

ENERGY STAR®

Program Requirements

Product Specification for

Pool Pumps

Draft 2, Version 2.0/Version 3.0
Recommended Changes



Chuck Thomas
Technical Leader

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Background

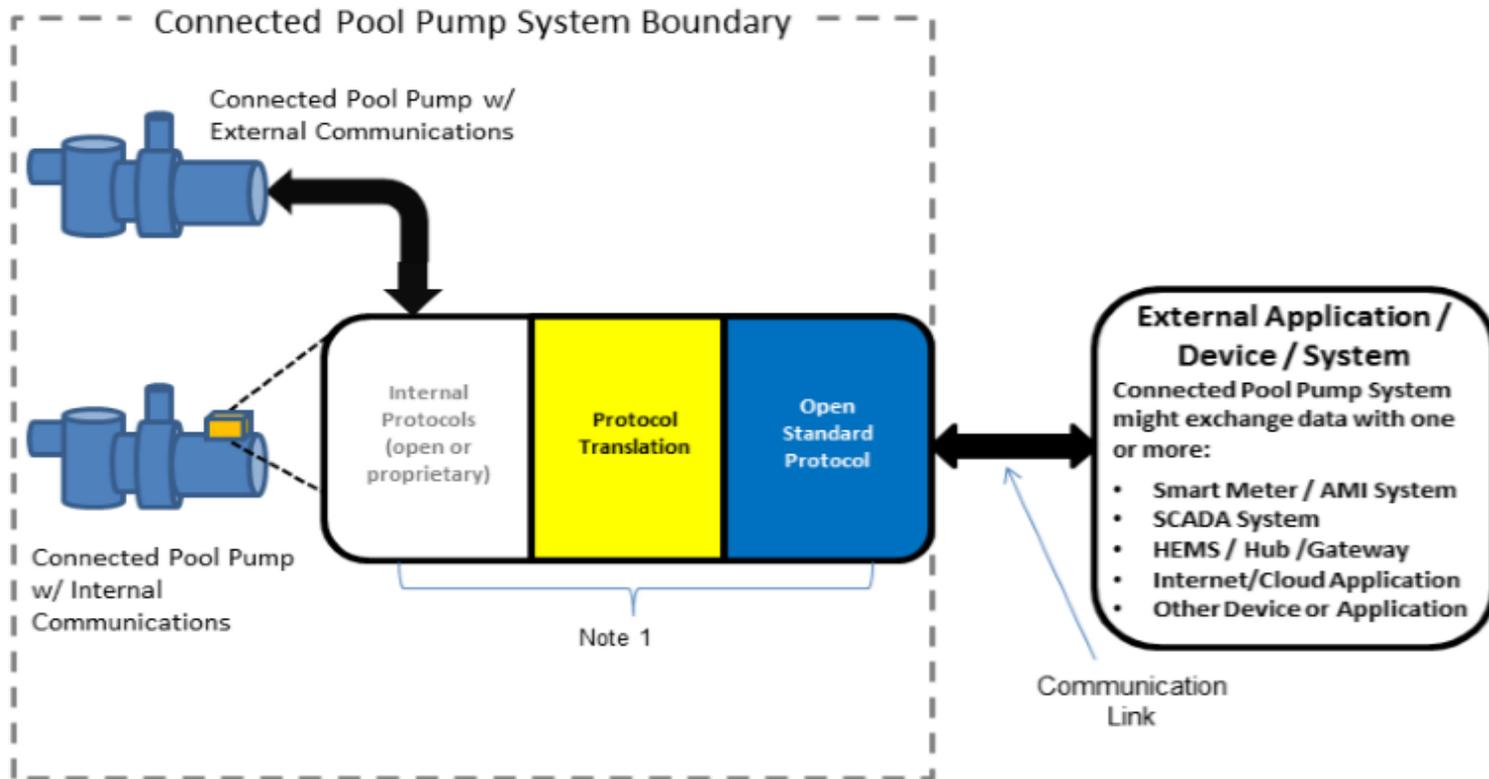
- Since 2009 EPRI and industry stakeholders researched a wide range of different communication protocols and technologies that could optimize the distribution of electric power to benefit consumers across all service territories
- A collaboration between researchers, utilities and manufacturers (2012 – present) resulted in consensus among project participants that the following requirements reflect the state-of-art technique for ensuring interoperability between mass produced products and a wide range of demand response use-cases
 - End-use loads should be equipped with a standardized communication interface
 - The communication interface must comply with an open communication standard that specifies the connector, physical layer, link layer and application layers of the OSI stack.
 - A standardized map between the protocol's application layer and functional responses for all end-use device types should be developed and tested (Functionality Requirements for OpenStandard_Y Enabled DeviceType_X)
 - All manufacturers of DeviceType_X that support OpenStandard_Y should use the same Functional Requirements document to map data and functions to application layer messages.
 - Third-parties could use the functional requirement maps to create innovative services that could be deployed across the same type of devices produced by any manufacturer that implements the map.

1.6 Connected Products Existing

Original

177	1.6 Connected Products
178	A) <u>Communication Link</u> : As shown in Figure 1, the mechanism for bi-directional data transfers
179	between the CPPS and one or more external applications, devices or systems.

Original



184 | Figure 1. Connected Pool Pump System (CPPS)

1.6 Connected Products

Recommended Changes

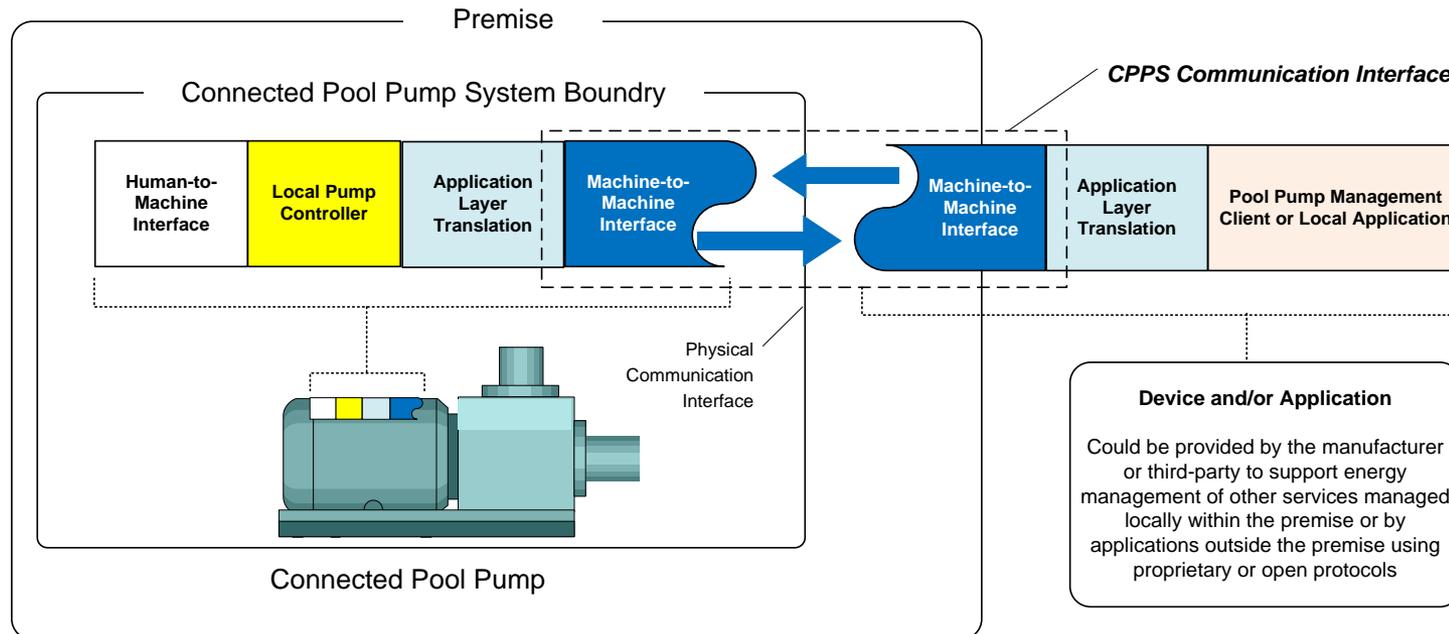
New

177	1.6 Connected Products
178	A) Physical Communication Interface: As shown in Figure 1, the mechanism for bi-directional data
179	transfers between the CPPS and a device and/or application.

Recommendation is to change Figure 1 to provide a conceptual understanding of the requirements defined herein. The intent is to show that the open communication interface must be incorporated into the pump system located within the premise.

Recommend that the text throughout the document be changed from “one or more external applications, devices or systems” to “a device and/or application.”

New



184 | Figure 1. Connected Pool Pump System (CPPS)

1.6 Connected Products

Original

180	B) Connected Pool Pump System (CPPS): Refers to the physical boundary between the communication interface of an ENERGY STAR certified pool <i>pump</i> and communication
181	certified pool pump, integrated or separate communications hardware, and additional hardware
182	and software required to enable connected functionality.

New

180	B) Connected Pool Pump System (CPPS): Refers to the physical boundary between the communication interface of an ENERGY STAR certified pool <i>pump</i> and communication
181	interface of external devices and/or applications provided by the manufacturer or third- parties
182	to enable connected functionality.

The recommended text along with the diagram in Figure 1 helps to defined the demarcation point between the CPPS and devices and/or applications that the consumer could add to utilize .

1.6 Connected Products

This note was changed to further define the communication interface. Original note allowed for connected functions to be managed from applications outside the premise

Original

185	Note: Communication device(s), link(s) and/or processing that enables Open Standards
186	based communication between the CPPS and external application / device / system(s)
187	These elements, either individually or together, could be within the pump/controller, and/or
188	an external communication module, a hub/gateway, or in the Internet/cloud

This note was changed to better align with the draft CEE Connected Criteria for Heat Pump Water Heaters, without specifying a specific standard

New

185	Note: The communication interface must comply with an Open Standard that specifies
186	at minimum, the physical layer, link layer and application layer.

CEE Connected Criteria for Heat Pump Water Heaters (Draft)

“CEE requires that a product must enable economical and direct, on premise, open standards based translation using the physical and data-link layers of an industry-accepted, modular communication interface such as ANSI/CTA-2045 Open Standards: communication with entities outside the Connected Heat Pump Water Heater that enables connected functionality must use, for all communication layers, standards that meet the "open standards definition" outlined in the *CEE Residential Water Heating Initiative*.”

1.6 Connected Products

Original

189	C) Consumer Authorized Third Party: Any entity for which the consumer has provided explicit
190	permission to access the CPPS connected functionality, in whole or in part, via a Communication
191	Link.

This requirement was moved to section 4.1 and modified to support the recommended architecture.

New

319	A) Consumer Access Control: The consumer must be provided access to the CPPS and the means
320	to connect or disconnect devices and/or applications to the CPPS.

This recommended text helps to ensure that the consumer authorizes all third-party access to their property. It also ensures that the consumer can connect technologies that can manage energy usage from a controller within the premise.

Original

192	D) <u>Open Standards</u> : Standards that are
193	1. Included in the Smart Grid Interoperability Panel (SGIP) Catalog of Standards,2 and/or
194	1. Included in the National Institute of Standards and Technology (NIST) Smart Grid Framework
195	Tables 4.1 and 4.2,3 and/or
196	1. Adopted by the American National Standards Institute (ANSI) or another well-established
197	international standards organization such as the International Organization for
198	Standardization (ISO), International Electrotechnical Commission (IEC), International
199	Telecommunication Union (ITU), Institute of Electrical and Electronics Engineers (IEEE), or
200	Internet Engineering Task Force (IETF).

Nothing was changed in this section, but it was moved to section 4.1

1.6 Connected Products

Original

208	G) <u>Time-Stamped Demand Reponse Override Notification</u> : A message capable of being sent to a
209	Consumer Authorized Third Party which signifies a particular instance of a Demand Response
210	Override, and at minimum includes the time or interval of the override or a reference to the event
211	that is being overridden.

This requirement was moved to section 4.1 E) and modified to support the new recommended architecture

New

335	E) Demand Response Override-ability : The capability for a user to override connected
336	functionality initiated by devices and/or applications connected to the CPPS. If the customer
337	overrides this functionality through an interface within the CPPS, the CPPS must inform the
338	connected device and/or application that an override is in effect.

Requirement was modified to support the new recommended architecture.

The first part requires the CPPS to respond to a canceled DR event. In this case, the override is initiated through a third-party application that could log the date and timestamp

Since the original intent was to inform a third-party of an event override, the test requires the CPPS to inform or make the information available to a third-party device and/or application through the CPPS communication interface. The third-party would be responsible for recording the date and timestamp of when the event was overridden.

4.0 CONNECTED PRODUCTS CRITERIA

Moved the requirements for the communication interface from section 1.6 to section 4.1

Original	302	4.0 CONNECTED PRODUCTS CRITERIA
	303	This section presents connected criteria for ENERGY STAR certified pool pumps. Compliance with
	304	Section 4 criteria is optional. ENERGY STAR certified pool pumps that comply with all Section 4 criteria
	305	will be identified on the ENERGY STAR website as having 'Connected' functionality.

Unchanged

Original	306	4.1 Communications
	307	A) The CPPS Communication Link, in Figure 1, shall use Open Standards for all communication
	208	layers to enable functions listed in Table 2

New	310	A) The CPPS Communication Interface: Shall use Open Standards for all communication layers.
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Removed the “to enable functions listed in Table 2” Reference to this table is made under section 4.1 D).

4.0 CONNECTED PRODUCTS CRITERIA

Original

309	B) An Interface Control Document (ICD), Application Programming Interface (API), or other
310	documentation shall be made available to interested parties that, at minimum, allows access to
311	the functions listed in Table 2.

Even if the manufacturer is required to support an open communication standard doesn't guarantee that products with the same interface are compatible. This requirement allows manufacturers to have a unique mapping between a communication standard and connected functions which restricts consumer choices

New

322	C) Functional Requirements Map for Connected Devices: Documentation that defines
323	the mapping between the selected Open Standard's application layer messages and the
324	connected functionality defined herein.

This requirement replaces the ICD, API text of line 309. It's designed to require manufacturers to use "documentation" that maps an open standard to the connected functions.

New

326	Note: The document that maps connected functionality to a specific Open Standard must be used
327	by all manufacturers that utilize that same standard for their CPPS Communication Interface.

This new note attempts to require all manufacturers implementing the same communication standard to use the same functional requirements map. The intent is to improve interoperability between products and to help ensure responses are predictable.

4.0 CONNECTED PRODUCTS CRITERIA

Original	314	Table 2: Functions Applicable to the Communications Criteria
		Functions
		<p>ICD/API/other doc. must include:</p> <ul style="list-style-type: none"> • Accuracy • Units <p>If Energy Consumption Reporting is also provided, ICD/API/other doc. must include:</p> <ul style="list-style-type: none"> • Accuracy • Units • Measurement Interval
		Section 4.4 Operational Status, User Settings, and Message
		Section 4.5 Demand Response

Since the ICD and API were removed, accuracy, units and interval was changed to require manufacturers to include this information in the product's documentation (see section 4.2)

New	332	Table 2: Connected Functionality
	333	Functions
		Section 4.2 Real-time Power Reporting
		Section 4.3 Remote Management
		Section 4.4 Operational Status, User Settings, and Message
	Section 4.5 Demand Response	

This table and document was changed to make it easier for users to locate the sections where common functions are defined.

4.0 CONNECTED PRODUCTS CRITERIA

Original

315	Notes:
316	1. A CPPS that enables economical and direct
317	communications that comply with 4.1.A and 4.1.B on the
318	consumer's premises is preferred; but alternative
319	approaches, where the CPPS only complies with 4.1.A
320	and 4.1.B outside of the consumer's premises are also
321	acceptable.
322	1. A product that includes an embedded modular
323	communications port that complies with 4.1.A and 4.1.B
324	need not be supplied with a compatible communications
425	module.

These notes were all deleted and addressed through recommended changes in other sections.

4.0 CONNECTED PRODUCTS CRITERIA

Original

326	4.2 Real-time Power Reporting
327	Whenever pumping, the CPPS shall be capable of transmitting measured or estimated data
328	representative of its real-time power draw to consumers and consumer authorized third parties via a
329	communication link. The CPPS may optionally also transmit measured or estimated data
330	representative of its interval energy consumption.
331	Note: Real-time power shall be reported in watts. If provided, EPA recommends that energy
332	consumption data be reported in watt-hours for intervals of 15 minutes or less; however,
333	representative data may also be reported in alternate intervals as specified in the ICD or API detailed
334	in Section 4.1. The CPPS may also provide energy use feedback to the consumer on the product
335	itself and use any units and format (e.g., dollars/month).

See next slide for new recommended text for 331-335

Intent of original text is incorporated into new recommended text

New

345	4.2 Real-time Power Reporting	
347	Manufactures' documentation must include the accuracy of all power and energy measurements. It's recommended that this information be provided through the CPPS.	
348		
349	The CPPS shall provide its measured or estimated instantaneous power consumption via the CPPS	
350	Communication Interface.	
351		
352	Instantaneous power must be updated every second and shall be reported in watts.	
353		
354	Table 3: Required Real-time Power Reporting	
355	Requirement	Function and/or Data
	4.2.1	Instantaneous Power Usage (w)
	4.2.2	Energy Usage (w-h)

Added testing and assigned names and units.

4.0 CONNECTED PRODUCTS CRITERIA

This is included in section 4.2

Original

331	Note: Real-time power shall be reported in watts. If provided, EPA recommends that energy
332	consumption data be reported in watt-hours for intervals of 15 minutes or less; however,
333	representative data may also be reported in alternate intervals as specified in the ICD or API detailed
334	in Section 4.1. The CPPS may also provide energy use feedback to the consumer on the product
335	itself and use any units and format (e.g., dollars/month).

New

357	Note: EPA recommends that energy consumption measurements be reported in watt-hours (w-h).
358	If reported, cumulative energy shall be a cumulative number with a resolution of 1 w-h.
359	If summed and reported in time intervals, the recommended interval should be 15-min.

Removed references to ICD and API, along with references to alternative intervals and units that may or may not be supported by standards included in the allowed list.

Intent is maintained, but updated to reflect recommended architecture

4.0 CONNECTED PRODUCTS CRITERIA

Original

336	4.3 Remote Management
337	At minimum, the CPPS shall be capable of responding to consumer authorized signals received via a
338	communication link requesting
339	A) A start or stop to pumping, and
340	A) change to motor speed and/or rate of flow

New

361	4.3 Remote Management	
362	Functions to aid the consumer with remotely managing basic functions of the CPPS should be	
363	accessible through the CPPS Communication Interface.	
364	Table 4: Required Remote Management Functions	
365		
365	Requirement	Function and/or Data
	4.3.1	Change motor speed and/or rate of flow
	4.3.2	Start or stop to pumping

Intent was maintained, but text updated to reflect recommended architecture.

4.0 CONNECTED PRODUCTS CRITERIA

Original

341	4.4 Operational Status, User Settings & Messages
342	A) At minimum, the CPPS shall be capable of providing the following information to consumers and
343	consumer authorized third parties via a communication link:
344	1. Operational status including:
345	a. On/Off/Standby, and
346	a. Motor speed and/or rate of flow
347	2. DR status including:
348	a. Inactive
349	b. Active – Type 1
350	c. Active – Type 2
351	d. Active – Type 3
352	e. Time-stamped DR override notification

~~The intent of this section is to require the CPPS to provide “feedback” to devices. Systems or applications managing the pump through the communication interface. This information is also falls under the category of “monitoring” data~~

The recommended changes maintains the original intent but includes additional functionality and aligns with existing tested specifications.

4.0 CONNECTED PRODUCTS CRITERIA

New	368	4.4 Operational Status, User Settings & Messages
	369	
	370	The CPPS shall provide information through the CPPS Communication Interface for use by
	371	Consumers to increase awareness and more effectively manage energy usage.
	372	
	373	Table 4: Required Operational Status, User Settings & Messages

Maintained intent, but aligned the original requirements with other existing specifications and standards including CTA-2045 and AHRI 1380.

New	Requirement	Function and/or Data
	4.4.1	<i>Idle Normal</i> , Indicates that no demand response event is in effect and the Pump is not running. This state also includes Off or Standby modes
	4.4.2	<i>Running Normal</i> , Indicates that no demand response event is in effect and the Pump is running
	4.4.3	<i>Running Curtailed</i> , Indicates that either a Type 1 or Type 2 demand response event is in effect and the Pump is running
	4.4.4	<i>Idle Curtailed</i> , Indicates that a curtailment type demand response event is in effect and the Pump is not running.
	4.4.5	<i>Running Heightened</i> , Indicates that a Type 3 demand response event is in effect and the Pump is running
	4.4.6	<i>Idle Heightened</i> , Indicates that a Type 3 demand response event is in effect and the Pump is not running.
	4.4.7	<i>Variable Following</i> , Indicates that the pump speed or flow is varied to support demand response and the pump is following the specified setting.
	4.4.8	<i>Variable Not Following</i> , Indicates that the pump speed or flow is varied to support demand response and the pump is not following the specified setting.
	4.4.9	<i>Idle, Override in Effect</i> , Indicates that the pump is in an Overridden state and the pump is not running
	4.4.10	<i>Running, Override in Effect</i> , Indicates that the pump is in an Overridden state and the pump is running
	4.4.11	<i>Pump Alarm or Fault</i> , Indicates that the pump is not operating because it needs maintenance support or is in some way disabled (i.e. no response to demand response commands). See Note 4.4.11
	4.4.12	<i>Motor Speed (RPM) and/or Flow Rate (GPM)</i>

4.0 CONNECTED PRODUCTS CRITERIA

Original

354	Note: Signals may vary by DR infrastructure used; for example, Open ADR 2.0 stores
355	long term DR enrollment in EiAvail and short term Opt-out in EiOpt messages. The EiOpt
356	message would contain the ID of the product, reason for Opt-out, and time interval of
357	Opt-out.

Removed this reference. There are other services in OpenADR that would be a more appropriate example for this section. But recommend OpenADR examples be removed.

Original

358	1. Program schedule including schedule times and scheduled operation
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Removed as a requirement for the CPPS since this is a function that is typically managed by the connected device and/or application.

Original

359	A) The CPPS shall be capable of providing at least two types of messages relevant to optimizing its
360	energy consumption, either
361	1. On the product (e.g. pool pump and/or controller), and/or
362	1. Transmitted to consumers and consumer authorized third parties via a communication link.
363	Note: For example, messages relevant to energy consumption for Pool Pumps might
364	address a fault condition, a reminder to clean/flush the filter, or a report of energy
365	consumption that is outside the product's normal range.

New

375	Note 4.4.11: The manufacturer's documentation shall include details of the reported fault.
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Information regarding faults or warnings can be communicated through the CPPS using requirement 4.4.11.

4.0 CONNECTED PRODUCTS CRITERIA

Original

366	4.5 Demand Response
367	At a minimum, the CPPS shall be capable of responding to Consumer Authorized Third Parties by
368	providing the following three responses:
369	A) Type 1 Response:
371	1. Within ten seconds of receipt of a requesting signal on the consumer's premise, the CPPS
372	shall respond in accordance with Table 3.
373	2. The CPPS shall ship with default settings that enable a response for at least 4 hours.
374	3. The CPPS shall be able to provide at least one response in a rolling 12-hour period.
375	4. The CPPS may either delay its response or not provide a response if responding would
376	compromise safety or result in equipment damage as determined by the manufacturer
377	5. The CPPS shall be capable of supporting DR event override-ability.

See following slides

379	Note: Signals may vary by DR infrastructure used; for instance, in Open ADR 2.0, this
380	requirement would translate to the need of the CPPS to be able to create short term EiOpt
381	events if needed by the user, to override long term (EiAvail) DR enrollment status.

Removed example references of OpenADR

4.0 CONNECTED PRODUCTS CRITERIA

379	4.5 Demand Response
380	This section details three demand response event types and the required responses that the CPPS
381	shall support.
382	
383	Within ten seconds after receipt of any demand response request, the CPPS shall execute the
384	required response.
385	
386	Prior to or during a demand response event, the CPPS must return to normal operation if the
387	consumer overrides the event.
388	
389	The CPPS may either delay or reject a demand response request if responding would compromise
390	safety or result in equipment damage as determined by the manufacturer.
391	
392	The CPPS shall always be in control of pump operations.

New

The intent of the original requirements were maintained, but modified to support the recommended architecture.

Requirements that are duplicated (common) to all three responses were moved to the main section 4.5. Subsections were used for each of the responses; Type 1 in 4.5.1, Type 2 in 4.5.2 and Type 3 in 4.5.3.

4.0 CONNECTED PRODUCTS CRITERIA

	4.5.1 Type 1 Response:
	The intent of this response is to curtail demand while minimizing consumer impact.
New	Anticipated Frequency of Use: This type of response could be used daily to manage demand
	under programs such as Time of Use or Real Time Pricing. Or could occur 20-30 times in year to
	shift demand during peak demand days.

One recommendation is to include an introduction and guidance that CPPS manufacturers could use to embed a response that meets or exceeds the connected criteria requirements while minimizing consumer discomfort or experience.

4.0 CONNECTED PRODUCTS CRITERIA

400 | Table 5: Type 1 Response Requirements

Original Text, New Format

Requirement	Pump Type	Response Subtype	Response
4.5.1.1	Single-speed Pump	-	<p>If the pump is running, the pump shall turn off and remain off for the duration of the event.</p> <p>If the pump is not running (idle mode), it shall remain off for the duration of the event.</p>
4.5.1.2	Two-speed / Multispeed Pump	A	If operating at greater than half of its maximum flow rate, the CPPS shall reduce flow rate to less than or equal to half of the maximum flow rate or switch to idle mode
4.5.1.3		B	If pump is in idle mode, the Pool Pump shall remain in idle mode.
4.5.1.4	Variable-speed Pump	A	If operating at greater than 1/3 of its full-flow rate, the Pool Pump shall reduce operation to less than or equal to 1/3 of full-flow rate.
4.5.1.5		B	If operating at less than or equal to 1/3 of full-flow rate, the Pool Pump shall not increase flow.

4.0 CONNECTED PRODUCTS CRITERIA

384	B) Type 2 Response:
385	1. Within ten seconds of receipt of a requesting signal on the consumer’s premises, the CPPS
386	shall terminate pumping for the duration of the requested response period.

Common requirement, moved to the body of section 4.5 to require all pumps that support the connected criteria to support this requirement

387	2. The CPPS shall ship with default settings that enable a response of least 20 minutes.
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Recommend that this min duration be removed. The recommended architecture enables connected devices and/or applications to manage this time.

388	3. The CPPS shall be able to provide at least three responses in a rolling 24-hour period.
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Intent maintained, moved to the body of section 4.5.2 Type 2 Response

389	4. The CPPS may either delay its response or not provide a response if responding would
390	compromise safety or result in equipment damage as determined by the manufacturer.
391	5. The CPPS shall be capable of supporting DR event override-ability.

Common requirement, moved to the body of section 4.5 to require all pumps that support the connected criteria to support this requirement

4.0 CONNECTED PRODUCTS CRITERIA

New

402	4.5.2 Type 2 Response:
403	This response is intended to immediately shutdown pumping operations.
404	
405	Anticipated Frequency of Use: The CPPS shall be able to provide at least three responses in a rolling
406	24-hour period.
407	
408	Table 6: Type 2 Response Requirements

Recommendation is to add some background with regards to when and how this function could be used.

Requirement	Pump Type	Response
4.5.2.1	All Pump Types	<p>Upon receipt, terminate pumping for the duration of the event.</p> <p>Independent of the duration of the event, pumping must remain off for at least 20-min.</p> <p>If the event is longer than 20-min, the CPPS must remain off for the entirety of the event.</p>

4.0 CONNECTED PRODUCTS CRITERIA

Original

392	C) Type 3 Response:
393	1. Within ten seconds of receipt of a requesting signal on the consumer's premises and in
394	accordance with consumer settings, the CPPS shall
395	a. If idle, initiate pumping at a rate appropriate for regular filtration, and
396	b. If active, shall increase the rate of flow by at least 10% of Full Flow Rate from the current
397	flow rate, or extend pumping duration within the requested response period. The CPPS
398	shall not increase flow to a rate outside the proper operating conditions of equipment
399	and/or filtration systems connected to the pump, as determined by the manufacturer. For
400	example, if manufacturer recommendations specify a maximum recommended flow rate
401	for filtration operations, a Type 3 signal should not bring the pump above this specified
402	maximum flow rate.
403	2. This response shall be limited such that the CPPS terminates pumping when:
404	a. Programmed daily pumping volume is reached (CPPS with controls capable of
405	scheduling pumping operation based on total desired volume pumped), or
406	b. Programmed daily pumping duration is reached (all other CPPS)
407	3. The CPPS is not required to respond if doing so would compromise safety or result in
408	equipment damage as determined by the manufacturer.
409	4. The CPPS shall be capable of supporting DR event override-ability.

4.0 CONNECTED PRODUCTS CRITERIA

New

410	4.5.3 Type 3 Response:
411	This response is intended to increase demand to take advantage of low cost electric power
412	Due to excess energy generated by renewable resources such as solar and wind.
413	
414	Anticipated Frequency of Use: The frequency in which this response could be called depends on
415	the generation mix and capacity of the assets that provide electric power to the premise. In regions
416	where renewable resource generation assets comprise a large percentage of the mix, this response
417	could be initiated daily during select periods of the year. This response can also be used to shift demand when available
418	capacity is low to a time when available capacity is high.
419	
420	Table 7: Type 3 Response Requirements

Recommendation is to add some background with regards to when and how this function could be used.

Requirement	Pump Type	Response
4.5.3.1	All Pump Types	<p>If idle, initiate pumping at a rate appropriate for regular filtration.</p> <p>If running, increase the rate of flow by at least 10% of Full Flow Rate from the current flow rate, or extend pumping duration within the requested response period.</p> <p>The CPPS shall not increase flow to a rate outside the proper operating conditions of equipment and/or filtration systems connected to the pump, as determined by the manufacturer. For example, if manufacturer recommendations specify a maximum recommended flow rate for filtration operations, a Type 3 signal should not bring the pump above this specified maximum flow rate.</p>

4.0 CONNECTED PRODUCTS CRITERIA

Original

423	This response shall be limited such that the CPPS terminates pumping when:
424	1. Programmed daily pumping volume is reached (CPPS with controls capable of
425	scheduling pumping operation based on total desired volume pumped), or
426	a) Programmed daily pumping duration is reached
427	a) The CPPS is not required to respond if doing so would compromise safety or result in
428	equipment damage as determined by the manufacturer.

Unchanged

4.0 CONNECTED PRODUCTS CRITERIA

Original

411	Note: EPA is proposing to change the Demand Response requirements for pool pumps from RPM based
412	requirements to flow based requirements. The primary driver of this change is to allow testing by
413	measuring flow, as is typically done when testing pool pumps. A revised test method with more traditional
414	flow based measurements will be easier for manufacturers and test labs to implement, reducing testing
415	burden. Additionally, flow rate and RPM are linked by physical equations, thus current RPM requirements
416	are easily translated to the new flow based requirements. This has the added benefit of writing
417	requirements based on the parameter with the most utility to the consumer, the pump operating flow.
418	Additionally, EPA is gathering stakeholder and industry feedback on Type 3 responses, which are
419	designed to support load shifting in low demand periods. Version 1.0 does not specify the amount of
420	increase in activity for a Type 3 response, particularly for a pump that is already active. EPA is proposing
421	to set a minimum incremental response within the pump operating conditions and manufacturer
422	recommended operating ranges. For idle pumps, EPA proposes specifying initiating flow at a rate
423	appropriate for filtering. EPA welcomes feedback on this proposal.

Same text. Recommended change was to add a new informative section 4.5.4

New

431	4.5.4 Informative
432	EPA is proposing to change the Demand Response requirements for pool pumps from RPM
433	based requirements to flow based requirements. The primary driver of this change is to allow testing
434	By measuring flow, as is typically done when testing pool pumps.
435	A revised test method with more traditional flow based measurements will be easier for
436	manufacturers and test labs to implement, reducing testing burden. Additionally, flow rate and RPM
437	are linked by physical equations, thus current RPM requirements are easily translated to the new flow
438	based requirements. This has the added benefit of writing requirements based on the parameter with
439	the most utility to the consumer, the pump operating flow.
440	
441	Additionally, EPA is gathering stakeholder and industry feedback on Type 3 responses, which are
442	designed to support load shifting in low demand periods. Version 1.0 does not specify the amount of
443	increase in activity for a Type 3 response, particularly for a pump that is already active. EPA is
444	proposing to set a minimum incremental response within the pump operating conditions and
445	Manufacturer recommended operating ranges. For idle pumps, EPA proposes specifying initiating flow
446	at a rate appropriate for filtering. EPA welcomes feedback on this proposal.

4.0 CONNECTED PRODUCTS CRITERIA

Original

424	4.6 Information to Installers and Consumers
425	If additional modules, devices, services, and/or supporting infrastructure are required in order to activate
426	the CPPS’s communications capabilities, installation instructions and a list of these requirements shall be
427	made available at the point of purchase and prominently displayed in the product literature. It is also
428	suggested that information be provided on the product packaging and on the product. These instructions
429	shall provide specific information on what must be done to activate these capabilities (e.g. a product
430	package or product label might briefly state “This product has Wi-Fi capability and requires Internet
431	connectivity and a wireless router to enable interconnection with external devices, systems or
432	applications.”)

New

449	4.6 Information to Installers and Consumers
450	
451	The CPPS shall be shipped with instructions and support documents required to connect
452	devices and/or applications to the CPPS Communication Interface. The requirements shall
453	be made available at the point of purchase and prominently displayed in the product literature.
454	It is also suggested that information be provided on the product packaging and on the product.
455	These instructions shall provide specific information on what must be done to activate these
456	capabilities (e.g. a product package or product label might briefly state
457	“This product has Wi-Fi capability and requires Internet connectivity and a wireless router to enable
458	interconnection with external devices, systems or applications that support OpenADR 2.0”

Modified to reflect recommended architecture

6.0 Test Requirements

Original - No Change

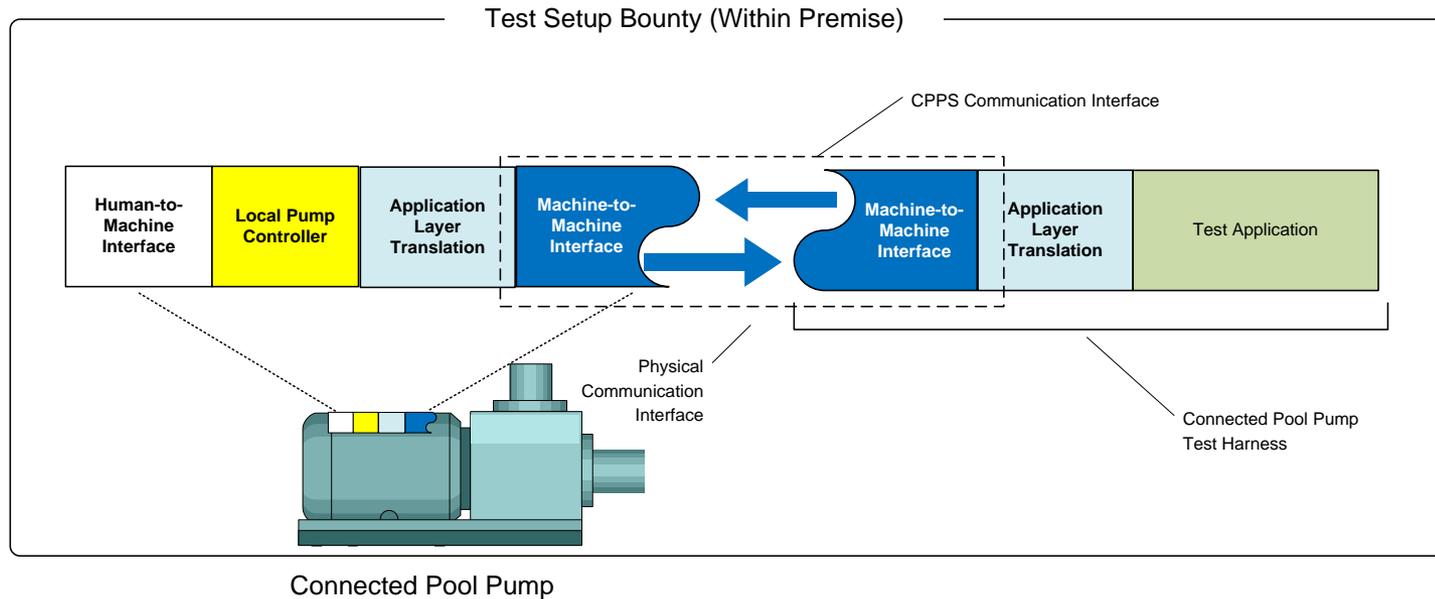
453	1. TEST REQUIREMENTS
470	Table 4: Test Method for ENERGY STAR Certification

ENERGY STAR Requirement	Test Method Reference
Demand Response	ENERGY STAR Pool Pumps Test Method to Validate Demand Response (Rev. TBD-2018)

482	EPA notes that an update of the ENERGY STAR Pool Pumps Test Method to Validate Demand
483	Response is underway. It is possible that it may be included in the Version 2 Pool Pumps Specification
484	prior to the Version 2 effective date.
486	Compliance with the DOE Test Procedure is required on February 5, 2018, for representations of energy
487	use or efficiency with respect to Dedicated Purpose Pool Pumps.

488	6.3 Compliance with Connected Criteria
489	Compliance with connected criteria, as specified in Section 4, shall be through examination of product
490	and/or product documentation. In addition, DR functionality shall be verified using the ENERGY
491	STAR Pool Pumps Test Method to Validate Demand Response, TBD-2018.

6.0 Test Requirements



Since the test plan for connected functionality has not been developed, it's recommended that the above be used to define the "Test Harness"

If recommendations included are accepted, any third-party of independent test agency and test the pump and connected functionality locally, at the pump, without having to contact the manufacturer.

The test harness(s) could be standardized and used by OEMs to develop and test their technologies prior to submission, helping to ensure interoperability between technologies tested against the same test harness.



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