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Draft 2 Test Method Rev. Aug-2012**4.1 Input Power****Comment:**

A) All products shall be connected to ~~an ac mains~~ **a power supply circuit** as specified in Table 1 below ~~based depending~~ on the ~~nameplate rated~~ voltage ~~required by~~ of the pump. ~~For any A pump that can use a combination of the listed voltage sources, test the pump~~ rated **for more than one** voltage **range** ~~source shall~~ be tested using the higher voltage source.

B) The Voltage and Frequency tolerance shall be $\pm 1.0\%$.

C) The Maximum Total Harmonic Distortion shall be 2.0%

Table 1: Input Power Requirements for All Products

Voltage	Voltage Tolerance	Maximum Total Harmonic Distortion	Frequency	Frequency Tolerance
115 Vac	$\pm 1.0\%$	$\pm 2.0\%$	60 Hz	$\pm 1.0\%$
230 Vac	$\pm 1.0\%$	$\pm 2.0\%$	50 Hz	$\pm 1.0\%$
100 Vac	$\pm 1.0\%$	$\pm 2.0\%$	50 Hz / 60 Hz	$\pm 1.0\%$

Table 1: Test Voltages

Rated voltage of the pump	Test Voltage @ 60Hz
within the range of: 110 – 120 volts	115 Vac
within the range of: 208 -240 volts	230 Vac

Rationale:

Suggested improved terminology.

Swimming Pool Pumps may be rated a various voltages, 110, 115, 208, etc.

It is quite likely that a typical ac source derived from the power grid will not be stable enough to meet the voltage tolerances of this product specification therefore for purposes of this specification, it is likely that a dedicated power source will be required. The term power supply is more generic.

Appears to be a typographical error as 230 volts in the US is supplied at 60 Hz rather than 50 Hz.

100 V is not used in the US. Is this a necessary rating for this specification?

Suggest the table be shortened. No need to repeatedly state the same information.

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5.1 Measurement Requirements

As Proposed from AS 5102.1-2009:

4.3.2 Number of readings (NR)

The number of readings, NR , averaged to give each reported value shall not be less than 30.

4.3.3 Duration of readings (τ)

The individual values that comprise the reported average values of P , V , I , Q , and H shall be recorded over a period of not less than 10 s.

4.5.1 Permissible amplitude of fluctuations

For each measured quantity, Table 6 gives the permissible amplitude of fluctuations.

TABLE 6
PERMISSIBLE AMPLITUDE OF FLUCTUATIONS

Measured quantity	Permissible amplitude of fluctuations between largest and smallest readings of each quantity as a % of the mean value
Flow rate	$\pm 3\%$
Pump total head	$\pm 3\%$
Power input	$\pm 3\%$

When using a differential pressure device to measure flow rate, the permissible amplitude of the fluctuations of the observed differential pressure shall be $\pm 6\%$.

In the case of separate measurements of inlet total pressure and outlet total pressure, the maximum permissible amplitude of fluctuation shall be calculated on the pump total head.

4.5.2 Steady conditions

Test conditions are considered steady if the mean value of the measured rate of flow, pump total head and power input remain within the permissible amplitude of fluctuation in Table 7 for a period of not less than 10 s. If this condition is met, and if the fluctuations are less than the permissible values given in Table 6, only one set of readings of individual quantities will be recorded for each set of conditions. If this condition is not met and the fluctuations exceed the permissible values given in Table 6, then the procedure for unsteady conditions as described in Clause 4.5.3 shall be followed.

Comment:

The Measurement Requirements section appears to suggest an unduly burdensome means of deriving a value for Energy Factor for a residential swimming pool pump. For example, there are four (4) parameters to be reported. Suction Pressure, Discharge Pressure, Power Input, and Flow. If we assume a pump with a Qmax of 100 GPM, the proposal would require each of these four parameters to be recorded at eleven (11) points along the pump performance curve for a total of 44

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reporting values. Each of these values is comprised of minimum 30 discrete readings that are taken over a period of not less than 10 seconds. A typical sample rate for a data acquisition system is 1 sample per second therefore this would likely equate to a minimum sampling period, once the desired flow point is reached and stable, of 30 seconds. Per Table 6 of AS 5102.1-2009, each of these individual 30 samples can not deviate from the mean by more than the % value indicated therefore it is likely that once a recording GPM point is reached, this data will be recorded for a period greater than 30 seconds to provide a sufficient number of samples and allow for erroneous readings, etc. At the conclusion of this test, the data file would yield approximately 1800 rows of data which will need to be manually reviewed, extracted, averaged, verified against the permissible fluctuations of Table 6, and then populated into EPA's proposed spreadsheet. If manufacturers are required to provide this data at all operating speeds, as in the case of a multi or variable speed pump, this would need to be repeated for each speed resulting significant effort. We would appreciate EPA's comments as to whether or not our understanding of the process is accurate. We also ask EPA consider reporting only at the low speed rpm since this is the metric for determining compliance with the Energy Star requirement as described in our comment for 5.2 below.

5.2 Test Requirements

Speeds for Testing

Comment:

Single speed pumps shall be tested at the rated only available speed.

Multi-speed pumps shall be tested at ~~all possible motor~~ the lowest speed.

Variable-speed pumps shall be tested at the minimum, ~~maximum, and most efficient lowest~~ speeds available. ~~Manufacturers shall report all speeds tested.~~

~~For each speed tested,~~ The following values shall be reported for the normal operating point corresponding to ~~each of the three~~ system curves (A, ~~B, and C~~) listed below.

A graph of the pump performance curve ~~for each speed tested~~ shall also be reported.

The ~~three~~ system curves to be used is ~~are~~ Curve A; $H = 0.0167 \times Q^2$

Rationale:

In EPA's letter dated August 30, 2012, Key Elements of Draft 1 Specification Proposal state that the Performance Level a pool pump would be required to meet is an Energy Factor of 3.8 or higher using Pool performance Curve A (at Low Speed if multi-speed or variable-speed). The proposed test protocol will be time consuming and expensive for manufacturers. (see additional comments for 5.1 above) Since this is a new program, we wish to request that EPA consider focusing this specification

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launch on testing that will demonstrate compliance with the currently proposed Energy Star compliance and performance criteria, that being Energy Factor at low speed, at Curve A. Additional motor speeds and system curves can be introduced as the program matures.

6.2 Pump Flow Testing

Comment:

Add a step between 1) and 2) to "Close the discharge valve and reduce the flow to zero"

Table 2: Flow Rates for Measurement

Comment:

Recommend a tolerance on the flow rate increments. For instance, if we assume a pump with a Q_{max} of 100 GPM, it will be difficult to adjust the discharge valve to provide an exact operating point coinciding with 10, 20, 30, etc. GPM, particularly once you average 30 data points. There needs to be an allowable range.

SUGGEST: +/- 2 or 3 gpm tolerance on the flow reporting points.

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Draft 1 Eligibility Criteria Version 1.0

1 Definitions

Comment:

Pool Pump: A mechanical assembly consisting of a “wet end”, which houses the impeller, and a motor. ~~There usually is a leaf strainer before the impeller.~~ The pump increases the “head” and “flow” of the water.

Rationale: The statement indicated by the strikeout are not necessary for the purposes of this specification.

H) Standby Mode: A reduced power state, in multi-speed and variable speed pumps, in which the unit is connected to an ac ~~main source~~, but the motor remains idle, and no water is being pumped through the system.

Please clarify that in this state, the controller is in an “ON” / ready state but not doing any work as opposed to connected to the ac source and powered “OFF”

Acronyms

H) °F Degree Fahrenheit

2.2 Please clarify the last statement “Pumps with manual speed controls that are not able to connect to an external speed controller, are also not eligible”

3.1 Energy Efficiency Requirements

We agree with EPA’s proposed Energy Efficiency Level of 3.8EF for Single, Multi, and Variable Speed Pumps.

END COMMENTS
