

# Next Generation Heat Pump Design Specifications

*Determined By EPRI in 2016*

## LEVEL 1

## LEVEL 2

### Thermal Performance Heating

- Efficiency: HSPF 10; COP & capacity reported @ 17°F.
- Capacity: 80% of nominal (47°F Rated) @ 17°F. (H32/H1N; AHRI tests)
- 2nd Stage Heat: Load based or informed control scheme. The intent is to prevent 2nd-stage heat from engaging due to set-point change or user interaction.

- Efficiency: HSPF 13; COP and capacity reported @ 17°F and 5°F.
- Capacity: 100% of nominal @ 17°F (H32/H1N; AHRI tests); 80% of nominal @ 5°F.
- 2nd Stage Heat: Load-based or informed control scheme. See Level 1 Specifications.
- **Defrost:** Employs defrost reduction or frost mitigation technology.

### Thermal Performance Cooling

- Efficiency: SEER 18. EER 13 @ 95°F test condition. Reported capacity and efficiency data at 115°F.
- Capacity: Adequate scaling of capacity with appropriate SHR maintenance.

- Efficiency: SEER 21. EER 15 @ 95°F test condition. Reported capacity and efficiency data at 115°F.
- Capacity: Adequate scaling of capacity with appropriate SHR maintenance.

### Demand Response

- Communication: Open Protocol(s) to the device: CEA2045, SEP2.0, OpenADR (or in compliance with AHRI standard) **OR** Equivalent cloud-based system with open-protocol connectivity to cloud server and manufacturer specific comm. to the device.
- Capabilities: Power Reduction Level, Customer Override, 2-Way Device Communication, and Soft Recovery. *\*Details on 2<sup>nd</sup> page.*

- Compliant with AHRI Demand Response Standard upon adoption.
- Until adoption should meet Level 1, without cloud-based approach (must be open protocol to the device).

### Fault Detection/ Diagnosis

- Commissioning charge assist.
- Customer alert for system faults: Minimum low charge or abnormal drop in capacity alert.

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- Customer alert for system faults: Minimum low charge alert.
- **Continuous performance analysis and notification.**

## Demand Response Criteria Details

### Communications to device:

- Open Protocol(s) communication to the device: CEA2045, SEP2.0, OpenADR (or in compliance with coming AHRI standard)

**OR**

- Equivalent cloud-based system with open-protocol connectivity to cloud server and manufacturer specific communication to the device

### Responses/capabilities:

- Power reduction level: Capability to lower power draw from nominal condition to at least one position  $\leq 70\%$  of nominal power draw minimum. Published in literature: power, capacity, and EER at DR state(s)
- Customer override capability
- Device report-back/2-way communication. Minimum: Confirm operation in demand response state
- Soft recovery (e.g. no resistance heat rebound): Does not exceed nominal power draw in recovery from DR event