NEMA Motor Enclosure Designations—Traditional

The below information is reproduced from the extensive reference section of the website **http://home.mchsi.com/~gweidner/site.**

The NEMA standard for motors and generators (MG 1) contains two methods for rating motor enclosures with regard to their environment:

1. Traditional (ODP, TEFC, etc.);
2. The IEC "IP" system of enclosure ratings.

The chart below describes the traditional designations, with a cross-reference to the IEC IP designations where there is equivalence. The term "enclosure" here means the same as "frame" or "housing."

Designation	IEC IP Equivalent	Description
Drip-proof (open drip-proof) ("ODP")	IP12	An open motor in which the ventilating openings are so constructed that drops of liquid or solid particles falling on it, at any angle not greater than 15 degrees for the vertical, cannot enter either directly or by striking and running along a surface of the motor.
Splash-proof	IP13	An open motor in which the ventilating openings are so constructed that drops of liquid or solid particles falling on it or coming toward it in a straight line at any angle not greater than 100 degrees from the vertical, cannot enter either directly or by striking and running along a surface of the motor.
Totally enclosed nonventilated (TENV)		A motor so enclosed as to prevent the free exchange of air between the inside and outside of the case but not sufficiently enclosed to be termed air-tight, and dust does not enter in sufficient quantity to interfere with satisfactory operation. Cooling is only by convection and radiation from the enclosure.
Totally enclosed fan-cooled (TEFC)		A motor so enclosed as to prevent the free exchange of air between the inside and outside of the case but not sufficiently enclosed to be termed air-tight, and dust does not enter in sufficient quantity to interfere with satisfactory operation. Cooling is by means of a fan or fans integral with the machine but external to the enclosure.
Waterproof	IP55	A motor so enclosed that it will exclude water applied as a stream from a hose, except that leakage may occur around the shaft provided it is prevented from entering the oil reservoir and provision is made for automatically draining the motor. The drain may be a check valve or a tapped hole at the lowest part of the frame which will serve for application of a drain pipe.
Explosion-proof		A totally enclosed motor whose enclosure is designed and constructed to withstand an explosion of a specified gas or vapor which may occur within it and to prevent the ignition of the specified gas or vapor surrounding the motor by sparks, flashes, or explosions of the gas or vapor which may occur within the motor housing.