CAPACITOR PROBLEMS?
IT'S WHAT'S INSIDE THAT COUNTS

NOT ALL CAPACITORS ARE CREATED EQUAL:

Every trade show we attend we are forced to defend ourselves from Contractors because they are fed up with capacitors failing within the warranty period of the equipment or the repair. When this occurs they must go back to the job site and replace the capacitor for free, thus losing the time slot for a revenue generating call. To most Contractors all capacitors are the same because the product labels look alike and the capacitors are close in dimensions, but it's what's inside that counts.

WHAT'S INSIDE?

A motor run capacitor is an energy storage device that can discharge energy quickly in order to keep a motor running efficiently within an RPM range. The capacitor stores energy between two plates until the motor decreases speed and the capacitor discharges to increase the speed. Each plate is made of metallized polypropylene film (think of a sheet of saran wrap with one side of it fused to a sheet of aluminum foil). The quality of the capacitor depends on the quality of the film used and how well you process that film into the final product. The film and processing is where not all capacitors are created equal and varies from manufacturer to manufacturer.

The capacitor design is based on the stress applied to the capacitor via ambient temperature of where the capacitor is housed and the voltage applied. Both factors introduce heat into the capacitor that causes the stress and begins to degrade the part. The thicker the metalized film the more stress it can handle, therefore different thickness film should be used for 370 Vac and 440 Vac parts as well as different temperature ratings such as 70C and 85C.

BEWARE OF THE CAPACITOR LABEL:

In most cases there is nothing on the capacitor label that can tell you if it is a quality part or not. However, there are some items that you should look carefully at question and take note of:

The UL Stamp: A lot of people mistake the UL label for a symbol of quality. UL is concerned about product safety and not about life or reliability. UL wants to be sure that when the capacitor fails it fails in a safe manner (electrically open). The UL stamp is important but only for safety reasons.

NG
RELIABLE CAPACITORS

INDUSTRY STANDARDS FOR RELIABILITY:

Manufacturers of capacitors, such as NG, have a couple of standards that have been developed to measure reliability.

Electronic Industries Alliance (EIA) has developed a Highly Accelerated Life Test standard number 456 in which a capacitor tested at 125% of rated voltage in an oven set to 10 degrees C above rated temperature for 2000 hours. This standard represents 60,000 hours of operation when used at rated voltage and rated temperature. Tecumseh Compressor also developed a HALT Standard (H-115) that is similar to the EIA Standard. Both of these standards are widely accepted and required by OEM's

NGM primarily uses the EIA 456 standard in our lab to verify our production

WHERE TO PURCHASE NG CAPACITORS?

NG is proud to be partnered with Motor and Armatures (MARS) who is a leading Master Distributor to the HVAC industry. Please contact MARS to find a distributor near you:

Motors &Armatures,Inc.
250 Rabro Drive East
Hauppauge,NY 11788

TEL: 631.348.0200
FAX: 631.348.7160

Email: mamail@marsm-a.com

BEWARE OF THE CAPACITOR LABEL CONT'D

Rated Temperature: Many capacitor Wholesalers have been marketing 85C temperatures as better capacitors than capacitors that are labeled the industry standard 70C. However, in every instance we have seen the higher temperature; a tear-down analysis revealed that the internal capacitor design was the same as a standard 70C part. Will the part work at 85C? Yes, just like a part rated at 70C would work, however, the life of the part will be severely reduced. If you use a part designed for 70C in an 85C application you will see a life reduction of at least 60%. See the Temperature vs. Life Graph for reference.

Dual Voltage Rated Capacitors: Many wholesalers are now trying to reduce the number of part numbers that they carry and are inventorying capacitors that are rated for 370 Vac and 440 Vac. This practice is a good idea as wholesalers can carry one part that covers both voltages. However, in many instances we have seen, the parts are only designed for 370 Vac. Therefore, if applied in a 440 Vac application the life of the capacitor will be drastically reduced. Of course, if the part is designed as a 440 Vac part and is installed in a 370 Vac application then the life will increase. When using a 370 Vac designed part in a 440 Vac application you can expect the part's life to be 65% of normal life than when run at 370 Vac. See the Temperature vs. Life Graph for reference.

Look for Where The Part Was Made: Quality capacitors are made all over the world but they should be proud of where their parts are made. Way too often we see capacitors that do not show the country of manufacture and we feel that is a red flag for their product quality. In addition improper labeling of country of manufacture can be a violation of U.S. importation laws.

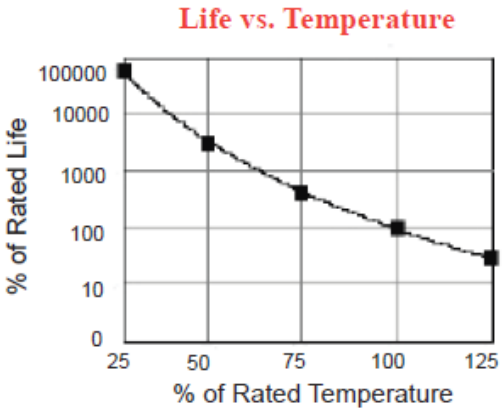
ASK ABOUT THE PRODUCT OFFERING:

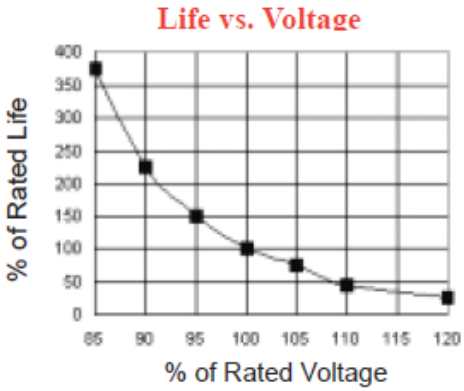
Many Wholesalers offer Aftermarket and OEM Grade capacitors for sale, some only offer an Aftermarket Grade, and some have no idea what they are offering. In fact some Wholesalers just substituted in the lower cost Aftermarket part replacing the OEM Grade part without notifying their customer.

Aftermarket Grade: In order to save on price Wholesalers have started to request an Aftermarket Grade product. Since the part is being sold into a repair market a full life OEM Grade part has not been needed. A reduced life Aftermarket capacitor can be created and controlled by using a thinner film thickness and good processing; or in an uncontrolled manner by using cheap film and/or questionable processing. We recommend the good processing and good film.

OEM Grade: This grade matches what the OEM's demand in terms of life and reliability. The OEM Grade part should be designed to meet or exceed the EIA 456 standard or the Tecumseh H-115 Standard outline on the previous page.

It's What's Inside That Counts





What Can You Do To Get better Capacitors?

- Don't let price be the sole factor in your buying decision
- Ask for the OEM Grade capacitor.
- Ask your Wholesaler about their product offering and where the parts are made.
- If their capacitor is marked with dual voltages ask which marked voltage has full life
- Ask your Wholesaler if the capacitor is designed for full life at the highest temperature shown on the label.
- If your Wholesaler cannot answer the above questions and cannot find out quickly then maybe look for a new Wholesaler.
- **Ask for the MARS Brand (OEM Grade) or MARS2 (Aftermarket Grade)**

RELIABLE CAPACITORS