Test Methods Comparison – NEMA MW 01000 vs. IEC 60851 series

NEMA OR IEC TEST	Comparison to IEC Method			Comments
	Technically Equivalent	Minor Difference	Major Difference	
DIMENSIONS		X		MEASURING FORCES DIFFERENT; NUMBER AND LOCATION OF MESUREMENTS ARE NOT THE SAME.
ADHERENCE & FLEXIBILITY	X		X (Rect.)	'RECTANGULAR WIRES TESTED WITH OTHER METHOD; MANDREL WINDING RATES LISTED IN 60851-3, NOT IN NEMA; 3 TO 5 TESTS PER SAMPLE REQUIRED IN 60851-3; "ADHERENCE TEST" ONLY IN 60851-3. "JERK TEST" NOT IN NEMA.
ELONGATION	X			SAMPLE LENGTH SLIGHTLY DIFFERENT: NEMA 254 mm, IEC 60851-3 200-250 mm
HEAT SHOCK		X (Rect.)	X (Round)	TOTAL SAMPLE ELONGATION DIFFERENT: EXAM. MAGNIFICATION LOWER IN NEMA; MANDREL WRAP USED IN NEMA UP TO 10 AWG RECTANGULAR WIRE BENT FLATWISE TO 180 DEGREES IN IEC METHOD; .
SPRINGBACK	X (>AWG 14)	X (< AWG 14)		GROOVES ALLOWED IN MANDRELS IN 60851-3 TESTER. LOADS USED ARE DIFFERENT AND NEED TO BE COMPARED.
DIELECTRIC BREAKDOWN	X (<AWG 38)	X (AWG 37-10)	X (Rect.)	RATE OF VOLTGE RISE DIFFERENT; LARGE ROUND (> 10 AWG, 2.5 mm) TESTED USING FOIL ELECTRODE IN NEMA AND SHOT IN IEC. RECT. TESTED DIFFERENTLY; 5 SPECIMENS REQUIRED PER TEST.
HIGH-VOLTAGE CONTINUITY	X			USE OF CONDUCTIVE BRUSH ELECTRODES RECOGNIZED IN NEMA AND IEC STANDARDS
LOW- VOLTAGE CONTINUITY		X		PRIMARY DIFFERENCE IS CONDUCTIVE MEDIUM: MERCURY VERSUS SODIUM SULFATE.
DISSIPATION FACTOR			X	TEST DELETED FROM MW 1000 IN 2020. UNIQUE TO IEC 60851-5
SOLDERABILITY		X		TWISTING OF 8 STRANDS REQUIRED FOR < 0.05 mm (AWG 44) IN IEC; TWISTING REQUIRED FOR WIRES < 0.02 mm (AWG 52) IN NEMA. IMMERSION DEPTHS DIFFERENT, 32 mm vs. 20 mm; IEC ALLOWS FOR TESTING BUNCHED WIRE, NOT IN NEMA.
THERMOPLASTIC FLOW (CUT-THOURGH)		X		DIFFERENCE IN PREHEATING, IEC - 1 OR 2 MIN., NEMA APPROXIMATELY 10 MIN. WITH TEMPERATURE RISING FROM 55 DEGRESS BELOW THE EXPECTED TEMPERATURE. NEMA HAS UNIQUE METHOD FOR TEST RECTANGULAR WIRE.
SOLUBILITY			X	NEAREST EQUIVALENT TEST IS "SOLVENT TEST", CLAUSE 3.1 OF 60851-4.
DIELECTRIC STRENGTH AT RATED TEMPERATURE	(<AWG 38)	X (AWG 37-10)	X (Rect.)	RATE OF VOLTAGE RISE DIFFERENT; LARGE ROUND (> 10 AWG, 2.5 mm) TESTED USING FOIL ELECTRODE IN NEMA AND SHOT IN IEC. RECT. TESTED DIFFERENTLY; 5 SPECIMENS REQUIRED PER TEST.
TRANSFORMER OIL RESISTANCE AND HYDROLYTIC STABILITY	X			TESTS WERE DEVELOPED AND MODIFIED IN PARALLEL WORK IN IEC AND NEMA.
REFREIGERANT EXTRACTION	X			ONE OF TWO TESTS INCLUDED UNDER "RESISTANCE TO REFRIGERANTS", CLAUSE 4, TEST 16 OF 60851-4.
RETAINED DIELECTRIC AFTER RFRIGERANT EXTRACTION	X			VERSIONS IN IEC AND NEMA VERSION NEARLY IDENTICAL.
BOND			X	NEMA TESTS ONLY THREE SIZES OF WHICH ONLY 36 AWG (0.125 mm) IS TESTED; SAME METHOD AS IEC; ELEVATED TEMPERATURE. BOND RETENTION (STRENGTH) IS NOT SIMILAR. TWISTED COIL METHOD IS NOT IN NEMA PROCEDURE; SOLVENT BONDING METHOD
THERMAL ENDURANCE	X			IEC 60172 = ASTM D2307.
SCRAPE RESISTANCE	X			TESTS IDENTICAL EXCEPT FOR VOLTAGE IN TEST CIRCUIT: 7.5 VERSUS 6.5.
LOSS OF MASS	N/A			TEST ONLY IN IEC 60851-6
ELECTRICAL RESISTANCE	N/A			NO EQUIVALENT TEST IN NEMA. (FOUND IN ASTM TEST METHODS.)
LAP SHEAR BOND STRENGTH	X			IEC AND NEMA VERSIONS ARE TECHNICALLY EQUIVALENT

Note: "Equivalent" means that testing methods are essentially the same; "Minor Difference" means that procedure differences likely do not affect test results; "Major Difference" means that procedures are different enough to affect results.