

# CERTIFICATE

**Client:** DOLLE A/S

**Product:** DOLLE Toronto | Gardenspin | Industria (Ø125 cm + Ø155 cm)

**Designation:** Product family

**Description:** Structural verification of the spiral staircase Toronto | Gardenspin | Industria (Ø125 cm + Ø155 cm). The spiral staircase has a maximum outer diameter of 155 cm. The maximum installation height is 3995 mm and it has maximum 16 treads and landing platform.

The staircase is approved with the following treads:[Ø125 trimax] [Ø155 trimax]  
[Steel Ø125 with three balustrades/step] [Steel Ø155 with four balustrades/step]

**Material:** Steps: Steel, S235 JRG2  
Centre construction: Steel, S235 JRG2  
Spacer: ABS  
Step support pipe: Steel, S235 JRG2  
Handrail: PVC-Rigid or LDPE  
Balustrades: Steel, S235 JRG2

**Particularities:** The structure is checked with FEM for deformations and stress.

**Eurocodes:** EN 1991-1-1:2007 Eurocode 1: Actions on structures - Part 1-1  
EN 1991-1-4:2007 Eurocode 1: Actions on structures - Part 1-4  
EN 1993-1-8+AC:2007 Eurocode 3: Design of steel structures - Part 1-8

**References:** [1] DOLLE® Design basis for ladders and stairs, rev. 01

**Conclusion:** DOLLE Toronto | Gardenspin (Ø125 cm + Ø155 cm) is calculated according to Eurocodes [1] and the design is found to be strong and stable.



March 2019  
Jan Riis Bovbjerg  
Senior Management Consultant  
BIIR ApS

A handwritten signature in black ink, which appears to read 'Jan Riis Bovbjerg'.