

# 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, appearing to read 'Jan Riis Bovbjerg'.

## PRODUCT FAMILY LOAD DECLARATION

# DOLLE®

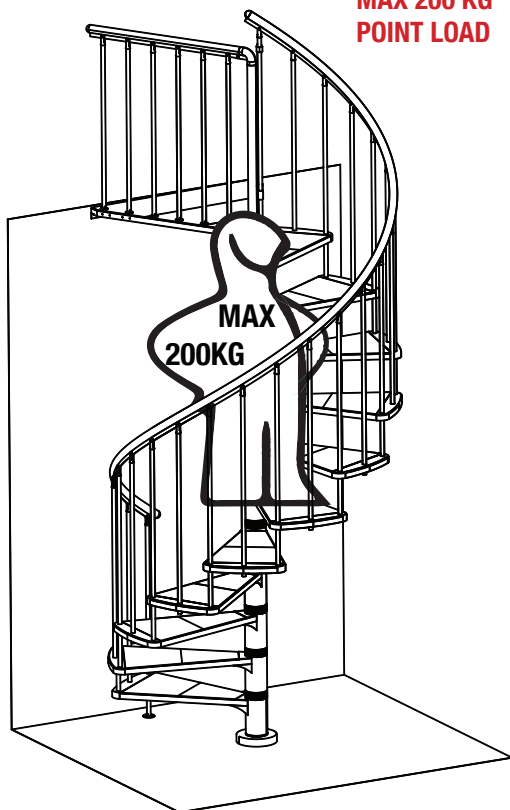
# DOLLE TORONTO I GARDENSPIN I INDUSTRIA

This is the graphical presentation of some of the relevant design criterias to this stair.  
The shown criteria are those that have the most direct impact for the actual use of the product.  
For further details we refer to the relevant Norms:

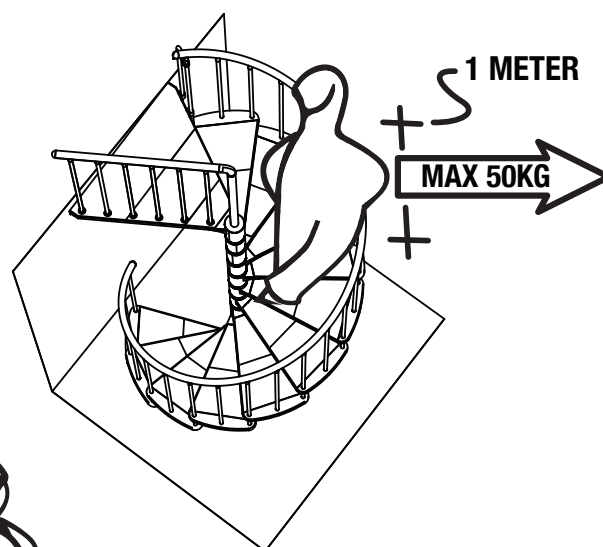
The load of the stair is assessed according to Eurocodes:  
EN 1991-1-1:2007 Eurocode 1: Actions on structures - Part 1-1  
EN 1991-1-4:2007 Eurocode 1: Actions on structures - Part 1-4  
EN 1993-1-8+AC:2007 Eurocode 3: Design of steel structures - Part 1-8

The main cases are:

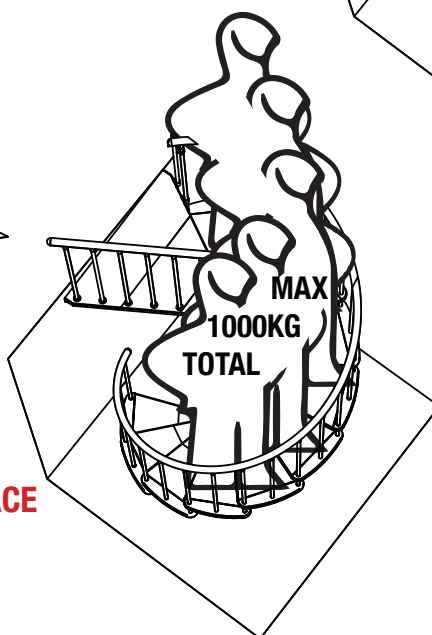
**STAIR POINT LOAD:  
MAX 200 KG  
POINT LOAD**



**BANISTER LOAD:  
MAX 50 KG  
HORIZONTAL LOAD  
PR 1 METER**



**STAIR SURFACE  
LOAD:  
MAX 1000 KG  
TOTAL LOAD**



Loads and limits according to certificat:  
"20190305\_CERTIFICATE-Garden\_spin\_0155"  
"20190305\_CERTIFICATE-Garden\_spin\_0185"



ISO 9001  
Management System Certification  
BUREAU VERITAS  
Certification Denmark A/S



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BETTER ENGINEERING

*Jan René Berg*