



Racking and Shelving Procedure

Introduction

The purpose of this policy is to establish the minimum requirements for constructing/installing racking or shelving in the Park West School Division (The Division). This policy provides information on the design, installation, and use of racks or shelves used for storage of materials. Due to the diversity of design and installation requirements for racking and shelving, it is essential that the manufacturer's recommendations be followed, and all the divisions manufactured storage racks or shelves meet these minimum requirements.

Procedure

Storage racks and shelves must be designed and fabricated according to the requirements established by a professional engineer. If there is a doubt as to the structural capacity of a racking system or any of its components, a request should be made for the approved design drawings. This may be obtained from the manufacturer or an independent professional engineer.

Layout

A proper layout of the proposed racking system and total floor area should be developed before installation. This is to ensure that adequate clearance and working space is provided for the safe movement and storage of the materials.

Base Plates

All columns of racks must be furnished with proper bearing plates. The bearing plate is designed to provide a uniform transfer of the column load to the floor. The rack manufacturer or designer can supply data on the size and pressure exerted under the bearing plates for each type of upright. This will confirm whether the floor can support the anticipated load.

Vertical Constraints

Rack capacity and rating is based on the racks being installed vertically straight or "plumb". It is essential that the vertical components of the racks be installed in conformance with the design specifications (maximum tolerance is 25mm in 3m of height).

Overtipping

The height-to-depth ratio of the entire rack should not exceed three-to-one, measured from the floor to the top of the rack. This ratio may be exceeded only if the rack is suitably anchored, externally braced, or properly secured to the building structure.



“Back-to-Back” Racks

Even if individual back-to-back racks do not exceed the three-to-one ratio, the racks should be fastened together to provide greater stability.

Deflections

At maximum working load, the deflection of rack beams must not exceed $1/180^{\text{th}}$ of the span of the beam, (i.e. if the span of the beam is 4m, the maximum deflection allowed is 22mm).

Bracing

Diagonal bracing of the structure is dependent upon design considerations, and varies from one rack to another. Diagonal bracing must be provided to ensure the stability of the uprights (columns). Reference to the original design specifications is necessary to determine if the structure is properly braced.

Floors

Racks cannot sit on uneven floors without being properly leveled. The uprights must meet the vertical constraint standards described above, and all shelves must be level.

Beam Connections

Rack connections made to the building must ensure that the loading of the racks does not affect the structural integrity of the building. The opposite is true also. The rack should not be damaged by the building. This can occur if the rack is tied in to the roof of a building and the roof defects under a snow or rain load, causing deflection of the rack itself.

Anchoring

Anchoring shall be installed when required by the manufacturer. Anchor bolts must be capable of restraining the horizontal forces caused by vertical and horizontal loading conditions. Structurally rated bolts should be used for anchoring purposes. Expandable bolts through the bearing plates and into the concrete should be of the type and size rated to resist these forces.

Rating Plates

Maximum load plates shall be clearly posted in a conspicuous location at the worksite indicating allowable loads (maximum weights) for the shelving unit.