ViaCon StormWater Solutions

Technical Data Sheet

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This technical data sheet is valid for ViaCon StormWater Solutions UK in St Helens, UK only.

The following EPD No. is valid 685/2024

DESCRIPTION

Flexible, cold formed, helically corrugated galvanized steel tanks with coupling and/or flange connections, used mainly in civil engineering as water attenuation, retention, infiltration or storage. ViaCon's water tanks can be coated with a polymer film to increase longevity, and can be used in green-fields or as a load bearing under-ground structure. All structures are customized to meet customer's needs

INTENDED USE

- **Storm** solutions:
  flood prevention
- **Reuse** solutions:
  rainwater harvesting
- **Treat** solutions:
  sand and oil separation
- **Fire** solutions:
  storage of water for fire-fighting

PRODUCT FEATURES

- high structural strength
- wide range of shapes and sizes
- relatively low weight
- high corrosion protection
- short installation time

DESIGN LIVE LOADS

ViaCon StormWater Solutions are used for every common class of road and rail loads (according to the European Standard EN 1991-2 or others).

ViaCon water tanks are suitable to be installed under roads, parking lots and green areas.

TECHNICAL PROPERTIES

STEEL

The steel used for production of the StornWater Tanks and all types of the coupling bands conform to the European Standards: EN 10346 “Continuously hot-dip coated strip and sheet of structural steels - Technical delivery conditions”

Table 1

MECHANICAL PROPERTIES

Steel grade	Standard	Yield point R_e [MPa]	Tensile strength R_m [MPa]	Elongation A_{80min} [%]
DX51D*	PN-EN 10346	–	270–500	22
S250GD	PN-EN 10346	250	330	19

* the steels DX51D and S220GD are used alternately.

The steel is delivered with the certificate 3.1 acc. to EN 10204

CORRUGATION

ViaCon StormWater solutions are produced in three types of corrugation depending on the dimensions of the profile:

- 68 x 13 mm
- 71 x 16 mm
- 125 x 26 mm

The following tables 2,3 and 4 are based on S250GD

Table 2

Corrugation 68x13

Plate thickness t [mm]	Yield stress [MPa]	Area [mm²/mm]	Moment of inertia [mm⁴/mm]	Section modulus [mm³/mm]	Plastic section modulus [mm³/mm]
1,5	250	1,625	32,3	4,455	6,400
2,0	250	2,167	43,6	5,817	8,582
2,5	250	2,709	55,4	7,143	10,796
3,0	250	3,252	67,6	8,447	13,048

Table 3

Corrugation 71 x 16

Plate thickness t [mm]	Yield stress [MPa]	Area [mm²/mm]	Moment of inertia [mm⁴/mm]	Section modulus [mm³/mm]	Plastic section modulus [mm³/mm]
1,5	250	1,663	46,4	5,303	7,695
2,0	250	2,218	62,6	6,951	10,312
2,5	250	2,774	79,2	8,562	12,964
3,0	250	3,329	96,4	10,148	15,654

Table 4

Corrugation 125x26

Plate thickness t [mm]	Yield stress [MPa]	Area [mm²/mm]	Moment of inertia [mm⁴/mm]	Section modulus [mm³/mm]	Plastic section modulus [mm³/mm]
1,5	250	1,660	143,1	10,411	13,880
2,0	250	2,213	191,8	13,697	18,557
2,5	250	2,768	241,0	16,909	23,263
3,0	250	3,322	290,8	20,057	28,000
3,5	250	3,877	341,4	23,149	32,772

SHAPES & SIZES

ViaCon water tanks are produced with diameters from Ø300mm to Ø3600mm.

The lengths of water tanks vary depending on the project, and the local design team will deliver a customized solution to meet specific requirements. The proposed length must be approved by the production department during the order preparation stage

The water tanks can be produced with re-corrugated ends.

COUPLING BANDS

The designed length of the whole culvert is obtained by joining several segments using the coupling bands, which are made from flat or corrugated steel.
All coupling bands have a width of 500 mm (flat steel coupling band with edges adjusted to the re-corrugated pipe ends)

TOLERANCES OF GEOMETRY

The values of the geometric parameters of the water tank after the assembly should not differ from the designed values more than:

- span ± 1.5%
- rise ± 1.5%
- length + 0.5%

During and after backfilling, vertical (soffit to invert) deflection shall not exceed +/- 2% of the pipe's original horizontal span (diameter)

FLANGE CONNECTIONS

Each ViaCon water tank can also be also connected to an adjacent section with a flange connection. The standard solution is a 100x10mm flange, connected by M20 bolts and nuts.
Flange connections are recommended for solutions that have to be watertight (e.g. fire water tanks)

BOLTS, NUTS, ANCHOR BOLTS

Depending on the application, the following standard fasteners are used in the production of the pipes.

Table 5

Type	Dimension	Length	Standard
Bolts	M1 (CLASS 8.8)	50mm, 70mm	EN ISO 4070
Nuts	M12, (CLASS 8.8)	-	EN ISO 4032

CORROSION PROTECTION

The steel is delivered with ready-made corrosion protection:

- 600g/m2 of zinc coating on both sides, which corresponds to 42 µm on one side (Z600).
- 600g/m2 of galvanized zinc coating on both sides, which corresponds to 42 µm on one side with an extra 300 µm-thick layer of polymer film (such as TrenchcoatTM , W-Protect®, Isofilm or similar) on one or both sides (1TC, 2TC).

DURABILITY

Table 6

		Non-aggressive environment	Aggressive environment
Air aggressiveness category according to EN ISO 12944-2*		■ C1 ■ C2	■ C3 ■ C4 ■ C5-I, C5-M
Water parameters		■ pH from 6.5 to 8.0 ■ hardness of water ≥ 20 mg Ca/l ■ speed of water ≤1.5 m/s	■ pH from 3.0 to 6.5 & from 8.0 to 12.0 ■ hardness of water < 20 mg Ca/l ■ speed of water >1.5 m/s
Soil parameters		■ pH from 6.5 to 8.0 ■ soil permeability k10 ≥ 8.0 m /24h ■ no organic parts ■ non-uniformity Cu ≥ 5 ■ humidity ≤ 17%	■ pH from 3.0 to 6.0 & from 8.0 to 12.0 ■ soil permeability K<8.0 m.24h ■ contains organic parts ■ non-uniformity index C_u <5 ■ Humidity >17%
Anti corrosive protection endurance	Zinc coating 42µm (600 g/m2)	min. 40 years	Not recommended
	Zinc coating 70µm (1000 g/m2)	50–70 years	20–50 years
	Zinc coating 42µm (600 g/m2) + polymer coating 300µm	over 100 years	80–100 years

C1: Very low (e.g., indoor, dry environments)
C2: Low (e.g., rural areas with little pollution)
C3: Medium (e.g., urban and industrial areas with moderate pollution)
C4: High (e.g., chemical plants, coastal areas)
C5: Very high (e.g., marine and heavy industrial environments)
C5-M: Very high in marine conditions
C5-I: Very high in industrial conditions

Water pH
Measures acidity or alkalinity. Lower values indicate acidic conditions, higher values indicate alkaline conditions.

Water hardness
Amount of dissolved calcium and magnesium; affects corrosion resistance.

Soil permeability (K value)
Indicates how easily water passes through soil.

K ≥ 10 (high permeability, good drainage)
K < 8 (low permeability, retains moisture, potentially corrosive)

Uniformity coefficient (Cu)
Indicates grain size distribution in soil. Higher values mean more variation in particle size.

Humidity (%)
Higher soil humidity increases the risk of corrosion.

Zinc coating (µm, g/m²)
Protective layer to prevent corrosion.

42 µm (600 g/m²): Standard corrosion protection

70 µm (1000 g/m²): Increased protection for harsher environments

Polymer coating (300 µm)
Additional layer on top of zinc coating, extending lifespan in aggressive conditions.

ABRASION

The water tank, during their service, can be subjected to an abrasion process. In accordance with the recommendations of the Local Board of Roads, the abrasion resistance of ViaCon StormWater Solutions due to the applied anti-corrosion layer, can be classified as shown in the table below

Table 7

	Low abrasion	Medium – High abrasion	
Water speed	≤ 1.5 m/s	≤ 3.5 m/s	> 3.5 m/s
Aggregate	Sand & gravel	Sand & gravel	Fine Sand
Zinc coating 42–70 µm Zinc coating + polymer coating	Suitable	Not suitable	
	Suitable	Suitable	

LIST OF STANDARDS:

EN ISO 1090-1 – Execution of steel structures and aluminum structures. Requirements for conformity assessment of structural components

EN ISO 1991-2 – Eurocode – Traffic loads on bridges

EN ISO 10204 – Metallic Products: Types of Inspection Documents

EN ISO 10346 – “Continuously hot-dip coated steel flat products – Technical - delivery conditions”

EN ISO 12944-2 – Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Classification of environments

EN10143 - Continuously hot-dip metal coated steel sheet and strip – tolerances on dimensions and shape

TRANSPORT AND STORAGE

Water tanks are delivered to the job site by trucks. The unloading and placement of the pipes must be carried out using light mechanical crane devices equipped with textile belts. Dropping the water tanks from the truck is strictly prohibited. Instead, lifting hooks must be used to handle the tanks safely.

Pipes can be stored in stacks, ensuring wooden spacers are used between the layers to prevent damage.

Any damage to the pipe's anti-corrosion protection caused during transport, unloading, or assembly must be repaired in accordance with the manufacturer’s instructions.

APPENDIX

Table 8

Space requirement and quantity of stored water depending on diameter

Diameter - inner [m]	Area [m²]	m³ stored water per meter tank
0,30	0,07	0,07
0,40	0,13	0,13
0,50	0,20	0,20
0,60	0,28	0,28
0,70	0,38	0,38
0,80	0,50	0,50
0,90	0,64	0,64
1,00	0,79	0,79
1,10	0,95	0,95
1,20	1,13	1,13
1,30	1,33	1,33
1,40	1,54	1,54
1,50	1,77	1,77
1,60	2,01	2,01
1,70	2,27	2,27
1,80	2,54	2,54
1,90	2,84	2,84
2,00	3,14	3,14
2,10	3,46	3,46
2,20	3,80	3,80
2,30	4,15	4,15
2,40	4,52	4,52
2,50	4,91	4,91
2,60	5,31	5,31
2,70	5,73	5,73
2,80	6,16	6,16
2,90	6,61	6,61
3,00	7,07	7,07
3,10	7,55	7,55
3,20	8,04	8,04
3,30	8,55	8,55
3,40	9,08	9,08
3,50	9,62	9,62
3,60	10,18	10,18

Table 9

Minimum cover heights with minimum plate thickness and trafficability (60 tons)

Diameter [m]	Plate thickness [mm]	Cover height [m]
1,0	2,0	0,6
1,1	2,0	0,6
1,2	2,0	0,6
1,3	2,0	0,6
1,4	2,0	0,6
1,5	2,0	0,6
1,6	2,0	0,6
1,7	2,0	0,6
1,8	2,0	0,6
1,9	2,0	0,6
2,0	2,0	0,6
2,1	2,0	0,6
2,2	2,0	0,65
2,3	2,0	0,75
2,4	2,0	0,9
2,5	2,5	0,8
2,6	2,5	0,9
2,7	2,5	1,0
2,8	2,5	1,1
2,9	2,5	1,15
3,0	3,0	1,2
3,1	3,0	1,15
3,2	3,0	1,25
3,3	3,5	1,2
3,4	3,5	1,25
3,5	3,5	1,3

How to read table 9:

If the diameter is 3 meters, the plate thickness must be 3 mm, and the cover height must be 1.20 m to support a 60-ton vehicle driving over it.

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ViaCon is a leader in infrastructure construction solutions. Built on strong Nordic roots, ViaCon embodies a practical, human perspective that brings together technology and verifiable sustainability. The long- term view defines our vision, and by driving smart, future-friendly construction solutions for bridges and culverts, geotechnical and stormwater solutions, we will continue to shape and lead our industry.

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