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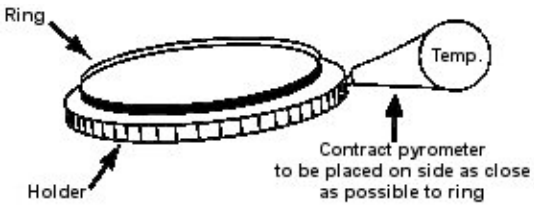
RING MAINTENANCE TIP #5
REDUCING RING HEAT AND THE PLANT ELECTRIC BILL

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.

The two primary sources of high ring heat are found in traveler choice and in the internally unclean ring. Heat is developed from frictional contact of the traveler with the ring. The impact on the electric bill of unnecessarily high ring heat is excessive power (KW) use costing $10,000s/yr for the small plant and $100,000s/yr for the larger plant. There is also a secondary electric power loss for air-conditioned plants in that excessive ring heat forces the plant cooling system to work extremely hard.

WHAT IS EXCESSIVE RING HEAT? We measure ring heat by reading contact temperatures on the ring holder as close to the ring as possible, without touching the traveler. This can be done with a hand-held pyrometer, or a remote infrared sensor. We try to measure temperatures mid to late in the package build cycle, and measure the difference between holder contact temperature and immediate area room temperature as the Delta T. For instance, if the holder reads 120°F and the immediate area temperature is 80°F, then the Delta T is 40°F (25°C).



USE OF PYROMETER TO READ TEMPERATURES

Beyond traveler and ring plugging considerations, ring temperatures depend largely on yarn type and denier (or count). Speed is really only a minor factor. Using a somewhat arbitrary scale:

HOLDER DELTA T TEMPERATURES IN F

Yarn Type	Denier	Ne Count	Excellent	Good	Fair	Poor
Tire Cord	~2000	~3	<9	9-18	19-40	>40
Carpet Yarn	~1500	~4	<8	8-15	16-35	>35
Wool	~800	~8 (Nw10)	<5	5-8	9-15	>15
Worsted	~160	~40 (Nw50)	<2	2-5	6-12	>13
Fine Manmade	<100	>60	<1	1-2	3-7	>7

To convert to Delta T in Celsius, multiply by 0.625

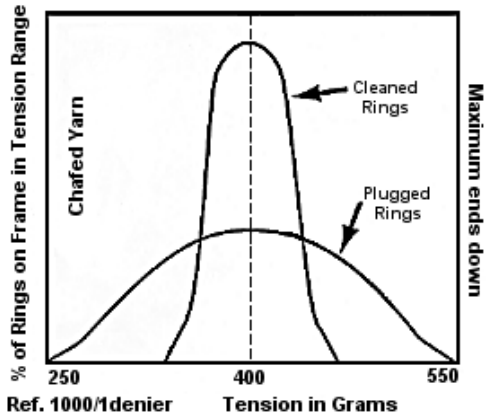
The lowest Delta Ts are almost always found with recently cleaned (or new) rings running with pure, synthetic ring oil and with a very stable traveler. Exceptionally high Delta Ts are found with plugged rings and with very unstable travelers, and often a traveler that is too heavy for conditions.

ELECTRIC BILL IMPACT: Spinning and/or twisting, for example, in a spun carpet yarn plant with 4,000 rings, will generally account for $500,000/yr, or 50%, of the total plant electric bill. In a tire cord plant with 60,000 rings, twisting may account for well over $2,000,000/yr, or 70%, of the total plant electric bill.

(The savings cited are midway in the range of actual results, and assume US $0.045/KWH; individual plants have found/will find greater or lesser savings.)

Cleaning of plugged rings has averaged, from plant to plant, about a 15% power savings; or closer to 20%, if conversion is also made to pure, synthetic ring oil. Likewise, finding the near perfect traveler for the yarn, ring, and running conditions can yield KW savings of about 15%, often more.

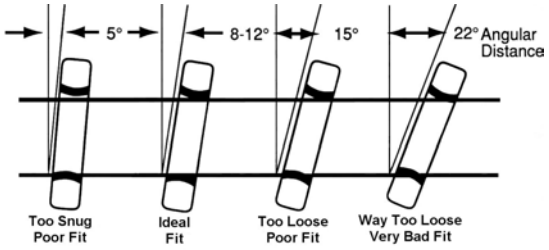
Further, and for air-conditioned plants, there is an add-on KW savings caused by reducing ring heat through the right traveler and a clean ring by taking about a 15% load off HVAC. For example, if a 4,000 ring carpet yarn plant through ring cleaning, pure, synthetic ring oil use, and an optimized traveler achieves a 30% frame KW or $150,000/yr savings, then the add-on HVAC savings would be about 15% (x $150,000), or another $22,000/yr. These numbers may be surprising, but are indeed very real.



TENSION & TENSION DISTRIBUTION

REDUCING RING TEMPERATURES BY FINDING THE NEAR PERFECT TRAVELER: Too heavy a traveler for the running conditions and/or an unstable, poor fitting traveler are major sources of a high Delta T in rings.

In general, the best traveler weight is the lightest traveler possible, consistent with the constraints of running too soft a package or abrasive damage of the yarn from balloon contact with the separator. With variably plugged rings on the frame, the plant cannot achieve the lowest weight traveler possible, because of the scatter of high tensions (broken ends) and low tensions (chafed yarn) on the frame; with cleaned or new rings, tension variation from position to position is minimal, this allowing the lightest possible traveler. (See figure to the left)



TRAVELER FIT

Traveler fit is extremely important in reducing heat and KW. Travelers should be observed with a strobe light. If the traveler is shaking so much that it is blurred, other travelers and traveler styles should be tried, until a nearly clear image of the traveler is observed.

The running angle of the traveler is also very important. The ideal angle generally lies between 8 to 12 degrees. (See drawing) At angles much less than 8 degrees, the traveler is not free on the ring and causes high traveler wear and heat. At angles greater than 12 degrees, the traveler skips and shakes, also causing high traveler wear and heat. The few hours spent in carefully testing to try and find the best possible traveler for the conditions yields very high dollar rewards.

Effect of Ring Cleaning
ref: 100/2 denier 90 mph

INTERNAL RING CLEANING: In extensive KW testing in many plants, running all yarn types, cleaned and rebuilt ring assemblies (a service provided by Epic Ring Service) yield very large temperature and KW reductions. It is probably safe to say that for most plants, the cleaned ring will show typical KW savings of 10 to 20%. If combined with a switch from petroleum to pure, synthetic ring oil, the KW savings will generally lie in the 15 to 25% range. A somewhat typical example is shown in the figure.

Additionally, pure, synthetic ring oil will maintain an internally clean ring for many years and consequently, keep ring temperatures and KW use low.

A cleaned ring means that ring/traveler dynamics change so that the plant should retest to find the best traveler for the new, clean ring condition. Based on KW savings and not on the many other advantages offered by ring cleaning, most plants calculate the payback from ring cleaning to be 10 to 15 weeks.

In summary, ring temperatures and frame KW usage can be reduced very significantly by:

1) Ring assembly cleaning and rebuilding
2) An effort by the plant to find the near-perfect traveler for the running conditions.

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

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