

**INSTYTUT TECHNIKI BUDOWLANEJ**  
PL 00-611 WARSZAWA  
ul. FILTROWA 1  
tel.: (+48 22) 825-04-71  
(+48 22) 825-76-55  
fax: (+48 22) 825-52-86  
www.itb.pl



**Member of EOTA**

## European Technical Assessment

**ETA-16/0545**

**Stacon<sup>®</sup> type LD**

**Dowels for structural joints under static  
and quasi-static loading**

*Trzpienie do złączy konstrukcyjnych pod obciążeniem  
statycznym i quasi-statycznym*



Europejska Organizacja ds. Oceny Technicznej  
European Organisation for Technical Assessment



INSTYTUT TECHNIKI BUDOWLANEJ



Member of



[www.eota.eu](http://www.eota.eu)

## European Technical Assessment

**ETA-16/0545  
of 28/12/2023**



### General Part

**Technical Assessment Body issuing the European Technical Assessment**

Instytut Techniki Budowlanej

**Trade name of the construction product**

Stacon® type LD

**Product family to which the construction product belongs**

Dowels for structural joints under static and quasi-static loading

**Manufacturer**

Schöck Bauteile GmbH  
Schöckstraße 1  
D-76534 Baden-Baden, Germany

**Manufacturing plant**

Schöck Bauteile GmbH  
Schöckstraße 1  
D-76534 Baden-Baden, Germany

**This European Technical Assessment contains**

16 pages including 3 Annexes which form an integral part of this Assessment

**This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of**

European Assessment Document (EAD)  
050019-00-0301 "Dowels for structural joints under static and quasi-static loading"

**This version replaces**

ETA-16/0545 issued on 30/09/2016

*This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.*

*Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.*

## Specific Part

### 1 Technical description of the product

The Stacon® type LD dowels for structural joints consist of a dowel bar and a sleeve. The bar is made of stainless or hot-dip galvanized steel. The sleeve is made of stainless steel or polypropylene (Annex A1 to A4).

The Stacon® type LD dowels belong to family of dowels with a single bar and a sleeve without anchor plate and ancillary reinforcement. Within this family bars are made of stainless steel or galvanized steel and sleeves are made of stainless steel or polypropylene. Dowels allow axial and lateral traverse movement.

The two components of a dowels are manufactured separately in the factory and assembled on the construction site into an expansion joint between concrete elements.

The bar is inserted into a sleeve on the one side of the joint and embedded in concrete on the opposite side. Such setting allows free expansion of the joint and shear stress transmission.

The possible combinations of bars and sleeves are given in Table A6.1 (Annex A6).

The materials used are given in Annex A1 to A5.

Optionally, the fire protection collars LD BSM or LD-Q BSM can be part of the dowel. The collar is plugged on the dowel between the concrete elements. In the case of fire the collar will expand and protect the dowel against heating. The dimensions of the fire protection collars are given in Table A6.2 (Annex A6). Arrangement of fire protection collars is given in Annex A8.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The performance given in clause 3 are only valid if the dowels are used in compliance with the specifications and conditions given in Annex B1.

Load bearing capacity of dowels with respect to steel failure is given in Annex B2. Load bearing capacity of joint resulting of concrete edge failure is given in Annex B3.

The provisions made in this European Technical Assessment are based on an assumed working life of the products of 50 years, when installed in the works, provided that dowels are subject to appropriate installation, in accordance with the manufacturer's recommendations. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, 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.

### 3 Performance of the product and references to the methods used for its assessment

Performance of Stacon® type LD dowels related to the Basic Requirements is given in Table 1.

**Table 1**

No	Essential characteristic	Assessment method (EAD clause)	Performance
<b>Mechanical resistance and stability (BWR 1)</b>			
1	Resistance to steel failure at ULS	2.2.2	$e = 0,5 \cdot d_{bar} [mm]$
2	Resistance to concrete edge failure at ULS not influenced by lateral movements of the dowel	2.2.3	$X_{1,1} = 0,52$ $B_{spec,1} = 0 [mm]$ $H_{spec,1} = 0,5 \cdot h_{slab} [mm]$ $k_{1,1} = 0$

Table 1

No	Essential characteristic	Assessment method (EAD clause)	Performance
3	Resistance to concrete edge failure at ULS influenced by lateral movements of the dowel	2.2.4	$X_{1,2} = 0,52$ $B_{spec,2} = 0$ [mm] $H_{spec,2} = 0,5 \cdot h_{slab}$ [mm] $k_{1,2} = 0$
4	Resistance to concrete edge failure at SLS	2.2.5	$X_2 = 0,57$
5	Resistance to steel failure at SLS	2.2.6	$X_3 = 0,21$
<b>Safety in case of fire (BWR 2)</b>			
6	Reaction to fire	2.2.7	Class A1
7	Resistance to fire	2.2.8	see Annex C1

#### 4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

According to Decision 2003/639/EC of the European Commission, the systems of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) given in Table 2 apply.

Table 2

Product	Intended use	Level or class (Reaction to fire)	System
Dowels for structural joints	For uses subject to structural performance regulations	-	2+
	For uses subject to regulations on reaction to fire	(A1 to E) <sup>(1)</sup> , F	4

<sup>(1)</sup> Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Class A1 according to Commission Decision 96/603/EC)

#### 5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

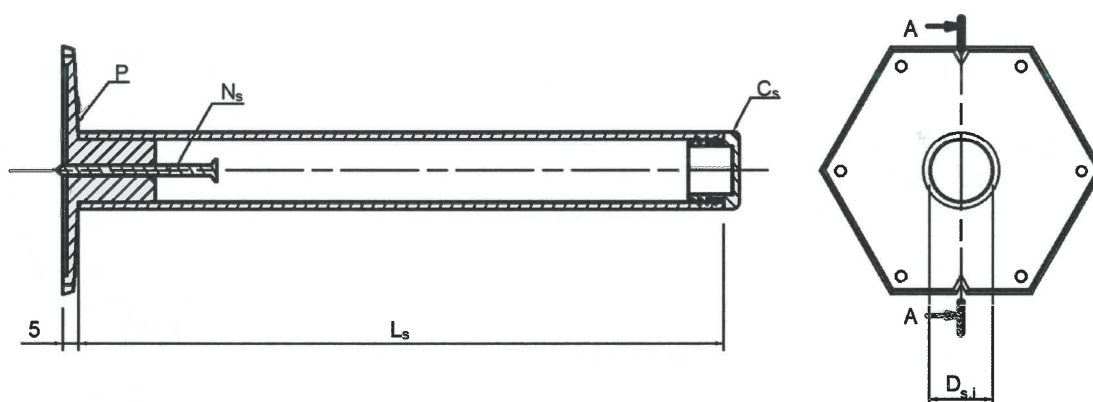
For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 28/12/2023 by Instytut Techniki Budowlanej



Anna Panek, MSc  
Deputy Director of ITB



**Figure A1. Dimensions of sleeve LD Part S / P with plug**


- P - mounting plate  
 N<sub>s</sub> - nail  
 D<sub>s,i</sub> - inside diameter  
 C<sub>s</sub> - tube plug  
 L<sub>s</sub> - length of the pipe

**Table A1. Dimensions and materials of sleeve LD Part S / P with plug**

For joint width 0 to 60 mm		For joint width 5 to 40 mm		D <sub>s,i</sub> [mm]
Type of sleeve	L <sub>s</sub> [mm]	Type of sleeve	L <sub>s</sub> [mm]	
LD 16/270 Part S	185	LD 16/250 Part S	160	17
LD 20/320 Part S	210	LD 20/300 Part S	185	21
LD 22/350 Part S	225	LD 22/330 Part S	200	23
LD 25/390 Part S	245	LD 25/370 Part S	220	26
LD 27/420 Part S	260	LD 27/400 Part S	235	28
LD 30/450 Part S	275	LD 30/430 Part S	250	31
LD 35/520 Part S	310	LD 35/500 Part S	285	36
LD 40/580 Part S	340	LD 40/560 Part S	315	41
LD 16/270 Part P	185	LD 16/250 Part P	160	17
LD 20/320 Part P	210	LD 20/300 Part P	185	21
LD 22/350 Part P	225	LD 22/330 Part P	200	23
LD 25/390 Part P	245	LD 25/370 Part P	220	26
LD 27/420 Part P	260	LD 27/400 Part P	235	28
LD 30/450 Part P	275	LD 30/430 Part P	250	31
LD 35/520 Part P	310	LD 35/500 Part P	285	36
LD 40/580 Part P	340	LD 40/560 Part P	315	41

**Materials:**

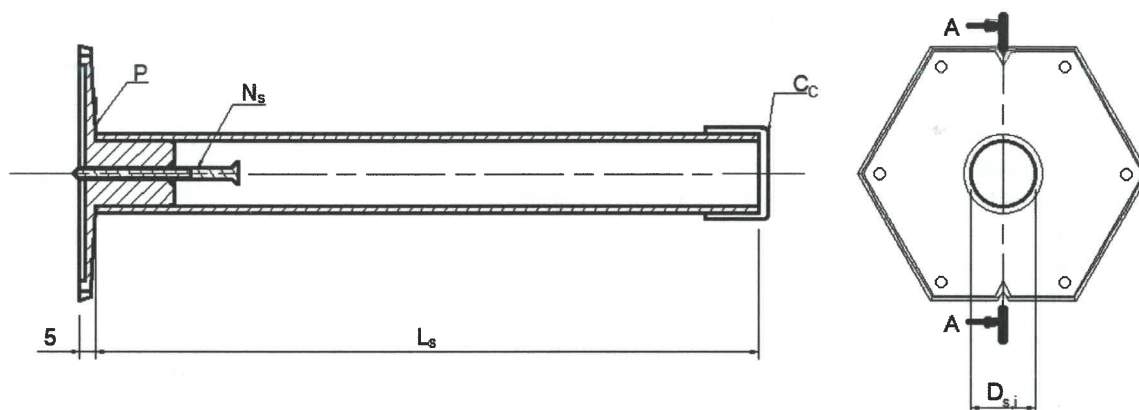
Part S: 1.4362 / 1.4404 / 1.4571; f<sub>yk</sub> > 235 N/mm<sup>2</sup>

Part P: polypropylene (PP)

**Stacon® type LD**

**Product description**  
 Dimensions and materials of sleeve LD Part S/P with plug

**Annex A1**  
 of European  
 Technical Assessment  
 ETA-16/0545

**Figure A2.** Dimensions of sleeve LD Part S / P with cap

P - mounting plate

Cc - tube cap

Ns - nail

Ls - length of the pipe

D<sub>si</sub> - inside diameter**Table A2.** Dimensions and materials of sleeve LD Part S / P with cap

For joint width 0 to 60 mm		For joint width 5 to 40 mm		D <sub>si</sub> [mm]
Type of sleeve	L <sub>s</sub> [mm]	Type of sleeve	L <sub>s</sub> [mm]	
LD 16/270 Part S	165	LD 16/250 Part S	140	17
LD 20/320 Part S	190	LD 20/300 Part S	165	21
LD 22/350 Part S	205	LD 22/330 Part S	180	23
LD 25/390 Part S	225	LD 25/370 Part S	200	26
LD 27/420 Part S	240	LD 27/400 Part S	215	28
LD 30/450 Part S	255	LD 30/430 Part S	230	31
LD 35/520 Part S	290	LD 35/500 Part S	265	36
LD 40/580 Part S	320	LD 40/560 Part S	295	41
LD 16/270 Part P	165	LD 16/250 Part P	140	17
LD 20/320 Part P	190	LD 20/300 Part P	165	21
LD 22/350 Part P	205	LD 22/330 Part P	180	23
LD 25/390 Part P	225	LD 25/370 Part P	200	26
LD 27/420 Part P	240	LD 27/400 Part P	215	28
LD 30/450 Part P	255	LD 30/430 Part P	230	31
LD 35/520 Part P	290	LD 35/500 Part P	265	36
LD 40/580 Part P	320	LD 40/560 Part P	295	41

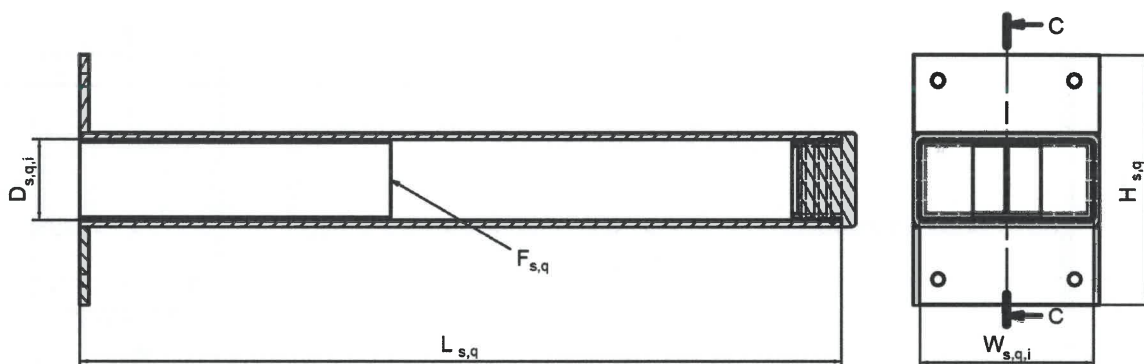
**Materials:**Part S: 1.4362 / 1.4404 / 1.4571;  $f_{yk} > 235 \text{ N/mm}^2$ 

Part P: polypropylene (PP)

**Stacon® type LD****Product description**

Dimensions and materials of sleeve LD Part S/P with cap

**Annex A2**  
of European  
Technical Assessment  
ETA-16/0545

**Figure A3.** Dimensions of sleeve LD-Q Part S with plug

 $F_{s,q}$  - foam strip

 $L_{s,q}$  - length of the rectangular pipe

 $H_{s,q}$  - height of the front plate

 $W_{s,q,i}$  - inside width of the rectangular pipe

 $D_{s,q,i}$  - inside height of the rectangular pipe

**Table A3.** Dimensions and materials of sleeve LD-Q Part S with plug

For joint width 0 to 60 mm		For joint width 5 to 40 mm		$D_{s,q,i}$ [mm]	$W_{s,q,i}$ [mm]	$H_{s,q,i}$ [mm]
Type of sleeve	$L_{s,q}$ [mm]	Type of sleeve	$L_{s,q}$ [mm]			
LD-Q 16/270 Part S	185	LD-Q 16/250 Part S	160	17	47	70
LD-Q 20/320 Part S	210	LD-Q 20/300 Part S	185	21	46	75
LD-Q 22/350 Part S	225	LD-Q 22/330 Part S	200	23	46	77
LD-Q 25/390 Part S	245	LD-Q 25/370 Part S	220	26	56	80
LD-Q 27/420 Part S	260	LD-Q 27/400 Part S	235	28	56	82
LD-Q 30/450 Part S	275	LD-Q 30/430 Part S	250	31	56	85
LD-Q 35/520 Part S	310	LD-Q 35/500 Part S	285	36	76	90
LD-Q 40/580 Part S	340	LD-Q 40/560 Part S	315	41	76	95

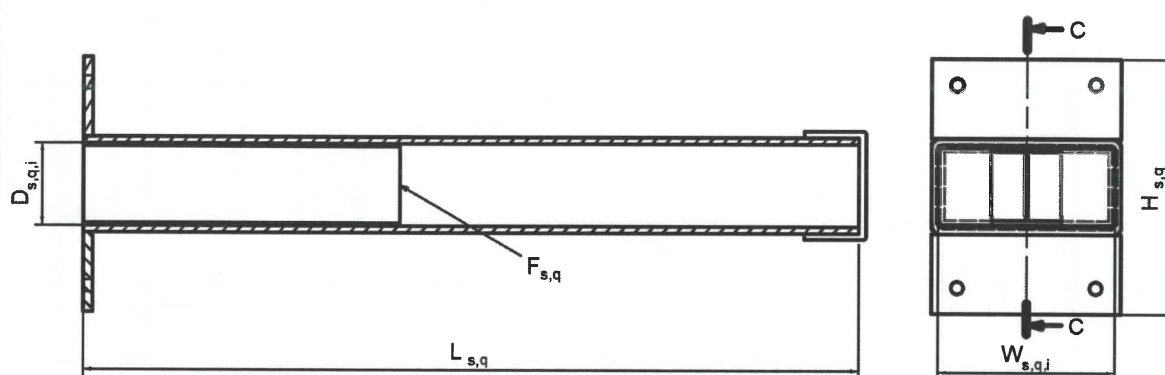
**Materials:**

Part S: 1.4362 / 1.4404 / 1.4571;  $f_{yk} > 235 \text{ N/mm}^2$ 
**Stacon® type LD**
**Product description**

Dimensions and materials of sleeve LD-Q Part S with plug

**Annex A3**  
of European  
Technical Assessment  
ETA-16/0545



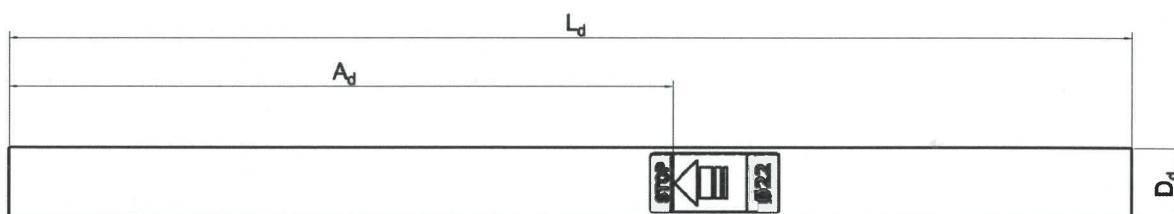
**Figure A4.** Dimensions of sleeve LD-Q Part S with capF<sub>s,q</sub> - foam stripL<sub>s,q</sub> - length of the rectangular pipeH<sub>s,q</sub> - height of the front plateW<sub>s,q,i</sub> - inside width of the rectangular pipeD<sub>s,q,i</sub> - inside height of the rectangular pipe**Table A4.** Dimensions and materials of sleeve LD-Q Part S with cap

For joint width 0 to 60 mm		For joint width 5 to 40 mm		D <sub>s,q,i</sub> [mm]	W <sub>s,q,i</sub> [mm]	H <sub>s,q,i</sub> [mm]
Type of sleeve	L <sub>s,q</sub> [mm]	Type of sleeve	L <sub>s,q</sub> [mm]			
LD-Q 16/270 Part S	165	LD-Q 16/250 Part S	140	17	47	70
LD-Q 20/320 Part S	190	LD-Q 20/300 Part S	165	21	46	75
LD-Q 22/350 Part S	205	LD-Q 22/330 Part S	180	23	46	77
LD-Q 25/390 Part S	225	LD-Q 25/370 Part S	200	26	56	80
LD-Q 27/420 Part S	240	LD-Q 27/400 Part S	215	28	56	82
LD-Q 30/450 Part S	255	LD-Q 30/430 Part S	230	31	56	85
LD-Q 35/520 Part S	290	LD-Q 35/500 Part S	265	36	76	90
LD-Q 40/580 Part S	320	LD-Q 40/560 Part S	295	41	76	95

**Materials:**Part S: 1.4362 / 1.4404 / 1.4571; f<sub>yk</sub> > 235 N/mm<sup>2</sup>**Stacon® type LD****Product description**

Dimensions and materials of sleeve LD-Q Part S with cap

**Annex A4**  
of European  
Technical Assessment  
ETA-16/0545

**Figure A5.** Dimensions of dowel bars LD Part A4 / Zn

 $A_d$  - insertion length

 $D_d$  - dowel bar diameter

 $L_d$  - dowel bar length

**Table A5.** Dimensions and materials of dowel bars LD Part A4 / Zn

For joint width 0 to 60 mm		For joint width 5 to 40 mm		$D_d$ [mm]	$f_{yk}$ [N/mm <sup>2</sup> ]	$f_{uk}$ [N/mm <sup>2</sup> ]
Type of bar	$L_d$ [mm]	Type of bar	$L_d$ [mm]			
LD 16/270 Part A4	270	LD 16/250 Part A4	250	16	750	860
LD 20/320 Part A4	320	LD 20/300 Part A4	300	20	750	860
LD 22/350 Part A4	350	LD 22/330 Part A4	330	22	750	860
LD 25/390 Part A4	390	LD 25/370 Part A4	370	25	690	800
LD 27/420 Part A4	420	LD 27/400 Part A4	400	27	690	800
LD 30/450 Part A4	450	LD 30/430 Part A4	430	30	690	800
LD 35/520 Part A4	520	LD 35/500 Part A4	500	35	690	800
LD 40/580 Part A4	580	LD 40/560 Part A4	560	40	690	800
LD 16/270 Part Zn	270	LD 16/250 Part Zn	250	16	750	860
LD 20/320 Part Zn	320	LD 20/300 Part Zn	300	20	750	860
LD 22/350 Part Zn	350	LD 22/330 Part Zn	330	22	750	860
LD 25/390 Part Zn	390	LD 25/370 Part Zn	370	25	690	800
LD 27/420 Part Zn	420	LD 27/400 Part Zn	400	27	690	800
LD 30/450 Part Zn	450	LD 30/430 Part Zn	430	30	690	800
LD 35/520 Part Zn	520	LD 35/500 Part Zn	500	35	690	800
LD 40/580 Part Zn	580	LD 40/560 Part Zn	560	40	690	800

**Materials:**

Part A4: 1.4362 / 1.4462

Part Zn: 1.7225 / 1.7227 hot-dip galvanised

**Stacon® type LD**
**Product description**

Dimensions and materials of dowel bar LD Part A4 / Zn

**Annex A5**  
of European  
Technical Assessment  
ETA-16/0545

**Table A6.1.** Possible combinations of Stacon® type LD dowels

Type of dowel	Type of sleeve	Type of dowel bar
LD Ø P-Zn	LD Ø Part P	LD Ø Part Zn
LD Ø P-A4	LD Ø Part P	LD Ø Part A4
LD Ø S-A4	LD Ø Part S	LD Ø Part A4
LD-Q Ø S-A4	LD-Q Ø Part S	LD Ø Part A4

**Table A6.2.** Dimensions and materials of LD BSM / LD-Q BSM fire protection collars

Type of collar	Material	D <sub>f</sub> [mm]	W <sub>f</sub> [mm]	T <sub>f</sub> [mm]
LD 16-22 BSM 20	mineral wool / Promaseal® PL	22	-	20
LD 25-30 BSM 20	mineral wool / Promaseal® PL	30	-	20
LD 35-40 BSM 20	mineral wool / Promaseal® PL	40	-	20
LD 16-22 BSM 30	mineral wool / Promaseal® PL	22	-	30
LD 25-30 BSM 30	mineral wool / Promaseal® PL	30	-	30
LD 35-40 BSM 30	mineral wool / Promaseal® PL	40	-	30
LD-Q 16-22 BSM 20	mineral wool / Promaseal® PL	22	48	20
LD-Q 25-30 BSM 20	mineral wool / Promaseal® PL	30	56	20
LD-Q 35-40 BSM 20	mineral wool / Promaseal® PL	40	76	20
LD-Q 16-22 BSM 30	mineral wool / Promaseal® PL	22	48	30
LD-Q 25-30 BSM 30	mineral wool / Promaseal® PL	30	56	30
LD-Q 35-40 BSM 30	mineral wool / Promaseal® PL	40	76	30

The LD BSM or LD-Q BSM collar is made of:

- Promaseal® PL intumescent fire protection plate produced by PROMAT GmbH, thickness of 2,5 mm, B-s1, d0 reaction to fire class according to EN 13501-1,
- mineral fibre board, thickness of 17,5 mm or 27,5 mm, A1 reaction to fire class according to EN 13501-1.

**Table A6.3.** Arrangement of the LD BSM / LD-Q BSM fire protection collars in dependence on the planned joint width

Initial joint width f during construction	Fire protection collar	Permitted additional joint width
20 mm	LD (-Q) Ø BSM 20	10 mm
30 mm	LD (-Q) Ø BSM 30	10 mm
40 mm	2 x LD (-Q) Ø BSM 20	20 mm
50 mm	LD (-Q) Ø BSM 20 + LD (-Q) Ø BSM 30	10 mm
60 mm	2 x LD (-Q) Ø BSM 30	0 mm

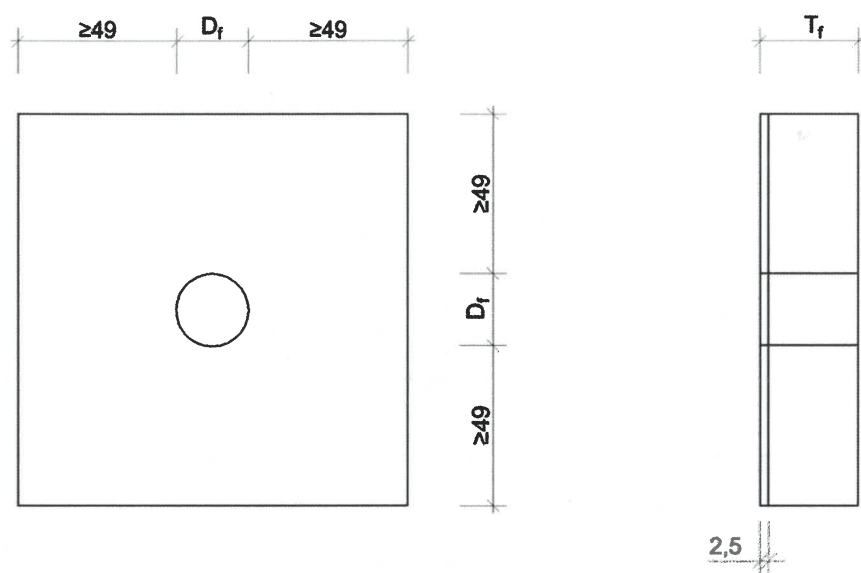
### Staçon® type LD

#### Product description

Possible combinations of Staçon® type LD dowels and dimensions, materials and arrangement of LD BSM / LD-Q BSM fire protection collars

**Annex A6**  
of European  
Technical Assessment  
ETA-16/0545

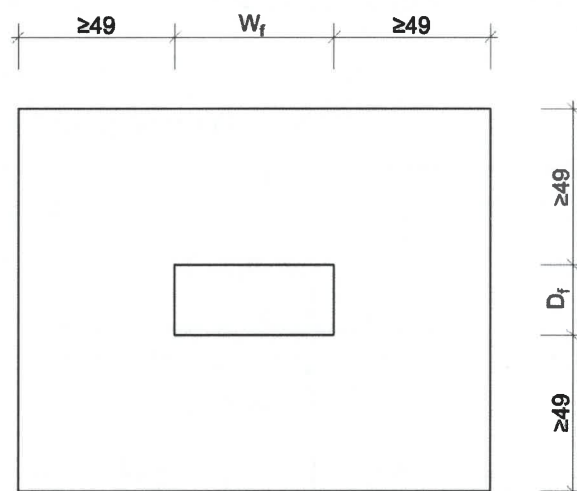
**Figure A7.1. Dimensions of fire protection collar LD BSM**



$D_f$  - hole diameter

$T_f$  - thickness of the collar

**Figure A7.2. Dimensions of fire protection collar LD-Q BSM**



$D_f$  - height of the opening

$W_f$  - width of the opening

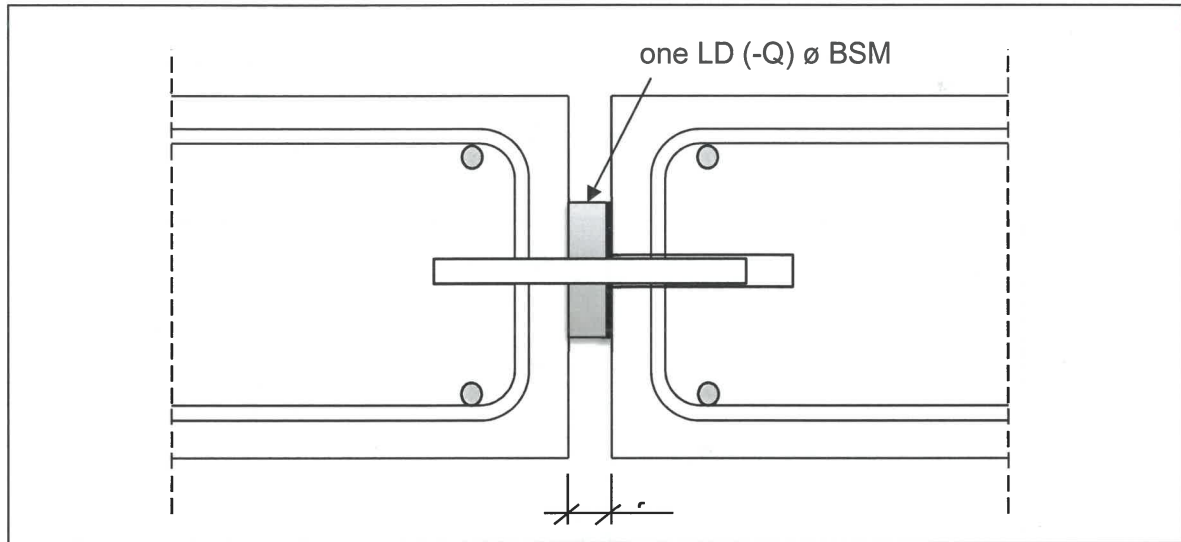
**Stacon® type LD**

**Product description**

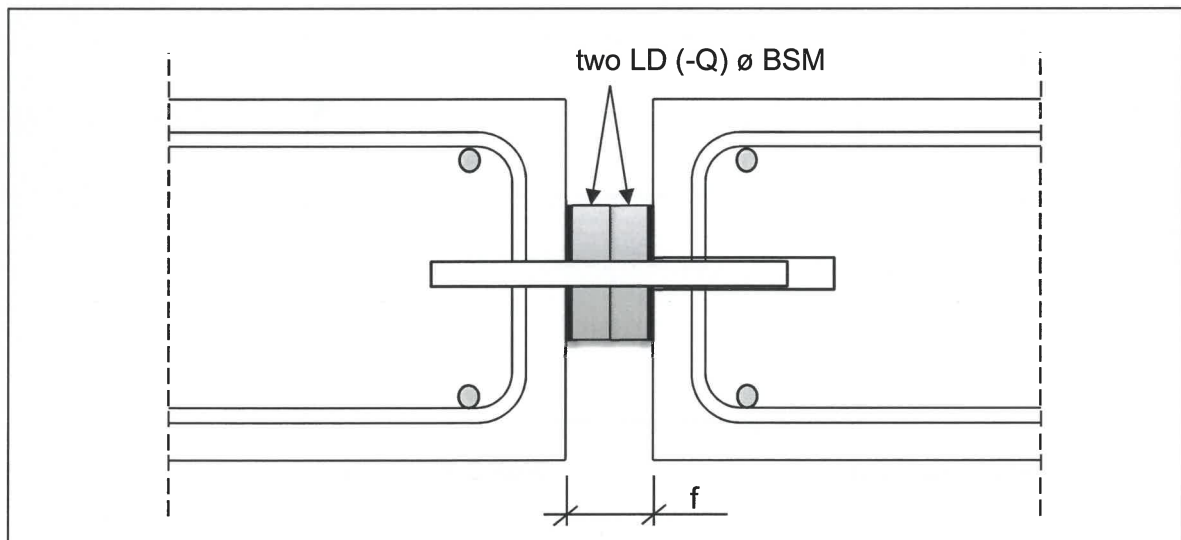
Dimensions of LD BSM / LD-Q BSM fire protection collars

**Annex A7**  
of European  
Technical Assessment  
ETA-16/0545

**Figure A8.1.** Arrangement of the LD BSM / LD-Q BSM fire protection collars for joint width smaller or equal to 30 mm



**Figure A8.2.** Arrangement of the LD BSM / LD-Q BSM fire protection collars for joint width wider than 30 mm



**Staçon® type LD**

**Product description**

Arrangement of the LD BSM / LD-Q BSM fire protection collars

**Annex A8**  
of European  
Technical Assessment  
ETA-16/0545



### Specification of intended use

#### Dowels subjected to:

- Concrete elements that are subject to static and quasi-static actions.
- Structural concrete elements made of reinforced normal weight concrete of strength classes C20/25 to C50/60 according to EN 206.
- Nominal joint width from 0 to 60 mm or 5 to 40 mm, depending on dimensions of dowels according to Tables A1 to A5 (Annexes A1 to A5).
- Concrete elements with a minimum slab thickness and the upper and lower maximum concrete cover in dependence of the dowel diameter given in Table B1 (Annex B1).
- Concrete elements that are subjected to fire exposure.

#### Use conditions (environmental conditions):

- Dowels with bars made of stainless steel and sleeves made of stainless steel or plastic that are subjected to environmental conditions according to EN 1993-1-4:2006+A1:2015, Annex A dependent on the corrosion resistant class (CRC) - depending on the material number, see EN 1993-1-4:2006+A1:2015, table A.3).
- Dowels with bars made of galvanized steel and sleeves made of galvanized steel or plastic that are subjected to dry internal environment (category C1 according to EN ISO 12944-2, table 1) only.
- Dowels are intended to be used in concrete elements subjected to fire exposure when installed with LD BSM / LD-Q BSM fire protection collars according to Annex A6 to A7 and Annex C1.

#### Design:

- Concrete elements that are designed according to EN 1992-1-1 or EN 1992-1-2.
- The design of the dowels and on-site reinforcement according to EOTA TR 065.

**Table B1.** Minimum slab thickness and maximum concrete cover for each dowel diameter

Dowel diameter [mm]	Minimal slab thickness [mm]	Maximum concrete cover at the minimal slab thickness [mm]
LD 16	160	20
LD 20	160	20
LD 22	160	20
LD 25	180	20
LD 27	190	30
LD 30	210	30
LD 35	250	30
LD 40	280	30
For higher concrete covers, the minimum slab thickness must be increased accordingly.		

**Stacon® type LD**

**Intended use  
Specifications**

**Annex B1  
of European  
Technical Assessment  
ETA-16/0545**

**$V_{Rd,s}$  – steel load bearing capacity of dowels**
**Table B2.1.** Steel load bearing capacity of Stacon® type LD dowel according to EOTA TR 065

Steel load bearing capacity of dowel LD $V_{Rd,s}$ [kN]	Joint width [mm]					
	< 10	20	30	40	50	60
LD 16	29,4	22,1	17,6	14,6	12,5	10,9
LD 20	49,0	38,4	31,4	26,5	22,9	20,1
LD 22	60,7	48,4	40,0	34,0	29,5	26,1
LD 25	74,4	60,5	50,7	43,5	38,1	33,8
LD 27	88,2	72,6	61,4	53,0	46,6	41,5
LD 30	111,2	93,0	79,5	69,2	61,2	54,8
LD 35	155,7	132,9	115,4	101,8	90,9	82,0
LD 40	207,6	180,2	158,6	141,3	127,2	115,5

**Table B2.2.** Steel load bearing capacity of Stacon® type LD-Q dowel according to EOTA TR 065

Steel load bearing capacity of dowel LD-Q $V_{Rd,s}$ [kN]	Joint width [mm]					
	< 10	20	30	40	50	60
LD-Q 16	26,4	19,9	15,9	13,2	11,2	9,8
LD-Q 20	44,1	34,6	28,3	23,8	20,6	18,1
LD-Q 22	54,7	43,6	36	30,6	26,6	23,5
LD-Q 25	66,9	54,4	45,6	39,2	34,3	30,4
LD-Q 27	79,4	65,3	55,2	47,7	41,9	37,4
LD-Q 30	100,1	83,7	71,5	62,3	55,1	49,3
LD-Q 35	140,1	120	104	91,6	81,8	73,8
LD-Q 40	186,9	162	143	127	115	104

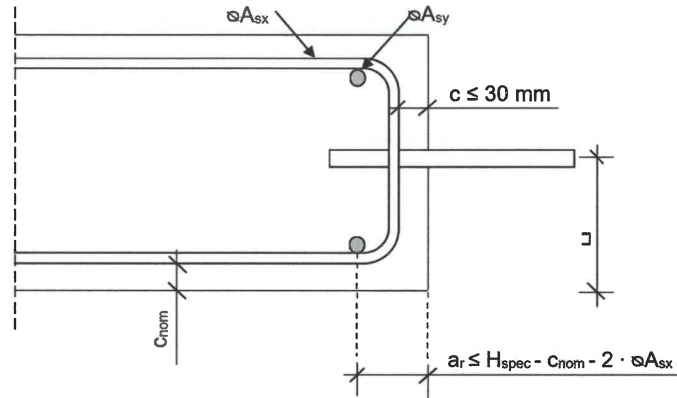
**Stacon® type LD**
**Design**

Load bearing capacity of dowels with respect to steel failure

**Annex B2**  
 of European  
 Technical Assessment  
 ETA-16/0545

The resistance to concrete edge failure and the dimensioning of the on-site reinforcement is carried out in accordance with EOTA TR 065 for the respective installation situation.

**Figure B3.** Dimensions of the reinforcement close to the dowel



**Stacon® type LD**

**Design**

Load bearing capacity of joint resulting of concrete edge failure

**Annex B3**  
of European  
Technical Assessment  
ETA-16/0545

### Classification of fire resistance in accordance with EN 13501-2

Loadbearing reinforced concrete floor or wall without separating function with Stacon® type LD dowels and fire protection collars (according to Annex A6 and A7) is classified:

**Fire resistance class: R120**

The following boundary conditions must be fulfilled:

- The minimum slab thickness and corresponding maximum concrete cover according to Annex B1 shall be observed.
- The fire protection collars shall be installed between the concrete components according to Annex A8.
- The shear force dowels were designed for normal temperatures according to EOTA TR 065.
- The concrete components were designed for normal temperatures according to EN 1992-1-1.

For structural fire design (accidental design situation), the action shall be determined on the base of normal temperature using a maximum reduction factor of  $\eta_{fi} = 0,7$  according to EN 1992-1-2, clause 2.4.2.

<b>Stacon® type LD</b>	<b>Annex C1</b> of European Technical Assessment ETA-16/0545
<b>Performance</b> Resistance to fire	