

European Technical Assessment

ETA 13/0692
of 16/08/2023

General Part

Technical Assessment Body issuing the European Technical Assessment:

RISE Research Institutes of Sweden AB

Trade name of the construction product

Northcone Lighting Columns

Product family to which the construction product belongs

Steel Lighting Columns

Manufacturer

Northcone AB
Rågåkersgatan 5
781 74 Borlänge, Sweden
www.northcone.se

Manufacturing plant(s)

Northcone AB, Rågåkersgatan 5, 781 74
Borlänge, Sweden

This European Technical Assessment contains

13 pages including 9 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

EAD 120003-00-0106 edition 2015-04 Steel lighting columns.

This version replaces*

ETA 13/0692, issued on 28/08/2019

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1 Technical description of the product

Steel lighting columns made of cold-rolled steel sheet according to EN 10346, either hot-dip galvanized and prepainted in accordance with EN 10169 or coated with a zinc-aluminum-magnesium coating. The characteristic yield strength of the material is ≥ 420 MPa in the longitudinal direction and the ultimate strength is ≥ 500 MPa.

The columns are made by cold-rolling to a tapered (cone) shape with a cross section according to Figure 1. The column is closed to a hollow section by a continuous laser weld.

The columns have an installation door that is screwed over the electrical installation opening. The door opening is, for most of the columns, reinforced by inside and/or outside plates. See Figure 2.

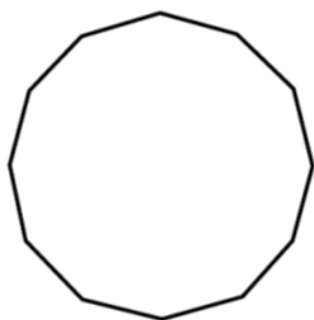


Figure 1: Principal cross section



Figure 2: Figure 2 Cross section through the door opening

The columns can be provided without or with post top or top brackets, cycle- and walking path brackets or/and arbitrary brackets along the column. The top bracket can be made of the same material and manufacturing method as the column and connected to the column, by a galvanized bended steel tube or galvanized steel tubes, welded together at an angle. As an alternative, the brackets, connected to the column, can be made of a galvanized straight-armed- or bended steel tube or galvanized steel tubes, welded together at an angle. All post top and bracket attachment above, are fixed to the column by screws.

The columns are mounted in prefabricated concrete foundation elements, on flange plates, intended to be bolted by screw or nut to the ground or on extended tube flange plates, where the tube is intended to be mounted in prefabricated foundation elements. The connection between the column and the foundation element is fixed by a plastic wedge ring. The top of the foundation is sealed with a protective cover.

The columns are coated with corrosion-resistant coating, consisting of hot dip galvanizing and paint (e.g. Prelaq Nova) with a total thickness of about $60 \mu\text{m}$ or zinc-aluminum-magnesium coating (e.g. Magnelis® HX460LAD ZM310) with coating weight 310 g/m^2 (double sided) and nominal thickness of $25 \mu\text{m}$ per side. On the painted columns, the longitudinal weld is covered with elastic sealant.

As an aesthetic option, the columns made of Magnelis®, can be provided with a polymer powder coating layer. The layer thickness is $50 - 300 \mu\text{m}$ and provided in different colours.

The columns are designed as standard or crash safety columns. The crash safety columns are, in contrast to the standard columns, extended and reinforced by a pipe in the bottom, to ensure the maintenance of the section during crash. They are also equipped with slots in the impact area to improve the buckling characteristic. Some of the standard columns are also tested and classified according to standard EN 12767. See Annex E.

A principal drawing and column dimensions are presented in Annex A and B. The column shown in Annex B have been designed with the Northcone calculation tool, see Annex D, using the design parameters shown in Annex C. Additional columns can be designed using the Northcone calculation tool assuming that the design provisions described in Annex C and D are observed.

The electrical equipment (including lantern, wiring devices, electrical boxes or enclosures), traffic signal masts as well as the foundation bolts are not covered by this ETA.

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

The Steel Lighting Columns are intended to be used as road lighting columns for circulation areas.

The provisions made in this European Technical Assessment are based on an assumed intended working life of 25 years depending of environmental conditions at the place of use. 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.

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

3.1 Essential characteristics and their performance

		Characteristic	Performance
BWR 1	Mechanical resistance and stability	Resistance to horizontal loads	See Annex B, C and D
		Durability (Corrosion protection)	Assessed to have properties/performance equivalent to the requirements described in Annex A of EN 40-5.
BWR 2	Safety in case of fire	Reaction to fire	Classification according to EN 13501-1. <ul style="list-style-type: none"> - Pre- painted steel sheet, e.g. Prelaq Nova: class A2-s2,d0 - Steel sheet with e.g. Magnelis®: class A1 - Other materials/ components: class F
BWR 4	Safety in use	Protection against mechanical impact	Indentation ≤ 3 mm (in accordance with EN 40-5, clause 9, impact protection category IK08 as specified in EN 50102)
		Performance under vehicle impact (passive safety)	See Annex E
		Internal finish and sharp edges	Assessed to have properties/performance equivalent to the requirements described in EN 40-5 clause 10.2 The door opening is free from rough edges and burrs

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

According to the decision 96/579/EC - Commission decision of date 24 June 1996, published in the Official Journal of the European Union (OJEU) L254/54 of 8/10/1996, of the European Commission the system of assessment and verification of constancy of performance (see Annex V to the regulation (EU) No 305/2011) given in the following table apply:

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Steel lighting columns	Lighting columns for circulation areas	-	1

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

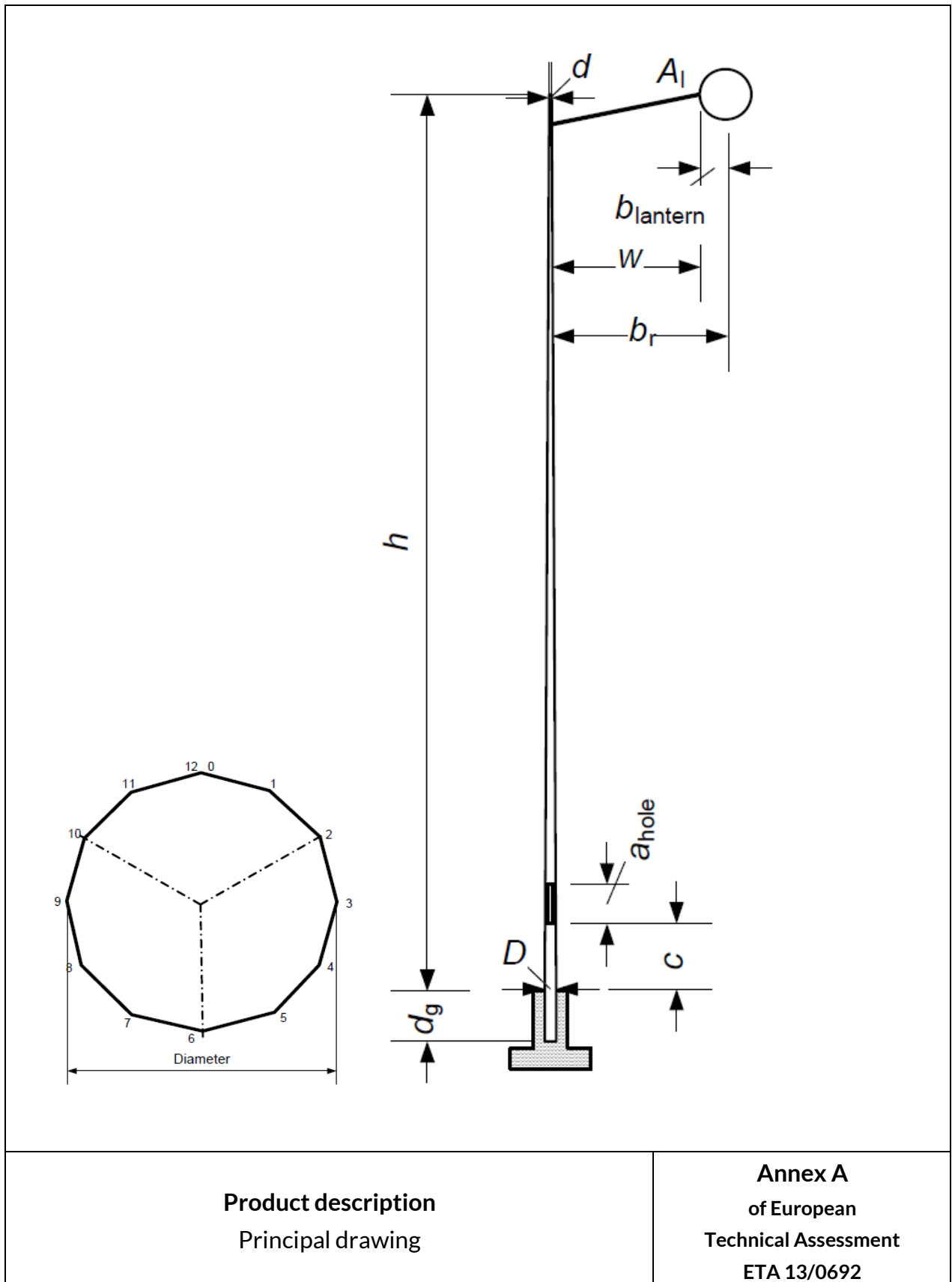
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at RISE.

The factory production control system is mainly performed in accordance with clause 13.1.1 of EN 40-5

Issued in Borås on 16.08.2023
By RISE Research Institutes of Sweden AB



Martin Tillander
Director, Product certification



Product description
Principal drawing

Annex A
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The standard columns shown in the tables below are designed with the Northcone calculation tool dated 2023-05-26 using the design parameters shown in Annex C.

Standard Column NC-ECO E without Bracket		
Designation		NC-ECO E 30 E0 – NC-ECO E 100 E0
Height (h)	[mm]	3 000 – 10 000

Standard Column NC-ECO E with 1 Bracket		
Designation		NC-ECO E30 E0,3 – NC-ECO E75 E10
Height (h)	[mm]	3 000 – 7 500

Standard Column with 2 Brackets		
Designation		NC-ECO E45 D0,3 – NC-ECO E75 D0,5
Height (h)	[mm]	4 500 – 7 500

Standard Column with 3-4 Brackets		
Designation		NC-ECO E30 K3×0,3 – NC-ECO E70 K3×0,3
Height (h)	[mm]	3 000 – 7 000

Standard Column with 0-4 Brackets and 0 – 3 Brackets along column		
Designation		NC-ECO E30 E0 EB – NC-ECO E100 E0 3EB
Height (h)	[mm]	3 000 – 10 000

Column characteristics
Standard Columns NC-ECO E

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The standard columns shown in the tables below are designed with the Northcone calculation tool dated 2023-05-26 using the design parameters shown in Annex C.

Standard Column NC-ECO EX with Top Post		
Designation		NC-ECO EX60 E0 – NC-ECO EX120 E0
Height (h)	[mm]	6 000 – 12 000

Standard Column NC-ECO EX with 1 Bracket		
Designation		NC-ECO EX60 E0,3 – NC-ECO EX120 E25
Height (h)	[mm]	6 000 – 12 000

Standard Column NC-ECO EX with 2 Brackets		
Designation		NC-ECO EX60 D0,3 – NC-ECO EX120 D15
Height (h)	[mm]	6 000 – 12 000

Standard Column NC-ECO EX with 3-4 Brackets		
Designation		NC-ECO EX60 K3×0,3 – NC-ECO EX120 K4×0,3
Height (h)	[mm]	6 000 - 12 000

Standard Column NC-ECO EX with 0-4 Brackets and 0 – 4 CW-Brackets		
Designation		NC-ECO EX60 E0 GC – NC-ECO EX100 E15 4GC
Height (h)	[mm]	6 000 – 10 000

Standard Column NC-ECO EX with 0-4 Brackets and 0 – 3 CW Arbitrary Brackets along column		
Designation		NC-ECO EX60 E0 EB – NC-ECO EX120 E25 3EB
Height (h)	[mm]	6 000 – 12 000

<p>Column characteristics Standard Columns NC-ECO EX</p>	<p>Annex B2 of European Technical Assessment ETA 13/0692</p>
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The crash safety columns shown in the tables below are designed with the Northcone calculation tool dated 2023-05-26 using the design parameters shown in Annex C.

Crash Safety Column NC-ECO E without Bracket (NE according to EN 12767)		
Designation		NC-ECO E 30 E0 – NC-ECO E 80 E0
Height (h)	[mm]	3 000 -8 000

Crash Safety Column NC-ECO S without Bracket (HE according to EN 12767)		
Designation		NC-ECO S 80 E0 – NC-ECO S 120 E0
Height (h)	[mm]	8 000 -12 000

Crash Safety Column NC-ECO S with Bracket (HE according to EN 12767)		
Designation		NC-ECO S 80 E 0,3 – NC-ECO S 120 E25
Height (h)	[mm]	8 000 -12 000

Crash Safety Column NC-ECO S with 2 Brackets (HE according to EN 12767)		
Designation		NC-ECO S 80 D 0,3 – NC-ECO S 120 D0,5
Height (h)	[mm]	8 000 -12 000

Crash Safety Column NC-ECO S with 3 Brackets (HE according to EN 12767)		
Designation		NC-ECO S100 K3x0,3
Height (h)	[mm]	10 000

<p>Column characteristics Crash Safety Columns NC-ECO E and S</p>	<p>Annex B3 of European Technical Assessment ETA 13/0692</p>
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Design parameters		
Basic reference wind velocity	22 or 26 m/s	
Terrain roughness, category (according to EN 40-3-1, clause 5.2.6)	Category I-IV	
Partial load factors, (according to EN 40-3-3, clause 5.4)	Class A Wind load $\gamma_f = 1.4$ Dead load $\gamma_f = 1.2$	Class B Wind load $\gamma_f = 1.2$ Dead load $\gamma_f = 1.2$
Maximum horizontal deflection (according to EN 40-3-3, clause 6.5.1)	Class 1, 0.04(h+w) Class 2, 0.06(h+w) Class 3, 0.10(h+w)	
Maximum vertical deflection (according to EN 40-3-3, clause 6.5.2)	0.025w	
Partial material factor (according to EN 40-3-3, clause 5.6.2.1)	$\gamma_m = 1.05$ (Standard and Crash safety columns)	
Material		
Column and bracket Steel sheet according to EN 10346.		
Yield strength	$f_y = 420$ MPa	
Ultimate strength	$f_u = 500$ MPa	
Elastic modulus	$E = 210000$ MPa	
Top bracket, CW arm, Crown and Arbitrary position bracket Steel tube according to EN 10217-1 P235TR1		
Yield strength	$f_y = 235$ MPa	
Ultimate strength	$f_u = 360$ MPa	
Elastic modulus	$E = 210000$ MPa	
Service hatch reinforcement Steel sheet according to EN 10149-2 or EN 10346		
Yield strength	$f_y = 420$ MPa	
Ultimate strength	$f_u = 480$ MPa for EN 10149-2 or 500 MPa for EN 10346	
Elastic modulus	$E = 210000$ MPa	

Design provisions
Standard and Crash Safety Columns

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Principal dimensions	
Column and bracket nominal thickness of sheeting	2.0 mm (to midline of sheeting)
Column and bracket steel core thickness t_0 (5% rule)	1.9 mm according to EN 1993-1-3 (to midline of sheeting)
Alternative top bracket	Folded: Ø60.3, conical or cylindrical Pipe: Ø48 – 72 mm Curved: Ø48 - 72 mm. Curve radius 0.2-0.5 m Thickness 2.9 - 5.6 mm Length \leq 2500 mm
Alternative GC arm bracket	Folded: Ø60.3, conical or cylindrical Pipe: Ø48 – 72 mm Curved: Ø48 - 72 mm. Curve radius 0.2-0.5 m Thickness 2.9 – 5.6 mm Length \leq 1000 mm
Alternative Crown bracket	Folded: Ø60.3, conical or cylindrical Pipe: Ø30 – 72 mm Curved: Ø48 - 72 mm. Curve radius 0.2-0.5 m Thickness 2.9 – 5.6 mm Length \leq 1000 mm
Alternative Arbitrary position bracket	Folded: Ø60.3, conical or cylindrical Pipe: Ø30 – 72 mm Curved: Ø30 - 72 mm. Curve radius 0.2-0.5 m Thickness 2.9 – 5.6 mm Length \leq 1000 mm
Lantern half width	b_{lant} = up to 350 mm
Lantern weight (4-12 m column)	G_l = up to 20 kg
Lantern area (4-12 m column)	A_l = up to 0.2 m ²
Lantern weight (3 m column)	G_l = Post top - up to 50 kg, Top bracket - up to 20 kg
Lantern area (3 m column)	A_l = Post top - up to 0.5 m ² , Top bracket - up to 0.2 m ²

Design provisions
Standard and Crash Safety Columns

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The calculation tools developed by Northcone AB are used to design steel lighting columns with reference to the standards: EN 40-1:1991, EN 40-2:2004, EN 40-3-1:2013 and EN 40-3-3:2013.

Column type	Calculation tool, version
Standard- and crash safety columns Single-, Double-, Triple-, or Four Armed Combi Column (road- and pedestrian column) Flange plates and Extended Tube Flange Plates	2023-05-26

The calculation tool is valid for the following design parameters:

- Column height between 3 to 12 m above the ground
- Conical columns with a 12-sided cross section, \varnothing 100 to 212 mm at ground level
- Brackets; position and number
 - Post top, or with 1, 2, 3 or 4 top brackets. Max length 2.5 m
 - Crown at top with 3 brackets
 - 1, 2, 3 or 4 cycle and walking arms. At lower height. Max length 1 m.
 - 1, 2 or 3 arms at arbitrary position along the column. Max length 1 m.
 - Possibility to vary the mutual angles between brackets.
- Brackets; shape
 - All brackets can be of conical or cylindrical shape (folded) up to \varnothing 89 mm and an angle of up to 5° from the horizontal. Thickness 2.0 – 5.6 mm.
 - All brackets can be of pipe type with pipe-diameter 30 – 72 mm and thickness 2.9 – 5.6 mm.
 - All brackets can be of curved type with curve radius 0.2-0.5 m, pipe-diameter 30 - 72 mm and thickness 2.9 - 5.6 mm.
- Flange plates and extended tube flange plates intended for columns
- Simplified flange plate for columns without arm. Column length 3 to 5 m
- Lantern up to 20 kg and up to 0.2 m² for columns 4 to 12 m above ground
- Post top lantern up to 50 kg and up to 0.5 m² and top bracket lantern up to 20 kg and up to 0.2 m² for columns 3 m above ground
- Service hatch opening with height 400 mm
- Service hatch reinforcement– up to 5 mm, riveted
- Service hatch reinforcement material equal to steel sheet according to EN 10149-2 with both a characteristic yield strength of 420 MPa and a specified A₅ elongation > 20% along the column length or equal to steel sheet according to EN 10346 with both a characteristic yield strength of 420 MPa and a specified A₈₀ elongation > 13% along the column length

- Crash safety slots with maximum length of 200 mm, and maximum width of 4 mm
- Column and bracket material equal to steel sheet according to EN 10346 with both a characteristic yield strength of 420 MPa and a specified elongation > 15% along the column length
- Column thickness up to 2.0 mm
- Alternative top bracket, CW- and EB-bracket equal to steel tubing according to EN 10217-1 P235TR1 with dimensions Ø30 - 72×2.9 - 5.6 mm
- Class A or B for the partial load factors γ_f
- Wind speed of 22-26 m/s
- Terrain category I-IV
- Horizontal deflection class 1-3
- Partial material factor, $\gamma_m = 1.05$

Calculation Tool
Northcone Calculation Tool

Annex D
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Column type	Classification according to EN 12767
NC-ECO E 30 E0 – E 80 E0	70,NE, C, S, NS, SD, class 1
NC-ECO S80 E0 – S80 E15	70,HE,C, S, NS, SD, class 0
NC-ECO S80 E0 – S80 E20	100, HE, C, S, NS, SD, class 1
NC-ECO S100 E0 – S120 E25	100, HE, D, S, NS, SD, class 1

Performance under vehicle impact
Passive safety

Annex E
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