleum in about 3 to 4 years. (See Ring Tip #1) Plugged rings cannot be cleaned by solvent washing, ultrasonic cleaning, or by so-called "ring cleaners". Rings must be chemically cleaned and rebuilt. Epic Ring Service is a full service agency, performing cleaning and rebuilding.

Further, rings should be regularly inspected about every 3 months to detect the tell-tale signs of oncoming, progressive ring damage in terms of pore smearing, bleed line closure, or chatter marking. Alternatively, a ring sampling (usually 6 rings) can be sent to Epic Ring Service to determine internal and external condition with the Porosimeter.

REGRINDING: A COST EFFECTIVE ALTERNATIVE TO REPLACING THE DAMAGED RING

If pore smearing, bleed line closure, or any chatter marking is observed, the rings should be removed at the first opportunity, to prevent progressive damage. These rings can be re-ground, chemically cleaned, and rebuilt with their holders, for a fraction of the cost of a new ring assembly. If damage is caught early, usually only 0.001 to 0.002" (0.03 to 0.06mm) radial must be removed; heavier damage may require removal of 0.010" (0.3mm). Damage as deep as 0.020" usually indicates that the ring should be replaced by a new ring, or a like-new, reconditioned ring. Cost for regrinding runs $1.20/inch ($0.05/mm) of diameter.

Ring regrinding is an art and should not be entrusted to any grinding shop. Epic Ring Service has the experience in regrinding 10,000s of rings. Any regrinding will tend to pore-smear the porosity of a sintered ring, or force metal into the bleed line, of a Herr-type ring. Epic employs a secondary process to restore full porosity, or the full bleed line, after regrinding.

WAVINESS OF BOTTOM CHAMFER: Rings, severely damaged on their faces, may also exhibit a wavy chatter marking of the formed bottom chamfer; again from ring plugging. Epic can remove mild waviness on this chamfer, but very heavy damage is simply too costly to remove, necessitating either a new ring, or a reconditioned, like-new ring.

In conclusion, the best procedure in maintaining rings is:

1) Start new or cleaned, reconditioned rings on pure, synthetic ring oil, to avoid internal plugging.
2) If rings are already plugged with petroleum oxidation and other contaminants, remove them and have them professionally cleaned and rebuilt.
3) Inspect rings every three months for telltale signs of surface damage from internal plugging. If rings show any sign of damage, remove them as soon as possible, for re-grinding, cleaning, and rebuilding. If damage is caught early, the rings can be re-ground and reconditioned many times, so that the effective ring life is almost infinite.

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

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