



## European Technical Approval ETA-13/0300

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung  
*Trade name*

Lindapter Trägerklemmen  
*Lindapter Girder Clamps*

Zulassungsinhaber  
*Holder of approval*

Lindapter International  
Lindsay House  
Brackenbeck Road  
Bradford, West Yorkshire BD7 2NF  
GROSSBRITANNIEN

Zulassungsgegenstand  
und Verwendungszweck  
*Generic type and use  
of construction product*

Lindapter Trägerklemmverbindungen  
*Lindapter Girder Clamp connections*

Geltungsdauer:  
*Validity:* vom  
from  
bis  
to

31 May 2013  
31 May 2018

Herstellwerk  
*Manufacturing plant*

Lindapter International  
Lindsay House  
Brackenbeck Road  
Bradford, West Yorkshire BD7 2NF  
GROSSBRITANNIEN

Diese Zulassung umfasst  
*This Approval contains*

13 Seiten einschließlich 4 Anhänge  
*13 pages including 4 annexes*

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;*
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
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- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12  
<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1  
<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25  
<sup>4</sup> *Bundesgesetzblatt Teil I 1998*, p. 812  
<sup>5</sup> *Bundesgesetzblatt Teil I 2011*, p. 2178  
<sup>6</sup> Official Journal of the European Communities L 17, 20 January 1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of product/ products and intended use

#### 1.1 Definition of the construction product

The construction products are Lindapter girder clamps type A and B and the load bearing connections of structural steel parts executed with these girder clamps (see Annex 1). The construction products are in the following called Lindapter girder clamp connections. Lindapter girder clamp connections are clamping systems typically consisting of clamps, intermediate plates and packings made of carbon steel and malleable cast (Whiteheart or Blackheart) and of structural hexagon bolting assemblies strength class 8.8 according to EN 15048-1:2007. Samples of girder clamp connections are shown in Annex 2. The overall dimensions of the Whiteheart malleable iron clamps types A & B are given in Annex 3 and the overall dimensions of the Blackheart malleable iron clamps types A & B are given in Annex 4.

#### 1.2 Intended use of the construction product

Lindapter girder clamp connections are intended to be used for the load bearing connection of girders, columns, channels made of structural steel or any combination of them as well as other type and sizes of structural steel sections including those with tapered flanges without welding. Connections with girder clamps are foreseen for internal and external use for temporary structures as well as for permanent structures. The advantage is the simple assembling and disassembling of structural parts and whole structures without site drilling, welding and cutting and hence resulting problems like subsequent corrosion protection etc. For installation, only hand tools are required.

The connections with girder clamps are suitable for static and dynamic loading for use in non-dissipative or low-dissipative structures as far as the dynamic loading mainly effects as tension load. Samples of possible types of Lindapter girder clamp connections are shown in Annex 2.

The provisions made in this European technical approval are based on an assumed working life of the Lindapter girder clamp connections of 25 years when installed in the works or as long as the assumed working life of the structure with the clamp connections - sufficient protected against corrosion provided. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2 Characteristics of product and methods of verification

### 2.1 Characteristics of product

The Lindapter girder clamp connections shall correspond in principle to the drawing given in Annex 2.

The characteristic material values, dimensions and tolerances of the Lindapter girder clamp connections and the appropriate components neither indicated in this section nor in Annex 3 or Annex 4 shall correspond to the respective values laid down in the technical documentation<sup>7</sup> to this European technical approval.

The characteristic values of resistance are given in section 4.2 to this European Technical Approval.

The Lindapter girder clamp connections are considered to satisfy the requirements of performance class A1 of the characteristic reaction to fire.

### 2.2 Methods of verification

The assessment of the fitness of the Lindapter girder clamp connections for the intended use in relation to the Essential Requirements ER 1 (Mechanical resistance and stability), ER 2 (Safety in case of fire), ER 3 (Hygiene, health and environment), ER 4 (Safety in use) and additional aspects of durability has been made in accordance with section 3.2 of the Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.

The assessment of the resistance to fire performance is only relevant to the assembled system (Lindapter girder clamp connections, steel structure) which is not part of the ETA.

The Lindapter girder clamp connections are considered to satisfy the requirements of performance class A 1 of the characteristic reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

Concerning Essential Requirements No. 1 (Mechanical resistance and stability) and Essential Requirements No. 4 (Safety in use) the following applies:

The characteristic values of resistance given in Table 1 were determined by tests.

Concerning Essential Requirement No. 3 (Hygiene, health and environment) the following applies:

The Lindapter girder clamp connections do not contain dangerous substances or radiation.

Note: In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

<sup>7</sup> The technical documentation to this European technical approval is deposited at Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure is handed over to the approved bodies.

### 3 Evaluation and attestation of conformity and CE marking

#### 3.1 System of attestation of conformity

According to the Decision 99/92/EC of the European Commission<sup>8</sup> system 2+ of the attestation of conformity applies.

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
  - (1) initial type-testing of the product;
  - (2) factory production control;
  - (3) testing of samples taken at the factory in accordance with a prescribed test plan.
- (b) Tasks for the approved body:
  - (4) certification of factory production control on the basis of:
    - initial inspection of factory and of factory production control;
    - continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

#### 3.2 Responsibilities

##### 3.2.1 Tasks for the manufacturer

###### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.<sup>9</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

###### 3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of prefabricated structural components made of hot-rolled steel products in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

<sup>8</sup> Official Journal of the European Communities L 80 of 18.03.1998

<sup>9</sup> The control plan is a confidential part of the documentation to this European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

### 3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in written reports.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

### 3.3 CE marking

The CE marking shall be affixed on the accompanying commercial documents. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European technical approval,
- the name of the product.

## 4 Assumptions under which the fitness of the product for the intended use was favourably assessed

### 4.1 Manufacturing

The Lindapter girder clamps are manufactured in accordance with the provisions of the European technical approval using the manufacturing process as laid down in the technical documentation.

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

### 4.2 Design

#### 4.2.1 General

Lindapter girder clamp connections completely or partly exposed to external weather or similar conditions are protected sufficiently against corrosion. For the corrosion protection the rules given in EN 1090-2:2008 are taken into account.

Connections in steel structure with Lindapter girder clamps are designed according to the appropriate parts of the standard EN 1993 as far as no other provisions are made in the following. The strength class of the bolts is 8.8 with the appropriate nuts and washers.

#### 4.2.2 Specific

##### 4.2.2.1 Loading in bolt axis direction (tension)

##### 4.2.2.1.1 Predominantly static loading

The characteristic values of tension resistance  $N_{R,k}$  according to Table 1 are used for calculation. The values are valid for one connection with four bolts.

**Table 1 Characteristic values of resistance**

Nominal size	Characteristic value of tension resistance for one connection (4 bolts) $N_{R,k}$ [kN]	Characteristic value of shear resistance for one connection (4 bolts) $V_{R,k}$ [kN]
M10	9	---
M12	30.7	3.1
M16	57.2	5.7
M20	89.3	8.9
M24	128.6	12.9

The recommended partial safety factor  $\gamma_M = 1.25$  is used in order to determine the corresponding design resistances, provided no values are given in national regulations of the member state in which the girder clamps are used or in the respective National Annex to Eurocode 3.

##### 4.2.2.1.2 Dynamic loading (fatigue)

For fatigue design the fatigue strength curve 50 according to EN 1993-1-9:2005 + AC:2009 is used.

Girder clamps of the nominal size M10 are not taken for dynamic loading.

##### 4.2.2.2 Loading rectangular to bolt axis (slip)

The loading is predominantly static or if repeated the impact is only short term (e.g. braking of cranes).

The characteristic values of shear resistance  $V_{R,k}$  according to Table 1 are used for calculation. The values are valid for one connection with four bolts.

##### 4.2.2.3 Loading via bending moments

Possibly bending moments to transfer by the Lindapter girder clamp connection are taken into account by approximation as tension loads in the bolts according to the following formula:

$$\Delta N = \frac{3 \cdot M}{b}$$

with

M - bending moment

$\Delta N$  - equivalent tension load for clamp connection (4 bolts)

b - flange width of girder loaded by rotation

#### 4.2.2.4 Combined loading

In the case of combined loading (tension load, shear load in girder axis and rectangular to girder axis, bending) the verification for all kinds of loading is done separately, except for bending with the tension load  $\Delta N$  is added to the regular tension load.

#### 4.2.2.5 Local bending of girder flanges

The girder flanges are calculated for local bending

### 4.3 Installation

#### 4.3.1 General

Connections in steel structure with Lindapter girder clamps are executed according to EN 1090-2:2008+A1:2011 as far as no other provisions are given in the following.

#### 4.3.2 Specific

The installation of the Lindapter girder clamp connections is only carried out according to the provisions of the manufacturer. The manufacturer hands over the assembly instruction to the executing company.

Connections with Lindapter girder clamps are only executed by companies with the necessary experience unless the instruction of the assembly personnel is arranged by specialists experienced in this field.

The beams or columns or structural parts with comparable shape (flanges) are parallel upon each other or intersect with an angle between  $80^\circ$  to  $100^\circ$ . The contact faces are flat and parallel to each other and free of contaminations. The parts to be connected are in direct contact without gap.

The nominal sizes are M10, M12, M16, M20 and M24. In each connection (4 bolts) only one nominal size is allowed.

Under the nut only Lindapter girder clamps Type B are located. The nuts are tightened with the torque moment according to Table 2.

**Table 2**

Nominal size	Torque moment for bolts grade 8.8 as delivered (not lubricated <sup>1)</sup> ) [Nm]	Minimum thickness of intermediate plates [mm]
M10	20	8
M12	69	8
M16	147	10
M20	285	12
M24	491	15

<sup>1)</sup> Where lubricated bolts are used the torque moment should be reduced to provide a preload equal to that for bolts not lubricated.

The clamps, the packings and the bolts are of the same nominal size and are suitable for the flange thickness of the structural parts to be connected (see manufacturer's instructions).

The minimum thickness of the intermediate plates according to Table 2 and the dimensions according to Annex 3 or Annex 4 are met.

The installed Lindapter girder clamps are accessible for control of the right installation and torque moment.

Only components without damages like deformations, corrosion etc. are used for installation.



The bolts are fixed rectangular to the contact face of the parts to guarantee a correct load bearing connection.

The conformity of the installed Lindapter girder clamps with the provisions of the ETA is attested by the executing company.

## 5 Indications to the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2, 4.2 and 4.3 (including Annexes if referred to) is given to those who are concerned. This information may be given by reproduction of the respective parts of the European technical approval.

In addition all installation data (e. g. torque moments) shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

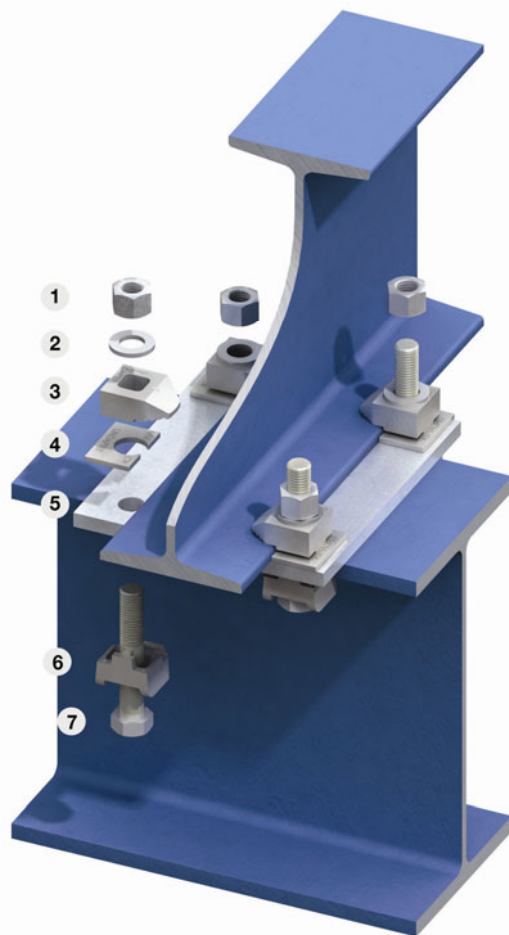
## 6 Use, maintenance, repair

If the Lindapter girder clamp connections are loaded by dynamic loads the state of the connection shall be checked every other year by a responsible person. The connection and the components shall be free of corrosion and cracks and not displaced. Furthermore the torque moment shall be checked. If the loading is rectangular to the bolt axis (shear) and predominantly in one direction it shall be checked in a shorter term that no unallowable displacement occurred. Damaged components shall be replaced immediately and the corrosion protection repaired if necessary. Every check shall be documented in written form as well as repair measures. The executing company is responsible to inform the user of the structure in written form about these requirements.

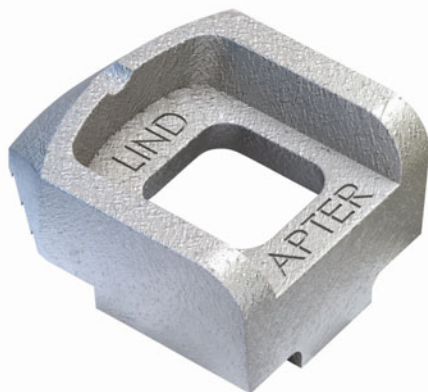
Andreas Kummerow  
p. p. Head of Department

*beglaubigt:*  
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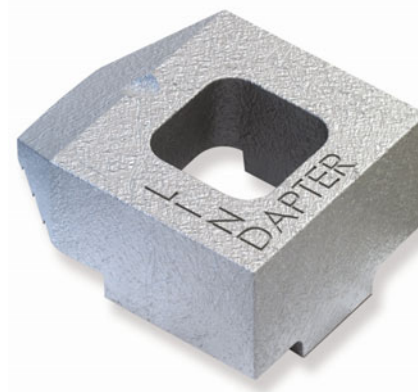
### Composition of a Lindapter girder clamp connection



- 1 Hexagon nut of bolting assembly
- 2 Washer of bolting assembly
- 3 Girder clamp type B
- 4 Packing
- 5 Intermediate plate
- 6 Girder clamp type A
- 7 Hexagon bolt of bolting assembly



**Girder clamp type A**  
suitable for bolt head side

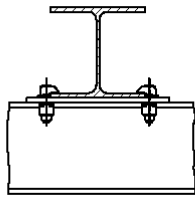
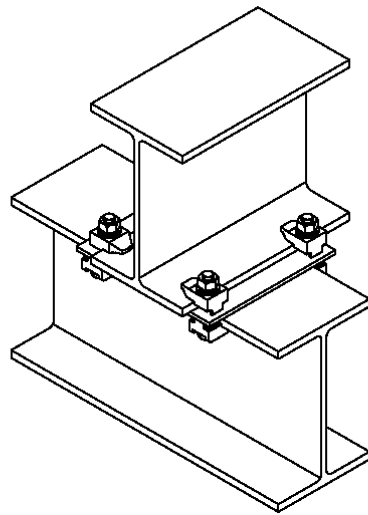


**Girder clamp type B**  
suitable for nut side  
may also be used under bolt head

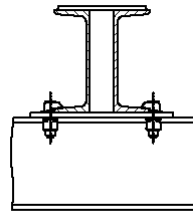
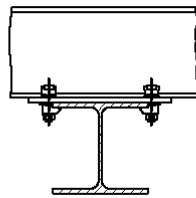
Lindapter Girder Clamps

Composition of a Lindapter girder clamp connection  
Girder clamp type A and type B

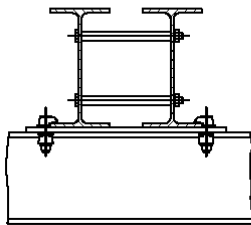
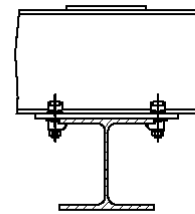
Annex 1



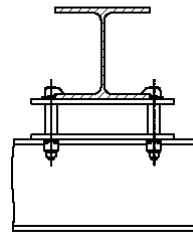
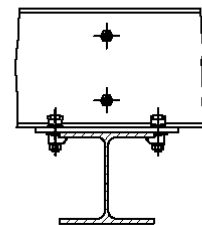
Sample 1



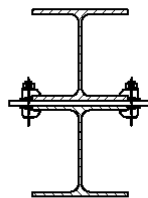
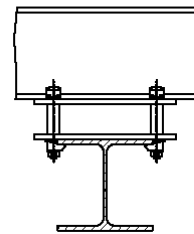
Sample 2



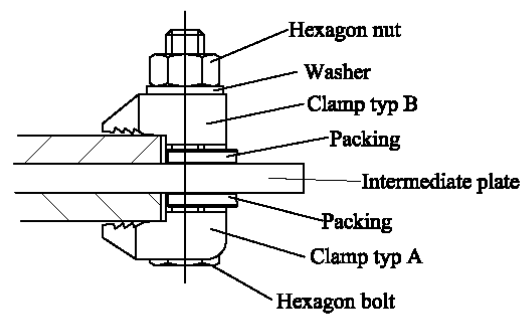
Sample 3



Sample 4



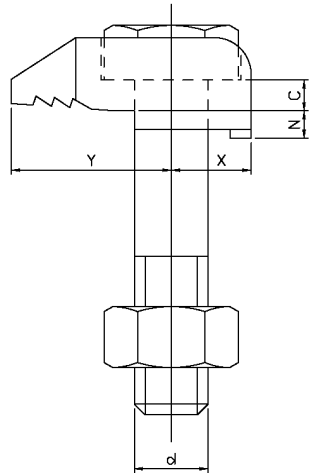
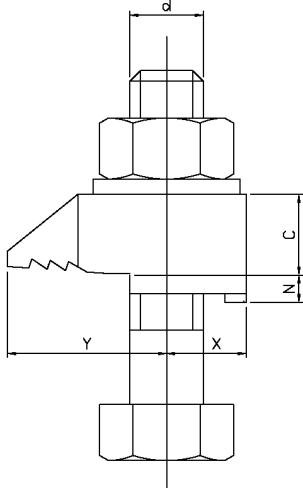
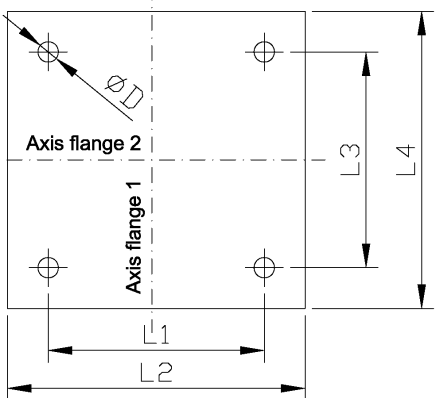
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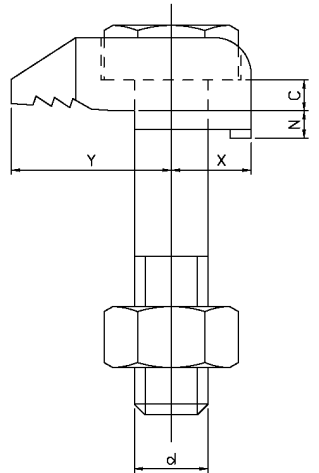
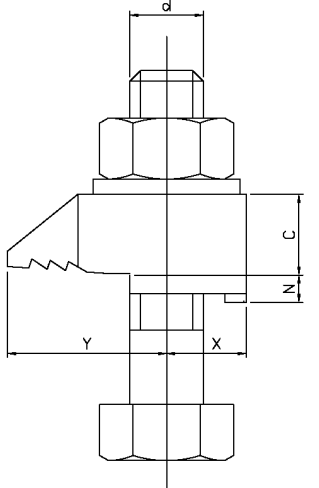
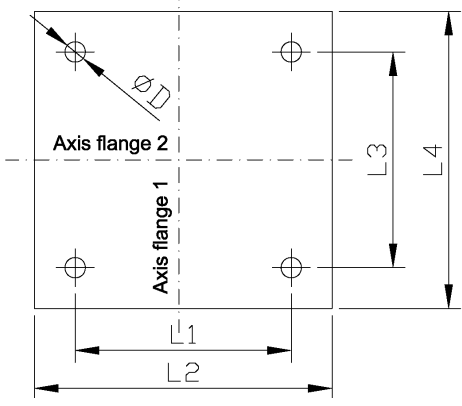


Lindapter Girder Clamps

Samples for application of Lindapter girder clamps for connections in structures

Annex 2

Hexagon bolts		Dimensions of Lindapter girder clamp type A (Whiteheart)							
Nominal size d	Width between flats [mm]	Y [mm]	X [mm]	Tail N [mm]			C [mm]	Width of clamps [mm]	
				short	medium	long			
M12	19	26	13	4.5	6.0	9.5	6.35	28.5	
M16	24	30	16	5.5	8.0	11.0	8.25	35.6	
M20	30	36	19	7.0	10.0	12.5	10.0	45.5	
M24	36	48	29	9.0	12.0	16.0	13.0	53.9	
Hexagon nuts		Dimensions of Lindapter girder clamp type B (Whiteheart)							
Nominal size d	Width between flats [mm]	Y [mm]	X [mm]	Tail N [mm]			C [mm]	Width of clamps [mm]	
				short	medium	long			
M12	19	26	13	4.5	6.0	9.5	12.0	28.5	
M16	24	30	16	5.5	8.0	11.0	15.5	36.0	
M20	30	36	19	7.0	10.0	12.5	19.0	46.2	
M24	36	48	25	9.0	12.0	16.0	25.0	55.0	
 <p>Dimensions of intermediate plates</p> <p> <math>D = d + 1 \dots 2 \text{ mm (see EN 1090-2)}</math>  <math>L1 = \text{Width of flange 1} + D</math>  <math>L2 = L1 + 3 \times D</math>  <math>L3 = \text{Width of flange 2} + D</math>  <math>L4 = L3 + 3 \times D</math> </p>									
Lindapter Girder Clamps								Annex 3	
Dimensions of clamps type A and B (Whiteheart) and of intermediate plates									

Hexagon bolts		Dimensions of Lindapter girder clamp type A (Blackheart)							
Nominal size d	Width between flats [mm]	Y [mm]	X [mm]	Tail N [mm]			C [mm]	Width of clamps [mm]	
				short	medium	long			
M10	17	20	11	4.0	5.0	6.5	5.0	25.5	
M12	19	26	13	4.5	6.0	-	6.75	29.0	
M16	24	30	16	5.5	8.0	11.0	8.00	36.0	
M20	30	36	19	7.0	10.0	12.5	10.0	42.5	
Hexagon nuts		Dimensions of Lindapter girder clamp type B (Blackheart)							
Nominal size d	Width between flats [mm]	Y [mm]	X [mm]	Tail N [mm]			C [mm]	Width of clamps [mm]	
				short	medium	long			
M10	17	20	11	4.0	5.0	6.5	9.5	24.5	
M12	19	26	13	4.5	6.0	9.5	13.0	29.0	
M16	24	30	16	5.5	8.0	11.0	16.0	35.0	
M20	30	36	19	7.0	10.0	12.5	18.5	42.0	
		<p><math>D = d + 1 \dots 2 \text{ mm}</math> (see EN 1090-2)</p> <p><math>L1 = \text{Width of flange 1} + D</math></p> <p><math>L2 = L1 + 3 \times D</math></p> <p><math>L3 = \text{Width of flange 2} + D</math></p> <p><math>L4 = L3 + 3 \times D</math></p>							Annex 4
Lindapter Girder Clamps		Dimensions of clamps type A and B and intermediate plates (Blackheart)							