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General Part

Technical Assessment Body issuing the European Technical Assessment: Itecons - Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade	
Trade name of the construction product	Projoint Plus S 50x05 DP1 Projoint Plus 4010 DP1
Product family to which the construction product belongs	Structural Metallic Products and Ancillaries Product area code:20
Manufacturer	JRP Flooring Products, S.A. Parque de Negócios Jaime Silva, Rua dos Covões 47, Pedrome 2495-183 Santa Catarina da Serra Portugal
Manufacturing plant	JRP Flooring Products, S.A. Parque de Negócios Jaime Silva, Rua dos Covões 47, Pedrome 2495-183 Santa Catarina da Serra Portugal
This European Technical Assessment contains	31 pages including 2 Annexes which form an integral part of the assessment
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	EAD 200089-00-0302 *In-situ Concrete Slab Permanent Joint Former*

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Specific parts

1. Technical description of the product

In-situ concrete slab permanent joint formers **Projoint Plus S 50x05 DP1** and **Projoint Plus 4010 DP1** are leave-in-place formwork and joint systems supplied in mild, stainless, galvanized steel or a combination of these materials. These joints, also referred to in this document as Projoint joints, provide continuity of reinforcement for ground supported slabs and transfer the loads through the edges of each panel of the slab to another. In addition, these joints will provide protection to slab edges and ensure continuing serviceability of the ground floor slab.

The assessed Projoint joints are composed of:

- Slab edge protection to protect edges from impacts;
- Concrete anchorage provided by shear studs;
- Divider plate to physically constrain the concrete during the casting;
- Dowels for load transfer mechanisms which are welded to the divider plate.

Projoint Plus S 50x05 DP1 is composed of the following elements:

- Double superior bar (A) with dimensions of 50 mm x 5 mm in S235JR steel or stainless steel or galvanized steel. Sinusoidal (amplitude = 11 mm | wave-length = 100 mm);
- Metallic shear connectors (B) with dimensions of 100 mm x 10 mm;
- Connection system (C) composed of a rivet made of aluminium and a socket made of polypropylene;
- Formwork divider plate (D) made of steel, with thickness of 1.5 or 2 mm, with variable height, welded to the lower part of the superior bar;
- Load transfer system composed by metallic plats (E). The load transfer system of Projoint Plus has rectangular geometry with thickness of 6/8/10/12 mm. The load transfer system of the joints is made of S275JR steel or higher, eccentrically welded, spaced 520 mm apart and is covered with plastic sleeves (F);
- Plastic sleeve made of polypropylene with interior section with dimensions of 190 mm x 6/8/10/12 mm made of polypropylene;
- Height of the joint: minimum of 100 mm and maximum of 240 mm;
- Alignment of the joint: ± 0.5 mm over 600 mm.

Further information on these joints is given in Annex A. Figure 1 shows the schematic drawings of the joints described above.

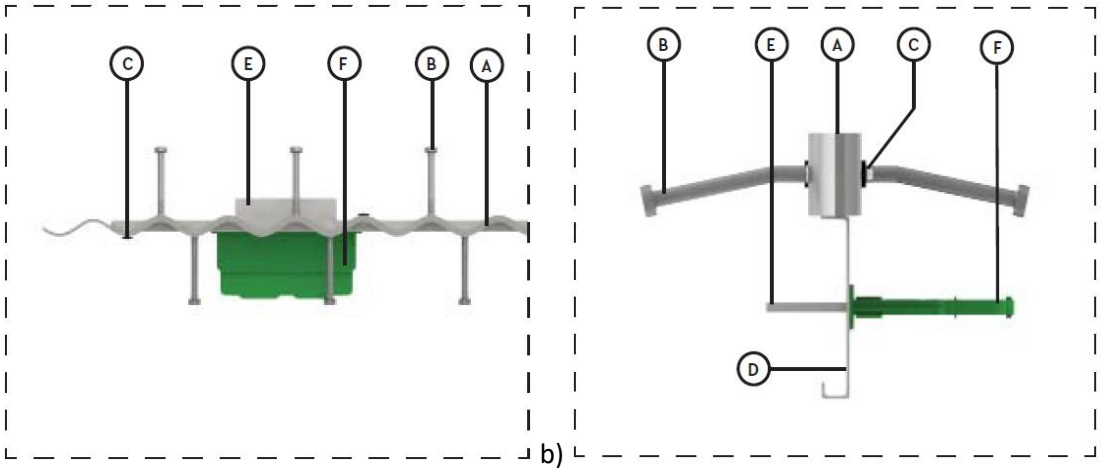


Figure 1: Projoint Plus S 50x05 DP1: a) Schematic drawing of the top view; b) Schematic drawing of the cross-section view

Projoint Plus 4010 DP1 is composed of the following elements:

- Calibrated double bar (A) with dimensions of 40 mm x 10 mm in S235JR steel or stainless steel or galvanized steel;
- Metallic shear connectors (B) with dimensions of 100 mm x 10 mm;
- Connection system (C) composed of a rivet made of aluminium and a socket made of polypropylene;
- Formwork divider plate (D) made of steel, with thickness of 1.5 or 2 mm, with variable height, welded to the lower part of the superior bar;
- Load transfer system composed by metallic plats (E). The load transfer system of Projoint Plus has rectangular geometry with thickness of 6/8/10/12 mm. The load transfer system of the joints is made of S275JR steel or higher, eccentrically welded, spaced 500/600 mm apart and is covered with plastic sleeves (F);
- Plastic sleeve made of polypropylene with interior section with dimensions of 190 mm x 6/8/10/12 mm made of polypropylene;
- Height of the joint: minimum of 90 mm and maximum of 240 mm;
- Alignment of the joint: ± 0.5 mm over 600 mm.

Further information on these joints is given in Annex A. Figure 2 shows the schematic drawings of the joints described above.

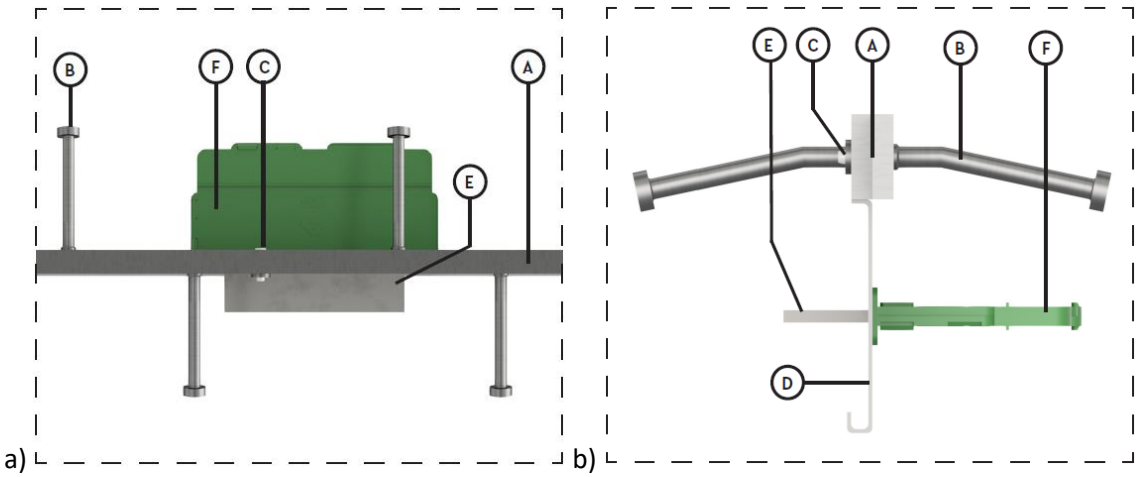


Figure 2: a) Projoint Plus 4010 DP1: Schematic drawing of the top view; b) Schematic drawing of the cross-section view

The components of the joints are presented in Table 1.

Table 1: Components of the joints

Component		Material
Calibrated bar	Steel	EN 10277-2 S235JR
	Stainless steel	304/316 AISI
	Galvanized steel	EN 10277 S235 JR Galvanization EN ISO 1461
Connectors		EN ISO 13918 S235J2+C450
Load transfer system		S275JR or higher
Plastic sleeve		Polypropylene
Divide plate		EN 10130 DC01 or EN 10111 DD11

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

2.1. Intended use

In-situ concrete slab permanent joint formers are leave-in-place formwork that provide continuity of reinforcement in ground supported slabs and transfer the loads from one slab to the next if required, providing a continuum in slab deformation to the required level. In addition, the joints will provide protection to slab edges and ensure continuous serviceability of the ground floor slab.

Slab edges are vulnerable to damage caused by the transit of materials handling equipment, with wider joints being more susceptible. The small hard wheels of pallet trucks and similar equipment are particularly aggressive.

The number and type of joints in a floor will depend on the floor construction method and its design. The chosen method should consider the intended use of the floor, among other factors.

The assessed Projoint joints are free-movement joints, designed to provide a minimum restraint to horizontal movements caused by drying shrinkage and temperature changes in the slab, while restricting relative vertical movement.

The provisions made in this European Technical Assessment are based on an assumed working life of 50 years as minimum according to the EAD, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met. 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 mean for choosing the right product 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

The assessment of the Projoint Plus S 50x05 DP1 and Projoint Plus 4010 DP1, according to the Basic Work Requirements (BWR), was carried out in accordance with EAD 200089-00-0302.

3.1. Performance of the assembled system (kit)

3.1.1. Mechanical resistance and stability (BWR 1)

3.1.1.1. Load transfer capacity

The load-transfer capacity depends mainly on the mechanism of the joint. Sub-base support may have some influence, but it is not considered in the design process. Joint mechanisms can be composed of round or square dowel bars, or plate dowels.

The transit of material handling equipment will cause some relative deflection across joints; hence, they should be designed to reduce such deflection to a negligible amount.

The load transfer capacity of the joints depends on the compressive strength of concrete and the geometry and strength of the dowels at yield. Their load transfer capacity was determined according to annex A of EAD 200089-00-0302 and the results are presented in Annex B of this ETA.

3.1.1.2. Durability

The durability of the product depends on the durability of the materials used. The part of the floor in which the joint systems are intended to be installed or applied must be assessed according to their chemical composition, thickness of material layers, intended use, concrete cover thickness and the environmental exposure to which they are subject. To assess the durability, the following cases must be considered:

- Stainless steel products can be considered fit for purpose from a durability aspect;
- Galvanized or mild steel elements with a minimum 30 mm concrete cover can be considered fit for

purpose from durability aspect;

- Galvanized steel must have a minimum of 25 µm galvanized coating if not covered by a minimum of 30 mm concrete cover for floors exposed to frequently wet or corrosive conditions;
- Galvanized steel must have a minimum of 85 µm galvanized coating if not covered by a minimum of 30 mm concrete cover for continuously wet floors.

If all products assessed comply with these requirements, no further investigation regarding durability is required.

3.1.1.3. Dimensions, tolerances on dimensions and shape

Dimensional tolerances of the Projoint joints steel components are ± 0.5 mm, as established by the production control.

The tolerances for angles between the systems components, as established in the production control, are ± 0.5°.

3.1.2. Energy economy and heat retention (BWR 6)

3.1.2.1. Thermal performance

No performance assessed.

3.1.2.2. Condensation risk

No performance assessed.

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

According to the Decision 1998/214/EC of European Commission as amended by the European Commission Decision 2001/596/EC, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) is 2+.

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

The ETA is issued on the basis of agreed data/information, deposited at Itecons, which identifies the product that has been assessed and judged. It is the manufacturer's responsibility to make sure that all those who use the construction product are appropriately informed of specific conditions laid down in this ETA.

Changes to the in-situ concrete slab permanent joint former or the components or their production process should be notified to the Itecons before the changes are introduced. Itecons will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

Issued in Coimbra on 12.03.2024

By
Technical Assessment Unit of

Itecons – Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade

Andreia Gil
Senior Official

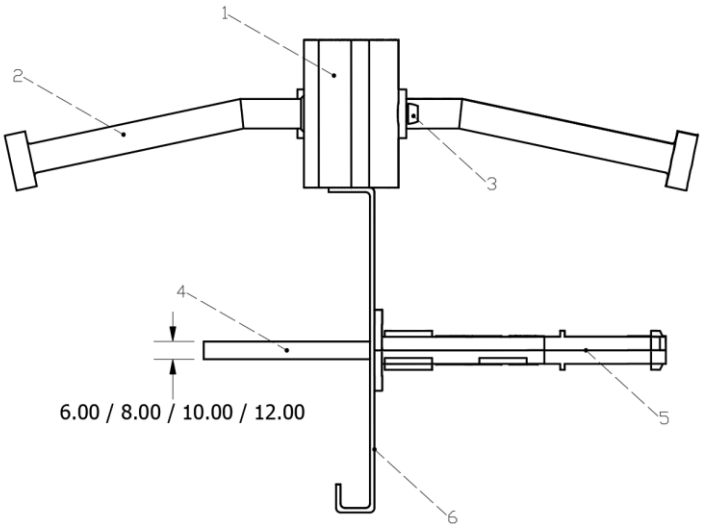
Validated document

(*Technical Assessment Unit Coordinator*) *(Administration)*

ANNEX A – TYPES of JOINT FORMERS

The details about the components of the joint former types are given in this section:

A1 – Projoint Plus S 50x05 DP1



[mm]

1. Double superior bar 50 mm x 5 mm
2. Metallic shear connectors
3. Connection system
4. Dowel – load transfer system
5. Dowel sleeve
6. Divider plate

Figure A1.1: Projoint Plus S 50x05 DP1 cross-section view

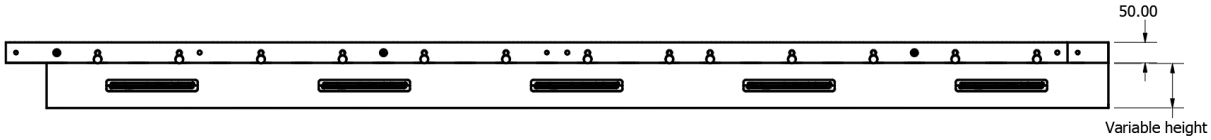


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Figure A1.2: Projoint Plus S 50x05 DP1 cross-section view

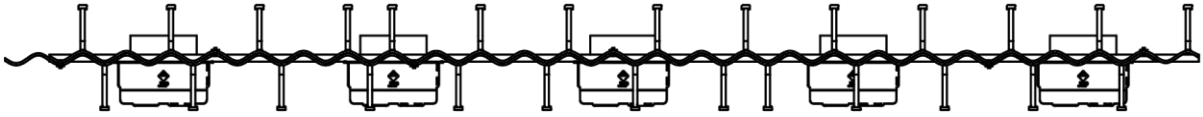
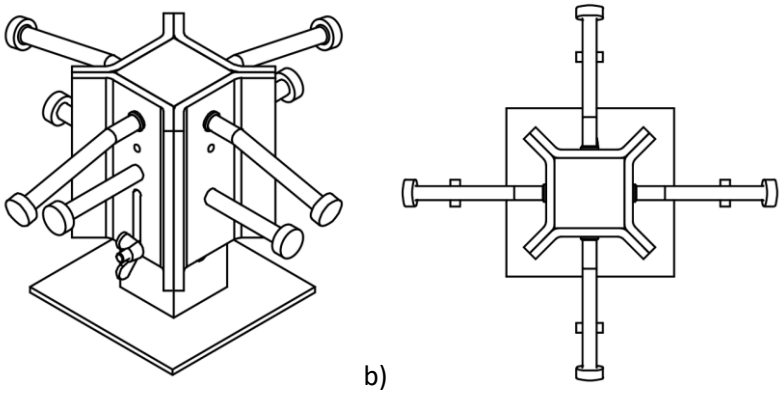
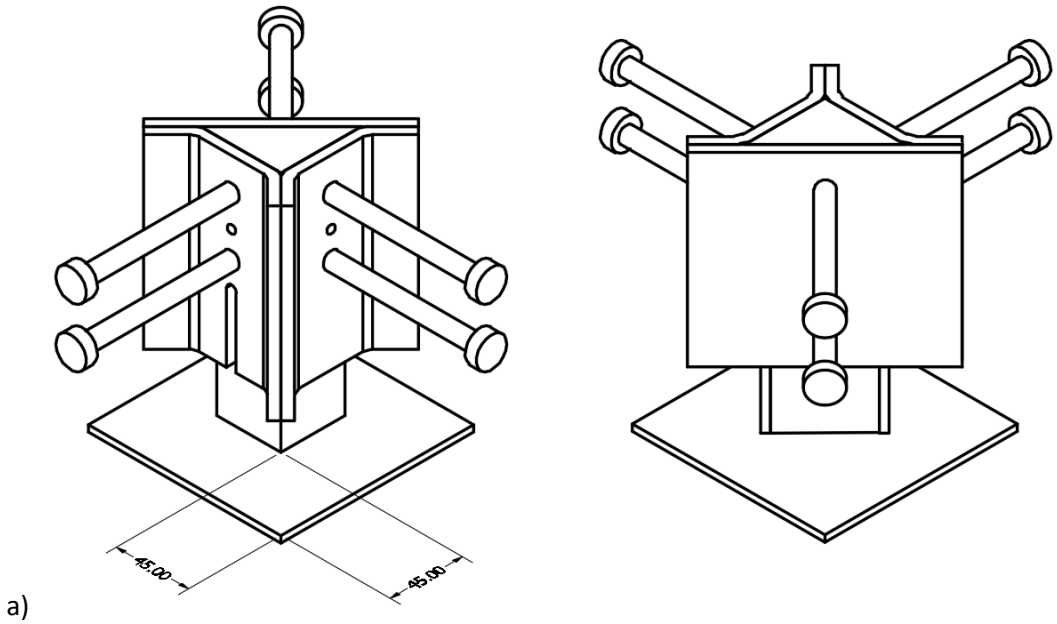


Figure A1.3: Projoint Plus S 50x05 DP1 cross-section view top view

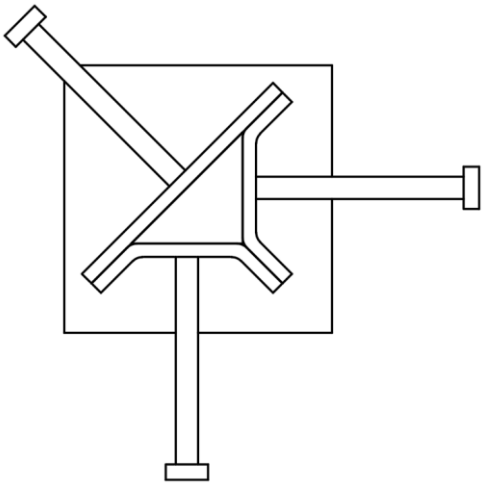


a) b)

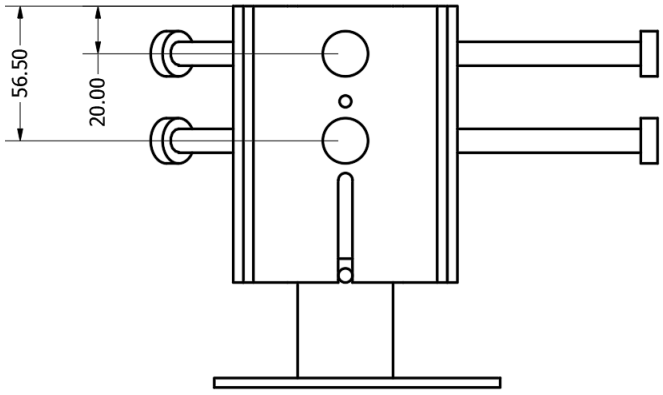
Figure A1.4: Projoint Plus S 50x05 DP1 X (four way) accessories: a) isometric view and b) top view



a)



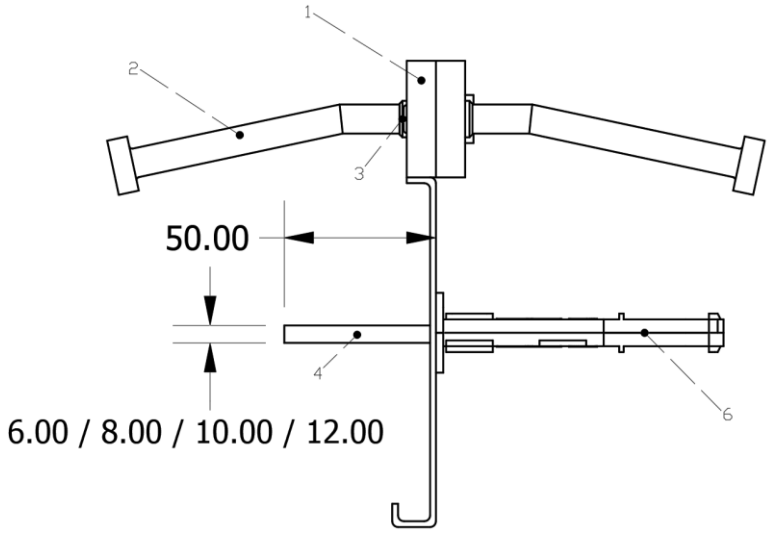
b)



c)

Figure A1.5: Projoint Plus S 50x05 DP1 T (tee) accessories: a) isometric views, b) top view and c) right-side view

A2 – Projoint Plus 4010 DP1



1. Calibrated double bar 40 mm x 10 mm
2. Metallic shear connectors
3. Connection system
4. Dowel – load transfer system
5. Dowel sleeve
6. Divider plate

Figure A2.1: Projoint Plus 4010 DP1 cross-section view

[mm]

Figure A2.2: Projoint Plus 4010 DP1 front view

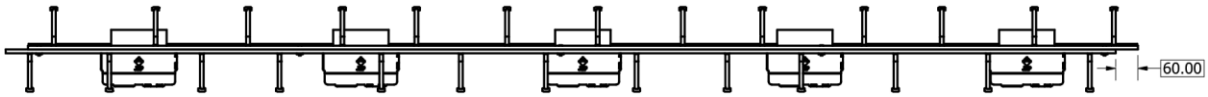


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Figure A2.3: Projoint Plus 4010 DP1 top view

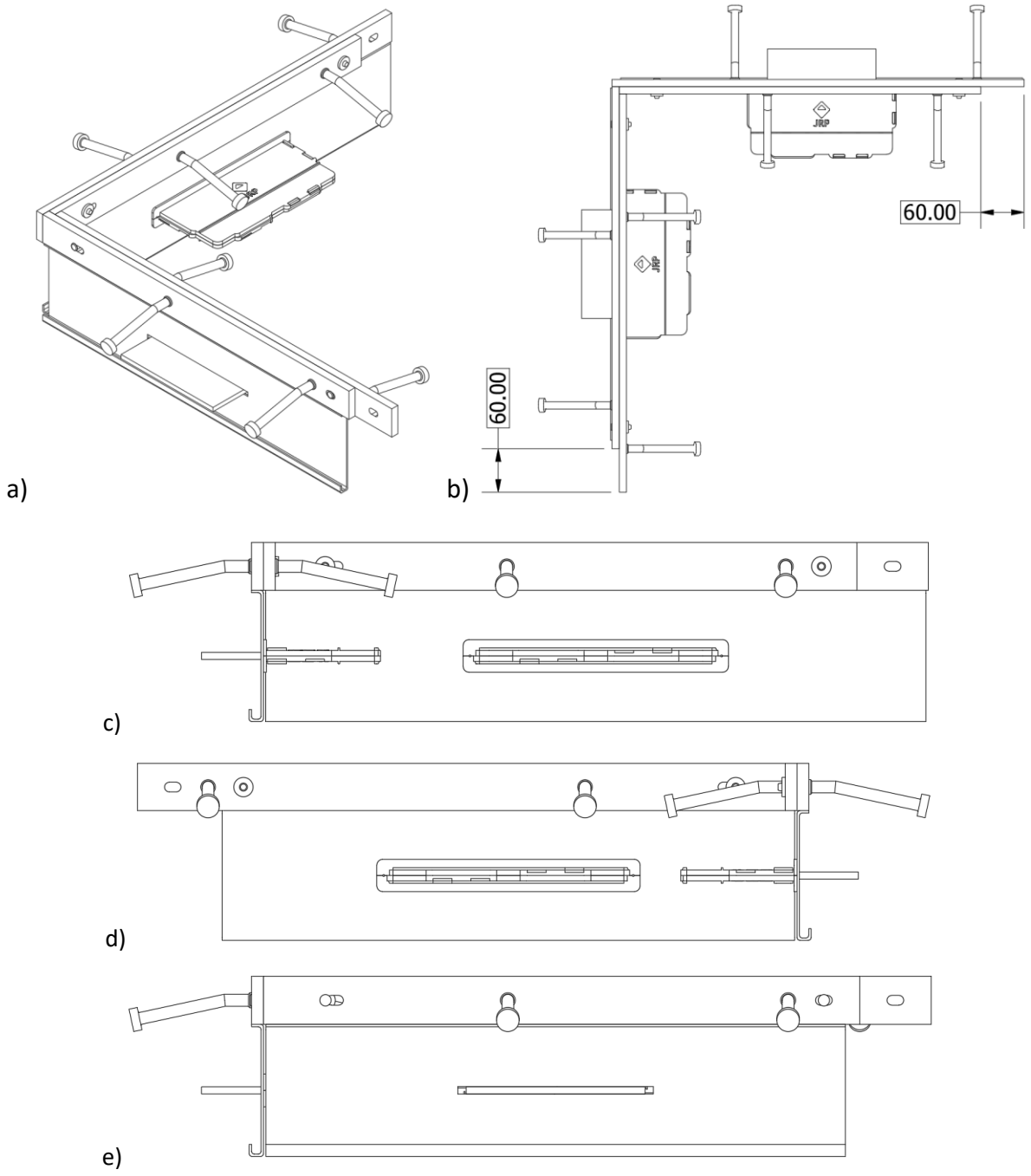

Figure A2.4: Projoint Plus 4010 DP1 L (corner) accessories: a) isometric view; b) top plan view, c) front view; d) right-side view and e) left-side view

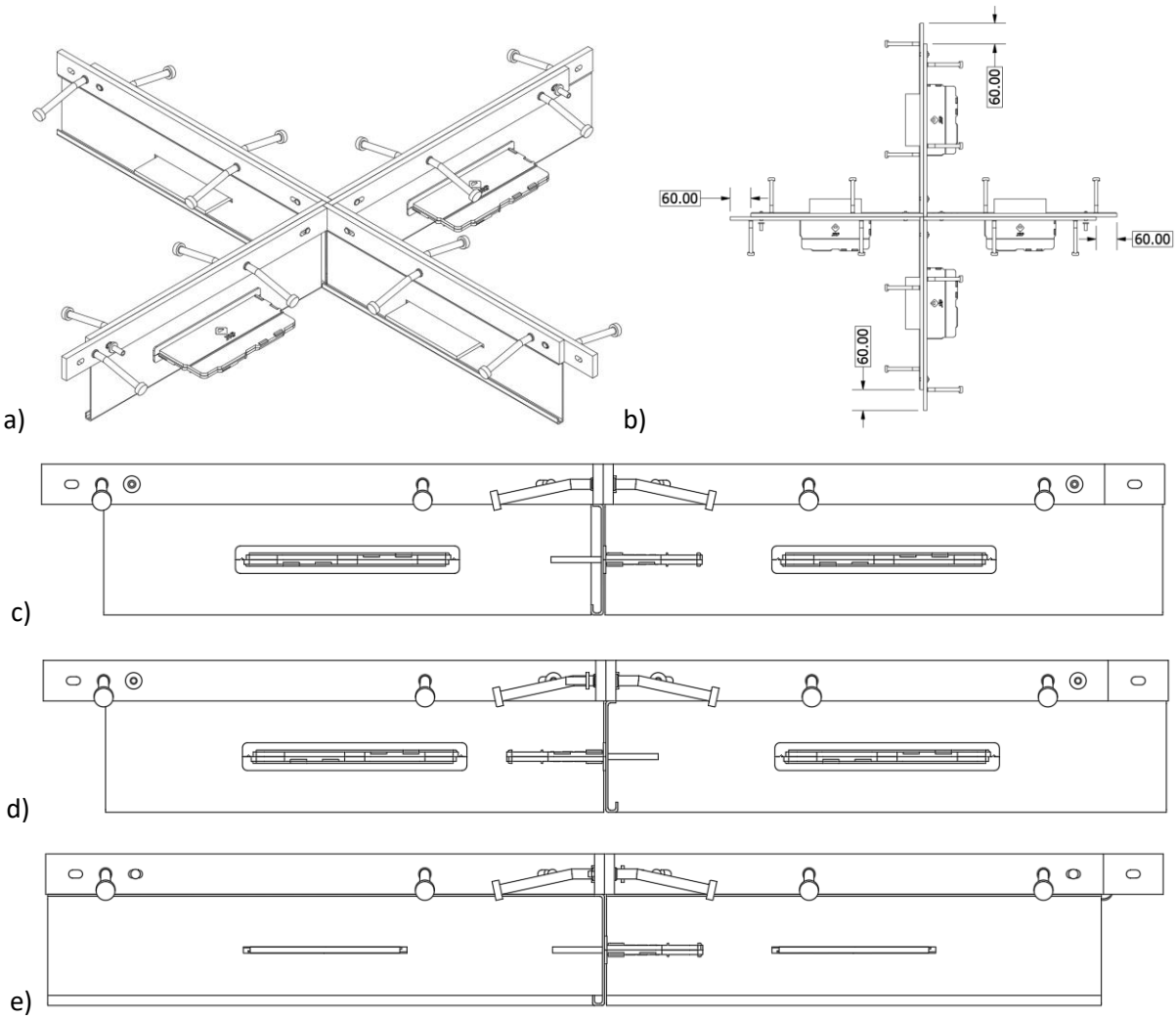

Figure A2.5: Projoint Plus 4010 DP1 X (four way) accesories: a) isometric view, b) top plan view, c) front view; d) right-side view and e) left-side view

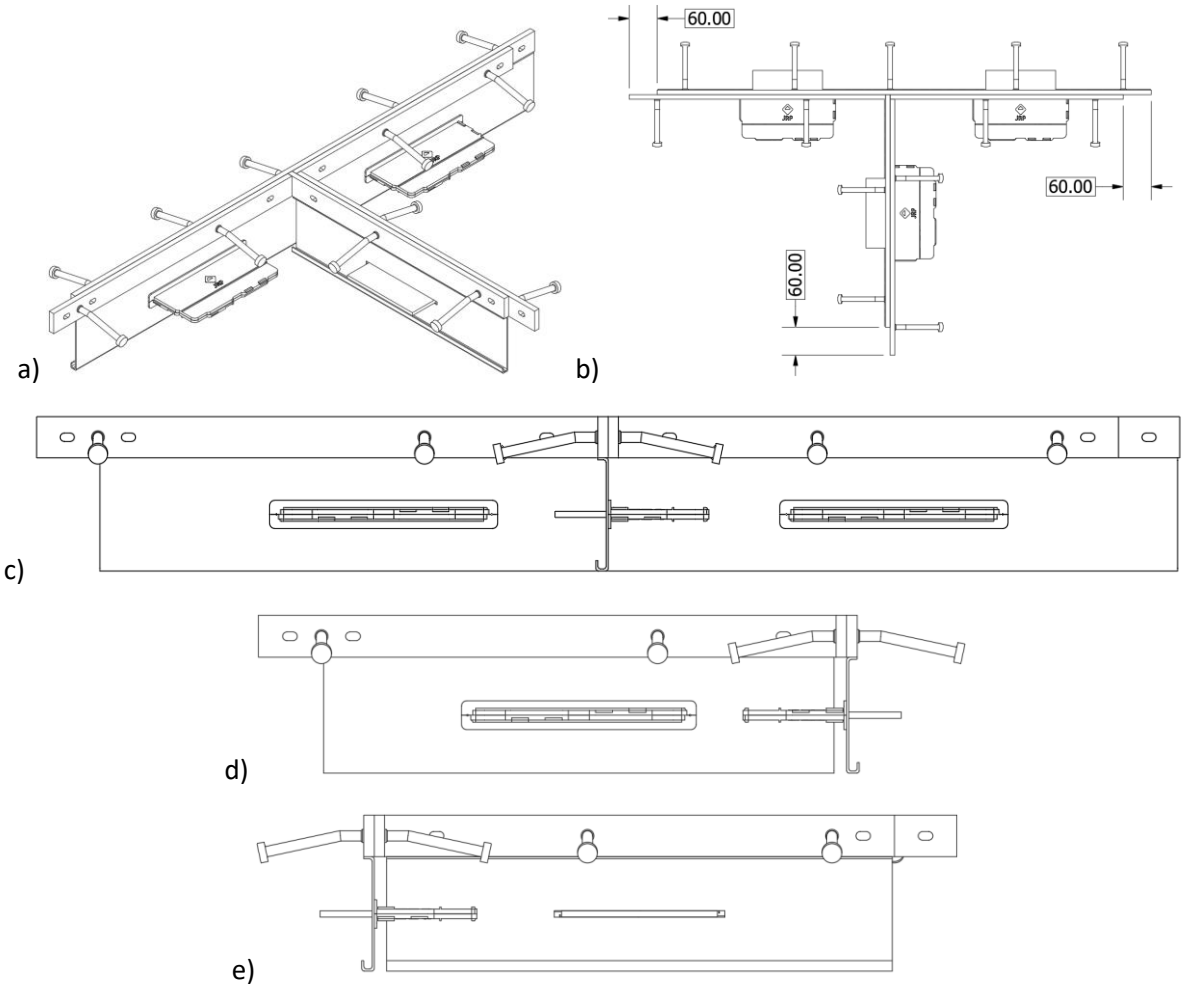

Figure A2.6: Projoint Plus 4010 DP1 T (tee) accessories: a) isometric view, b) top plan view, c) front view; d) right-side view and e) left-side view

A3 – Dowels

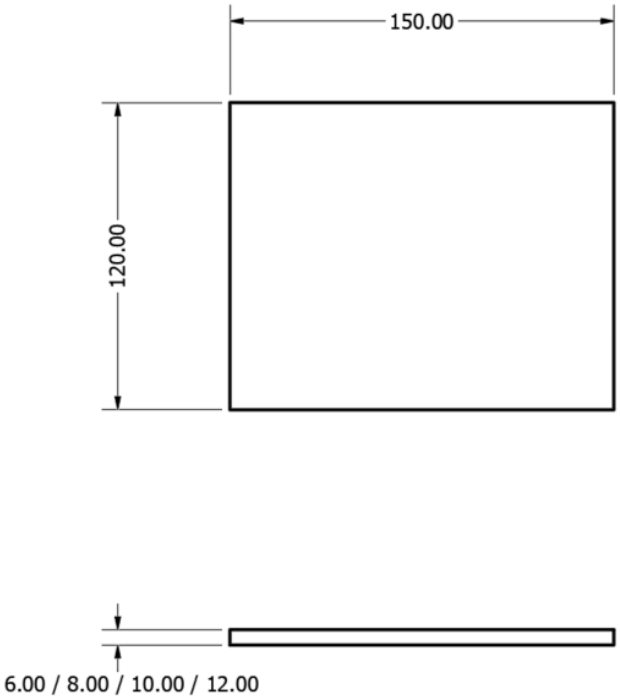

Figure A3.1: Projoint Dowel DP1

ANNEX B – DOWEL LOAD TRANSFER

The methodology used for calculating the load transfer capacity of dowels was adopted from TR34, Fourth edition (2016), according to EAD 200089-00-0302. The dowels are classified as plate dowels with prismatic geometry (Projoint Dowel DP1 6mm, 8mm, 10 mm and 12 mm). The calculation method and the results are presented in the following sections.

B.1 Calculation parameters

Table B1.1: Characteristic strength and design strength of the concrete

Class	Characteristic compressive cylinder strength f_{ck} [MPa]	Design compressive cylinder strength f_{cd} [MPa]
C20/25	20	13.33
C25/30	25	16.67
C30/37	30	20.00
C32/40	32	21.33
C35/45	35	23.33
C40/50	40	26.67

Table B1.2: Characteristic yield strength and design yield design strength of the steel

Class	Characteristic Yield strength f_{yk} [MPa]	Design yield strength f_{yd} [MPa]
S275	275	239.13
S355	355	308.70
S420	420	365.22
S500	500	434.78

The open joints considered (2 x e): 1 mm; 2.5 mm; 5 mm; 7.5 mm: 10 mm; 15 mm and 20 mm.

B.2 Projoint Dowel DP1

Discrete plate dowels are commonly used as alternatives to traditional bar dowels. These are not to be confused with continuous plate dowels which have been found to perform poorly in service and are not recommended.

The shear capacity of the Projoint Dowels DP1 is given by:

$$P_{sh,plate} = 0.9 \cdot t_p \cdot p_b \cdot \frac{f_{yk}}{\sqrt{3}} \approx 0.9 \cdot t_p \cdot p_b \cdot 0.6 \cdot f_{yk}$$

Where: t_p = Plate thickness

p_b = Plate width

f_{yk} = plate steel design yield strength

The bearing/bending capacity per plate dowel is given by:

$$P_{max\ plate} = 0.5\ [(b_1^2 + c_1)^{0.5} - b_1]$$

Where: $b_1 = 2ek_3 f_{cd} P_b$

$c_1 = 2k_3 f_{cd} P_b^2 t_p^2 f_{yd}$

e = half of joint opening width

k_3 = 3, a constant determined empirically

$f_{cd} = f_{ck}/\Upsilon_c =$ concrete design compressive cylinder strength

Υc = 1.50

P_b = Plate width

t_p = Plate thickness

$f_{yd} = f_{yk}/\Upsilon_s =$ design yeld strength

Υs = 1.15

The calculated values for $P_{sh,plate}$ and $P_{max,\ plate}$ using equations above are presented in the following tables.

Table B2.1: Projoint Dowel DP1 6mm S275 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		6.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	1.5E+10	1.5E+10	1.5E+10	1.5E+10	1.5E+10	1.5E+10	1.5E+10
	$P_{max,plate}$ [kN]	**59.3**	**55.2**	**49.0**	**43.7**	**39.1**	**31.8**	**26.5**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	1.9E+10	1.9E+10	1.9E+10	1.9E+10	1.9E+10	1.9E+10	1.9E+10
	$P_{max,plate}$ [kN]	**65.9**	**60.8**	**53.3**	**46.9**	**41.5**	**33.2**	**27.3**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	2.3E+10	2.3E+10	2.3E+10	2.3E+10	2.3E+10	2.3E+10	2.3E+10
	$P_{max,plate}$ [kN]	**71.9**	**65.8**	**57.0**	**49.6**	**43.5**	**34.3**	**27.9**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	2.5E+10	2.5E+10	2.5E+10	2.5E+10	2.5E+10	2.5E+10	2.5E+10
	$P_{max,plate}$ [kN]	**74.1**	**67.6**	**58.3**	**50.6**	**44.2**	**34.7**	**28.2**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	2.7E+10	2.7E+10	2.7E+10	2.7E+10	2.7E+10	2.7E+10	2.7E+10
	$P_{max,plate}$ [kN]	**77.3**	**70.3**	**60.2**	**51.9**	**45.2**	**35.2**	**28.4**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	3.1E+10	3.1E+10	3.1E+10	3.1E+10	3.1E+10	3.1E+10	3.1E+10
	$P_{max,plate}$ [kN]	**82.2**	**74.3**	**63.0**	**53.9**	**46.5**	**35.9**	**28.8**
$P_{sh,plate}$ [kN]		**133.6**						

Table B3.2: Projoint Dowel DP1 6mm S355 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		6.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	2.0E+10	2.0E+10	2.0E+10	2.0E+10	2.0E+10	2.0E+10	2.0E+10
	$P_{max,plate}$ [kN]	**67.8**	**63.6**	**57.3**	**51.7**	**46.8**	**38.8**	**32.7**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	2.5E+10	2.5E+10	2.5E+10	2.5E+10	2.5E+10	2.5E+10	2.5E+10
	$P_{max,plate}$ [kN]	**75.4**	**70.2**	**62.5**	**55.8**	**50**	**40.8**	**34**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	3.0E+10	3.0E+10	3.0E+10	3.0E+10	3.0E+10	3.0E+10	3.0E+10
	$P_{max,plate}$ [kN]	**82.2**	**76.1**	**67**	**59.2**	**52.6**	**42.3**	**34.9**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	3.2E+10	3.2E+10	3.2E+10	3.2E+10	3.2E+10	3.2E+10	3.2E+10
	$P_{max,plate}$ [kN]	**84.8**	**78.3**	**68.6**	**60.4**	**53.5**	**42.8**	**35.2**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10
	$P_{max,plate}$ [kN]	**88.4**	**81.3**	**70.9**	**62.1**	**54.8**	**43.5**	**35.6**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	4.0E+10	4.0E+10	4.0E+10	4.0E+10	4.0E+10	4.0E+10	4.0E+10
	$P_{max,plate}$ [kN]	**94.2**	**86.1**	**74.4**	**64.7**	**56.6**	**44.5**	**36.2**
$P_{sh,plate}$ [kN]		**172.5**						

Table B3.3: Projoint Dowel DP1 6mm S420 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		6.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	2.4E+10	2.4E+10	2.4E+10	2.4E+10	2.4E+10	2.4E+10	2.4E+10
	$P_{max,plate}$ [kN]	**74.0**	**69.8**	**63.4**	**57.6**	**52.6**	**44.1**	**37.6**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	3.0E+10	3.0E+10	3.0E+10	3.0E+10	3.0E+10	3.0E+10	3.0E+10
	$P_{max,plate}$ [kN]	**82.3**	**77.1**	**69.3**	**62.4**	**56.3**	**46.5**	**39.1**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10
	$P_{max,plate}$ [kN]	**89.8**	**83.6**	**74.4**	**66.3**	**59.4**	**48.4**	**40.3**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	3.8E+10	3.8E+10	3.8E+10	3.8E+10	3.8E+10	3.8E+10	3.8E+10
	$P_{max,plate}$ [kN]	**92.6**	**86.0**	**76.2**	**67.7**	**60.5**	**49.0**	**40.7**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	4.1E+10	4.1E+10	4.1E+10	4.1E+10	4.1E+10	4.1E+10	4.1E+10
	$P_{max,plate}$ [kN]	**96.6**	**89.5**	**78.8**	**69.7**	**62.0**	**49.9**	**41.2**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	4.7E+10	4.7E+10	4.7E+10	4.7E+10	4.7E+10	4.7E+10	4.7E+10
	$P_{max,plate}$ [kN]	**102.9**	**94.8**	**82.8**	**72.7**	**64.2**	**51.2**	**42.0**
$P_{sh,plate}$ [kN]		**204.1**						

Table B3.4: Projoint Dowel DP1 6mm S500 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		6.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	2.8E+10	2.8E+10	2.8E+10	2.8E+10	2.8E+10	2.8E+10	2.8E+10
	$P_{max,plate}$ [kN]	**81.0**	**76.8**	**70.3**	**64.4**	**59.1**	**50.2**	**43.2**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10	3.5E+10
	$P_{max,plate}$ [kN]	**90.2**	**84.9**	**76.9**	**69.8**	**63.5**	**53.2**	**45.1**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	4.2E+10	4.2E+10	4.2E+10	4.2E+10	4.2E+10	4.2E+10	4.2E+10
	$P_{max,plate}$ [kN]	**98.4**	**92.2**	**82.7**	**74.4**	**67.2**	**55.5**	**46.6**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	4.5E+10	4.5E+10	4.5E+10	4.5E+10	4.5E+10	4.5E+10	4.5E+10
	$P_{max,plate}$ [kN]	**101.5**	**94.8**	**84.8**	**76.1**	**68.5**	**56.3**	**47.1**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	4.9E+10	4.9E+10	4.9E+10	4.9E+10	4.9E+10	4.9E+10	4.9E+10
	$P_{max,plate}$ [kN]	**105.9**	**98.7**	**87.8**	**78.4**	**70.3**	**57.4**	**47.8**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	5.6E+10	5.6E+10	5.6E+10	5.6E+10	5.6E+10	5.6E+10	5.6E+10
	$P_{max,plate}$ [kN]	**112.8**	**104.6**	**92.4**	**81.9**	**73.0**	**59.0**	**48.8**
$P_{sh,plate}$ [kN]		**243.0**						

Table B3.5: Projoint Dowel DP1 8mm S275 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		8.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	2.8E+10	2.8E+10	2.8E+10	2.8E+10	2.8E+10	2.8E+10	2.8E+10
	$P_{max,plate}$ [kN]	**80.0**	**75.8**	**69.3**	**63.5**	**58.2**	**49.4**	**42.4**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	3.4E+10	3.4E+10	3.4E+10	3.4E+10	3.4E+10	3.4E+10	3.4E+10
	$P_{max,plate}$ [kN]	**89.1**	**83.9**	**75.9**	**68.8**	**62.6**	**52.3**	**44.3**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	4.1E+10	4.1E+10	4.1E+10	4.1E+10	4.1E+10	4.1E+10	4.1E+10
	$P_{max,plate}$ [kN]	**97.2**	**91.0**	**81.6**	**73.3**	**66.2**	**54.5**	**45.8**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	4.4E+10	4.4E+10	4.4E+10	4.4E+10	4.4E+10	4.4E+10	4.4E+10
	$P_{max,plate}$ [kN]	**100.3**	**93.7**	**83.7**	**75.0**	**67.4**	**55.3**	**46.3**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	4.8E+10	4.8E+10	4.8E+10	4.8E+10	4.8E+10	4.8E+10	4.8E+10
	$P_{max,plate}$ [kN]	**104.7**	**97.4**	**86.6**	**77.3**	**69.2**	**56.4**	**46.9**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	5.5E+10	5.5E+10	5.5E+10	5.5E+10	5.5E+10	5.5E+10	5.5E+10
	$P_{max,plate}$ [kN]	**111.5**	**103.3**	**91.1**	**80.7**	**71.8**	**57.9**	**47.9**
$P_{sh,plate}$ [kN]		**178.2**						

Table B3.6: Projoint Dowel DP1 8mm S355 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		2 x *e* [mm]						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		8.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	3.6E+10	3.6E+10	3.6E+10	3.6E+10	3.6E+10	3.6E+10	3.6E+10
	$P_{max,plate}$ [kN]	**91.3**	**87.1**	**80.5**	**74.4**	**68.9**	**59.5**	**51.8**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	4.4E+10	4.4E+10	4.4E+10	4.4E+10	4.4E+10	4.4E+10	4.4E+10
	$P_{max,plate}$ [kN]	**101.7**	**96.5**	**88.3**	**81.0**	**74.4**	**63.2**	**54.4**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	5.3E+10	5.3E+10	5.3E+10	5.3E+10	5.3E+10	5.3E+10	5.3E+10
	$P_{max,plate}$ [kN]	**111.10**	**104.8**	**95.2**	**86.6**	**78.9**	**66.3**	**56.4**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	5.7E+10	5.7E+10	5.7E+10	5.7E+10	5.7E+10	5.7E+10	5.7E+10
	$P_{max,plate}$ [kN]	**114.6**	**107.9**	**97.7**	**88.6**	**80.6**	**67.3**	**57.1**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	6.2E+10	6.2E+10	6.2E+10	6.2E+10	6.2E+10	6.2E+10	6.2E+10
	$P_{max,plate}$ [kN]	**119.6**	**112.3**	**101.2**	**91.4**	**82.8**	**68.8**	**58.0**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	7.1E+10	7.1E+10	7.1E+10	7.1E+10	7.1E+10	7.1E+10	7.1E+10
	$P_{max,plate}$ [kN]	**127.5**	**119.2**	**106.7**	**95.7**	**86.2**	**70.9**	**59.4**
$P_{sh,plate}$ [kN]		**230.0**						

Table B3.7: Projoint Dowel DP1 8mm S420 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		8.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	4.2E+10	4.2E+10	4.2E+10	4.2E+10	4.2E+10	4.2E+10	4.2E+10
	$P_{max,plate}$ [kN]	**99.6**	**95.3**	**88.6**	**82.5**	**76.9**	**67.0**	**58.8**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	5.3E+10	5.3E+10	5.3E+10	5.3E+10	5.3E+10	5.3E+10	5.3E+10
	$P_{max,plate}$ [kN]	**111.0**	**105.7**	**97.4**	**89.9**	**83.1**	**71.5**	**62.0**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	6.3E+10	6.3E+10	6.3E+10	6.3E+10	6.3E+10	6.3E+10	6.3E+10
	$P_{max,plate}$ [kN]	**121.2**	**114.9**	**105.1**	**96.3**	**88.4**	**75.1**	**64.5**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	6.7E+10	6.7E+10	6.7E+10	6.7E+10	6.7E+10	6.7E+10	6.7E+10
	$P_{max,plate}$ [kN]	**125.0**	**118.3**	**107.9**	**98.6**	**90.3**	**76.4**	**65.4**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	7.4E+10	7.4E+10	7.4E+10	7.4E+10	7.4E+10	7.4E+10	7.4E+10
	$P_{max,plate}$ [kN]	**130.5**	**123.2**	**111.9**	**101.9**	**93.0**	**78.1**	**66.6**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	8.4E+10	8.4E+10	8.4E+10	8.4E+10	8.4E+10	8.4E+10	8.4E+10
	$P_{max,plate}$ [kN]	**139.2**	**130.8**	**118.1**	**106.9**	**97.0**	**80.7**	**68.2**
$P_{sh,plate}$ [kN]		**272.2**						

Table B3.8: Projoint Dowel DP1 8mm S500 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		8.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	5.0E+10	5.0E+10	5.0E+10	5.0E+10	5.0E+10	5.0E+10	5.0E+10
	$P_{max,plate}$ [kN]	**108.9**	**104.7**	**97.9**	**91.6**	**85.9**	**75.6**	**67.0**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	6.3E+10	6.3E+10	6.3E+10	6.3E+10	6.3E+10	6.3E+10	6.3E+10
	$P_{max,plate}$ [kN]	**121.4**	**116.1**	**107.8**	**100.1**	**93.1**	**80.9**	**70.9**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	7.5E+10	7.5E+10	7.5E+10	7.5E+10	7.5E+10	7.5E+10	7.5E+10
	$P_{max,plate}$ [kN]	**132.6**	**126.3**	**116.4**	**107.4**	**99.2**	**85.3**	**74.0**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	8.0E+10	8.0E+10	8.0E+10	8.0E+10	8.0E+10	8.0E+10	8.0E+10
	$P_{max,plate}$ [kN]	**136.8**	**130.1**	**119.6**	**110.1**	**101.5**	**86.8**	**75.0**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	8.8E+10	8.8E+10	8.8E+10	8.8E+10	8.8E+10	8.8E+10	8.8E+10
	$P_{max,plate}$ [kN]	**142.9**	**135.5**	**124.1**	**113.8**	**104.6**	**88.9**	**76.5**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.0E+11	1.0E+11	1.0E+11	1.0E+11	1.0E+11	1.0E+11	1.0E+11
	$P_{max,plate}$ [kN]	**152.4**	**144.0**	**131.1**	**119.5**	**109.2**	**92.1**	**78.6**
$P_{sh,plate}$ [kN]		**324.0**						

Table B3.9: Projoint Dowel DP1 10mm S275 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		2 x *e* [mm]						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		10.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	4.3E+10	4.3E+10	4.3E+10	4.3E+10	4.3E+10	4.3E+10	4.3E+10
	$P_{max,plate}$ [kN]	**100.8**	**96.5**	**89.8**	**83.6**	**78.0**	**68.1**	**59.8**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	5.4E+10	5.4E+10	5.4E+10	5.4E+10	5.4E+10	5.4E+10	5.4E+10
	$P_{max,plate}$ [kN]	**112.3**	**107.0**	**98.7**	**91.2**	**84.4**	**72.6**	**63.1**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	6.5E+10	6.5E+10	6.5E+10	6.5E+10	6.5E+10	6.5E+10	6.5E+10
	$P_{max,plate}$ [kN]	**122.6**	**116.3**	**106.5**	**97.7**	**89.8**	**76.4**	**65.7**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	6.9E+10	6.9E+10	6.9E+10	6.9E+10	6.9E+10	6.9E+10	6.9E+10
	$P_{max,plate}$ [kN]	**126.5**	**119.8**	**109.4**	**100.1**	**91.7**	**77.7**	**66.6**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	7.5E+10	7.5E+10	7.5E+10	7.5E+10	7.5E+10	7.5E+10	7.5E+10
	$P_{max,plate}$ [kN]	**132.1**	**124.7**	**113.5**	**103.4**	**94.4**	**79.5**	**67.8**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	8.6E+10	8.6E+10	8.6E+10	8.6E+10	8.6E+10	8.6E+10	8.6E+10
	$P_{max,plate}$ [kN]	**140.8**	**132.5**	**119.7**	**108.4**	**98.5**	**82.1**	**69.5**
$P_{sh,plate}$ [kN]		**222.8**						

Table B3.10: Projoint Dowel DP1 10mm S355 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		10.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	5.6E+10	5.6E+10	5.6E+10	5.6E+10	5.6E+10	5.6E+10	5.6E+10
	$P_{max,plate}$ [kN]	**114.9**	**110.6**	**103.8**	**97.5**	**91.6**	**81.2**	**72.3**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	6.9E+10	6.9E+10	6.9E+10	6.9E+10	6.9E+10	6.9E+10	6.9E+10
	$P_{max,plate}$ [kN]	**128.1**	**122.7**	**114.4**	**106.6**	**99.5**	**87.0**	**76.6**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	8.3E+10	8.3E+10	8.3E+10	8.3E+10	8.3E+10	8.3E+10	8.3E+10
	$P_{max,plate}$ [kN]	**139.9**	**133.5**	**123.6**	**114.5**	**106.2**	**91.9**	**80.1**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	8.9E+10	8.9E+10	8.9E+10	8.9E+10	8.9E+10	8.9E+10	8.9E+10
	$P_{max,plate}$ [kN]	**144.4**	**137.6**	**127.0**	**117.4**	**108.6**	**93.6**	**81.3**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	9.7E+10	9.7E+10	9.7E+10	9.7E+10	9.7E+10	9.7E+10	9.7E+10
	$P_{max,plate}$ [kN]	**150.8**	**143.3**	**131.9**	**121.4**	**112.0**	**95.9**	**83.0**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11
	$P_{max,plate}$ [kN]	**160.8**	**152.4**	**139.4**	**127.6**	**117.2**	**99.4**	**85.4**
$P_{sh,plate}$ [kN]		**287.6**						

Table B3.11: Projoint Dowel DP1 10mm S420 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		10.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	6.6E+10	6.6E+10	6.6E+10	6.6E+10	6.6E+10	6.6E+10	6.6E+10
	$P_{max,plate}$ [kN]	**125.2**	**120.9**	**114.1**	**107.7**	**101.7**	**90.9**	**81.5**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	8.2E+10	8.2E+10	8.2E+10	8.2E+10	8.2E+10	8.2E+10	8.2E+10
	$P_{max,plate}$ [kN]	**139.6**	**134.3**	**125.8**	**117.9**	**110.7**	**97.7**	**86.8**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	9.9E+10	9.9E+10	9.9E+10	9.9E+10	9.9E+10	9.9E+10	9.9E+10
	$P_{max,plate}$ [kN]	**152.6**	**146.2**	**136.1**	**126.8**	**118.3**	**103.4**	**91.0**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11
	$P_{max,plate}$ [kN]	**157.4**	**150.6**	**139.9**	**130.1**	**121.1**	**105.4**	**92.4**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11
	$P_{max,plate}$ [kN]	**164.4**	**157.0**	**145.4**	**134.7**	**125.0**	**108.2**	**94.5**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11
	$P_{max,plate}$ [kN]	**175.4**	**166.9**	**153.8**	**141.8**	**131.0**	**112.4**	**97.4**
$P_{sh,plate}$ [kN]		**340.2**						

Table B3.12: Projoint Dowel DP1 10mm S500 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		10.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	7.8E+10	7.8E+10	7.8E+10	7.8E+10	7.8E+10	7.8E+10	7.8E+10
	$P_{max,plate}$ [kN]	**136.9**	**132.6**	**125.7**	**119.2**	**113.1**	**101.9**	**92.2**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	9.8E+10	9.8E+10	9.8E+10	9.8E+10	9.8E+10	9.8E+10	9.8E+10
	$P_{max,plate}$ [kN]	**152.7**	**147.3**	**138.8**	**130.8**	**123.3**	**109.9**	**98.4**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11
	$P_{max,plate}$ [kN]	**166.9**	**160.4**	**150.3**	**140.9**	**132.1**	**116.6**	**103.5**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11
	$P_{max,plate}$ [kN]	**172.2**	**165.3**	**154.6**	**144.6**	**135.3**	**119.0**	**105.3**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11
	$P_{max,plate}$ [kN]	**179.9**	**172.4**	**160.6**	**149.8**	**139.8**	**122.3**	**107.8**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.6E+11	1.6E+11	1.6E+11	1.6E+11	1.6E+11	1.6E+11	1.6E+11
	$P_{max,plate}$ [kN]	**191.9**	**183.4**	**170.1**	**157.9**	**146.7**	**127.3**	**111.4**
$P_{sh,plate}$ [kN]		**405.0**						

Table B3.13: Projoint Dowel DP1 12mm S275 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		12.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	6.2E+10	6.2E+10	6.2E+10	6.2E+10	6.2E+10	6.2E+10	6.2E+10
	$P_{max,plate}$ [kN]	**121.5**	**117.2**	**110.4**	**104.0**	**98.0**	**87.4**	**78.2**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	7.7E+10	7.7E+10	7.7E+10	7.7E+10	7.7E+10	7.7E+10	7.7E+10
	$P_{max,plate}$ [kN]	**135.5**	**130.1**	**121.7**	**113.9**	**106.6**	**93.9**	**83.1**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	9.3E+10	9.3E+10	9.3E+10	9.3E+10	9.3E+10	9.3E+10	9.3E+10
	$P_{max,plate}$ [kN]	**148.0**	**141.6**	**131.6**	**122.4**	**114.0**	**99.2**	**87.0**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	9.9E+10	9.9E+10	9.9E+10	9.9E+10	9.9E+10	9.9E+10	9.9E+10
	$P_{max,plate}$ [kN]	**152.7**	**145.9**	**135.3**	**125.5**	**116.6**	**101.1**	**88.4**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11
	$P_{max,plate}$ [kN]	**159.5**	**152.1**	**140.5**	**129.9**	**120.3**	**103.8**	**90.3**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11
	$P_{max,plate}$ [kN]	**170.1**	**161.7**	**148.6**	**136.7**	**126.0**	**107.7**	**93.1**
$P_{sh,plate}$ [kN]		**267.3**						

Table B3.14: Projoint Dowel DP1 12mm S355 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		12.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	8.0E+10	8.0E+10	8.0E+10	8.0E+10	8.0E+10	8.0E+10	8.0E+10
	$P_{max,plate}$ [kN]	**138.5**	**134.1**	**127.2**	**120.7**	**114.6**	**103.4**	**93.6**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	1.0E+11	1.0E+11	1.0E+11	1.0E+11	1.0E+11	1.0E+11	1.0E+11
	$P_{max,plate}$ [kN]	**154.4**	**149.0**	**140.5**	**132.5**	**125.0**	**111.6**	**100.0**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11
	$P_{max,plate}$ [kN]	**168.8**	**162.3**	**152.2**	**142.7**	**134.0**	**118.4**	**105.2**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11	1.3E+11
	$P_{max,plate}$ [kN]	**174.2**	**167.3**	**156.5**	**146.5**	**137.2**	**120.8**	**107.0**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11
	$P_{max,plate}$ [kN]	**181.9**	**174.4**	**162.7**	**151.8**	**141.8**	**124.2**	**109.5**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.6E+11	1.6E+11	1.6E+11	1.6E+11	1.6E+11	1.6E+11	1.6E+11
	$P_{max,plate}$ [kN]	**194.1**	**185.6**	**172.3**	**160.0**	**148.8**	**129.3**	**113.3**
$P_{sh,plate}$ [kN]		**345.1**						

Table B3.15: Projoint Dowel DP1 12mm S420 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		12.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	9.5E+10	9.5E+10	9.5E+10	9.5E+10	9.5E+10	9.5E+10	9.5E+10
	$P_{max,plate}$ [kN]	**150.9**	**146.5**	**139.6**	**133.0**	**126.7**	**115.3**	**105.1**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11	1.2E+11
	$P_{max,plate}$ [kN]	**168.3**	**162.9**	**154.3**	**146.2**	**138.5**	**124.7**	**112.6**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11
	$P_{max,plate}$ [kN]	**184.0**	**177.5**	**167.3**	**157.7**	**148.7**	**132.6**	**118.8**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	1.5E+11	1.5E+11	1.5E+11	1.5E+11	1.5E+11	1.5E+11	1.5E+11
	$P_{max,plate}$ [kN]	**189.9**	**183.0**	**172.1**	**161.9**	**152.4**	**135.5**	**121.0**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	1.7E+11	1.7E+11	1.7E+11	1.7E+11	1.7E+11	1.7E+11	1.7E+11
	$P_{max,plate}$ [kN]	**198.3**	**190.8**	**178.9**	**167.9**	**157.7**	**139.5**	**124.0**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	1.9E+11	1.9E+11	1.9E+11	1.9E+11	1.9E+11	1.9E+11	1.9E+11
	$P_{max,plate}$ [kN]	**211.6**	**203.1**	**189.6**	**177.2**	**165.7**	**145.4**	**128.5**
$P_{sh,plate}$ [kN]		**408.2**						

Table B3.16: Projoint Dowel DP1 12mm S500 steel – $P_{max,plate}$ and $P_{sh,plate}$

PARAMETERS		**2 x *e* [mm]**						
		1.0	**2.5**	**5.0**	**7.5**	**10.0**	**15.0**	**20.0**
t_p[mm]		12.0						
p_b [mm]		150.0						
C20/25	b_1 [mm]	6.0E+03	1.5E+04	3.0E+04	4.5E+04	6.0E+04	9.0E+04	1.2E+05
	c_1 [mm]	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11	1.1E+11
	$P_{max,plate}$ [kN]	**164.9**	**160.5**	**153.5**	**146.9**	**140.5**	**128.8**	**118.3**
C25/30	b_1 [mm]	7.5E+03	1.9E+04	3.8E+04	5.6E+04	7.5E+04	1.1E+05	1.5E+05
	c_1 [mm]	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11	1.4E+11
	$P_{max,plate}$ [kN]	**184.0**	**178.5**	**169.8**	**161.6**	**153.9**	**139.7**	**127.1**
C30/37	b_1 [mm]N]	9.0E+03	2.3E+04	4.5E+04	6.8E+04	9.0E+04	1.4E+05	1.8E+05
	c_1 [mm]	1.7E+11	1.7E+11	1.7E+11	1.7E+11	1.7E+11	1.7E+11	1.7E+11
	$P_{max,plate}$ [kN]	**201.1**	**194.6**	**184.3**	**174.6**	**165.4**	**148.9**	**134.4**
C32/40	b_1 [mm]	9.6E+03	2.4E+04	4.8E+04	7.2E+04	9.6E+04	1.4E+05	1.9E+05
	c_1 [mm]	1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
	$P_{max,plate}$ [kN]	**207.6**	**200.7**	**189.7**	**179.3**	**169.7**	**152.2**	**137.0**
C35/45	b_1 [mm]	1.1E+04	2.6E+04	5.3E+04	7.9E+04	1.1E+05	1.6E+05	2.1E+05
	c_1 [mm]	2.0E+11	2.0E+11	2.0E+11	2.0E+11	2.0E+11	2.0E+11	2.0E+11
	$P_{max,plate}$ [kN]	**216.9**	**209.3**	**197.3**	**186.1**	**175.7**	**156.8**	**140.6**
C40/50	b_1 [mm]	1.2E+04	3.0E+04	6.0E+04	9.0E+04	1.2E+05	1.8E+05	2.4E+05
	c_1 [mm]	2.3E+11	2.3E+11	2.3E+11	2.3E+11	2.3E+11	2.3E+11	2.3E+11
	$P_{max,plate}$ [kN]	**231.5**	**222.9**	**209.3**	**196.6**	**184.8**	**163.9**	**146.0**
$P_{sh,plate}$ [kN]		**486.0**						