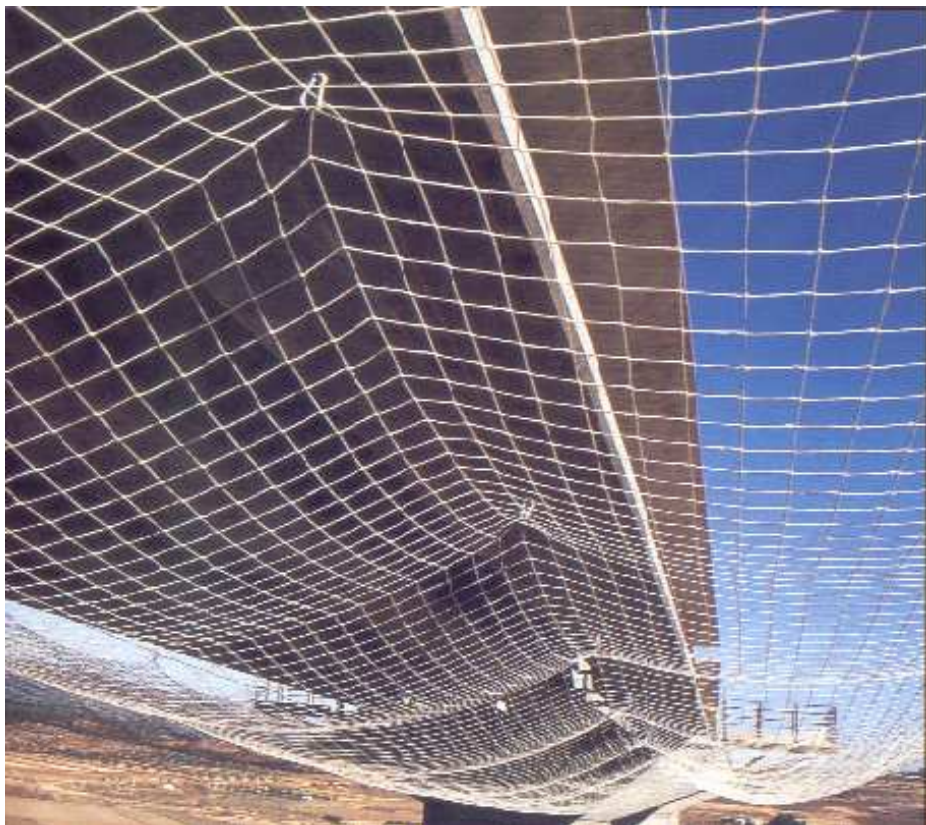


“SYSTEM S”
SAFETY NETS EN-1263-1

HANDBOOK



TECNOLOGÍA DEPORTIVA, S.A.



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1.- INTRODUCTION

Edition: October 1998.
Last revision: October 2005

Safety nets are used as collective protections in building and assembly works, as devices to prevent people or objects from falling while constructing buildings, industrial premises, warehouses, bridges, etc. This allows total mobility for those people working over the area covered by the safety net during transport and working duties.

This handbook serves as a guideline for the assembly and removal of safety nets. It is applicable to TYPE S safety nets, which are safety nets with perimeter cord according to the EN-1263-1 standard, used for horizontal protection (cavities in buildings, industrial premises, warehouses, bridges, etc.)

The framework Directive 89/391/CE and its transposition to the Spanish Legislation, Act 31/95 on Occupational Risks Prevention, establish the principles of preventive action putting collective protection before individual protection.

Directive 92/57/CE and its transposition to the Spanish RD 1627/97 on Minimum Safety and Health Requirements in the building sector, indicates several fall protection systems, including the use of safety nets.

The European Committee for Standardization (CEN/TC53), at the request of the European Commission, has established an EN standard for safety nets, divided into two parts, as follows:

UNE-EN-1263-1. Safety nets. Part 1: Safety requirements. Test methods.
UNE-EN-1263-1. Safety nets. Part 2: Safety requirements to install safety nets.

AENOR (Spanish Association for Standardization) has published the official Spanish version of the said standards, thus repealing the UNE 81-650-80 standard which was in force up to that date.

2.- DEFINITIONS

The following definitions are established according to the EN-1263-1 standard:

2.1. Net.

The net is a link of meshes.

2.2. Safety net.

A net held by a perimeter cord or other fixing elements or a combination of both designed to catch people falling from certain heights.

2.3. Mesh.

A mesh is a set of cords in the shape of geometrical models that form a net.



2.4. Perimeter cord.

It is the rope which passes through the edges of every mesh in a net and which determines the dimensions of the safety net.

2.5. Attachment cord.

The cord used to tie the perimeter cord to an adequate bracket.

2.6. Joining cord.

Cord used to join several safety nets.

2.7. Test mesh.

It is a separate section of meshes placed in the safety net in order to determine the deterioration due to aging and that can be pulled without altering the net's features.

2.8. Support structure.

The support structure must be designed to absorb kinetic energy.

2.9. System "S" Safety Net .

Safety net with perimeter cord.

3. DESCRIPTION OF SYSTEM "S" SAFETY NETS COMPONENTS AND AUXILIARY ELEMENTS

3.1. Main components.

3.1.1. Net.

The net's dimension is greater than 35 m² and it is delimited by the perimeter cord.

The mesh dimensions are smaller than 100 mm and its plaits are manufactured with super tough polyamide or polypropylene fibres. They have been tested in accordance with the requirements provided for by the UNE-EN-1263-1 standard.

3.1.2. Perimeter cord.

The perimeter cord passes through the edges of every mesh in a net. It has been tested in accordance with the requirements provided for by the UNE-EN-1263-1 standard, with a minimum breaking load of 30 kN.

3.2. Auxiliary components.

The following elements are used to hold the safety net:

3.2.1. Attachment cord.

This cord is used to hold the net to the work structure.

The attachment cord is tested in accordance with the requirements provided for by the UNE-EN-1263-1 standard, with a minimum breaking load of 30 kN (Cord M) or 15 kN with double strap (Cord Z).



3.2.2. Joining cord.

It is used to connect safety nets.

The joining cord is manufactured with tough polyamide and tested in accordance with the requirements indicated in the UNE-EN-1263-1 standard, with a minimum breaking load of 7.5 kN.

3.2.3. Steel cables.

The steel cables used to hold safety nets should be made of galvanized steel with a quality of 180 kgrs/mm² and a minimum breaking load of 50KN.

These steel cables are to be joined to the structure by means of duly calculated anchorage.

3.2.4. Snap rings.

Snap rings should be made of galvanized steel with locknut and a minimum breaking load of 20 KN.

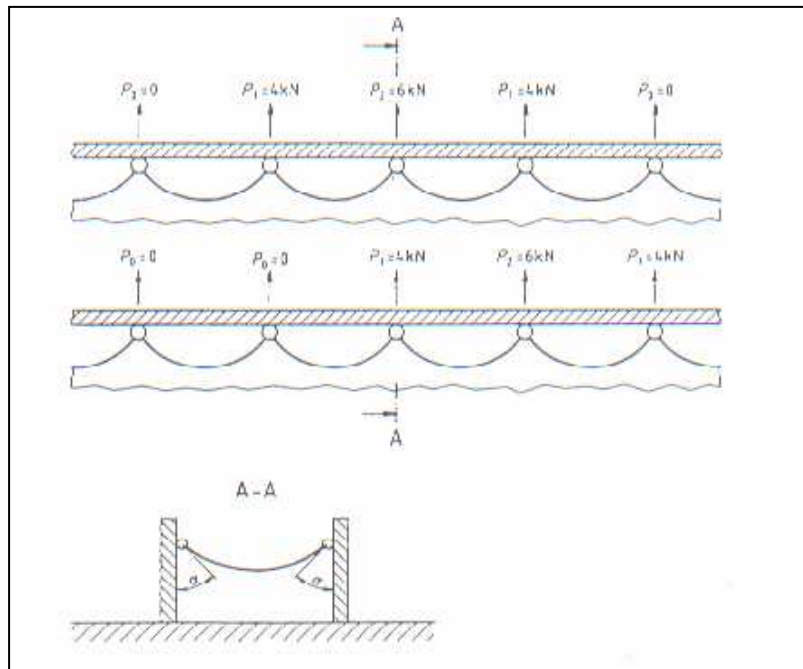
3.2.5. Forging hooks.

These hooks are recommended to protect cavities in indoor patios, stairwells and other cavities in general. They must be placed (separated not more than 50 cm) in the forging before the setting of the cement in order to hold the net's perimeter cord to the forging edge.

4. GENERAL REQUIREMENTS FOR INSTALLATION

4.1. Required Anchorage Forces.

"Type S" safety nets can be held to adequate anchorage points with attachment cords. The distance between the attachment points must not be greater than 2.5m. The shorter the fixing distance, the closer is the net to the holding edge. In order to calculate each anchorage point, the characteristic load will be at least 6kN, for a 6m fall height. The angle of calculation of this load will be $\alpha = 45^\circ$. To calculate the support structure, only three characteristic loads will be considered: 4 kN, 6 kN and 4 kN, in the most unfavourable position (see figure).





4.2. Fall height.

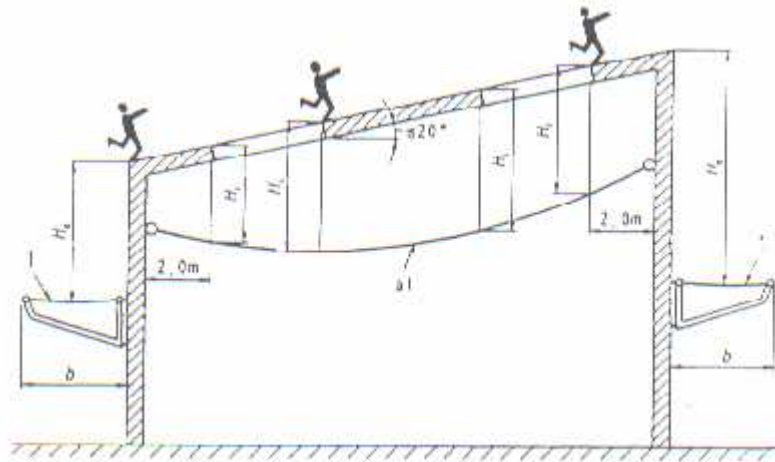


Figure 1

Fall height H_i is the distance between the safety net and the upper working point, see Figure 1.

Fall height H_e is the vertical distance between the safety net and the upper working point, at the edge of the working area, see Figures 1 and 2.

Reduced fall height H_r is the vertical distance between the safety net and the upper working point, to a horizontal distance of 2.0 m from the anchorage points, see Figure 1.

Safety nets must be installed as close as possible under the work level. Work heights H_i and H_e will not exceed 6.0 m, see Figure 1 and 2.

Besides, the reduced fall height H_r will not exceed 3.0 m, see Figure 1.

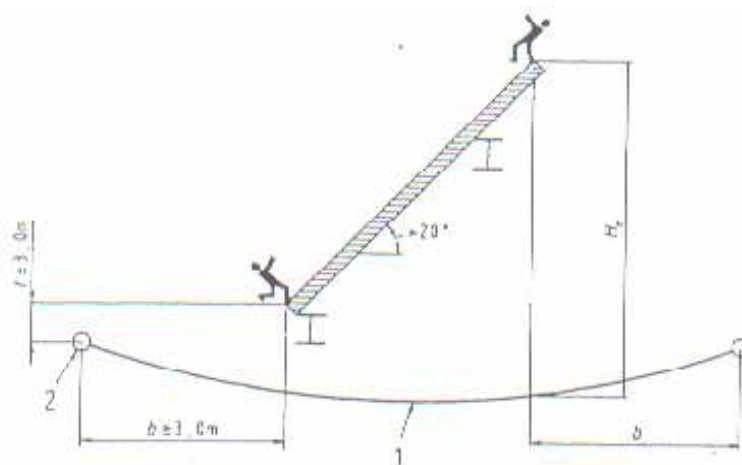


Figure 2



4.3 Collecting width

Collecting width b is the horizontal distance between the working area edge and the safety net edge, see Figures 1 and 2.

Depending on the fall height, the collecting width b of the safety net will not be less than the values indicated above:

Authorized fall heights and collecting width requirements.

Fall Height H_e	≤ 1.0 m	≤ 3.0 m	≤ 6.0 m
Collecting Width b	≥ 2.0 m	≥ 2.5 m	≥ 3.0 m

If the work area is tilted more than 20° :

- Width b will be at least 3.0 m.
- The distance t between the working point at the edge and the lowest point of the safety net's edge will not exceed 3.0 m. (see Figure 2)

4.4 Joining nets.

The cords used to join safety nets must be in accordance with the EN-1263-1 standard. They must be overlapped so that the distances which are not covered do not exceed 10mm within the net. The minimum overlapping length will be 2.0 m.

4.5 Minimum free distance under the safety net

The minimum free distance under the safety net must be in accordance with the net deformation, the smallest side of the net, and higher than:

	Fall height in meters					
Smallest side of the net	1	2	3	4	5	6
5	3.50	3.80	4.00	4.20	4.30	4.40
9	4.40	4.50	4.75	4.80	4.90	5.00
12	5.00	5.20	5.40	5.50	5.70	5.80
16	6.00	6.25	6.50	6.80	6.90	7.00
20	7.10	7.25	7.40	7.80	8.00	8.20



5. INSTALLATION, ASSEMBLY AND REMOVAL

5.1 Installation of Safety Nets.

While installing, appropriate individual protection measures must be used: harness connected to a lifeline.

The installation system of “System S” safety nets can vary depending on the dimensions and areas where they will be installed.

There are two ways of installation:

- “System S” safety nets for big cavities in buildings.
- “System S” safety nets for protection in industrial premises or warehouses.

“System S” safety nets will be installed with attachment cords held to anchorage points which are able to resist the characteristic load. The distance between anchorage points must be shorter than 2.5 m.

The cords used to join safety nets must be in accordance with the EN-1263-1 standard. They will be joined in such a way that the distances which are not covered will not exceed 10mm inside the net.

5.2 Assembly of safety nets.

In buildings with big cavities, the hooks will be used to fix the safety net to the roof edge, passing the perimeter cord through the net.

Hooks must be made of galvanized iron and they will be placed every 50 centimetres.

The net should adapt to the dimensions of the industrial premises, using attachment cords to fix the net to the metal structure.

5.3 Removal of safety nets.

While removing safety nets, the workers involved must use appropriate individual protection equipment (harness connected to a lifeline).

Once the works have been completed, safety nets will be removed following the steps above:

- 1.- Recover transversal cords.
- 2.- Recover horizontal cords.
- 3.- Take the net to the edge where the cables are fixed to the ground.



- 4.- Recover one of the cables and place the net on the ground with the system's pull.
- 5.- Nets are removed from the sliding pulley.

8. STORAGE, INSPECTION AND REPLACEMENT

6.1 Storage of safety nets.

Safety nets are manufactured with 6 Super tough Polyamide fibres or with super tough Polypropylene with sun treatment, the performance of which against the solar action is very good, and against abrasion excellent. Nevertheless, the following precautions must be taken:

- Nets must be stored in dry rooms, away from humid areas, over wooden shelves or in closed containers. If they get wet, they must be dried before they are stored.
- Nets must be protected against UV radiation.
- Nets cannot be stored close to heat sources or in areas where they could be in contact with dangerous materials or substances (solvents, oils, welding, radials, etc.)
- In case they can enter in contact with welding particles, protect with fireproof covers.

6.2 Inspection of safety nets.

Safety nets must be tested and checked in order to detect:

- Breaks in mesh cords.
- Objects within the net's area.
- Oxidation caused by metallic elements.
- Threads or fibres damaged because of abrasion, etc.

6.3 Replacement of safety nets.

Safety nets must be replaced in the following cases:

- If a person falls into the safety net, it must be replaced by a new one and sent to the factory for inspection.
- If materials such as rubble, bricks or other small elements fall into the net, but its fibres or plaits are not broken, remove the materials from the net.
- If the materials are heavy, even if the net's plaits or fibres are not broken, it is advisable to replace the net and send it to the factory for inspection. If the fibres or plaits have been broken, remove the net and place a new one.



7. TESTING TEST MESHES.

Safety Nets have a test mesh used to control the net's conditions due to natural aging.

The test mesh, which has the same registration number than that of the safety net you are using, must be sent back to our address three months before the expiration date indicated on the net's label, so that we can test the sample and determine the aging.

The minimum breaking load that the test mesh must bear is indicated on the safety net's label.

If the safety net's deterioration has been greater due to high solar exposure, it is recommended that the safety net should be replaced.