TECHNICAL WHITE PAPER

MEDIA CONTACT: Jackie Catalano
Director, Branding and Marketing Communications, Regal
Jackie.catalano@regalbeloit.com
Tel: 859 727 5271

TECHNICAL CONTACT: Mandy Pressel
Product/Marketing Specialist Pumps, Regal
mandy.pressel@regalbeloit.com
Tel: 937 669 6287

The Importance of Understanding a Nameplate

READING AND UNDERSTANDING A MOTOR'S NAMEPLATE IS KEY IN CHOOSING THE CORRECT MOTOR

BELOIT, Wis., August 9, 2017 — A circulation pump motor is the heart of a swimming pool, and it is important to keep it beating properly for the water to stay clean and healthy. When replacing a pump motor, there are several things a service technician needs to understand.

A replacement motor must be capable of carrying the same load as the motor it is replacing, assuming that the original motor was sized correctly. This is not a complicated concept, and if you replace like with like, there's little need for further understanding. However, real world situations aren't always so clear and reviewing some basic concepts and definitions should be helpful in selecting the correct replacement motor. If you suspect the failed motor is not the right size, you should consult the OEM pump manufacturer for the proper motor nameplate specifications.

Much of the information you need to identify an electric motor is contained on the motor's nameplate. The nameplate also provides some basic information about a motor's operating characteristics. Proper motor selection is extremely important for safe, efficient, and reliable motor operation. You must fully understand motor nameplate data in order to select the right motor for each application. If an exact match between an old motor and its replacement is not possible, you must be able to determine the most appropriate replacement.

Horsepower and Service Factor

The idea behind the service factor (SF) is to provide an extra margin of safety in motor operation. This extra strength is designed into the motor to allow it to operate at some specified higher load than the motor's rated load.

Basically, the horsepower (HP) stated on the nameplate multiplied by the service factor equals the maximum allowable loading, or total horsepower (THP). The service factor defines the maximum overload the motor can handle when operating at rated voltage and frequency. Thus, a 1 HP motor with 1.5 SF can safely produce up to 1.5 horsepower to move a load (1 HP times 1.5 SF = 1.5 THP).

The best procedure in replacing any motor when an exact match of HP and SF is not available is to multiply the nameplate horsepower of the old motor times its service factor to determine the THP. Make certain the replacement motor has a maximum horsepower equal to or slightly higher than the old motor. Handling a continuous load greater than that allowed by the service factor will cause the motor's thermal protection device to trip. If the situation is not corrected, continued operation will eventually damage the motor.

For Example
The failed motor is ¾ HP with 1.25 SF. A motor with this exact HP/SF combination is not available. You have four motors available that meet the mechanicals and enclosure requirements. Which is the best choice?

	HP		SF		THP
Failed Motor	¾	X	1.25	=	.938
Motor A	¾	X	1.0	=	¾
Motor B	¾	X	1.15	=	.863
Motor C	1.0	X	1.0	=	1.0
Motor D	1.0	X	1.15	=	1.15

The replacement motor must have at least .938 THP

If you chose motor C, you made the right choice, both electrically and economically. Motors A and B are wrong choices since both have maximum horsepower lower than the failed motor. Motor D may work, but it provides more horsepower than needed. An oversized motor will cost the pool owner more but will not offer improved performance or efficiency.

A final confirmation that the proper replacement was selected is an amperage check under load conditions. The amp draw under load should not exceed the maximum load amps shown on the motor nameplate. It is important to remember that you multiply only the horsepower times the service factor. Never multiply the amps times the service factor.

Frame Size

Standard frame sizes are defined by the National Electrical Manufacturer's Association (NEMA). Each NEMA size defines specific critical dimensions. Frame size is very important in replacing an old motor with a new model or a motor from a different manufacturer. A new motor with a frame size that is different from the old motor may not fit. The most common fractional horsepower motor frame sizes are NEMA 42, 48, and 56. Integral horsepower (IHP) frame sizes are NEMA 140, 180, and larger.

Speed

The speed at which the motor operates is a critical factor in motor selection. Motor speed must match the needs of the application. Motors are rated according to their speed in revolutions per minute (RPM) at rated horsepower, voltage, and frequency. The actual motor speed under load will vary slightly due to the actual voltage and loading.

Motor speed is determined by the number of poles the motor contains. Two-pole motors operate at 3450 rpm, and 8-pole motors at 850 rpm. The replacement motor must have the same number of electrical poles as the motor it is replacing, not just the same approximate speed.

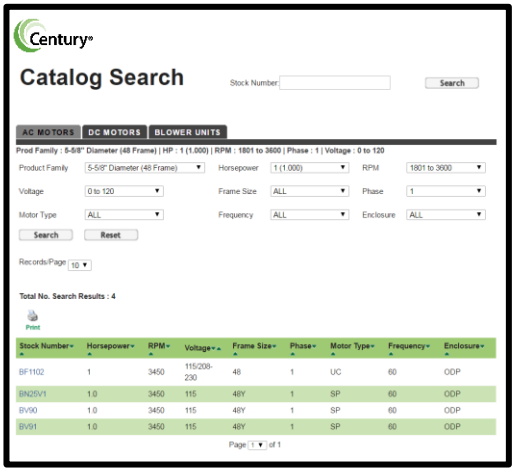
Voltage

The motor voltage rating must match the voltage of the electrical supply. Fractional horsepower motors can have voltage ratings of 115, 200, 208, 230, or 460 volts. The most common ratings are for 115 and 230 volts. A dual-voltage motor, such as a 115/230 volt motor, can be used with either of the listed power supply voltages. Especially in the case of dual-voltage motors, refer to the connection diagram for proper installation.

Online Tools

Regal's online Cross-Reference Tool is a great place to start when selecting a Century® replacement motor if the model number is known. Simply go to www.pool-motors.com and click the "Cross Reference Tool" link to enter the model number and search for a replacement.

If the model number is unknown, use the "Advanced Catalog Search" tool instead. Enter as many characteristics as possible and choose the best replacement motor option.



About Regal Beloit Corporation

Regal Beloit Corporation (NYSE: RBC) is a leading manufacturer of electric motors, electrical motion controls, power generation and power transmission products serving markets throughout the world. The company is comprised of three business segments: Commercial and Industrial Systems, Climate Solutions and Power Transmission Solutions. Regal is headquartered in Beloit, Wisconsin, and has manufacturing, sales and service facilities throughout the United States, Canada, Latin America, Europe and Asia. For more information, visit RegalBeloit.com

###

Release No. MCWR17034E