

Installation instructions **DTS Heat Retainer**

Insulation for point heating



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1. General

This document describes the installation of insulation elements for electrical point heating. The insulation elements are applied in a similar manner when using earth energy and central heating.

1.1 Introduction

Points have to be kept snow-free and ice-free in winter. In most cases, electrical point heating based on resistors is used.

The increase in energy costs and the desired reduction of CO₂ emission make it necessary to use a technique which allows the power consumption of the current point heating systems to be reduced easily.

The availability of the point should be guaranteed.

A simple and effective solution is using plastic insulation blocks on the outer side of the stock rail.

1.2 Scope

The use of point insulation considerably decreases the operation costs due to the lower power consumption at the same availability of the point.

Measurements in a climate chamber performed by Eindhoven University of Technology in the Netherlands and measurements in the field on the railways have demonstrated that point insulation can reduce power consumption by approximately 40 to 60%.

1.3 Definitions and abbreviations

None.

2. Description of point insulation

2.1 Composition

An insulation block consists of an insulating plastic block that is secured on the stock rail and/or switch blade using two spring clips.

2.2 Principle of point insulation

A point is heated using electrical heating elements (electrical point heating) or using a heated liquid (earth energy or central heating point heating).

The point heating system is usually mounted on the inner side of the stock rail. The outer side of the switch blade (and stock rail) is also heated when required.

The heating results in considerable (heat) radiation loss at the outer and bottom side of the rail. This heat is not used to keep the rail snow-free and ice-free.

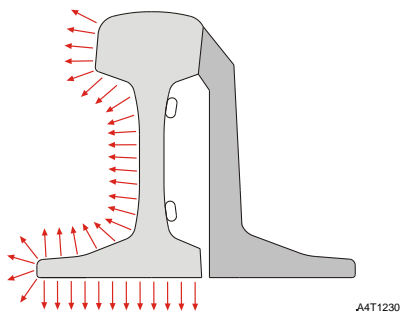


Fig. 2.1 Heat loss for point type 54E1

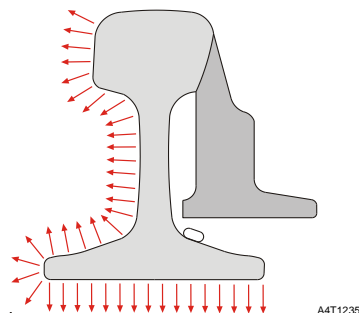


Fig. 2.2 Heat loss for point type 60E1

Insulation is applied to prevent unnecessary heat loss. The heat loss mainly takes place at the outer and lower side of the rail.

2.3 Composition and specifications

A few important and practical properties of point insulation:

- The design of the insulation elements is exactly the same as the rail, therefore, the wind and melt water have nearly no influence on the cooling of the rail.
- The insulation can easily be shortened or adjusted on site if any point components (bolts, welds, etc.) are in the way.
- Insulation of the required dimensions is provided ex works as much as possible with a slight excess length,
- Insulation is provided as a unit with two spring clamps at approx 1000mm
- The insulation blocks are tough and strong which minimises the chance of damage and breakage.
- The insulation blocks are very UV resistant, therefore, do not age much.
- The insulation blocks are moisture-resistant.
- The pointy upper side presses heavily on the rail, thereby preventing melt water from penetrating behind the applied insulation.
- Insulation is, in general, at least 10 mm thick, thereby realising maximum insulation values.
- Insulation limits the natural heating of the rail in the summer.

Options

- Signal cables along the rail can be clamped in an insulation recess. The cables are then less accessible (a positive measure against vandalism). This recess is not provided as standard.
- A rubber sealing strip can be included in the insulation to guarantee the flush application of insulation against the rail. Dirty rails or incorrect assembly can allow small quantities of melt water to penetrate between the insulation and rail. Again, this recess is not provided as standard.

2.4 Impact on engaging/disengaging behaviour of the heating system

Most heating systems are provided with a rail temperature sensor at the bottom side of the rail foot of a heated point section. Based on the data from this sensor and the engage/disengage set points, the heating will engage/disengage to prevent unnecessary heating.

The location of the point insulation influences the engaging/disengaging behaviour as follows:

- a) Insulation is applied flush against the rail temperature sensor as much as possible. This ensures that when the heating is disengaged, the available heat near the sensor is retained in the rail longer. This results in a much slower cooling curve of the sensor. In comparison with a non-insulated point considerably less energy will be required for a comparable heat capacity in the point (availability).
- b) Insulation is not applied flush against the rail temperature sensor but at a short distance. The heating and cooling curve in comparison with a non-insulated point does not change. As a result more heat will be available in the heated rail to melt snow and ice. In comparison with a non-insulated point a much higher heat capacity will be concerned (availability) with equal energy consumption.

The use of insulation can save much energy and provide a much higher heat capacity, Depending on the required application.



2.5 Specifications / properties

Basic material	: PP with specific additives to improve fire and UV resistance (no CFCs)
Insulation value λ	: 0.040 W/mK
Properties	: tough, flexible, easy to process and 100% recyclable
Temperature	: -40 to +75 °C
Coating	: UV resistant, strong and tough
UV resistance	: according to DIN 18363, No. 2.4./2.1, A1 cat. (Extremely UV resistant)
Flammability properties:	according to DIN 4102, B1 cat. (Difficult to ignite/often self-extinguishing)
Economic life	: min. 10 years when placed according to installation instructions
Durability	: resistant to practically all substances used around the track, such as Oils, greases, water and herbicides (and vermin)
Colour	: basic material: dark gray/black, coating: light gray
Dimensions	: depending on track and point type
Spring clip	: Galvanised steel

3 Heat shield assembly instructions

3.1 General

Point insulation is used to limit unnecessary heat loss during point heating.

3.2 Safety regulations

Observe the regulations regarding work area safety.

Refer to the safety documentation for information about all further safety aspects. The commissioning party makes this documentation available for inspection.

3.3 Preparation

The required material should be determined beforehand. Below you will find a brief description of the required preparatory work.

3.4 Required tools

- Measuring tape
- Saw
- Wire brush
- Screwdriver
- Hammer
- Chalk or permanent marker
- Sharp and sturdy cutting knife
- Degreaser (Interflon Metal Cleaner recommended)
- Saw template (piece of hard plastic rail)

3.5 Guidelines

The following aspects are to be considered to be guidelines when mounting point insulation:

- The insulation should be flush with the rail, in particular the pointy upper side below the rail head and be inserted tight up to the web of the rail
- If the coating layer has been extensively damaged, the insulation section should be replaced.
- 2 spring clips are required per section.



3.6 Assembly

1. The rail should be thoroughly cleaned before starting the assembly. Use the wire brush to remove dirt when required any excessive rust or grease can be removed by Interflon Metal Cleaner. When the rail is not thoroughly cleaned, the insulation cannot be correctly applied and the insulation will not be optimal.
2. Insert the insulation into the web of the rail positioning it between the pandrol clips and the web of the rail. Ensure insulation is a tight snug fit by lightly pressing the piece into the rail web and under the head. Work along the section being insulated,



3. The insulation is tough and flexible. If the point is a 'shallow depth' type, the insulation may be bent slightly too properly fit the insulation behind the spring clamp or clip. If a bolt, nut or similar prevents the insulation from being fitted, shorten the block with a saw (a plastic saw template is available) or use a cutting knife to cut a notch or a hole.
4. Use two clips for each insulation block. The clips should be fitted approximately 100mm from each end. Fix to the foot of the rail by tapping the clips with a hand hammer.

Coating comments:

- When the coating layer is damaged or missing due to the changes to an insulation block, Extra coating need not be applied.
- Small openings (holes) in the coating layer do not have a negative impact on the insulation or economic life.

Final check:

After assembly, the insulation should be flush against the rail and have as little transition seams as possible.

Pay particular attention to the pointy upper side, which should fit tightly to the rail.

Clean the insulation blocks with a degreasing fluid (if necessary).

3.7 Procedure for rail temperature sensor

As has been specified in Section 2.5 the insulation can be applied to the heated rail temperature sensor in two different ways, depending on the intended purpose: saving energy or increasing heat capacity.

Energy saving: A small recess should be cut into the insulation block base depending on the location of the rail sensor. The insulation must be applied as close to the sensor (sideways) as possible.

Increased heat capacity: A large recess should be cut into the insulation block base depending on the location of the rail temperature sensor. NO insulation should be applied approx. 15 cm to the left and right of the sensor.

3.8 Disassembly

An insulation block can easily be removed.

1. Use a solid screwdriver and insert it sideways into the clip at the foot of the rail.
2. Prise the clips away from the foot of the rail.
3. Pull the insulation block away from the rail.

4 Ordering method

Heat shield point insulation can be ordered from:
Direct Track Solutions Limited
paul@directtracksolutions.co.uk

4.1 Storage and packing

When performing assembly activities, the lightweight insulation blocks may be blown away when a train passes. Ensure sound packaging of the insulation blocks when these are not yet assembled.

Packing materials become the property of the commissioning party upon delivery and should be discarded by the commissioning party in an environmentally friendly manner.

4.2 Inspection

Prior to assembly the delivered insulation blocks should be checked for possible damages.

4.3 Guarantee

The guarantee period is 12 months, starting from the date of delivery (date on packing slip). In case of defective materials DTS must receive written notification from the commissioning party within 2 weeks of delivery. After consultation the commissioning party will send the materials to DTS. DTS will assess the materials. Any follow-up actions will be discussed with the commissioning party.

The guarantee is void if the insulation blocks have not been handled according to the instructions.

DTS is not responsible for labour and safety costs if the materials are to be replaced under the guarantee.



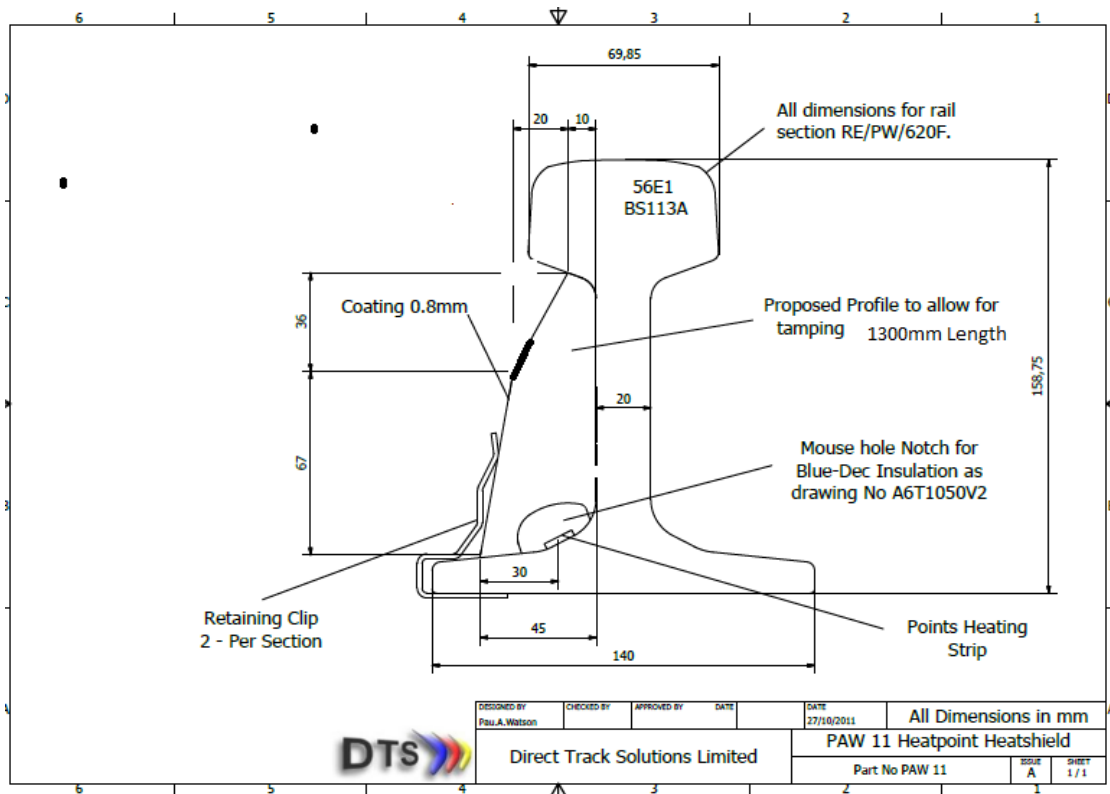
5 Disposal instructions

The point insulation does not contain any environmentally hazardous substances and can, therefore, be disposed of easily; special instructions are not required.
It is also possible to recycle the materials and send them to a specialist processing company.

6 Typical Arrangements

No.	Description	Drawing no.
1	56E1 Rail with insulation	PAW 11
2	Installation Pictures of Heat shield to 56 Rail Section	

1



DTS - CEN56e1 full depth / CEN56e1 Shallow Depth (Universal Web fitting)

- DTS -HS – 011 – UNIV – Heatshield Heat Retainer
- DTS – HS – 012 – UNIV – Spring Steel retaining clip
- DTS – HS – 004 – Heat retaining fabric strip - 55/162028





