

# MRH

## CERTIFICATE OF SEISMIC QUALIFICATION BY ANALYSIS

### EARTHQUAKE RACKS FOR STATIC BATTERIES MANUFACTURED BY

**Passoni Paolo e figli S.r.l.**  
Via Aristotele, 32  
20047 Brugherio (MI) – Italy

**Alpha Industrie-bedarfs gmbh**  
Niedesheimer Str. 26  
DE-67550 Worms – Germany

The earthquake battery racks produced by Alpha-Passoni are hereby seismically certified for compliance with the following Building Codes:

**2018 International Building Code – IBC 2018**

**2019 California Building Code – CBC 2019**

These battery racks are hereby seismically qualified when properly installed for their structural adequacy in areas with the Risk-Targeted Maximum Considered Earthquake ( $MCE_R$ ) Design Spectral Acceleration Parameter at a short period of  $S_{DS} \leq 0.97g$  as defined by the above codes. These battery racks shall be located at or below grade with  $z/h=0$  and when  $I_p$  is 1.0. These battery Racks shall be used for Risk Categories I, II & III, Site Classes A, B, C & D, and in structures assigned with Seismic Design Categories A, B, C, D & E. See page 2 of this certificate and our seismic qualification report dated July 15, 2021 for other limitations and modifications of this qualification. This qualification is based on a thorough review of the report entitled “static calculations of racks for earthquake battery installation” produced by:

Kühne BSB GmbH, Mina-Rees-Straße 5A, 64295 Darmstadt - Deutschland

And investigation and collateral seismic stress analysis performed by our engineers.

**MRH Structural Engineers, Inc.**

3400 Irvine Avenue, Suite 101  
Newport Beach, California 92660

Phone: (714) 633-6302  
Email: MRH@MRHS.com  
Website: MRHSE.com

**July 15, 2021**

**No. 20115**

**Page 1 of 2**



# MRH

## CERTIFICATE OF SEISMIC QUALIFICATION BY ANALYSIS

### EARTHQUAKE RACKS FOR STATIC BATTERIES MANUFACTURED BY

**Passoni Paolo e figli S.r.l.**  
**Via Aristotele, 32**  
**20047 Brugherio (MI) – Italy**

**Alpha Industrie-bedarfs gmbh**  
**Niedesheimer Str. 26**  
**DE-67550 Worms – Germany**

#### CONDITIONS & LIMITATIONS:

1. Racks shall be in sites with  $S_{DS} \leq 0.97g$  as determined per Sec 11.4.5 of ASCE 7-16.
2. Racks shall be installed in “Non-Life-Depending” and “Non-Essential” facilities only.
3. Racks shall be located **only at or below grade ( $z/h=0$ )**.
4. Racks shall NOT be located above grade (any floor above ground level) or roof.
5. Racks shall be used when  $I_p = 1.0$  per Sec. 13.1.3 of ASCE 7-16.
6. Racks shall NOT be used for Seismic Design Category “F” per Sec. 11.6 of ASCE 7-16.
7. Racks shall NOT be used for the Risk Category “IV” per Table 1.5-1 of ASCE 7-16.
8. Racks shall NOT be installed in Site Class “E” & “F” per Sec. 11.4.7 & 11.8 of ASCE 7-16.
9. Racks shall NOT be used for DSA or OSHPD projects in California.
10. Racks shall NOT be subject to any impact, shock or vibrating forces.
11. Racks shall NOT be located at exterior, corrosive, and non-dry conditions.
12. Racks shall be positively and rigidly anchored at all base plates and anchor points to a rigid base.
13. Rack anchor bolt design shall be provided by others. For anchorage to concrete, Sec. 13.4.2 of ASCE 7-16 shall be satisfied.
14. Racks shall be anchored using the following seismic design parameters:  $a_p=2.5$  (min),  $R_p=1.5$  (max) and  $\Omega_o=2.0$  (min).
15. Certificate of compliance for the seismic qualification of racks, supports and attachments shall be submitted to the building official in accordance with Sections 1704.5 and 1705.13.2 of IBC 2018 and CBC 2019.
16. Special inspection is required for installing racks & attachments per Sec 1704, 1704.5 & 1705.13.2 of IBC 2018 & CBC 2019.
17. Racks shall have a minimum all-around clearance of 6 inches from any other object (walls, columns, other equipment, etc.).
18. Batteries shall have restraints in all directions per Section 13.6.3, item 3 of ASCE 7-16.
19. To determine the maximum allowable battery masses from the Khüne BSB report use only Min. 1.0g & Min 0.5g columns of the Battery Mass values from the Annex D Tables with a reduction factor of 0.5 (Do not use values in the 0.3g columns).

**MRH Structural Engineers, Inc.**

3400 Irvine Avenue, Suite 101  
Newport Beach, California 92660

Phone: (714) 633-6302  
Email: MRH@MRHS.com  
Website: MRHSE.com

**July 15, 2021**

**No. 20115**

**Page 2 of 2**



