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European Assessment Document for

Support fixing assemblies



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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD covers support fixing assemblies of several types intended for suspending building services from steelwork or pre-cast hollow core slabs. With the exception of the threaded fasteners and nuts, the fixing assemblies are made entirely of malleable or ductile cast iron to EN 1562 or EN 1563 respectively, steel to EN 10025-1, EN ISO 683-1 or EN ISO 683-2 or stainless-steel to EN 10088-4 or EN 10088-5. The assemblies are made without any adhesive and do not contain any organic material.

1.1.1 The types of assembly covered by this EAD

Type 1: Flange clamps with integral set screw to provide clamping with adjustability

The C shaped flange clamps manufactured in cast iron, steel or stainless-steel are supplied with an integral set screw and locknut that when tightened provide a secure grip on the beam flange. The clamps may have a drilled or tapped hole to allow a set screw or threaded rod to be assembled for suspending building services or alternatively, the clamp may include an additional self-adjusting swivel unit for inclined applications. The C shaped clamps can be assembled on to a parallel or tapered flange.

The tightening procedure shall be torque controlled. The range of clamp sizes may incorporate set screws from M5 to M39. The integral set screws and locknuts supplied will be of minimum property classes 4.6 in accordance with EN ISO 898-1¹ and 5 to EN ISO 898-2 respectively.

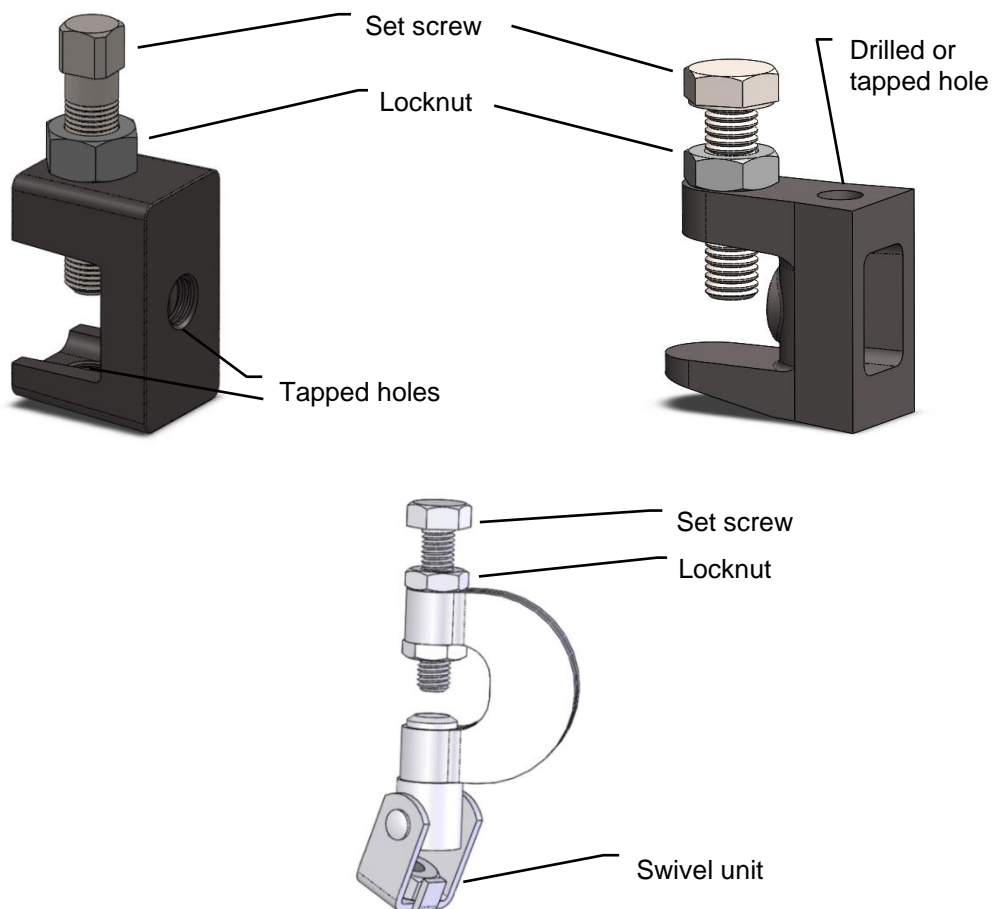


Figure 1.1.1.1: Type 1 - Fixing examples

¹ All undated references in this EAD are to be understood as references to the dated versions listed in Chapter 4.

Type 2: Flange clamp with adjustable jaws

The flange clamp manufactured in cast iron, steel or stainless-steel assembly is a two-part clamp having a through hole that when assembled with a set screw or threaded rod form an adjustable clamp allowing the suspension of building services. This type of clamp can be used on parallel flanges only and the tightening procedure shall be torque controlled. The Type 2 flange clamp can be supplied with a set screw, nut and washer as shown (minimum property classes 4.6 of EN ISO 898-1, 5 of EN ISO 898-2 and 100HV of EN ISO 898-3 respectively) or additional Type 6 ancillary items may be utilised. The building services threaded fasteners may range from M5 to M39.

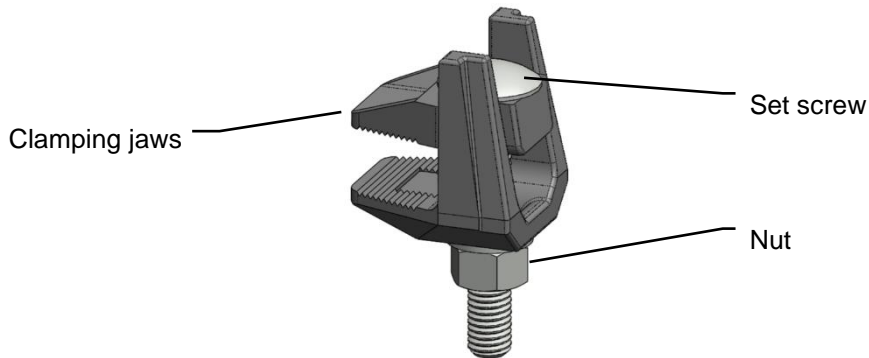


Figure 1.1.1.2: Type 2 - Fixing example

Type 3: Purlin clips

A clip manufactured in steel or stainless-steel that can be either hooked onto a purlin section or fixed through the web of a purlin, that has a hole enabling a threaded rod or wire to be passed through allowing the suspension of building services. The fasteners sizes to be accommodated may range from M5 to M39.

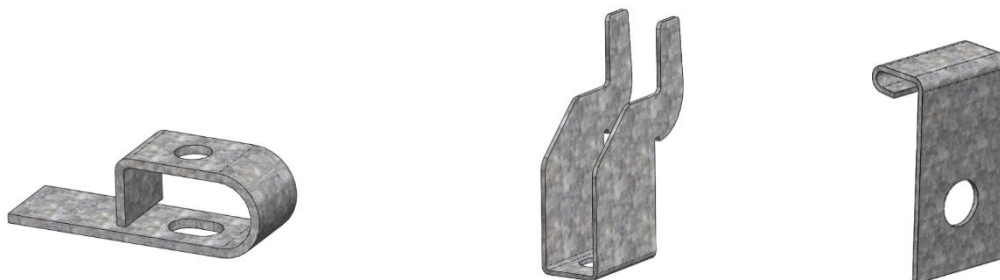


Figure 1.1.1.3: Type 3 - Fixing example

Type 4: Self-adjusting fixing

A self-adjusting hemispherical washer and cup manufactured in cast iron, steel or stainless-steel for use on inclined surfaces to allow the vertical suspension of building services.

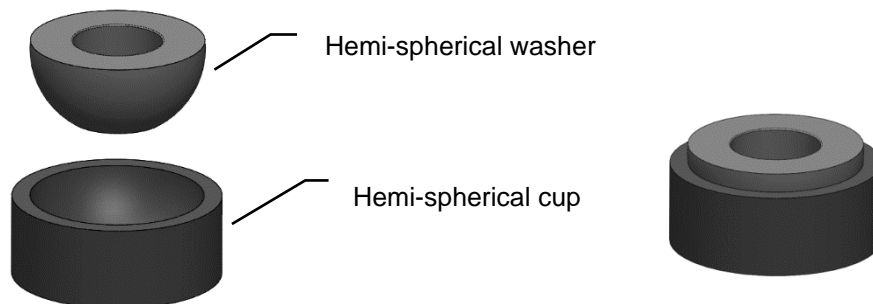


Figure 1.1.1.4: Type 4 - Self-adjusting fixing as parts and assembled example

Type 5 Toggle fixing

A toggle fixing manufactured in steel or stainless-steel designed to enable building services to be suspended from pre-cast hollow core slabs, structural hollow section, steel sheeting or purlins.

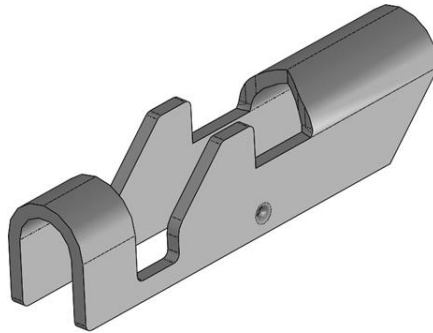


Figure 1.1.1.5: Type 5 - Toggle fixing

Type 6 Ancillary items

Ancillary items can be used in conjunction with the fixing Types 1-5 described in this EAD to support items such as pipework or may provide additional features such as self-levelling when used on inclined surfaces. Ancillary items shall be made entirely of cast iron, steel or stainless-steel without any adhesive or organic material and shall be designed to be suspended from a single point of attachment that is compatible with one of the fixing Types 1-5. Two examples of ancillary items are shown below.



Figure 1.1.1.6: Type 6 - Examples including items for the suspension of pipe work and a self-levelling unit

The product Types 1 to 6 in the scope of this EAD and described in this clause are not covered by a harmonised European standard.

Similar clamping assemblies for connecting steel sections are covered by the following EADs:

- EAD 330080-00-0602 High slip resistance clamp (HSR) assembly.
- EAD 330155-00-0602 Self adjustable clamp assemblies.

The assessment methods in these EADs are specific to their intended use in that they incorporate structural steel sections in the mechanical tests. They also require slip tests to be carried out. Slip tests are not necessary for products described above since they are intended for suspending building services.

A further type of clamping assembly is covered by the following EAD:

- EAD 330079-00-0602 Floor fixing assemblies for use in checker plate or open bar grating.

The assessment methods in this EADs are specific to their intended use in that they incorporate flooring grates. The EAD also requires slip tests to be carried out. Slip tests are not necessary for products described above since they are intended for suspending building services.

Wedge-type assemblies for suspending building services are covered by the following EAD:

- EAD 331924-00-0602 Decking fixing assemblies.

The assessment methods in this EAD are specific to their intended use in that they incorporate dovetail re-entrant blocks. The assemblies rely on self-tightening wedge shaped attachments rather than the clamps and toggles described above.

Concerning product packaging, transport, storage, maintenance, replacement and repair, it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in the absence of such instructions) according to the usual practice of building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

The products are intended to provide connections for suspending building services to structural or secondary beam steelwork or pre-cast hollow core slabs. Typical applications include supporting equipment for heating, ventilation, and air conditioning (HVAC), pipework, fire protection and sprinkler systems. The products described in this EAD are intended to be used for static tension loading only. Examples for intended uses are shown in figures 1.2.1.1 to 1.2.1.9.

This EAD does not provide assessment methods for the performance of the structures to which these products are intended to be attached nor for the types of building services that are intended to be supported.

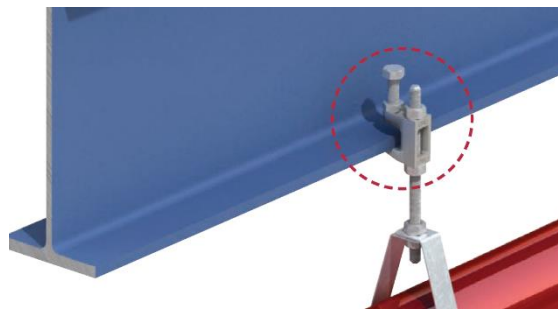


Figure 1.2.1.1: Example installation

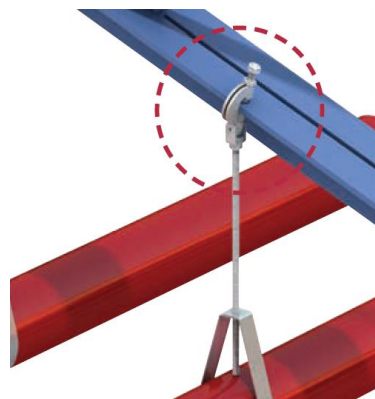


Figure 1.2.1.2: Example installation

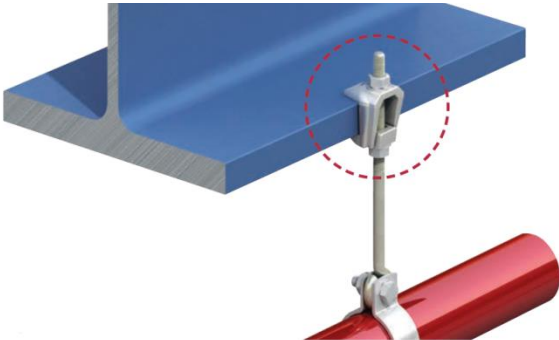


Figure 1.2.1.3: Example installation

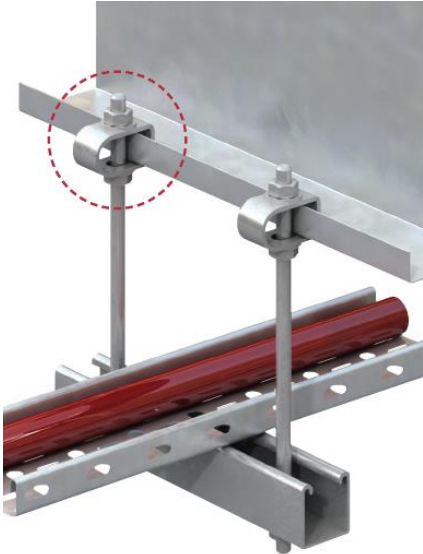


Figure 1.2.1.4: Example installation

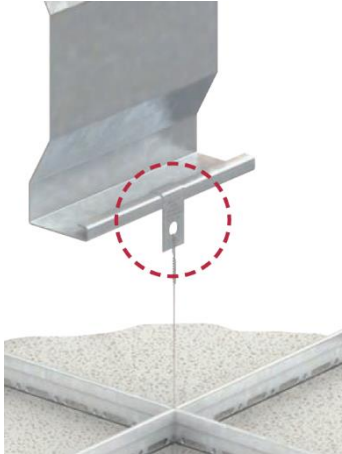


Figure 1.2.1.5: Example installation



Figure 1.2.1.6: Example installation

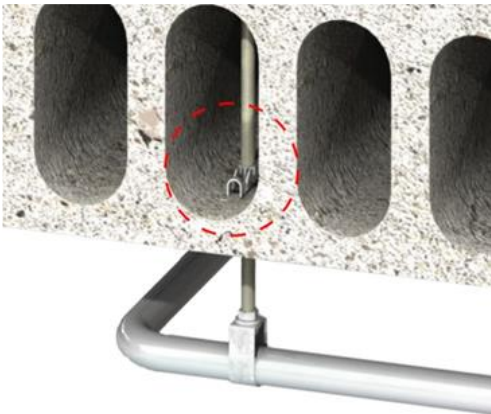


Figure 1.2.1.7: Example installation

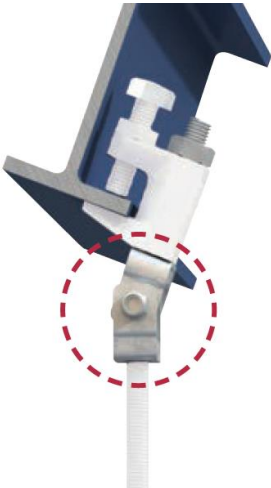


Figure 1.2.1.8: Example installation

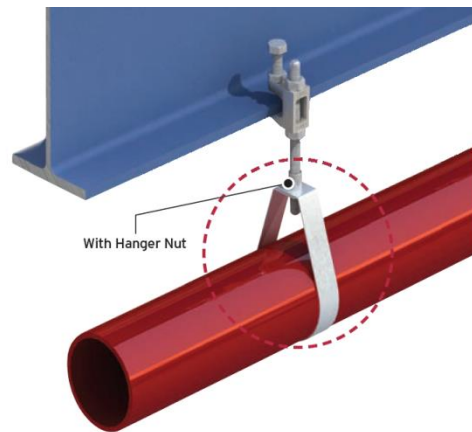


Figure 1.2.1.9: Example installation

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the support fixing assemblies for the intended use of 50 years when installed in the works (provided that the support fixing assemblies are subject to appropriate installation (see 1.1)). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works².

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

² The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential Characteristics of the Product

Table 2.1.1 shows how the performance of support fixing assemblies is assessed in relation to the essential characteristics.

Table 2.1.1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to Fire	2.2.1	Class
Basic Works Requirement 4: Safety and accessibility in use			
2	Characteristic tension resistance	2.2.2	Level

2.2 Methods and Criteria for Assessing the Performance of the Product in Relation to Essential Characteristics of the Product

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

If for any components covered by harmonised standards or European Technical Assessments the manufacturer of the component has included the performance regarding the relevant essential characteristic in the Declaration of Performance, retesting of that component for issuing the ETA under the current EAD is not required.

2.2.1 Reaction to Fire

The support fixing assemblies, as described in clause 1.1, are considered to satisfy the requirements for performance Class A1 of the reaction to fire performance in accordance with the Commission Decision 96/603/EC, as amended by Commission Decisions 2000/605/EC and 2003/424/EC, without the need for testing on the basis of its fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

Therefore, when the conditions referred to above are fulfilled, the performance of the support fixing assemblies is class A1, which shall be given in the ETA.

2.2.2 Characteristic Tension Resistance

Purpose of the assessment

The purpose of the assessment is to evaluate the performance of the support fixing assemblies in relation to the essential characteristic ‘tension resistance’. The characteristic tension resistance shall be assessed

on the basis of tests described in this EAD and evaluated in accordance with EN 1990, Annex D7. A log-normal distribution shall be assumed.

Assessment Method

The product shall be installed into a test machine that is suitable for this type of test, shall have sufficient strength to support the required load and shall be verified in accordance with EN ISO 7500-1 class 1 or better.

The test arrangement shall consist of a test plate or disk of thickness suitable for the clamping range of the product as indicated in the manufacturer's product installation instructions (MPII) and shall be sufficiently rigid to ensure that displacement of the support fixing assembly only is recorded. All components of the test apparatus, including the connecting threaded rod shall have capacities that exceed the ultimate failure load of the tested component and shall be sufficiently rigid to ensure that failure of the product only is recorded.

Examples of the test setup for each type of assembly are shown in Annex A and Annex B. For some types, the torque shall be specified.

EN 1090-2 does not contain a method for calculating installation torque that is applicable to the assemblies described in this EAD. If the MPII do not contain torque values the guidance given in EN 1090-2 clause 8.3 for non-preloaded bolts shall be followed whereby the connected components shall be drawn together such that they achieve firm contact and a snug-tight condition³. The torque values used in the installation of the test assemblies shall be measured with a calibrated device and stated in the ETA.

The components shall be assembled without lubrication unless specified by the MPII. If lubrication is used this shall be stated in the ETA.

The test arrangement shall resemble the application for which the support fixing assembly is intended to be installed. For example, if the support fixing assembly is intended to be used on applications where the steelwork is horizontal, and the tensile load is applied perpendicular to the beam then the test arrangement shall resemble this (see Annex A).

For assemblies that are installed by passing a toggle or hook through a hole (Type 5 assemblies in accordance with clause 1.1.1) the hole shall be of a specified diameter.

If the support fixing assembly incorporates a swivel unit to suspend building services vertically from inclined beams (Type 6 in accordance with clause 1.1.1) then the test arrangement shall be set so that tests are performed at the maximum achievable angle of the support fixing assembly as indicated in the MPII (see Annex B). If the MPII do not indicate a maximum angle for a swivel unit, then it shall be tested at the greatest angle that can be achieved by the swivel action not exceeding 90°, since this is assumed to provide the lowest tension resistance. In addition, the tests may also be performed at lower angles. The angle values used shall be stated in the ETA.

The test plate shall be fixed securely in the test machine, ideally either side of the plate and the support fixing assembly installed as per the MPII centrally onto the test plate.

Displacement measuring devices (contactless may be used) shall be positioned to ensure only the elastic or plastic deformation of the support fixing assembly is measured. Any deformation of the test plates shall be excluded from the measurement.

A preload shall be applied (pre-determined as described below), the displacement measuring device shall then be set to zero, and a tensile load applied until either failure of the support fixing assembly occurs or the elastic and plastic deformation of the fixing exceeds 5mm.

The amount of preload applied shall be determined by performing an initial tensile test on the support fixing assembly as described above until failure is recorded either by failure of the fixing or by exceeding 5mm displacement, the preload shall then be calculated as 10% of the failure load of the tested component.

The relationship between the clamp geometry, the fastener diameter and the installation torque may vary within the product range, so the failure mechanism cannot be predicted, and tests shall be carried out for each bolt size. At least four tests shall be carried out for each bolt size.

3 The term "snug-tight" can generally be taken as that achievable by the effort of one person using a normal sized spanner without an extension arm, and can be set as the point at which a percussion wrench starts hammering.

The load-displacement curves and the respective failure modes as well as the material properties, dimensions and geometry of the components used for the tests shall be recorded.

Expression of results

The characteristic tension resistance shall be stated in the ETA for each assembly as a value not exceeding the 5% fractile determined from the test results. The value shall be given for a particular Type (1-5), size, cast iron or steel grade, fastener specification, and the following parameters as applicable to the Type: installation torque, lubrication (if any), maximum swivel angle, other swivel angles (if tested) and the installation hole diameter (for Type 5).

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of Assessment and Verification of Constancy of Performance to be Applied

For the products covered by this EAD the applicable European legal act is Commission Decision 98/214/EC, as amended by Commission Decision 2001/596/EC.

The system is 2+.

3.2 Tasks of the Manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.1.

Table 3.2.1 Control Plan for the Manufacturer; Cornerstones

No	Subject/Type of Control	Test or Control Method	Criteria, if any	Minimum Number of Samples	Minimum Frequency of Control
Factory Production Control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Check of material properties	Inspection certificate 3.1 in accordance with EN 10204	Control plan	1	Each manufacturing lot
2	Geometry and dimensions of part	Gauge	Control plan	1	Each manufacturing lot
3	External soundness of cast iron parts	Check in accordance with test plan	No pitting, cracks or inclusions	1	Each manufacturing lot

3.3 Tasks of the Notified Body

The cornerstones of the actions to be undertaken by the notified body of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.3.1.

Table 3.3.1: Control Plan for the Notified Body; Cornerstones:

No	Subject/Type of Control	Test or Control Method	Criteria, if any	Minimum Number of Samples	Minimum Frequency of Control
Initial Inspection of the Manufacturing Plant and of Factory Production Control					
1	Ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the support fixing assembly	-	Laid down in control plan	-	When starting production or a new production line
Continuous Surveillance, Assessment and Evaluation of Factory Production Control					
2	Verifying that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan	-	Laid down in control plan	-	Twice per year

4 REFERENCE DOCUMENTS

EN 1562:2019	Founding. Malleable cast irons
EN 1563:2018	Founding. Spheroidal graphite cast irons
EN 1990:2023	Eurocode - Basis of structural and geotechnical design
EN 10088-4:2009	Stainless steels - Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes
EN 10088-5:2009	Stainless steels - Technical delivery conditions for bars, rods, wire, sections and bright products of corrosion resisting steels for construction purposes
EN 10204:2004	Metallic products - Types of inspection documents
EN 1090-2:2018 +A1:2024	Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures
EN 10025-1:2004	Hot rolled products of structural steels - General technical delivery conditions
EN ISO 683-1:2018	Heat-treatable steels, alloy steels and free-cutting steels - Non-alloy steels for quenching and tempering
EN ISO 683-2:2018	Heat-treatable steels, alloy steels and free-cutting steels - Alloy steels for quenching and tempering
EN ISO 898-1:2013	Mechanical properties of fasteners made of carbon and alloy steel – Part 1: Bolts, screws and studs with specified property classes – Coarse thread and fine pitch thread (ISO 898-1:2013+Cor.1:2013)
EN ISO 898-2:2022	Fasteners - Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified property classes (ISO 898-2:2022)
EN ISO 898-3:2018+A1:2021	Mechanical properties of fasteners made of carbon steel and alloy steel - Part 3: Flat washers with specified property classes (ISO 898-3:2018+Amd.1:2020))
EN ISO 7500-1:2018	Metallic materials - Calibration and verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Calibration and verification of the force-measuring system (ISO 7500-1:2018)

ANNEX A: Test Setup for Support Fixing Assemblies Used on Horizontal Steelwork

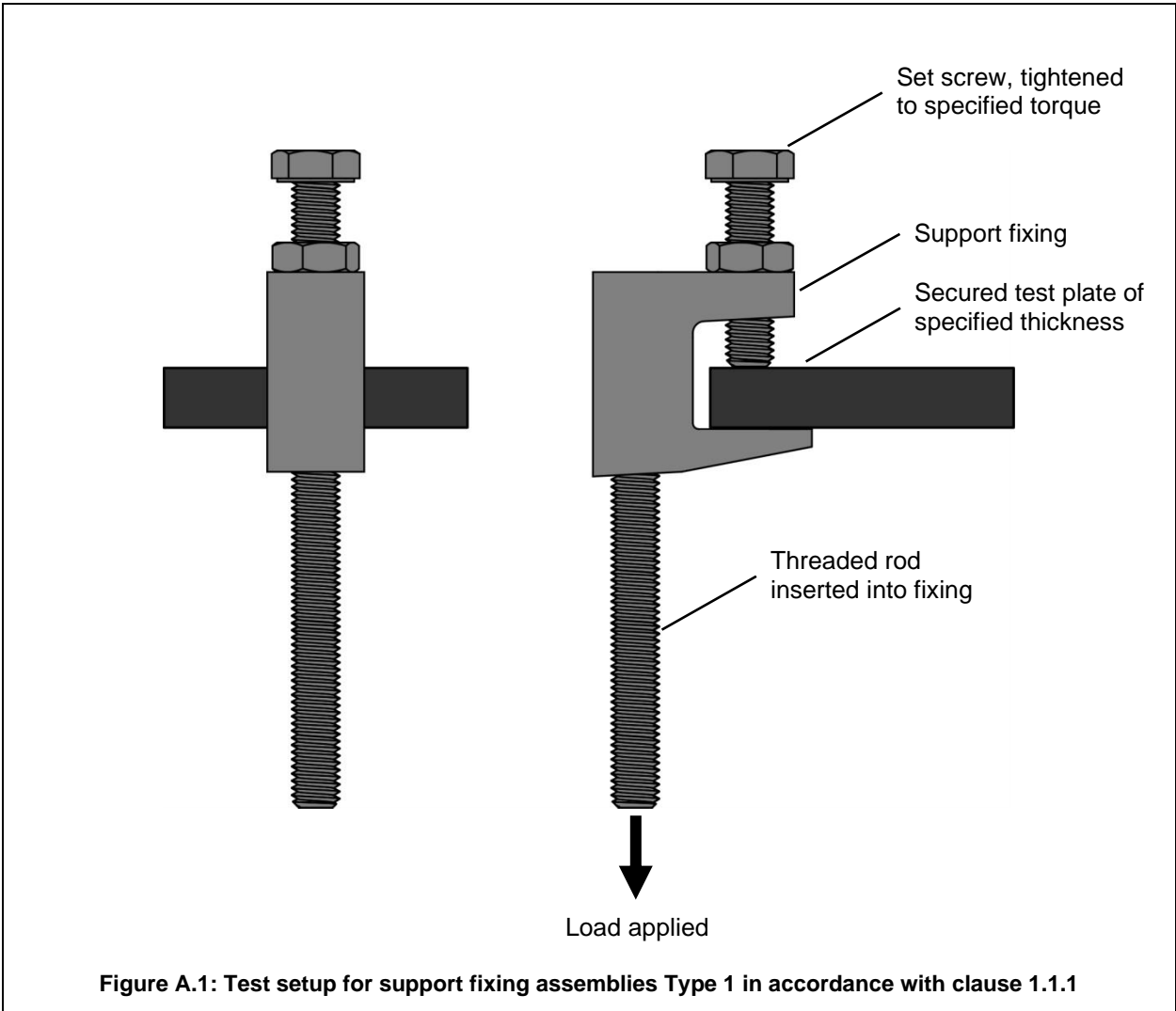
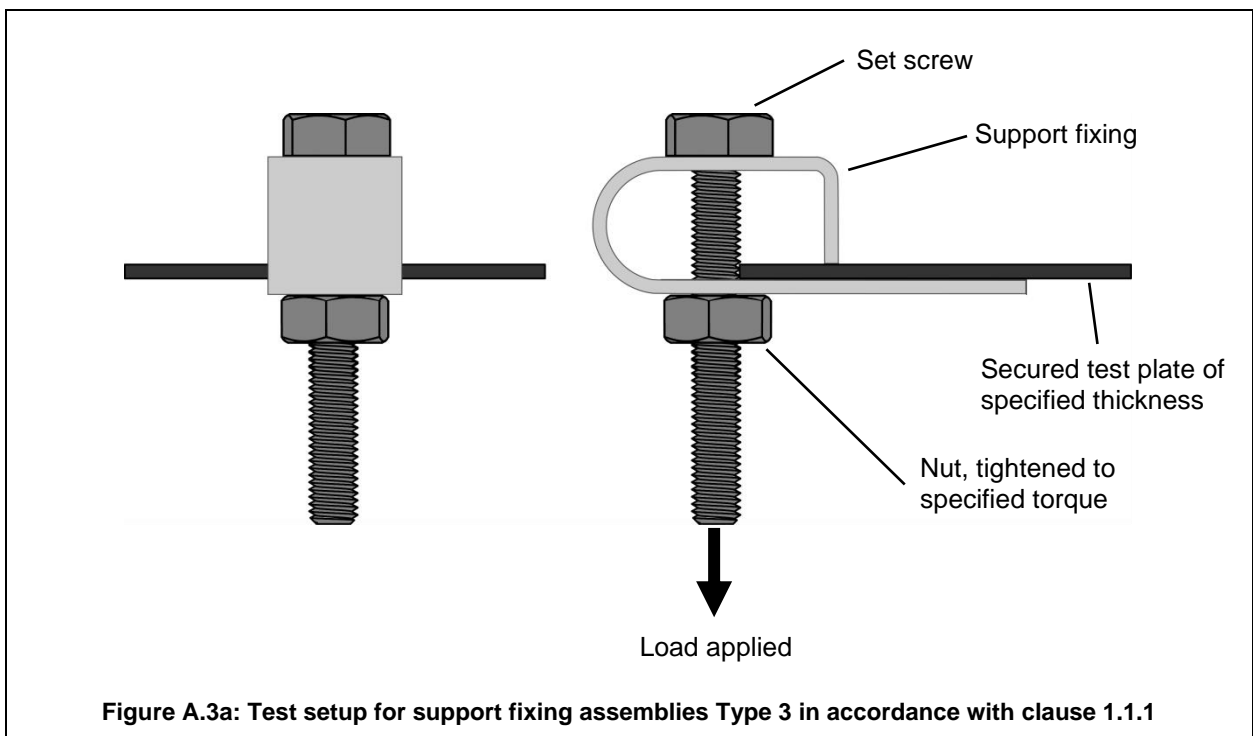
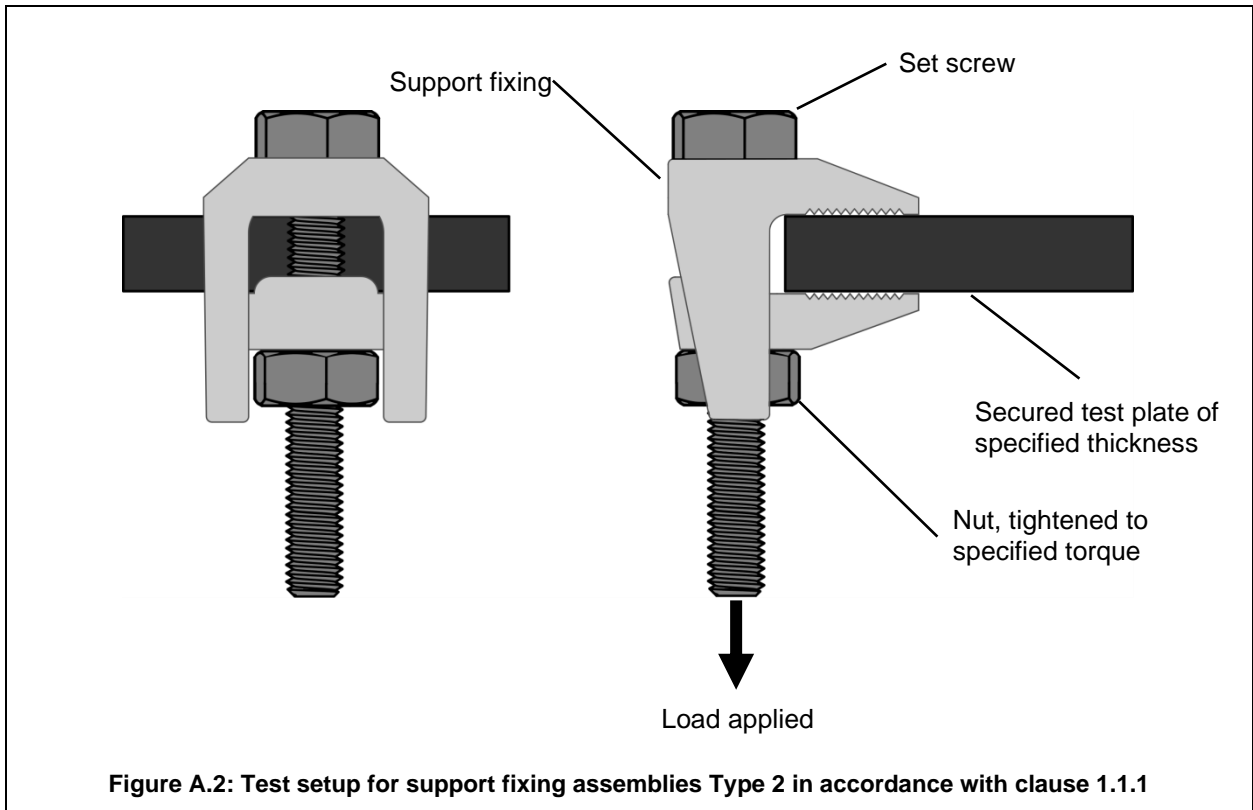
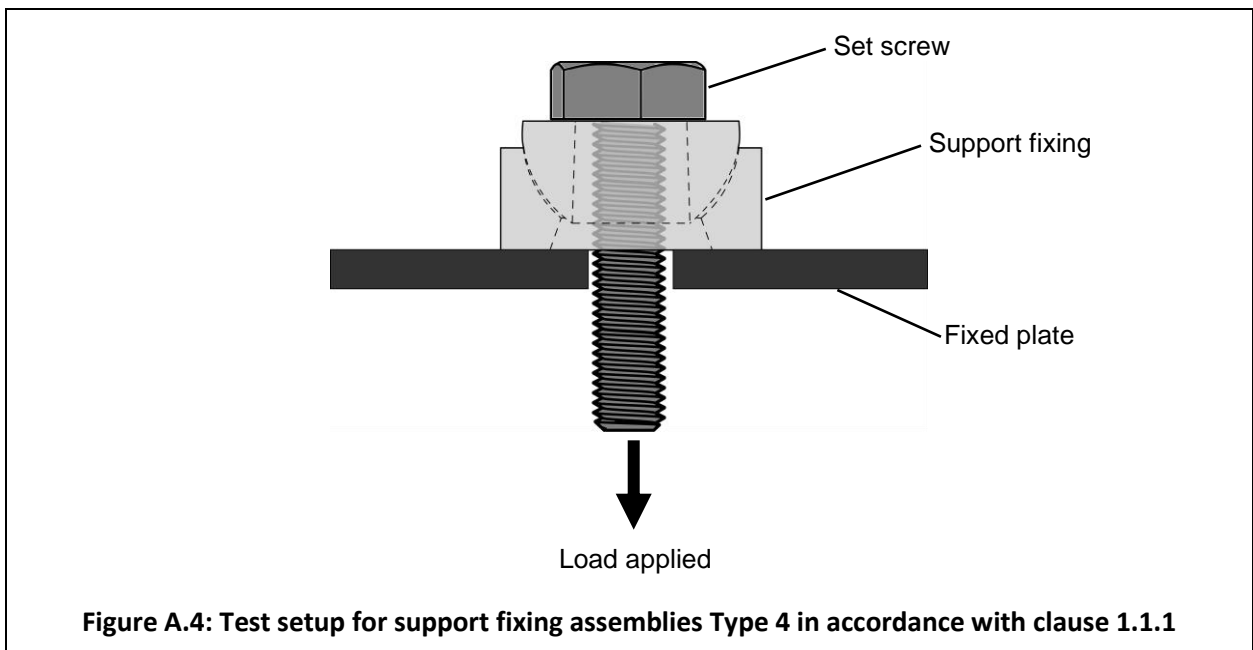
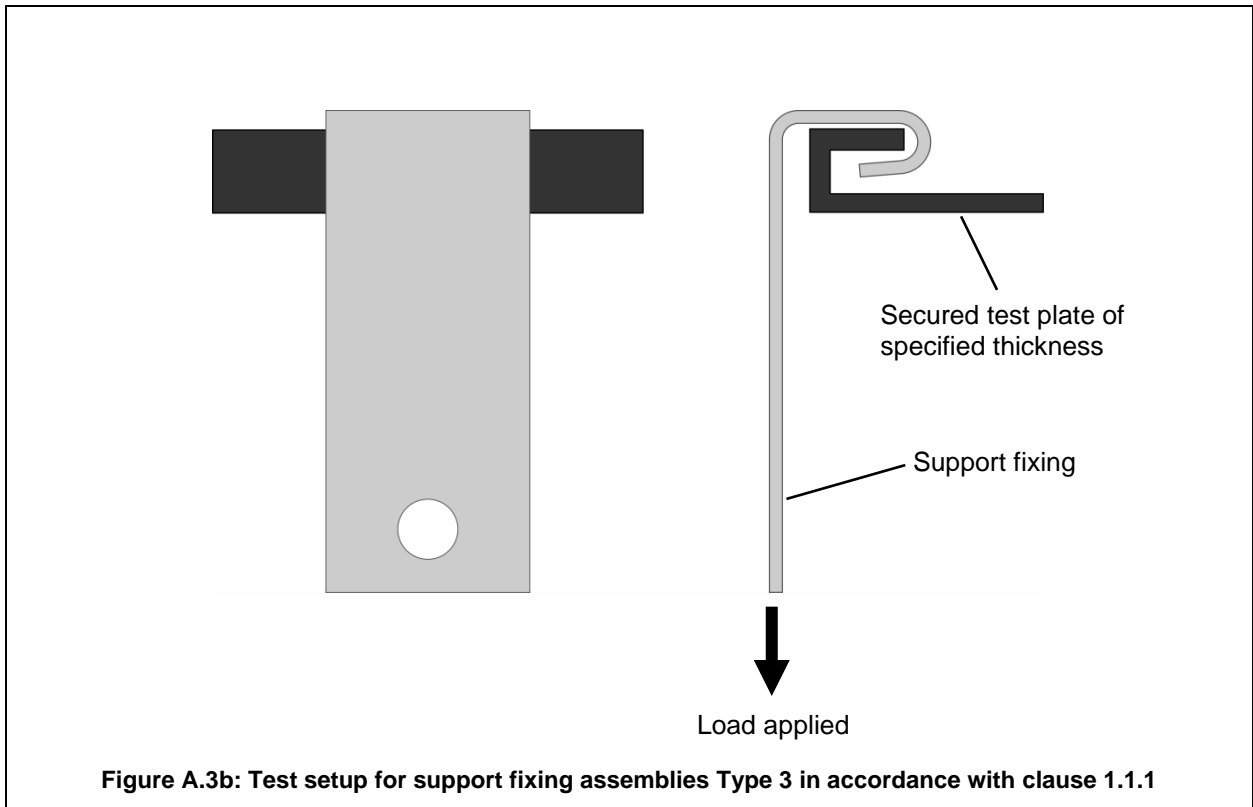
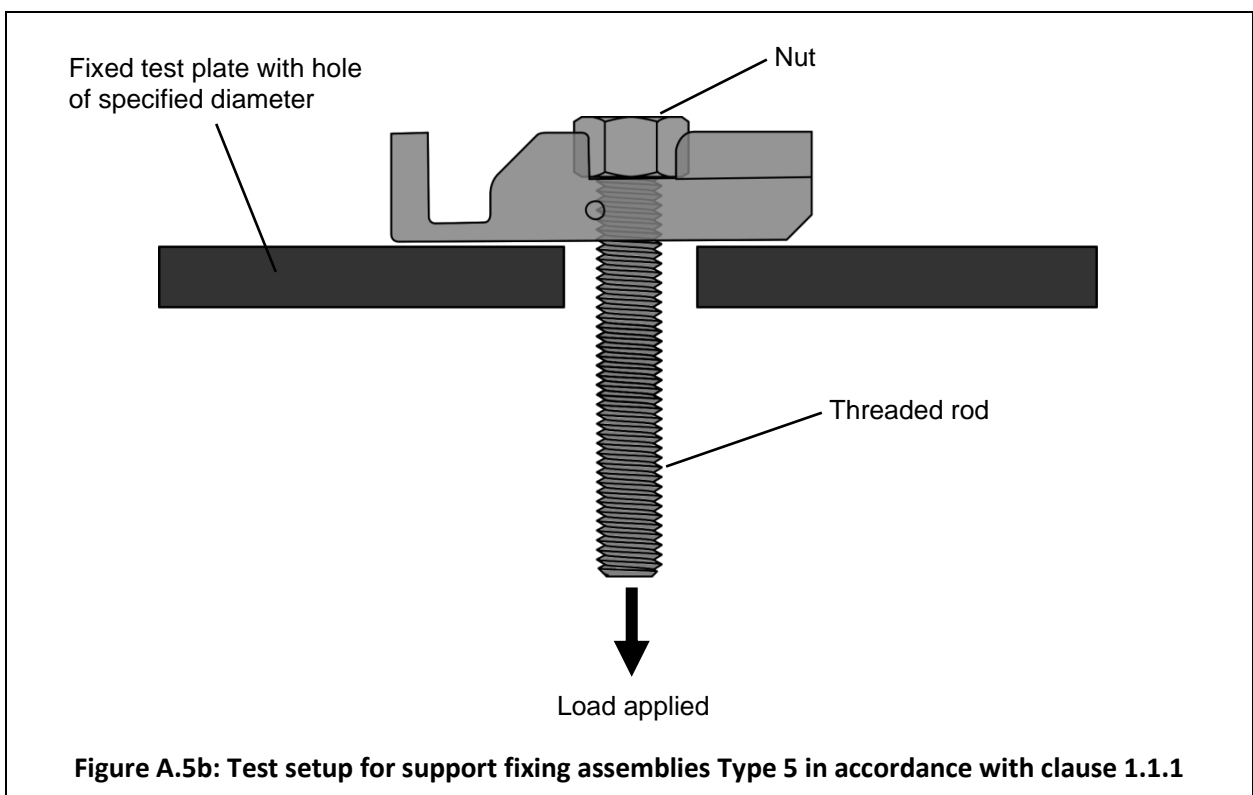
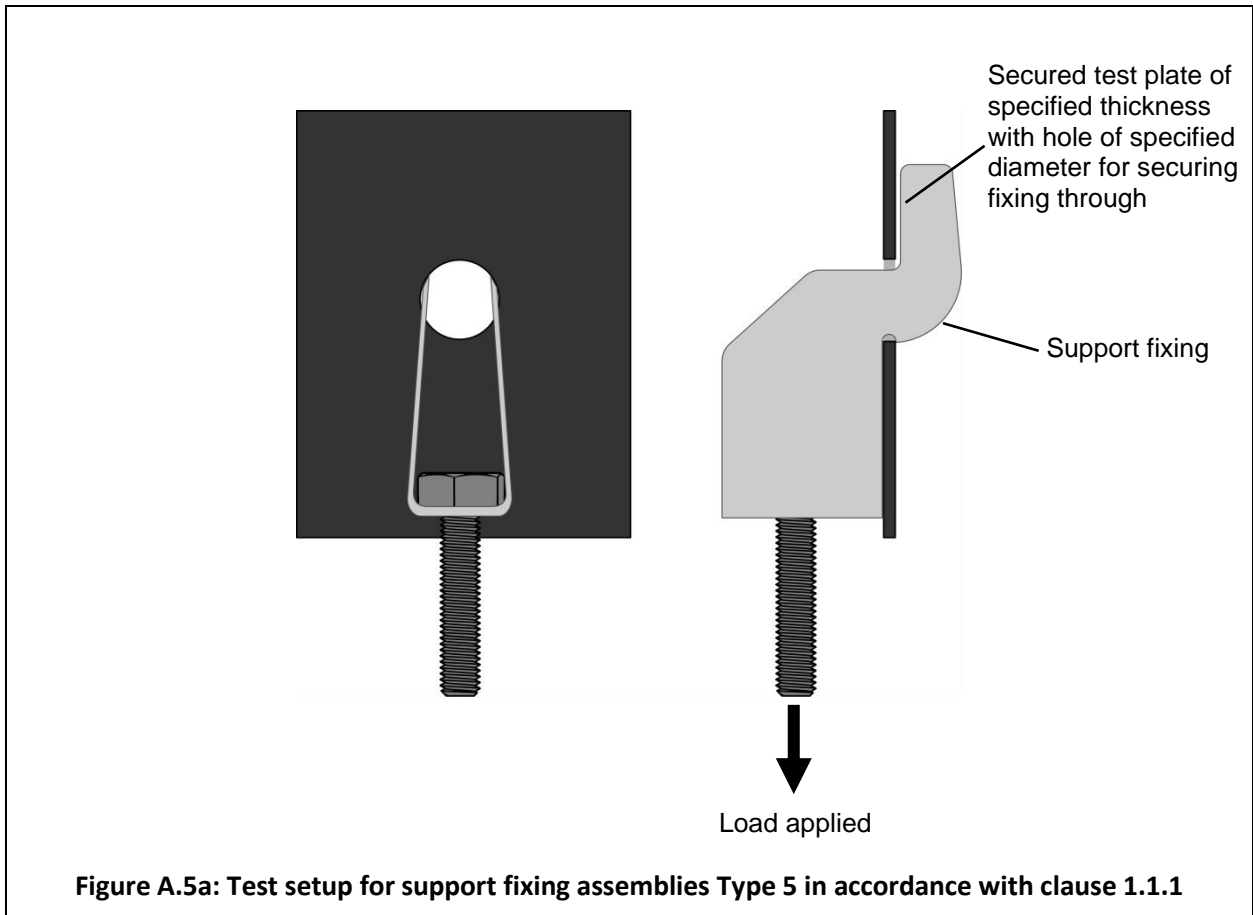


Figure A.1: Test setup for support fixing assemblies Type 1 in accordance with clause 1.1.1







ANNEX B: TEST SETUP FOR SUPPORT FIXING ASSEMBLIES USED ON INCLINED STEELWORK

