OVERVIEW document reformat*v1*

Comparison of AS/NZ standards with EN and IEC standards - Dishwashers

The standards below were compared:

AS/NZS 2007 Performance of household electrical appliances—Dishwashers Part 1 (2005): Methods for measuring performance, energy and water consumption
Part 2 (2005) + Amd 1: Energy efficiency labelling requirements

With:
EN 50242:2008 (dual numbered as EN 60436:2008) Electric dishwashers for Household use – Methods for measuring performance. Note that this standard is identical to IEC 60436:2004 except that the EN has some additional clauses etc. Where relevant these differences have been noted in the Table below.

Summary

While these standards are for the same products and are aimed at determining similar properties, there are significant differences between them. Fundamentally, the AS/NZS contain some minimum performance requirements and also cover mandatory labelling details, while the EN contains methods and assessments only - the labelling requirements are in separate EU legislation.

This version of Part 1 of the AS/NZ standard included a number of requirements from IEC 60436:2004.
The Table below lists the main areas of difference, where different methodology, operating conditions etc. are used in both and also where one standard or other standard has additional assessments.

The format used in the Table below is that the AS/NZ is used as the basis for comparison. Only differences are listed. The comparison between the AS/NZS part 1 (Test) standard and the IEC/EN standards are made in the first table below followed by a second table comparing the AS/NZS part 2 (Regulatory/Labelling) standard and the IEC/EN standards.

Nomenclature

"N/P" means attribute not present.

Section	**Attribute (AS clause) {IEC clause}**	**AS/NZS 2007: 1(2005)**	**IEC 60436 (2004), EN 50242 (2008),** *attributes only in the EN in italics*	**Notes/issues**
1. Scope and general	Levels of acceptable performance (1.1)	Sets levels for washing and drying performance	No performance requirements	
	Definitions (1.4.5 & 6)	Additional definitions for end of cycle, off mode and standby mode	N/P	
2. Measurements to be performed and requirements for testing	Rated capacity (2.2.5 & 4.3)	Check for compliance	N/P	
	Standby power (2.8)	Shall be measured	N/P	
	Noise {9}	N/P	Tests defined in separate standard, IEC 60704-2-3)	
3. Use of reference machine	Test programme used (3.2){E.1}	Gentle (or Fein) 45°programme	E.1. Universal 65°programme	
	Water softener (3.4){E.1}	Rendered inoperable	To be is used, water hardness in rinse is specified	
	Cleaning and drying performance values {E.1}	N/P (states is under consideration)	Specified for the Universal 65°programme	
	Detergent in pre-wash (3.2)	To be used	N/P	

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	Log of reference run results and all calibration checks (3.7)	To be kept	N/P	
	Drying tests (F4.1){7.3.1}	Not to be used	To be used for drying tests	
4. Performance requirements	Supply water pressure (4.2){5.1}	To operate at manufacturer's max and min water pressures	To be checked that operates correctly, no specific criteria	
	Operation at rated capacity (4.3)	All load items shall be adequately supported	5.1. Dishwasher checked to ensure operates correctly, no specific criteria	
	Washing index (4.4)	Shall not be less than 0.9	N/P	
	Claimed water consumption (4.5)	Shall not be less than the average water consumption under test conditions	N/P	
	Drying index (4.6)	Shall not be less than 0.5 (50%)	N/P	
5. Requirements for accompanying information (Information to be marked on the dishwasher or in	Rated capacity (5.2)	To be present	N/P	
	Loading pattern (5.3)	To be present	N/P	
	Amount of	To be present; shall not exceed	N/P	

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manual/instructions	detergent to be used (5.4)	15g + 1.25g per place setting for the programme used for testing		
	Rinse aid settings information (5.5)	Shall be supplied for the programme used for testing	N/P	
	Programme to be used for testing (5.6){5.4}	Shall be stated with all associated settings	*Test programme for energy labelling to be declared*	
	Door opening at completion of programme (5.6)	(if relevant)	N/P	
	Installation and max and min water pressures (5.7)	Shall be stated (if applicable)	N/P	
Appendix A, Test conditions, instrumentation and materials	Ambient temperature & humidity (A3){5.5}	Shall be 20+/-2°C; 60+/-5%	Shall be 23+/-2°C; 55+/-5% for oven dry (soils) method, 65+/-10% air dry method, *oven dry only for energy labelling*	
	Water temperature and pressure (A4){5.6.2}	Shall be, cold 20+/-2°C, hot 60+/-2°C, pressure 320+/-20kPa	Shall be, cold 15+/-2°C, hot 60+/-2°C, or manufacturers indicated, pressure 240+/-20kPa. *Cold fill only for energy labelling*	

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	Water hardness (A5){5.6.3}	Shall be 45+/-5 ppm (equivalent to 0.45mmol/l)	Shall be 2.5+/-0.5 mmol/l or ≤0.7mmol/l. *Only 2.5+/-0.5 mmol/l for energy label.* If no softener fitted, follow manufacturer's instructions	
	Electricity (A6){5.3.2.1}	Shall be 230V+/-2%	Shall be 230V+/-1%	
	Detergent (A8){5.7}	Shall be as specified, Phosphate-based	Shall be IEC detergent B, non-phosphate	
	Rinse agent (A9){5.8}	Shall be as specified (containing Isopropanol)	Shall be as specified (not containing Isopropanol) *Only Formula III used for energy label.*	
	Salt for water softener {5.9}	Not applicable	Salt specified	
	Thermal oven (for drying soiled load) {G.2}	Not applicable (soils air dried)	Type specified	
	Microwave oven (for cooking milk soil) {G.1}	Not applicable (no milk soil)	Type specified	

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	Block insert to hold dishwasher door open after wash performance (A14)	Specified	Not applicable	
	Lighting conditions for assessments (A17){6.7.1}	To be carried out against specified grey or black backgrounds as appropriate	Same lighting conditions, no backgrounds specified	
	Tomato juice (A10a)	Specified	Not applicable	
	Milk (A10d){6.4.1}	Reconstituted fortified skim milk specified	UHT milk specified	
	Cereal (A10e){6.4.5}	Infant type specified	Oat flakes- uncooked small specified	
	Spinach (A10f){6.4.6}	Tinned (not frozen) specified	Spinach – frozen type specified	
	Margarine (A10g){6.4.7}	65-85% fat specified	75-85% fat specified	
	Minced meat {6.4.3}	Not applicable	Type specified	
	Test loads (a12){A & B}	Two loads specified, AS/NZ load or one based on IEC60432. Either may be used in both test	Two loads specified, one based on AHAM tests (B) and one not (A). Only (A) shall	

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		and reference machines, but the same to be used in both	be used in the reference machine. *Only (A) shall be used in energy label tests*	
	One place setting (A12.3.2){A.2}	As IEC load except no serving items	Full load A (IEC)	
Appendix B, Preparation of a dishwasher for testing and general test procedures	New machine {5.1}	N/P	To be used	
	Water softener (B9){5.6.3}	Follow manufacturer's instructions for 45ppm supply hardness; if no instructions, deactivate softener and remove any salt	Water hardness specified (see above)	
	Machine preconditioning (B10){5.2}	At least 2 complete cycles with clean load, detergent and rinse aid.	3 cycles with clean load, detergent and no rinse aid. No additional cycles between conditioning and tests.	
Appendix C, Preparation and soiling of loads	Load cleaning before test (C1.1){6.2}	All items to be clean and dry before soiling. Cleaning may be carried out with any dishwasher detergent; items to be thoroughly rinsed to remove any detergent residue	6.2. Cleaning may be by hand or dishwasher but afterwards all items to be rinsed in a dishwasher dispensing IEC Rinse Agent prior to testing. New items shall have 10 cycles with IEC detergent and rinse aid	

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	Conditioning during test {6.2 & 7.2}	N/P	After each test of 5 -8 cycles, the items are washed in a different dishwasher with citric acid in place of detergent	
	Age of test load items {6.2}	N/P	Items that are tested with soils shall not be used for more than 200 cycles	
	Soils for glassware (tomato juice){milk} (C.2) {6.4.1}	Tomato juice applied to glassware	Milk applied to glassware; cooked in a specified microwave oven	Note – since the AS/NZS method does not use serving items in the test load, sometimes different load items are soiled compared with the IEC method. Only the differences in the main items soiled are noted
	Tea soil (C2.3){6.4.2}	Tea made (20 g/l, water hardness 45ppm) and applied to cups, poured away after 30 min	Tea made (6 g/l, hard water) and applied to cups. Cups then left in a specified heated oven for I h or air dried (*for energy labelling, oven dried only*) tea then poured away	
	Egg soil (C2.4){6.4.3.& 4}	Egg yolk (poached 30s) applied to dishes and cutlery	Egg yolk (raw) double the weight applied to half the number of crockery items. Also used with minced meat	
	Cereal soil	Prepared using 20 g oats, 15 g	Prepared using 50g per	

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	(C2.5){6.4.5}	milk powder, 200 ml water	750ml water, three times the amount applied to a third of the crockery items	
	Spinach soil (C2.6){6.4.6}	Preparation similar, amount applied different (see next column)	(*For energy labelling, brand is specified)*. Three times the amount applied to a third of the crockery items	
	Margarine soil (C2.7){6.4.7}	1.5g per place setting applied to one crockery item (saucers)	1 g per place setting is applied to the oval platter only	
	Drying soils (C2.80{6.5}	After applying soils, test items are loaded into the racks from the dishwasher on test and left to air dry at test ambient for 15 – 18 h.	All the soiled test items may be air-dried or in a specified oven at 80°C. (*For energy labelling, oven dry only)*	
Appendix D, Determination of washing performance, energy and water consumption and standby power	Delay start mode (D5)	Energy consumption shall be measured for machines with this feature, for the energy between setting the machine until the programme starts.	N/P (feature is referred to but no test given)	
	Door opening at end of programme (D4){7.3.2}	For wash performance, within 10 minutes of the cycle finishing, the dishwasher door is opened and propped ajar using the specified block. Evaluation	For drying, door left closed and latched until evaluation	

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		of the load for washing performance shall not be less than 60min or more than 18h from insertion of the block. For drying performance, follow manufacturer's instructions for door opening at end of cycle		
	Post programme energy consumption (D3){8.2.1}	Energy for aspects after end of programme, e.g. softener regeneration, end of cycle and off mode energy may be tested and reported	8.2.1. Where regeneration occurs in a test, it shall be disregarded for energy, but water used and times reported	
	Water, energy consumptions and time (D4){8.2}	Record the water consumption (hot & cold where relevant), electrical energy and time for each operation within the programme for the test cycle	Consumptions are measured for each complete cycle. Average values are reported. *For energy labelling, only cold fill is permitted and no correction for cold water temperature is allowed*	
	Energy consumption (D8.1)	Energy consumption includes any energy used between the end of the programme and the end of the cycle, e.g. includes any energy used in stand by	N/P	
Appendix F, Evaluation and	Soil area criteria (F2.3){6.7.1}	For wash scores 3 and 2, criteria are $4<A\leq20$ mm and	For the same wash scores, criteria are $0<A\leq4$ mm and	

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calculation of washing and drying indices		20‹A≤50 mm respectively	4‹A≤50 mm respectively	
	Number of test runs required {6.7.2.1}	N/P (in Part 2-2.2. & 2.3, one test run on 3 machines for energy consumption only).	On one machine, at least 5 cycles and possibly 12 cycles may be required (see below)	
	Washing/Cleaning index (F3.2){6.7.2}	Washing index is calculated from the wash score for the test machine divided by the score for the reference machine, correcting for any difference in place settings.	For each run, the Cleaning index is calculated as a logarithm from the wash scores for the test machine and the reference. For all the runs carried out, the mathematical average of these logarithms is calculated as the Total Cleaning Performance. Also, the standard deviation and confidence interval of the results is calculated (W_C). This value and the type of filter are used to assess the number of runs required. The requirement is that ln W_c is equal or less than 0,073. Conduct 5 test cycles, if ln WC is equal or less than 0,073 is met, stop.	

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			If In *W*C requirement is not met, conduct test cycle 6. If In *W*C requirement is met, stop. If In *W*C requirement is not met, conduct test cycle 7 – If In *W*C requirement is met, stop. If In *W*C requirement is not met, conduct test cycle 8 – If In *W*C requirement is met, stop. If dishwasher has self-cleaning or manual filters: conduct test cycles 9 to 12 with filter cleaning between each run. *For energy labelling tests, only the cleaning index without filter cleaning should be used.*	
	Drying Index (F5.2){7.3.2}	One run only needed. Drying index is the total score divided by the number of test load items	Minimum of 5 cycles needed. For each run, the Drying index is calculated as a logarithm from the wash scores for the test machine and the reference. For all the runs carried out, the	

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			mathematical average of these logarithms is calculated as the Total Drying Performance. Also, the standard deviation and confidence interval of the results is calculated (W_D). This value is used to assess the number of runs required. If the value is ›0.10, carry out more runs to a maximum of 8.	

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EDITORIAL: General Requirements for energy labelling purposes	NOTE: Specified separately in AS/NZS 2007:2,combined in EN 50242 as additional EU requirements to IEC 60436 (2004)	Includes all calculations and requirements for energy labelling, both for suppliers (for declaration) and for regulators (for checking). The test results from AS/NZS 2007:1 are used, no additional testing methodology is given in Part 2 except for numbers of samples/runs to be	Only includes requirements for obtaining the test-based consumptions and values for the performance part of the EU energy label. All requirements for suppliers to calculate the energy label ratings, design of the label, how the label is to be used	

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		used.	etc. are within separate EU legislation and national regulations.	
1. Scope and general	Definitions (1.5)	Some additional to Part 1, e.g. Base energy consumption, Star rating, Variant	Not applicable	
2. Test requirements, calculations and algorithms for the energy efficiency label	Programme to be used for testing (2.2.1 and Section 3)	Supplier shall nominate the programme for energy labelling. This programme shall meet the performance requirements of Section 3 i.e. Correct operation at rated capacity, meet minimum values for Washing index, Claimed water consumption and Drying index	N/P	
	Number of units/runs to be tested (2.2.2 & 3)	A minimum of three units of the dishwasher is tested. A minimum of one test run is carried out on each unit.	N/P	
	Comparative energy consumption (CEC) (2.4)	The CEC is the declared value for the annual energy consumption. It is based on the Projected annual energy consumption (PAEC), obtained from the tested energy consumption for one machine using the methodology	N/P	

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		in AS/NZ 2007:1, including standby power. The PAEC for each run is obtained by multiplying the tested energy consumption by 365 (i.e. on the basis of one run per day). The PAEC for the 3 units (minimum) tested is linearly averaged and rounded to the nearest integer. The CEC shall not be less than this value.		
	Star Rating Index (SRI) (2.6)	The SRI is obtained from a calculation using the average CEC (above) and the Base energy consumption (BEC), a calculated comparative value of annual consumption based on the dishwasher load capacity	N/P	
	Star rating (2.7)	The Star Rating is obtained from where the SRI fits in a specified table	N/P	
	Energy label validity (2.8){Z2}	Requirements for the acceptance criteria for organisations checking the validity of an energy label E.g. if one sample is	*For comparison of machines subsequently tested by third parties, tolerances are provided that need to be met*	

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		tested, result is valid if PAEC ≤1.1*CEC. If not, three further units tested and average PAEC needs to be ≤1.1*CEC.	*between declared test performance, consumption and time values. If the tolerance for one test is exceeded, tighter tolerances are given from the testing of more samples. E.g. for cleaning, the tolerance for one test is 6% below the declared value. If the test is lower than this, 3 more samples are tested, the average of these 3 has to be not less than 4% lower than the declared value*	
3. Performance criteria	See Section 2 above			
4. Application and test report formats	Requirements for suppliers (4){Z1}	Requirements and information for suppliers to register products, provision, keeping and availability of test reports and records Requirements for the format of test reports	N/P *Z1. Advisory recommendations for the format*	
5. Printing and placement of	Requirements for suppliers (5)	Requirements and information for suppliers concerning design	N/P	

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energy labels		and location on the product of the energy label		