



# Section 6

## Installation





**install** plus

# Install Plus Frame Levelling and Installation System

Designed to help support and level the frame during the early stages of installation, Install Plus saves time, makes efficient use of materials and reduces whole life costs by ensuring products are installed right first time.

As you would for a standard installation using traditional methods, follow the recommended steps to remove existing ironwork or to prepare the chamber as detailed on the following pages.

## Stage 1

The Install Plus Frame Levelling system consists of 4 spacers fixed to the underside of the frame flange, these are pre-set to 15mm which is the recommended minimum depth of bedding material.



## Stage 2

Place a straight edge across the top of the frame to determine its height in relation to the surrounding finished surface level. The frame top edge must be flush with the carriageway surface.

## Stage 3

To adjust the frame height and to also allow for changes in gradient, rotate the nylon bolts clockwise until the desired height is achieved. The bolts are sacrificial and have a range of movement between 15mm and 50mm.

Note: Should the gap be >50mm an additional brick course should be installed



## Stage 4

Mix the bedding mortar to a stiff workable consistency, then using a trowel or similar tool place the mortar into the gap at the front edge of the frame and chamber leaving no voids to produce a 'dam' and a smooth finish; allow this to stiffen, this can be assessed using the hammer test (refer to the manufacturers' guidelines).





**install** PLUS

# Install Plus Frame Levelling and Installation System

## Stage 5

Where the gap between the frame flange and the vertical edge of the excavation is more than 50mm; to save costs, form a bund using rapid set C32/40 concrete or similar SROH compliant material. Rapid set



concrete must be used immediately after mixing and achieve a minimum compressive strength of 20N/mm<sup>2</sup> in 1 hour. Alternatively use shuttering or form work positioned in the same way; then remove when flowable mortar is set. The bund must be a minimum of 100mm from the carriageway surface to allow correct layers of reinstatement as per SROH.

## Stage 6

For optimum durability the system has been designed to be used in conjunction with a high performance flowable bedding material. The material must exhibit the mechanical properties as defined within Section 6 of Highways England Advice Note HA 104.

To apply the bedding material, mix in accordance with the manufacturer's instructions, the use of a mechanical mixer is recommended. In a controlled manner, pour in the flowable material immediately after mixing from the side of the excavation allowing the mortar to flow under the frame, filling all voids, working the mortar all the way around.



Continue to mix and pour the mortar until it covers the base and the flange of the frame to a level of 20mm above the flange ensuring 100mm remains to the surface of the carriageway. This is indicated by the height on the nylon cap which sits on the flange.

## Stage 7

Bedding material or concrete can be used to fill the excavation to within 100mm of the road surface. All bedding materials shall be allowed to cure to a compressive strength exceeding >30N/mm<sup>2</sup> and tensile strength exceeding >5N/mm<sup>2</sup> before trafficking.



## Stage 8

Care must be taken to avoid contact between any compaction device and the frame or cover in order to avoid damage.

# Cover, grating and surface box

## Reinstatement at existing site

### Site assessment

#### Stage 1

Before beginning any reinstatement work it is recommended that a site assessment is carried out. This can often save considerable time on site through improved planning. The assessment should identify:

1. Type of reinstatement required.
2. Whether a new cover or grating is required. If so, the size and type of unit should be identified, including the frame depth of the existing unit as it is more cost effective to replace the unit with one of equivalent frame depth.
3. The extent of work required. This should include any repairs required to the brick chamber, the urgency of the work required, whether a short-term emergency repair is required and an estimate of how long the work will take.

### Material selection

#### Stage 2

The selection of the appropriate bedding and reinstatement materials is critical in ensuring optimum durability. It has long been acknowledged that the performance of the installation is directly attributed to the interaction between all the key components.

Consideration should be given to:

- The design of the casting.
- The road type.
- The chamber type and material used whether concrete, brick, composite or plastic.

We recommend that the guidance contained within Section 6 Bedding Materials of the Highways England Guidance Document HA104/09 is adopted prior to selecting the appropriate bedding and reinstatement materials.

Chamber tops and gully tops should be bedded upon material which has the following properties:

- (a) the material should be non-shrink;
- (b) the material should have a minimum workable life of 15 minutes;
- (c) the compressive strength of the material should exceed 30N/mm<sup>2</sup> in 3 hours;
- (d) the tensile strength of the material should exceed 5N/mm<sup>2</sup> in 3 hours;
- (e) notwithstanding the above requirements, the use of proprietary bedding components to different specifications may be permitted subject to appropriate certification and approval from the overseeing organisation.

This specification is for a rapid-hardening material which could, for example, be achieved by a suitable resin based material. The use of alternative bedding compounds to different specifications is not necessarily precluded where they form part of an alternative proprietary support system which has the approval of the overseeing department.

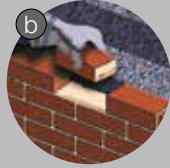
Bedding materials should be laid strictly in accordance with manufacturers' recommendations.

Materials manufactured for use in different temperature conditions must be selected as appropriate to suit site conditions at the time of mixing and application.

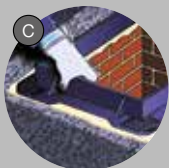
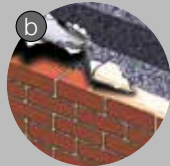
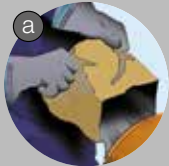
Consideration should also be given to the use of a flowable type material to ensure full encapsulation of the frame flange.



### Preparation Stage 3



### Installation Stage 4



# Cover, grating and surface box

## Preparation Stage 3

### a. Excavate ironwork

Remove all failed reinstatement as recommended within SROH which defines the trim back area as **'flange width of the frame + compactor sole plate width + 50mm'**.

The marked area is saw cut and excavated to uncover the flange of the existing cover and frame. The existing cover and frame are removed using a suitable lifting device, taking care to avoid dropping loose materials into the shaft.

### b. Prepare base

All existing bedding mortar is removed and the supporting structure/chamber cut back until a sound base is achieved. The newly-exposed substrate must be clean and structurally sound prior to commencing refurbishment work.

## Installation Stage 4

### a. Mix material

Ensure the material is mixed correctly following the manufacturer's instructions. It is recommended that a mechanical mixer is used to ensure full mixing and to reduce time taken.

### b. Bedding layer

The depth of bedding materials needed to install the frame and cover level to the road surface is determined, taking into account the depth of the frame. It is recommended that a minimum depth of mortar below the flange is no less than 10mm.

### c. Seat casting

Position casting frame over the access chamber and tamp down to ensure that the mortar keys to the casting. For optimum performance units are designed to be supported under the entire flange area, up to the edge of the clear opening. Failure to provide bedding over this area will detrimentally affect the performance and longevity of the unit.

### d. Level casting

Ensure that the casting is level with the road surface by placing a straight edge across the corners of the casting onto the road. The frame can be made level by tamping the frame into the bedding material.

### e. Check gaps under flange

Voids below the flange must be completely filled with bedding material to ensure full support of the frame. Exposed surfaces of the bedding mortar around the frame are float finished and textured to create a key, ensuring any voids or loose material are removed and the inside surface pointed to a smooth finish.

### f. Envelope flange

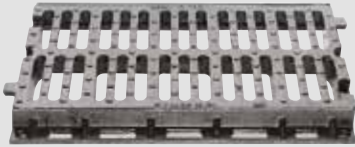
Any holes within the frame are infilled and the flanges of the frame enveloped by a minimum thickness of 10mm as per HA 104/09, however 20mm is recommended as this is viewed as best industry practice for bedding mortar. The bedding material must also extend beyond the flange to a minimum distance of 50mm.

### g. Backfill

Check that the bedding material has hardened, then backfill with asphalt. Ensure that the asphalt is properly compacted.

### Installation in new roads

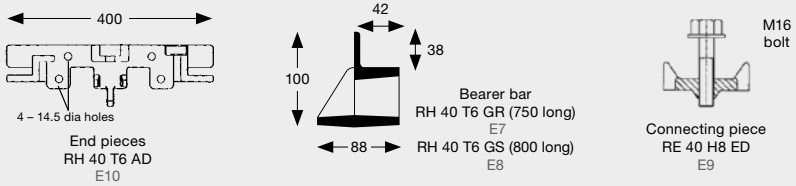
When installing covers in new roads, where the road surface has not yet been applied, embedment is made easier. Simply follow Stage 2: Material selection and Stage 4: Installation.



# Channel grating

## Translinea installation

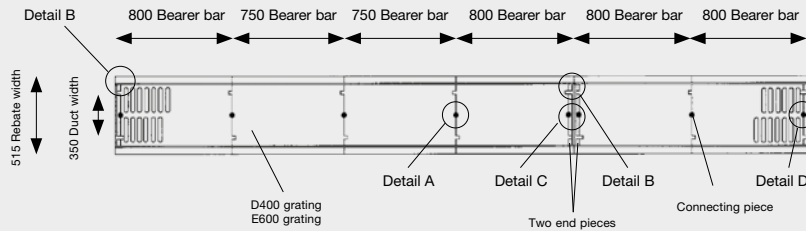
### Components



### Installation

Translinea grates should be installed using the specifically designed bearer bars and with the gratings joined together using the connecting pieces.

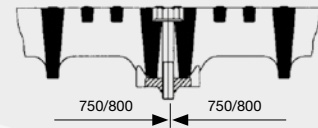
Translinea grates should be connected to both the frame and to each other in heavily trafficked and high security areas and cross carriageway locations at least every fourth grating (see Detail C).



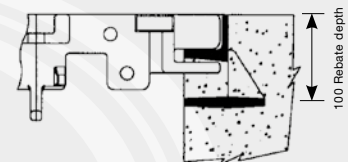
### Important notice

In all areas where there is extensive manoeuvring of HGVs or other heavy vehicles, (for example in docks, loading yards, HGV parking areas), consideration should be given to bolting down every three or four gratings. If other types of 'T' section or angle section frames are used it must be ensured that their dimensions, security and embedment are suitable for the loading and stresses to which they will be subjected.

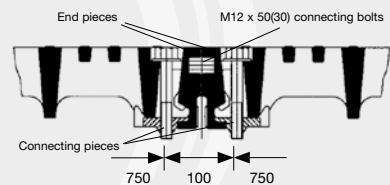
**Detail A**  
Grating connected to grating.



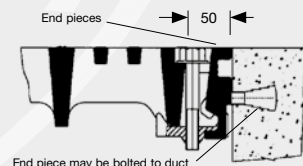
**Detail B**  
Interlocking of bearer bar and end piece.



**Detail C**  
Grating connected to grating using two end pieces.  
Use every fourth grating for heavy traffic and high security situations.



**Detail D**  
Grating and end piece.

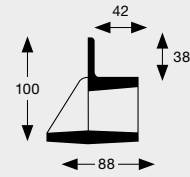
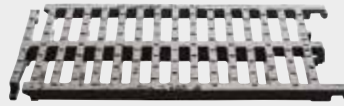




# Channel grating

## Autolinea installation

### Components



Bearer bar  
RH 40 T6 GR (750 long)  
E7

### Installation and operation



#### Simple

Easy to install.

Gratings are simply snapped into place through a ductile spring lock.

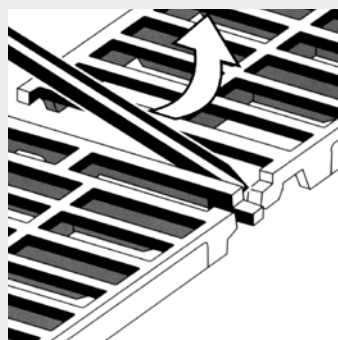
With Autolinea, no accessories are needed.



#### Safe

Autolinea provides safety in service:

- No danger of accidental displacement.
- Limited vandalism.
- Anti-dilation effects.



#### Quick

Removal by professionals is instantaneous, using a crowbar as a lever.

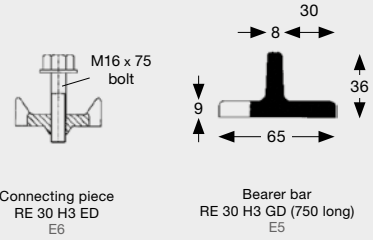
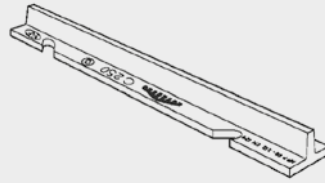
Autolinea is suitable for use at the side of highways carrying intense traffic. It should not be used in areas subject to cross traffic manoeuvring vehicles.



# Channel grating

## Mecalinea installation

### Components



Connecting piece  
RE 30 H3 ED  
E6

Bearer bar  
RE 30 H3 GD (750 long)  
E5

### Installation

Mecalinea grates should preferably be installed using the specifically designed bearer bars and with the gratings joined together using the connecting pieces where used in cross traffic areas. Typical layout for heavy use and areas subject to slow-moving traffic.

#### Detail A

Grating connected to grating (must be used if subject to cross traffic).

#### Detail B

Bearer bar seating.

