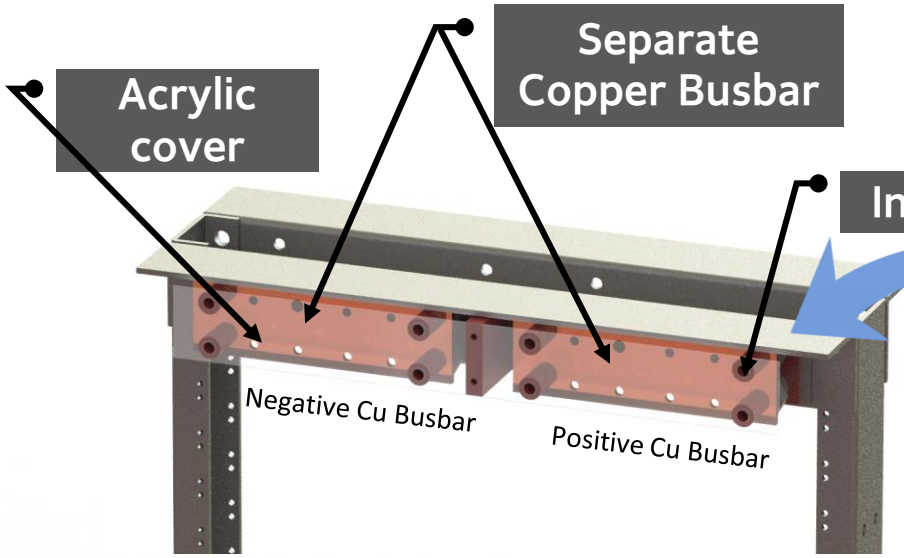
EHP Series 19” & 23” Rack mounted batteries designed for Datacenter Applications

Standard Battery Installation in 19” & 23” Racks

- Single cabinet solutions housing battery as well as UPS & other electronics
- Standard dimensions leading to ease of system design & modularity
- Dedicated battery cabinets/racks for higher energy requirements

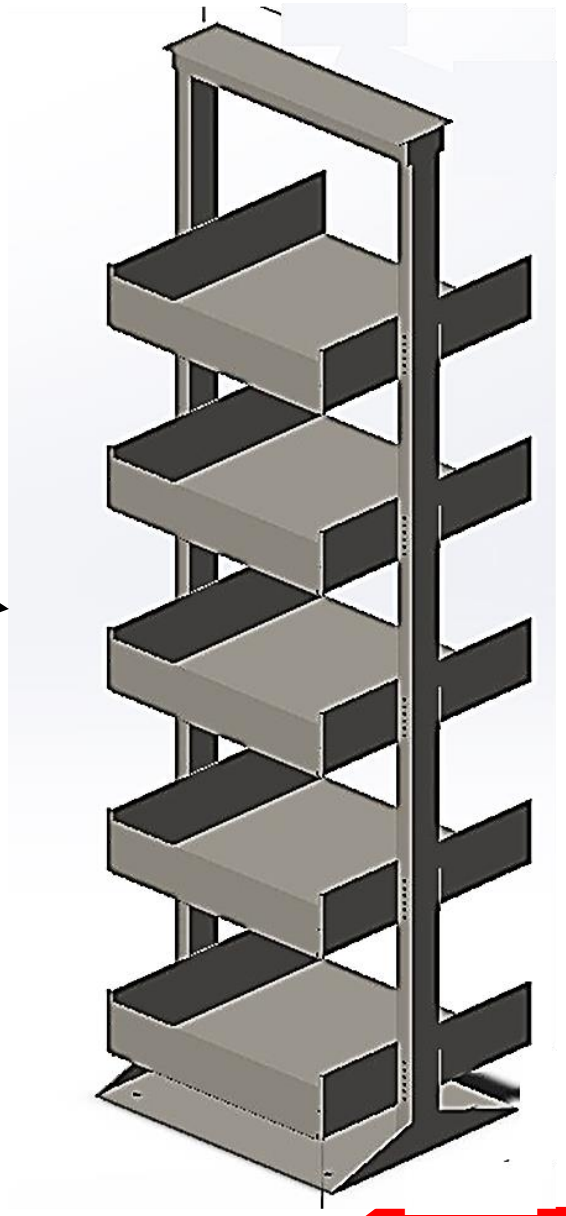
Best Practices - Datacentre Battery Installation



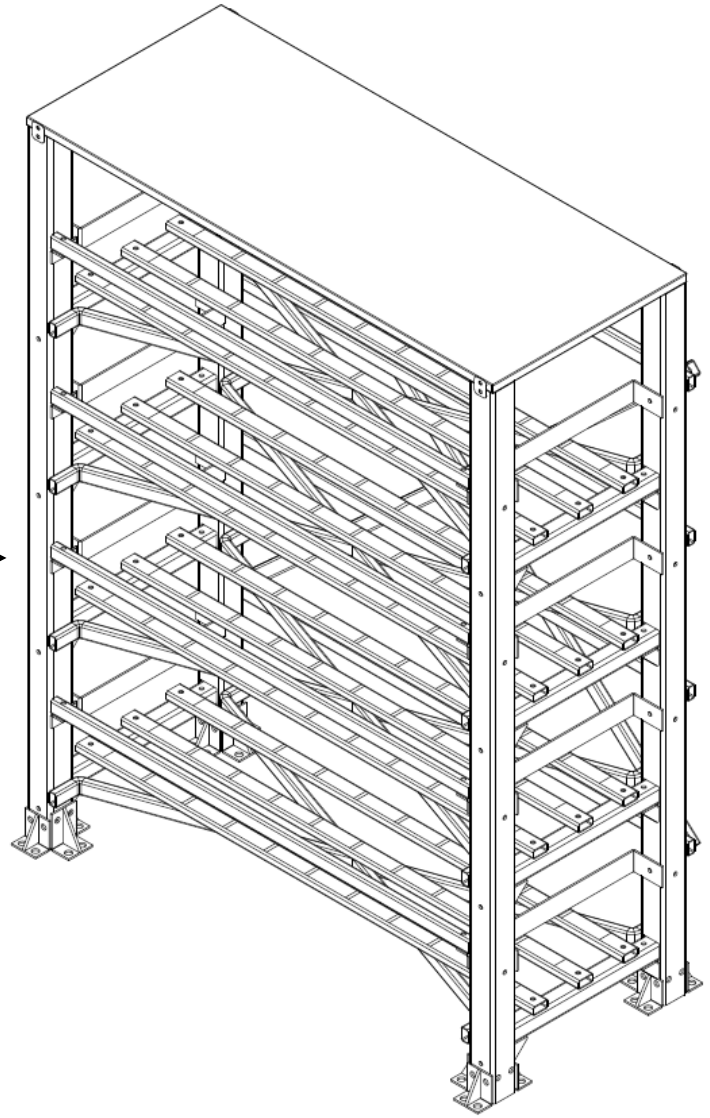
- Neat installation
- Rack rails for proper cable routing

Advantages of Battery Installation in 19” & 23” Racks over regular installation

19-inch rack as per IEC 60297 →



Regular 12V rack design →



Advantages of Battery Installation in 19” & 23” Racks over regular installation

19- and 23-inch rack

- *Standard design* : Dimensions are defined in internation standard IEC 60297-3-100.
- *Lower Footprint* : Lower footprint compared to conventional rack design.
- *Knockdown design* : Enclosures are shipped flat in partially assembled sections that provide the required compactness and also ensuring ease of assembly.
- *Increased efficiency* : The UPS and the battery bank is placed on different chassis of a server rack, reducing the complexity and length of cable connectors and thus minimizing voltage drop.

Regular 12V rack

- *Non-standard design* : rack dimensions are modified based on available room layout.
- *Standard Footprint* : Approx. 7-10% higher footprint compared to standard rack (EHP-FT batteries are considered).
- *Fabricated rack design* : Usually ship assembled and ready to roll into place. Based on specific requirement, knock-down arrangement can be made but the assembly is complex and time-consuming.
- *Compromised efficiency* : The UPS and the battery bank is usually placed in different rooms, increasing the complexity and length of cable connectors.

Advantages of Battery Installation in 19” & 23” Racks over regular installation

19- and 23-inch rack

- *Ease of installation :* Rigid positive & negative copper bus bars ensuring minimal resistance in current collection and simple electrical circuitry.
- *Simple scalability & flexibility* : Adding more battery units to the server rack is a simple way to extend UPS system as the infrastructure develops and expands.
- *Seismic Protection* : Seismic-rated enclosures include heavy-duty, torsion-resistant construction to withstand industrial vibrations and other severe seismic movement.
- *Device Management* : Rack-mountable KVM switches allow you to control dozens or even hundreds of servers from a single keyboard, monitor and mouse.

Regular 12V rack

- *Difficult installation :* Connections can sometimes be cumbersome esp. with X-X layout battery installations. Insulated front covers & terminal take-off covers have to be provided to ensure safety of installation.
- *No scalability & flexibility* : New racks are necessary to extend UPS system.
- *Seismic Protection* : Seismic-resistant rack design construction to withstand industrial vibrations and other severe seismic movement.
- *Device Management* : Not in scope.

SEISMIC DESIGNING METHODOLOGY

Design Assessment of 19- and 23-inch rack

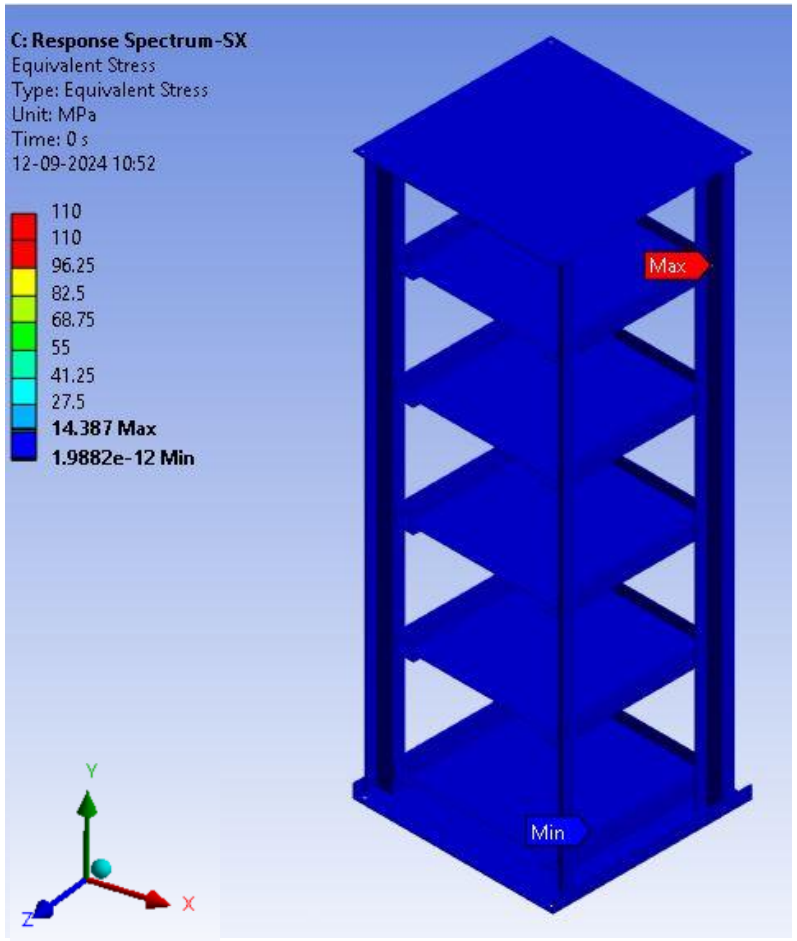
- 19- and 23-inch rack is designed based on IEC 60297-3-100 guidelines.
- These standard rack designs are validated as per IS specification IS: 1893 (Part 1) : 2002.
- The rack design is validated for 5 tier chassis design with 48V EHP-FT battery system on each chassis.
- High tensile material grade steel of E350 is used in simulation.
- Module design is validated to withstand ground acceleration of seismic zone 5 category.
- For Response Spectrum analysis, max. natural frequency is considered as 200 Hz as per provided data by ANSYS India in collaboration with Indian seismological department.
- Module design is suitable to withstand 2.5 g load with very min. structural displacement less than 2 mm.
- Overall design safety of factor is greater than 1.5 (recommended).

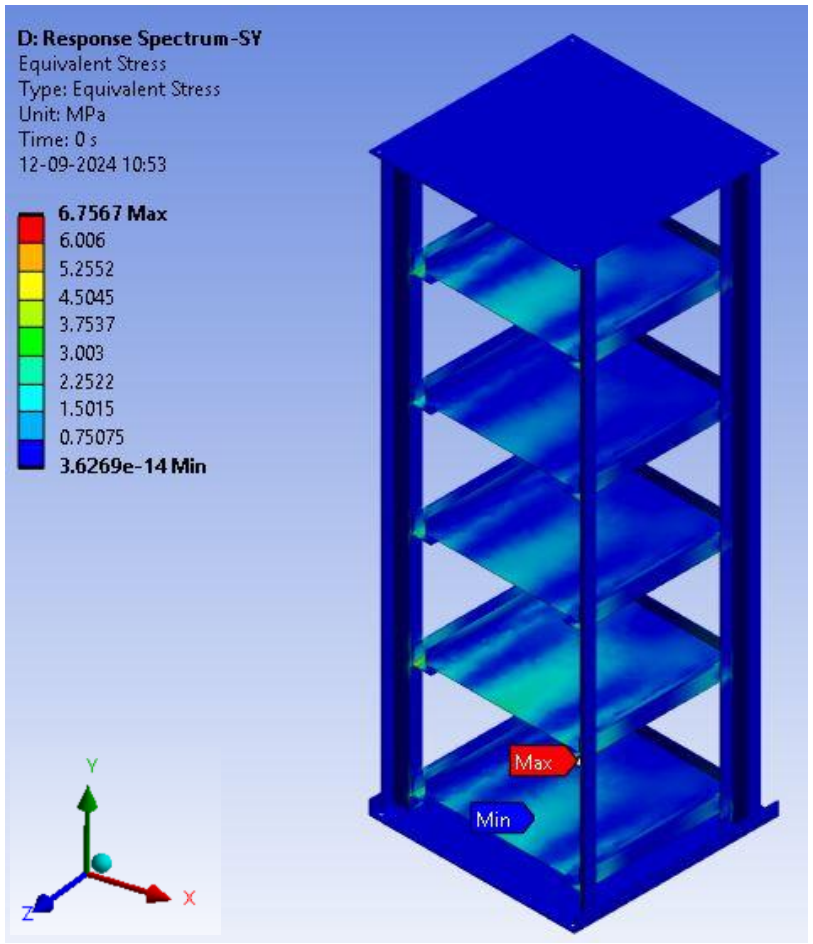
SEISMIC DESIGNING METHODOLOGY

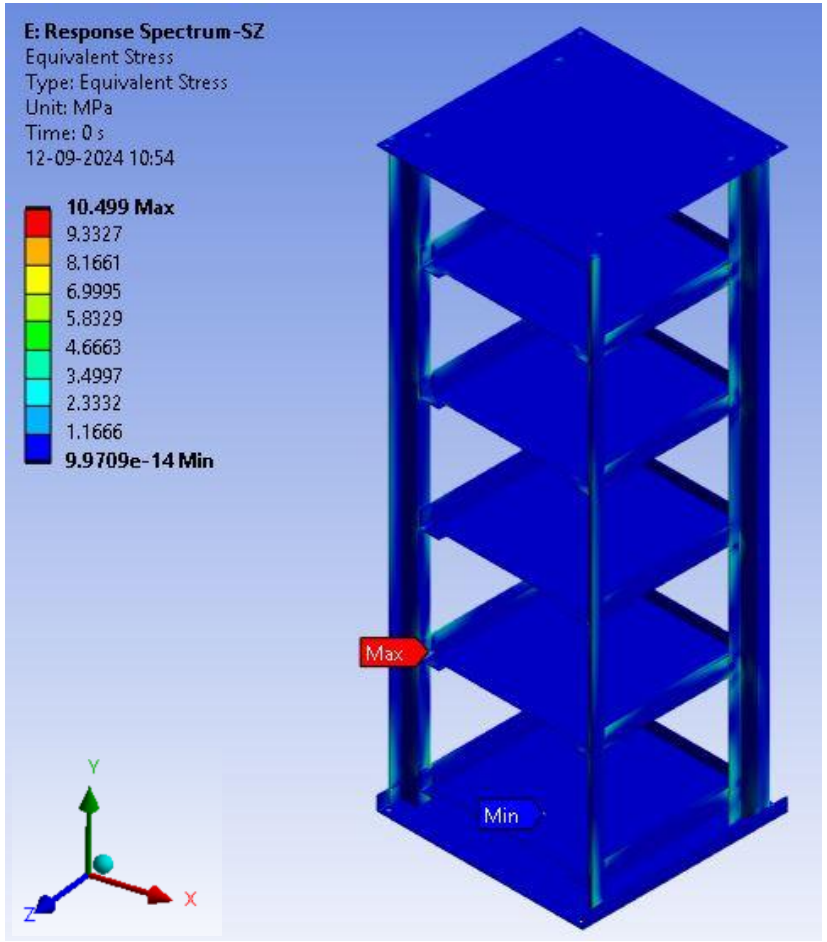
Response Spectrum Analysis

In seismic, max. impact will occur in lateral vibration (SaX).

Observed stress value is lesser than Allowable stress limit.







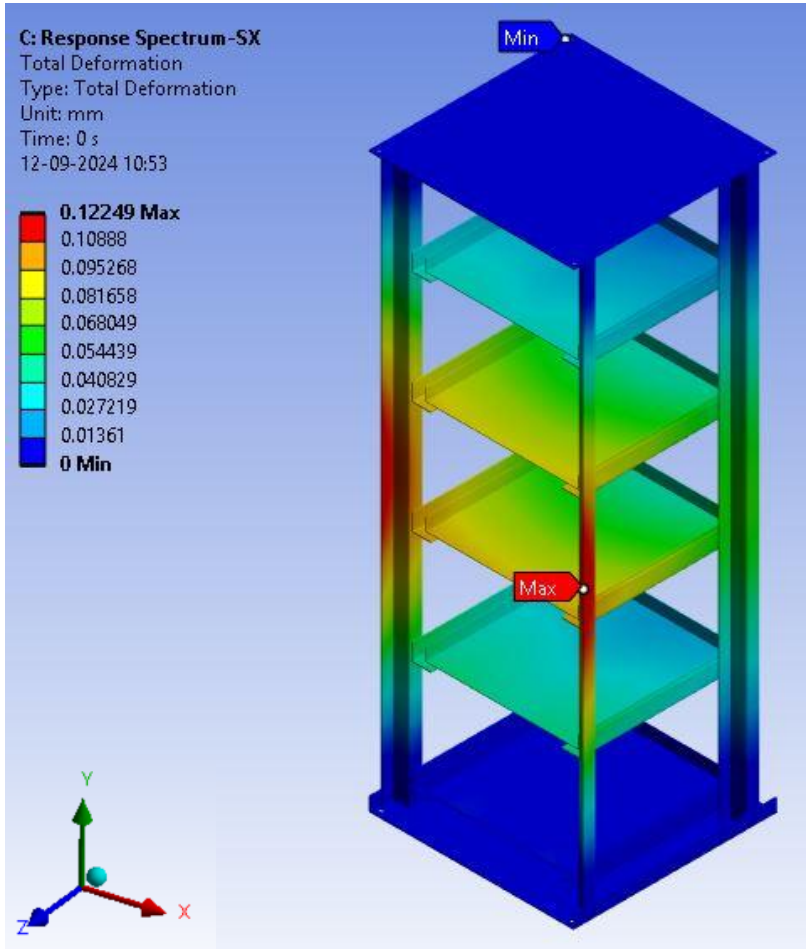
Max. allowable stress = 233 MPa

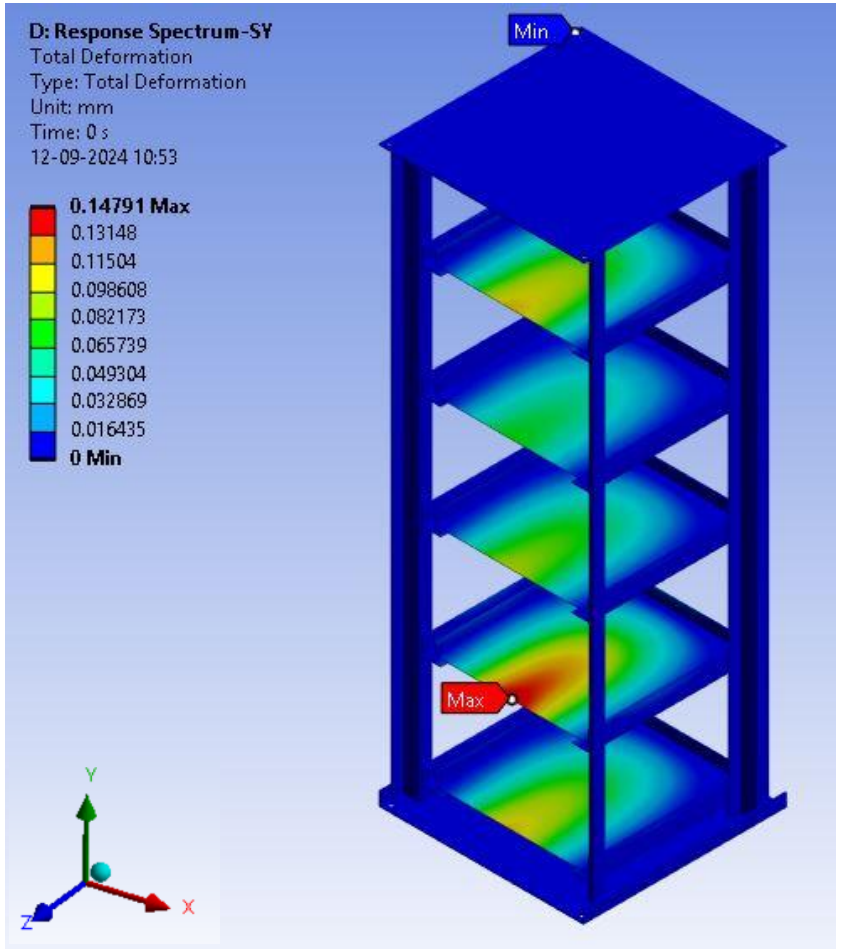
Max. Stress < 100 MPa

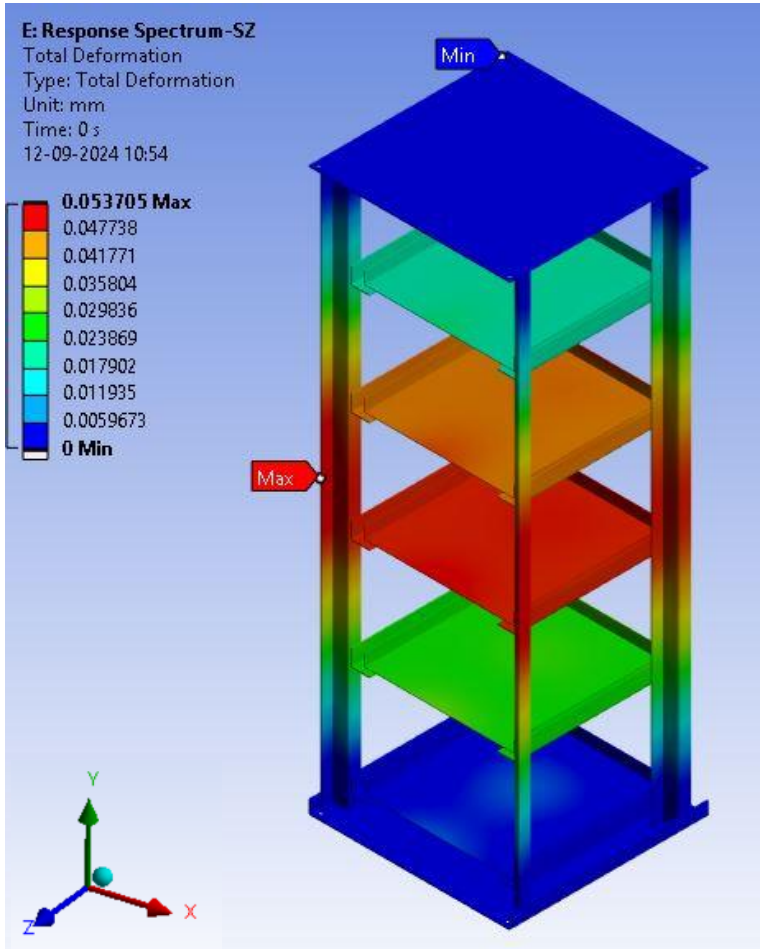
SEISMIC DESIGNING METHODOLOGY

Response Spectrum Analysis

Max. deformation observed is < 0.5 mm







Constant Power Declarations per cell (W) at 25°C

EHP12-340W-FT	ECV	3 min	5 min
	1.6	836	684
	1.67	756	618
	1.7	666	593
	1.75	565	526
	1.8	N/A	447

EHP12-450W-FT	ECV	3 min	5 min
	1.6	899	821
	1.67	841	747
	1.7	782	716
	1.75	707	643
	1.8	N/A	555

EHP12-560W-FT	ECV	3 min	5 min
	1.6	1071	946
	1.67	1013	864
	1.7	942	828
	1.75	854	749
	1.8	N/A	653

EHP12-640W-FT	ECV	3 min	5 min
	1.6	1257	1059
	1.67	1162	969
	1.7	1066	929
	1.75	969	844
	1.8	N/A	741

EHP12-750W-FT	ECV	3 min	5 min
	1.6	1307	1196
	1.67	1186	1098
	1.7	1181	1052
	1.75	1029	961
	1.8	N/A	849