Circulation system components
and related materials for
swimming pools, spas/hot tubs

NSF/ANSI 50

2 Definitions

2.50 self-priming centrifugal pump: A pump (after initial filling with water) capable of priming and
repriming a dry suction line (up to 3 m [10 ft] vertical lift at a minimum of 1.52 m [5 ft] or the
manufacturer's specified vertical lift, whichever is greater claim) without using foot or check valves or
adding water.

6 Centrifugal pumps

This section contains requirements for centrifugal pumps used to circulate swimming pool or spa / hot tub
water in commercial and residential applications. The requirements for strainers shall apply to strainers
that are integral with the pump and to strainers supplied as separate equipment for use in conjunction
with a centrifugal pump.

6.8 Self-priming pumps

A pump designated as self-priming shall be capable of repriming itself when operated under a suction lift
without the addition of more liquid. Self-priming capability shall be verified in accordance with annex C,
section C.3.

6.9 Data plates(s)

6.9.1 A pump shall have a data plate(s) that is permanent; easy to read; and securely attached, cast, or
stamped into the pump at a location readily accessible after installation. The data plate(s) shall contain
the following information:

- manufacturer's name and address;
- pump model number;
– pump serial number, date code, or specification number;
– whether the unit has been evaluated for swimming pools or spas/hot tubs, if not evaluated for both applications; and
– designation as a self-priming or non-self-priming pump. If the pump is self-prime the maximum vertical lift height shall also be specified.

C.3 Self-priming capability

C.3.1 Purpose

The purpose of this test is to verify the manufacturer’s claim of self-priming capability.

C.3.2 Apparatus

– suction line essentially as shown in annex C, figure C1;
– elapsed time indicator accurate to within ± 0.1 min;
– gauge pressure indicating device;
– temperature-indicating device; and
– barometric pressure indicating device.

C.3.3 Test conditions

<table>
<thead>
<tr>
<th></th>
<th>swimming pool</th>
<th>hot tubs / spa</th>
</tr>
</thead>
<tbody>
<tr>
<td>water temperature</td>
<td>24 ± 6 °C (75 ± 10 °F)</td>
<td>39 ± 3 °C (102 ± 5 °F)</td>
</tr>
<tr>
<td>turbidity</td>
<td>≤ 15 NTU</td>
<td>≤ 15 NTU</td>
</tr>
</tbody>
</table>

NOTE – Pumps, except those labeled to be for swimming pools only, shall be tested at the hot tubs / spa temperature.

C.3.4 Self-priming capability test method

a) The pump shall be installed and operated according to the manufacturer’s instructions, except that the suction line shall be essentially as shown in annex C, figure C1.

b) The pump shall be turned on and the timer started.

c) The elapsed time to steady discharge gauge reading or full discharge flow shall be recorded. This is the measured priming time (MPT).

d) The pump shall be shut off and all lines drained of water.

e) The true priming time (TPT) shall be calculated as follows:

\[
TPT = MPT \times \left( \frac{\text{pump suction inlet size}}{\text{actual test pipe size}} \right)^2
\]

NOTE – Typically the pump suction inlet size is equal to the test pipe size and therefore \( TPT = MPT \).

f) Steps b) through e) shall be repeated (no additional water shall be added to the pump).
C.3.5 Acceptance criteria

If a pump is to be designated as self-priming, the true priming time for each run shall not exceed 6 min or the manufacturer’s recommended time, whichever is greater.

![Diagram of self-priming test setup]

**Figure C1**

**Figure C1 – Apparatus for self-priming capability test**

D = Nominal diameter of the riser pipe

VL = Vertical lift, 3.05 m (10 ft) 1.52 m (5 ft) or the manufacturer’s claim whichever is greater

- suction lift (corrected for standard temperature 20 °C [68 °F]) and pressure (101 kPa [14.7 psia]), with water density of 1000 kg/m³ (62.4 lbs/ft³), including losses due to friction.

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