



FEDERATION EUROPEENNE DE LA MANUTENTION
SECTION IX

FEM
9.754

Safety rules for automatic miniload storage and retrieval machines

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Preliminary note

When deviating from the following recommendations, equivalent regulations, especially regarding the protection of persons, should be agreed upon in writing by the supplier and the customer; they are, if possible, to be laid down previously with the competent authorities.

1 Scope

The regulations laid down in the present rules, apply to miniload storage and retrieval machines which are used for the automatic service of shelves; they cover miniload storage and retrieval machines which operate in an enclosed area and which have a maximum height of 12,50 m, a maximum load of 315 kg, and which do not transport bulky loads (total dimensions length + width + height $< 2,5$ m). These miniload storage and retrieval machines have no installation to carry persons.

The machines which do not meet these criteria, do not fall under the present rule and must correspond to the regulations of FEM 9.753 „Safety rules for storage and retrieval machines“.

2 Definitions

The definitions of FEM 9.101 of FEM Section IX are complemented within the scope of the present rule as follows:

2.1 Miniload storage and retrieval machines

A miniload storage and retrieval machine is an automatic conveyor for unit loads.

2.2 Enclosed area

The enclosed area comprises the areas in which persons can be endangered by miniload storage and retrieval machines.

These areas are:

- the operating range of the miniload storage and retrieval machine
- the shelves
- the area in which the load units or products, which are being moved by the miniload storage and retrieval machine, can fall down.

2.3 Operating range of the machine

The area taken up by the movements of the miniload storage and retrieval machine.

2.4 Operator's position(s)

Each place from which the movement of the storage and retrieval machine can be commanded; it always lies outside of the enclosed area. Do several operator's positions exist, one operator's position (called the main operator's position) must have the priority over the others.

3 Construction and equipment – rules and regulations

With respect to the materials used, the design, the method of construction and equipment, the machines must comply with the state-of-the-art engineering and especially with the regulations put down in the documents of FEM Section IX (TSC storage and retrieval machines) and meet the relevant regulations in the country of the user.

4 General conditions of operation

4.1 Construction of the installation and operation

The conditions of the installation and operation must be subject of a performance spec which is drawn up by the supplier and the user and where is put down especially the place of erection, the kind of load, the throughput, etc.; should it be necessary to consider certain

factors in an installation with respect to safety, like fire, explosion, risks of chemical or biological nature, prejudice to the environment, noise, etc., these factors have to be laid down by the parties to the contract.

The description of the manufacturer is applied, where no special operating conditions are agreed upon.

4.2 Delimitation of the enclosed area

4.2.1 The enclosed area shall not be accessible during operation. The access can be prevented by permanently installed enclosures (wall, partition, fence, etc.) or by invisible barriers. Only qualified and authorized personnel may pass these barriers after having taken all necessary precautions. The opening of an access during operation must provoke an immediate stillstand. If the access is through a door, the door must have the following characteristics:

- it must open only outwards
- it must be possible to open it from the inside without a key
- it only shall be possible to open it from the outside with a key.

4.2.2 Warning and directional signs

Clearly visible warning signs have to be put on suitable places, especially at the access, which prohibit the access to the enclosed area or the travelling of persons on the storage and retrieval machines or which give other indications.

4.3 Load units

The load units must comply with the specifications accepted by the manufacturer. The user has to see to it that the load units are in such a condition not to fall down into the enclosed area during operation, not to jam and not to project into the area of operation of the machine.

4.4 Application

It is prohibited to use miniload storage and retrieval machines for purposes other than the one it was constructed for.

5 Safety equipment

These measures and dispositions are meant to ensure the safety of persons and goods, considering the legal regulations in the country of the user, after determination of the causes of danger (including the dangers in connection with maintenance and repair).

The means for preventing accidents must be examined in the following order:

- accident preventing by the machine itself already in the stage of construction, in order to avoid the origination of danger;
- when this is not possible, provision of protective measures.

5.1 Removable protection equipment

If the installation requires this kind of protection equipment (coverings, partitions, fences, etc.), it is to be provided with safety contacts which prevent dangerous movements of the machine when the protection equipment is removed.

5.2 Brakes

The drives for the travel and lifting unit must be equipped with brakes which actuate automatically in the event of power failure.