

IP66 Rating: What It Means for Electric Motors | TECO

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Glossary

IP66 Rating: What does an IP66 rating mean, specifically for electric motors?

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When specifying an electric motor, one of the lines on the specification is routinely IP rating. It is very common for industrial specifications in particular to specify IP66, but what does that IP66 rating actually mean for an electric motor?

What is IP66? Defining Ingress Protection (IP) Ratings

IP (Ingress Protection) rating is a standard defined under IEC 60529. It relates to the protection an enclosure provides to electrical equipment against the intrusion of solid objects (dust) and liquid.

The first digit of this rating is protection against solid objects, and can range from 0 (lowest) to 6 (highest).

The second digit of this rating is protection against liquid, and can range from 0 to 9.

Breaking Down the IP66 Code

The first digit "6" = fully protected against the ingress of dust/solid particles.

The second digit "6" = Protected against jets of water comparable to heavy-seas. This is also commonly referred to as protected against powerful water jets.

Simplifying the IP66 rating, it is as high of a rating as an electrical enclosure can be given under IEC 60529 without being at least partially/temporarily immersible.

The TECO MAXe3 catalogue breaks it down:

How is an IP66 rating achieved in an electric motor?

The exact combination of how an IP66 rating is achieved and what differs from an IP55 motor for example, differs slightly from brand-to-brand, as the IEC 60529 standard doesn't specify how this must be achieved, rather it focuses on the result that must be achieved. In the case of IP66, complete protection against dusts and protection against powerful jets of water.

Commonly, the areas that need to be focused on for a TEFC (totally enclosed fan cooled) motor are the seals around the shaft, and the gaskets on the terminal box.

The TECO MAXe3 Solution

For the purposes of this article, we will focus on the TECO MAXe3 motor and the features it uses to achieve an IP66 rating. The TECO MAXe3 uses several different types of seal depending on the mounting type of the motor (foot or flange) and the size of the motor; these can be gamma seals, oil seals, or brass dust flingers (for more details on where each is used, please refer to the MAXe3 brochure). For the terminal box, all MAXe3 motor terminal boxes have one-piece neoprene gaskets between frame, box and gland plate. Sintered bronze porous drain plugs are also used on all foot and foot/flange MAXe3 motors.

Why IP66 Ratings Matter for Motors in Australia and New Zealand.

For electric motors, this rating is critical because dust and water ingress are two of the most common causes of premature motor failure.

Among other things, ingress of dust and water can easily contaminate bearing greases and degrade insulation systems, both ultimately impacting the life expectancy of the motor.

An Insurance Policy for Harsh Environments

The Australian and New Zealand markets have some particularly harsh environments from mining sands and dusts in the WA Pilbara, to wash down situations in the New Zealand dairy processing industry, an IP66 rating can in a way be looked at as an insurance policy on your electric motor. While it does not directly impact the output performance of your motor, it minimises risks of some of the most common motor failures giving your plant the best chance of minimising downtime, and maximising the lifespan of the investment you're making in an electric motor.

Reference & Resources

IEC60529 – <https://webstore.iec.ch/en/publication/2452>

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Electric motors are critical to industrial operations across sectors such as mining, water & wastewater, oil & gas, and manufacturing. Designed for high reliability and energy efficiency, modern motors are

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Electric motors convert electrical energy into mechanical motion, but the way they use electrical energy differs significantly. The two broad categories, Alternating Current (AC) and Direct Current (DC), use different

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