

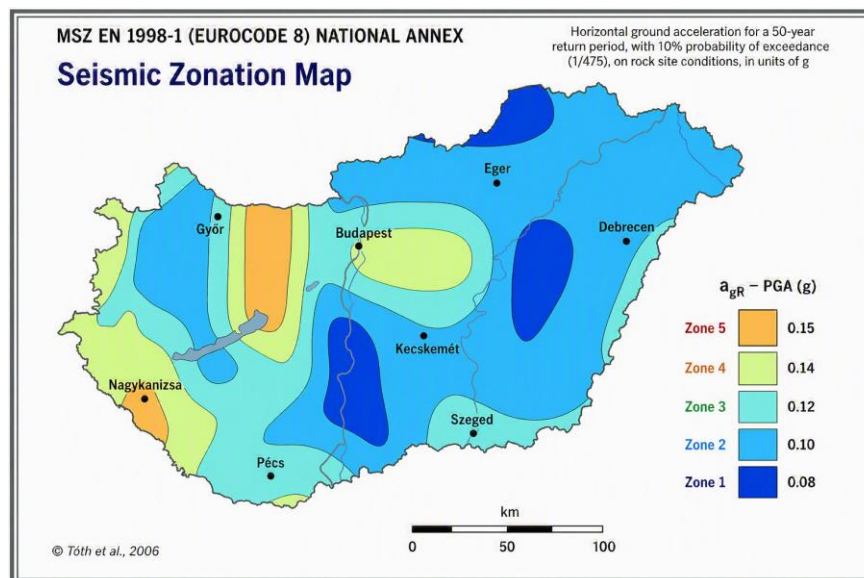
Information on the Seismic Design of Racking Systems

Due to changes in the standardization framework in recent years, Jungheinrich Hungária Kft. provides the following information to investors and operators of racking systems regarding the structural design of racking systems.

Applicable standards for racking systems:

MSZ EN 15512:2020+A1:2022	Fixed steel storage systems. Adjustable pallet racking systems. Principles for structural design
MSZ EN 15620:2021	Fixed steel storage systems. Tolerances, deformations and clearances
MSZ EN 15629:2009	Fixed steel storage systems. Specification of storage equipment
MSZ EN 15635:2009	Fixed steel storage systems. Application and maintenance of storage equipment
MSZ EN 16681:2016	Fixed steel storage systems. Adjustable pallet racking systems. Principles for seismic design

- In 2022, the Hungarian Standards Institution adopted the European standard EN 15512:2020 as a Hungarian standard under the reference MSZ EN 15512:2020+A1:2022, replacing the previous MSZ EN 15512:2009. The standard sets out the principles for the structural design of racking systems, including rack-clad storage systems.
- The amended MSZ EN 15512 refers to the MSZ EN 16681:2016 standard, according to which, in areas affected by seismic loading, both standards must be applied jointly for the structural design of racking systems.
- According to MSZ EN 16681:2016, earthquake loads shall be determined in accordance with MSZ EN 1998-1 (Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings), for which the zoning map below provides a basis. Furthermore, MSZ EN 15629:2009 specifies additional parameters to be considered in the seismic design of racking systems, and the necessary data must be provided by the investor or future operator (or an external expert) to the supplier of the racking system.



Due to differing practices in the industry, the Department of Material Handling and Logistics Systems of the Faculty of Transport and Vehicle Engineering at the Budapest University of Technology and Economics issued a professional statement on 13.01.2023 following extensive consultations, aimed at clarifying the standards and legal framework relating to the design, installation,

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operation and inspection of warehouse racking systems.

According to the statement:

- „Based on MSZ EN 16681:2016, racking systems and Clad-rack storage systems must be designed for seismic loading.”
- „The investor (the future operator) must be aware that the professional design process and the resulting technology to be installed will ensure and create safe working conditions for employees. At the same time, it is the responsibility of the operator to apply the relevant MSZ EN standards during the operation of the racking system in order to ensure safe working conditions.”
- „If the parties decide for any reason not to design the racking system for seismic loading, the requirements of the relevant standard will not be fully met. In the absence of a consultant, it is the responsibility of the supplier to draw the investor’s attention to the expected consequences and potential risks arising from the omission of seismic design, which should be determined and assessed in light of the current installation conditions. Such consequences may include differences resulting from the mechanical characteristics of the structure; changes in physical parameters; differences arising from the properties of the materials used; changes in performance limits, etc. Potential risks may include, without limitation, in the event of an earthquake: collapse of all or part of the racking system; damage to the host building; personal injury, etc.”

In deciding whether or not to take seismic loads into account, it is recommended that the investor prepares a risk analysis examining the conditions of operation, and – particularly in the case of complex logistics systems – engages a consultant supporting the investor/end-user in cooperation with Jungheinrich Hungária Kft. By accepting this document containing this information, the investor and/or future operator of the racking system acknowledges that it has received appropriate information from Jungheinrich Hungária Kft. regarding the seismic design of racking systems.