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# WORKING INSTRUCTIONS

## INSTALLATION AND REPAIR OF GUARDRAIL

### Birsta 1P

#### **Introduction**

The typical installation process is subdivided in following order. This order is general. In case of a situation where special or project specific conditions prevail that do not allow this typical process to be followed, a project specific job description has to be established.

- 1) Planning:
- 2) Unloading of materials:
- 3) Self-monitoring:
- 4) Safety:
- 5) Establishment:
- 6) Installation:
- 7) Repair of zinc damage:
- 8) On completion:
- 9) Repairs:

#### **1) Planning:**

It's at this point that the project's quality and flexibility is determined. A well planned installation is an essential platform that will ensure the delivery of high quality, good logistics, and a job well and safely done, for a satisfied customer.

All parties involved should discuss their key aims for the installation, and agree on how it should be done.

It is important that both clients and contractors are aware of the commitments and obligations that they are responsible for. These can then be coordinated best by good communication.

It is vital to plan delivery and installation in good time. All parties involved shall keep each other informed about changing conditions or circumstances so that these can be incorporated safely and properly into the installation.



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## 2) Unloading of material:

The material is unloaded and placed appropriately where the installation is done, so that there is no unnecessary handling of the material. Handle material with care, use timber battens or supports for components that are not delivered on pallets, with ample clearance for the safe use of forklifts and lifting straps to be safely secured when materials are moved.

When unloading, check that unloaded goods comply with the waybill. The goods must be checked to ensure that no damage is visible. Deviations on the package number or damages must be noted on the waybill and the sender shall immediately be contacted to agree the condition and quantities.

## 3) Self-monitoring:

The system installers shall carry out, and in appropriate document record the self-monitoring report which shall at least include the following paragraphs;

### Checkpoints on arrival

Take note of the work plan and site drawings.

Go through the material and compare with the packing list and the drawings to see if anything is missing. Inform supplier immediately of any discrepancies.

### Checkpoints guardrail

The material is checked after the delivery to the workplace in terms of damage and quantity

Horizontal alignment on the track is controlled within the specified tolerances

The height of the railing is controlled within the specified tolerances

All bolts are installed and tightened to the specified torque settings with calibrated air wrenches or torque spanners

Any slight damage to the hot-dip galvanizing or painting is treated

Possible zinc lumps and tags are removed

### Checkpoints at the end of work

The workplace is cleaned

## 4) Safety:

Because the installation of 1P often is performed in a busy traffic adjacent to live carriageways, the safety terms are very important.



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Temporary barriers should be adapted so that the installation of 1P can be done without their removal.

Only suitably trained operatives can be employed, with a recognized safety control system on place to ensure the correct PPE is worn, and the correct and safe procedures are maintained.

These important safety considerations must be involved at an early stage of planning, to maintain safety in the workplace during installation, and to ensure the safety of the road users.

## 5) Establishment:

Prior to commencement on site, the installers shall be informed about the conditions on in the workplace. See paragraphs 3 and 4.

## 6) Installation:

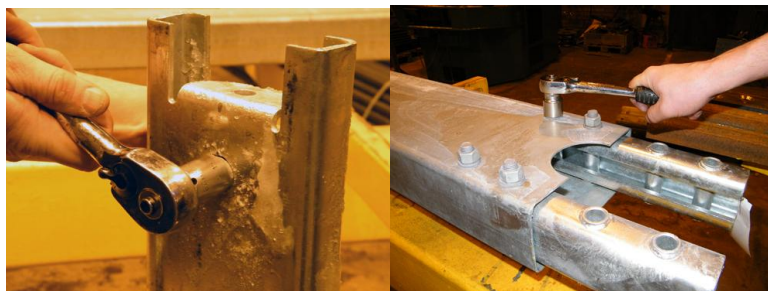
The installation description implies that the company that provides the installations must ensure that the installers have the necessary knowledge of the guardrail details, terms and bolts dimensions, and correct tightening torque for each different bolt type. This information is available on the system drawings. These are attached at the end of the description.

**Staking:** Before installation can begin, the setting out for the post hole locations has to be done. This requires great precision. Faults at this stage are hard to correct at a later stage. Bear in mind that the beam is 8 meters straight and in curves post centre distance measurement shall be amended to suit the actual centre line of the curve.

**Punching holes:** This requires special-broach to minimize the damage of the asphalt and reduce the need for later remedial works to the asphalt. Immediately after punching, posts or socket must be installed, alternately rotated 180 degrees, (C alternately facing the traffic flow). The depth of holes must be checked to ensure that the resulting post height will be within the required tolerance.

**Installation:** The installation is started with an anchor or energy absorbent. Then install the railing, followed by yet another anchor / energy absorbent

**Railing:** The installers loosen the mounted T-nut (picture 2) completely from the post and loosen the screws sufficiently to facilitate mounting on the joint bars (picture 3).



Picture 2

Picture 3

Then install the railing by inserting the tubular spigots, and install T-nuts in the c-profile. (Figure 4-6) the entire post must have contact with the c-profile.

The gap between the beams should be  $4 \pm 2$  mm. Install all the parts without completely tightened bolt joints which is done after the final alignment is made.



Picture 4-6

**Quick Openings:** Can be reinstalled and have the same release as usual railing. The difference is that the T-nut is not used in the quick opening beams. The post is only guided by the C-profile.

**Energy absorbers:** The absorbers are installed on the foundation that is punched down to about 1 dm above ground level. After that make an assessment whether the foundation twisted more than 10 degrees.

If the nail is twisted more than 10 degrees adjust this by moving the screw (Figure 12) to another position.



Picture 12



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After that the nail is driven down to ground level. Then the standard post is driven down. The pre-assembled energy absorbent is mounted on the nail, and the pole

## 7) Repair of zinc damage:

Repair of any damage zinc where the distance between the zinc surfaces is greater than 3mm should be repaired with zinc rich paint

## 8) On Completion

Inspect and check horizontal alignment of the system, heights and general appearance, are correct.

Self-monitoring and certification according Paragraph 3 shall be performed and signed and copies shall be handed over to the client (customer).

Clean the storage sites and remove packaging materials in consultation with the client (Client).

## 9) Repair:

All damaged material must be replaced immediately. Damage requiring replacement is defined as that which has weakened the steel component, or has compromised the galvanized coating to a degree that cannot be repaired by the use of zinc rich paints, e.g. deep scratches, tears, creases etc.

To replace damaged parts after the collision does not differ so much from the usual installation. The major differences are described below;

**Replacing damaged posts:** To access the horizontal profile, it is either lifted up on trestles and pushed to the side so that the damaged post can be removed, or held by a truck mounted crane (Picture 7-8). To loosen the posts, tools are used accordingly (Figure 9-11). Then the new post is installed.



Picture 7 and 8



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Picture 9-11

**Replacement of damaged beams:** When replaced, the beam is installed as at the first installation except the last joint splice bars which fully retract into the tube and slid through the hole on the bottom bar.

**Energy absorbers:** These are changed in its entirety with the exception of non-damaged nails.