Annex for The Netherlands

Steel Design 3

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Connections

bouwen met staal

Colofon/Content

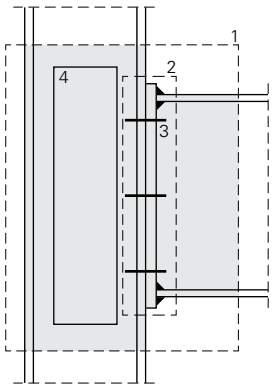
Annex for the Netherlands to *Connecrions* (Steel Design 3)

This annex has been prepared by prof.ir. J.W.B. Stark and is based on the original Dutch version of *Connections*, published in 2012 by Bouwen met Staal as *Verbinden* by the same author. References are made to each NA symbol in *Connections* and – where relevant – the corresponding clause in the Eurocode.
Annexes to *Connections* (Steel Design 3) are also available for Belgium, Luxembourg and Switzerland and can be downloaded free of charge from the website of Bouwen met Staal.

www.bouwenmetstaal.nl

Connections in steel structures

1 Annex NL



1 joint
2 connection
3 component
(like: bolt, weld, end-plate)
4 doubler plate

NL1.1 Eurocode terminology of connection and joint.

English	Dutch (EN 1993-1-8)	Dutch (common use)	French	German
connection	verbinding	verbinding	attache	Verbindung
joint	verbinding	knoop	assemblage	Anschluss

NL1.2 Use of connection and joint in Dutch, French and German language.

p. 1-2 ***EN 1993-1-8, cl. 1.4***

The terms 'connection' and 'joint' (according to Eurocode) are illustrated in figure NL1.1 and have also respective Dutch, German and French equivalents (table NL1.2).
However, 'connection' is often used where 'joint' is appropriate according to the given definitions. So in practice it is certainly necessary to remain attentive to what is actually meant.
In the Dutch translations of EN 1993-1 (both NEN-EN and NBN) the term 'verbinding' is used for both connections and joints. The term 'knoop' is used for a sub-assemblage of a beam-to-column connection as shown in EN 1993-1-8, fig. 1.1 (see fig. NL1.1).
Moreover, in the field of welding-technology, the term 'joint' is used for exactly the welded area (as in 'butt welds in T-joints').
And even in this textbook (*Connections*) the term 'connection' is sometimes used where strictly speaking it is a 'joint' (occuring mostly in chapter 5).

p. 1-19 (a)

No additional remarks needed.

p. 1-19 (b)

No additional remarks needed.

p. 1-24

No additional remarks needed.

clause	parameter	Dutch National Annex
1.2.6 (group 6)	reference standards for rivets	hot riveted rivets must be made of grade S235 steel
2.2(2)	partial safety factors γ_{M2}, γ_{M3}, $\gamma_{M3,ser}$, γ_{M4}, γ_{M5}, $\gamma_{M6,ser}$ and γ_{M7}	recommended values are adopted
3.1.1(3)	bolt class	bolt classes 4.8 and 5.8 are excluded
3.4.2(1)	requirements for the level of preloading, exclusively related to the characteristics during manufacturing and assembly or to the quality requirements	no specific requirements
5.2.1(2)	additional information related to the classification of joints	no additional information
6.2.7.2(9)	additional information with regard to the use of equation (6.26)	in this clause $1{,}9F_{t,Rd}$ is replaced by $1{,}8F_{t,Rd}$

NL1.1 Overview of the Dutch choices for the nationally determined parameters in EN 1993-1-8.

clause	status	topic
3.2	N	dimensions of holes for rivets (reference to EN 1090-2, cl. 6.6.1)
3.6.1	N	for preloading with the torque or the HRC method, the design preload should be taken as $F_{p,Cd} = 0{,}5f_{ub}A_s/\gamma_{M7}$
3.6.2.2(5)	N	properties of injection material for injection bolts
3.9.1	I	examples of friction coefficients for contact surfaces
3.9.1(2)	I	for preloading with the torque or the HRC method, instead of formula (3.7) the following formula should be used : $F_{p,Cd} = 0{,}5f_{ub}A_s/\gamma_{M7}$
4.5.2(3)	I	weld penetration depth beneath powder arc welding without procedure tests
4.7.2(3) and 4.7.3(3)	N	design value of the penetration for welding with gap

NL1.2 Overview of the Dutch choises for the non-contradictory complementary information in EN 1993-1-8 (N = normative; I = informative).

p. 1-26 (a) ***EN 1993-1-8***

The Dutch National Annex to EN 1993-1-8 provides the choices of the nationally determinded parameters (NDP) as shown in table NL1.1.

p. 1-26 (b) ***EN 1993-1-8***

The Dutch National Annex to EN 1993-1-8 provides the non-contradictory complementary information (NCCI) as shown in table NL1.2.

p. 1-27 ***EN 1993-1-8***

See remarks to p. 1-26 (a).

p. 1-28 (a)

No additional remarks needed.

p. 1-28 (b)

No additional remarks needed.

Bolts in clearance holes

2 Annex NL

p. 2-11 (a) ***bolt choice***

In the Netherlands M12, M16, and M20 bolts are generally used, with M24 used for heavy steel structures, and sometimes M30. M22 bolts are not used in the Netherlands and M27 only in special situations.

p. 2-11 (b) ***EN 1993-1-8, cl. 3.1.1(3)***

Bolt classes 4.8 and 5.8 are excluded. These two classes are excluded in The Netherlands because they have the same tensile strength – and therefore the same limiting forces – as bolt classes 4.6 and 5.6. But they have less ductility.

For bolts used in category A en D bolt class 8.8 is recommended.

For bolts used in category B, C and E bolt class 10.9 is recommended.

p. 2-18 ***EN 1993-1-1, cl. 6.1(1)***

The recommended values (for buildings) γ_{M0} = 1,0 and γ_{M2} = 1,25 are accepted.

Annex NL 3

Slip-resistant connections, rivets and pins

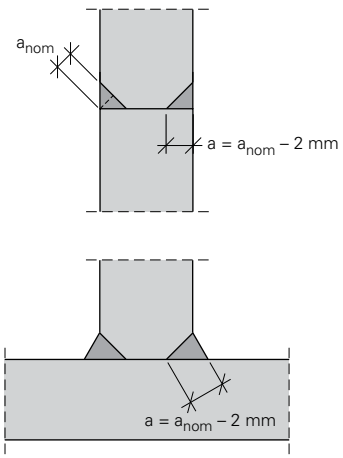
p. 3-25 ***EN 1993-1-8, cl. 3.2***

In The Netherlands hot installed rivets must be made of grade S235 steel with f_{ur} = 400 N/mm^2.

Welds

p. 4-34 ***EN 1993-1-8, cl. 4.7.2***

In The Netherlands the weld thickness of partial penetration butt welds must be determined as shown in figure NL4.1.



NL4.1. Weld thickness of a partial penetration butt weld.

Annex NL 5

Design and detailing of connections

No annex required for this chapter.