Table A-1
CONVERSION OF NEMA ENCLOSURE TYPE RATINGS
TO IEC 60529 ENCLOSURE CLASSIFICATION DESIGNATIONS (IP)

(Cannot be Used to Convert IEC Classification Designations to NEMA Type Ratings)

IP First Character	NEMA Enclosure Type																		IP Second Character
	1		2		3, 3X, 3S, 3SX		3R, 3RX		4, 4X		5		6		6P		12, 12K, 13		
IP0_		■		■		■		■		■		■		■		■		■	IP_0
IP1_				■		■		■		■		■		■		■		■	IP_1
IP2_				■		■		■		■		■		■		■		■	IP_2
IP3_						■		■		■		■		■		■		■	IP_3
IP4_						■		■		■				■		■		■	IP_4
IP5_						■				■				■		■			IP_5
IP6_										■				■		■			IP_6
														■		■			IP_7
																■			IP_8
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	

A = A shaded block in the “A” column indicates that the NEMA Enclosure Type exceeds the requirements for the respective IEC 60529 IP First Character Designation. The IP First Character Designation is the protection against access to hazardous parts and solid foreign objects.

B = A shaded block in the “B” column indicates that the NEMA Enclosure Type exceeds the requirements for the respective IEC 60529 IP Second Character Designation. The IP Second Character Designation is the protection against the ingress of water.

EXAMPLE OF TABLE USE

An IEC IP 45 Enclosure Rating is specified. What NEMA Type Enclosures meet and exceed the IP 45 rating?

National Electrical Manufacturers Association
1300 N. 17th Street, Suite 1752
Rosslyn, VA 22209

Approved by NEMA Enclosures Section
Nov 2005

Referencing the first character, 4, in the IP rating and the row designated "IP4_" in the leftmost column in the table; the blocks in Column "A" for NEMA Types 3, 3X, 3S, 3SX, 4, 4X, 5, 6, 6P, 12, 12K, and 13 are shaded. These NEMA ratings meet and exceed the IEC protection requirements against access to hazardous parts and solid foreign objects.

Referencing the second character, 5, in the IP rating and the row designated "IP_5" in the rightmost column in the table; the blocks in Column "B" for NEMA Types 3, 3X, 3S, 3SX, 4, 4X, 6, and 6P are shaded. These NEMA ratings meet and exceed the IEC requirements for protection against the ingress of water. The absence of shading in Column "B" beneath the "NEMA Enclosure Type 5" indicates that Type 5 does not meet the IP 45 protection requirements against the ingress of water. Likewise the absence of shading in Column "B" for NEMA Type 12, 12K and 13 enclosures indicates that these enclosures do not meet the IP 45 requirements for protection against the ingress of water. Only Types 3, 3X, 3S, 3SX, 4, 4X, 6, and 6P have both Column "A" in the "IP4_" row and Column "B" in the "IP_5" row shaded and could be used in an IP45 application.

The NEMA Enclosure Type 3 not only meets the IP 45 Enclosure Rating, but also exceeds the IEC requirements because the NEMA Type **requires** an outdoor corrosion test; a gasket aging test; a dust test; an external icing test; and **no** water penetration in the rain test. Slight differences exist between the IEC and NEMA test methods, but the IEC rating **permits** the penetration of water if "it does not deposit on insulation parts, or reach live parts." The IEC rating does **not** require a corrosion test; gasket aging test; dust test or external icing test. Because the NEMA ratings include additional test requirements, this table **cannot** be used to select IP Designations for NEMA rated enclosure specifications.

IEC 60529 specifies that an enclosure shall only be designated with a stated degree of protection indicated by the first characteristic numeral if it also complies with all lower degrees of protection. Furthermore IEC 60529 states that an enclosure shall only be designated with a degree of protection indicated by the second characteristic numeral if it also complies with all lower degrees of protection up to and including the second characteristic numeral 6. An enclosure designated with a second characteristic numeral 7 or 8 only is considered unsuitable for exposure to water jets (designated by second characteristic numeral 5 or 6) and need not comply with requirements for numeral 5 or 6 unless it is dual coded. Since the IEC protection requirements become more stringent with increasing IP character value up through 6, once a NEMA Type rating meets the requirements for an IP designation up through 6, it will also meet the requirements for all lower IP designations. This is apparent from the shaded areas shown in the table.

National Electrical Manufacturers Association
1300 N. 17th Street, Suite 1752
Rosslyn, VA 22209

Approved by NEMA Enclosures Section
November 2005