



# INDUSTRIAS DUERO, S.L.

## QUALITY MANAGEMENT DEPT

### RECOMMENDATIONS FOR HANDLING, STORAGE, ASSEMBLY, CLEANING AND RECONDITIONING

In order not to damage the zinc coating and thus maintaining the aesthetic and durability features that the HDG finish provides, please read and follow the hereunder series of recommendations.

#### Handling.

- Avoiding detachment of the zinc layer caused by improper handling, storage, transportation, or incorrect assembly on site, as well as avoiding mechanical impacts or abrasion efforts.
- While undertaking lift/ moorage works during transportation and/or assembly, non-metallic strips or slings are preferred.
- Protection gear (gloves) used on site, must be kept clean off greases, oils and products, that can trigger undesirable damages on the galvanizing.

#### Storage.

- Keeping materials in a dry place, where condensation does not occur, preferably at roofed surfaces, is regarded as an optimal pick.
- Direct ground piling of material is not recommended. Material should always be piled-up, preferably on wooden supports when placed on ground.
- Well-ventilated spots for storage is a good idea.
- Zinc-coated material contact with other metal elements, causes the called galvanic rust, therefore the use of an isolating interlayer between them is a must.
- In order to avoid condensation phenom, please never store material out in the open, covered with a canvas or retractile plastic.
- If no other choice than storing material out in the open, it's highly recommended to store the material slightly inclined, to favouring accumulated water drainage.
- Materials whose packaging is based on plastic or cardboard, should be stored under roof to protect them from direct sunlight, rain and / or snow and to avoid deterioration of the their wrapping.

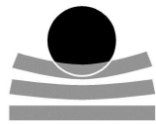
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### Assembly.

- Through out posts driving procedure, ensure the machinery is in good condition, and no oil or grease dropping is observed on the galvanised surface.
- Whilst carrying out barrier's parts distribution on ground, avoid walking on them to get material's deformation risk; staining; or elimination of the passive film, reduced.

### Cleaning.

- Remove cement remains immediately. Mortar stains or any other dirtiness should be removed using a clear water solution, preferably containing in it, 5% of a neutral detergent or soap, using a sponge, leathered or wet cloth.
- Restrain the use of cleaning products such as abrasive materials, organic solvents or detergents whose chemical composition is unknown.

### Reconditioning.

In case of the galvanized surface shows small damaged areas, resulting from hits produced during handling or installation, and such areas are not larger than 10 cm<sup>2</sup>, when individually-overhauled, neither affecting as a whole more than 0.5% of the zinc-coated surface, it can be restored following the procedure described in the standard **UNE EN ISO 1461:2010 “HDG coatings on iron or steel products”**

- Rust removal: Rust that may have showed up and reached the substrate, will mechanically be eliminated.
- Zn-enriched paintings application. The metallic zinc content on the dried paint film, should not be less than 90% in mass.. Paint layer's thickness should at least be 100 microns.



**RECOMMENDATIONS FOR THE DOING OF PERIODIC INSPECTIONS,  
MAINTENANCE AND REPAIR**

With the purpose of verifying the installation parameters and guaranteeing the security of the installed VRS, the road authority should define an appropriate program of periodic inspections and maintenance.

The exposure to corrosive ambiances or the stagnation of rainwater, can cause long-term corrosion, both in the galvanized layer and in the base steel, which consequently can get lifetime of the VRS shortened. Industrias Duero, SL recommends that the periodicity of the below-described routine inspections, should not go beyond the four (4) years from the installation completion date.

According to the type of intervention set up: afterwards of the collision of a vehicle, the checkup of the installation parameters requires more attention as higher is the potential danger of vehicles running out of the rolling surface of the road.

Some general indications in this regard (without prejudice to the provisions set by the Administration / Road Authority.), follow hereunder:

**Periodic inspections and maintenance.**

The parameters to be assessed to ensure the preservation of the operating and safety features of the installed device are:

- **Preservation of anchors installation parameters:**

- Features subjected to ascertainment: the absence of anomalies on the tightening torque, cracks and faults.

- Type of intervention brought up: Recuperation of initial installation conditions.

- **Preservation of the initial installation features of the structural components and accesories:**

- Characteristics to be controlled: Physical integrity and good operation of system structural components (i.e .: posts, spacers, bolts and nuts, etc.); and all its accesories (ej.: presence of reflectors, or those dirty ones that are not sufficiently visible, etc).

- Type of proposed intervention: Initial installation conditions regularized.

**Rust. State of conservation of galvanized and/or steel base's:**



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- Features to be eyed: Visual verification of effective presence or not, of a significant corrosive attack or deterioration of the galvanized coating; Monitoring of the residual zinc coating thickness by means of a specific magnetic tool; and ocular inspection of effective presence or not, of a significant corrosive attack or deterioration of the anchoring system (rock bolts) on the concrete foundation.
- Type of intervention tabled: Restoration of initial installation conditions with the withdrawal, disposal and replacement of damaged components.
  - **Preservation of the geometrics and realignment of the installation if necessary.**
- To be put up under control: Longitudinal, horizontal and vertical repositioning of the elements side-facing the traffic (beam, posts, spacers, stiles...)
- Type of intervention suggested: Initial installation conditions normalized.

### **Repair.**

In case of a damaged system right after an impact by an errant vehicle, the repair intervention (removal, disposal, and replacement of damaged elements), should be carried out as fast as possible, since the breakage caused represents a prominently high hazard to road's users, besides conditioning the performance of all the structure.

Repair works should be executed in such a way, that road safety barriers installation conditions, described at the installation manual, are purposely reestablished.

Deformed elements subjected to substitution (essentially those in galvanized steel) should be treated as waste, and be withdrawn and disposed, in accordance with the environmental local safety rules in force (recycling).