

PERMISSIBLE EMBEDMENT DEPTH OF CABLE PROTECTION PIPES

EVO CAB HARD



Compression strength class: 450
Impact resistance: N

Material: polyethylene (HDPE)

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calculation table



Installation places - according to EN 124-1

A15

Areas which can only be used by pedestrians and pedal cyclists.

B125

Pedestrian areas and comparable areas, car parks or car parking decks.

C250

Area of kerbside channels of roads which, when measured from kerb edge, extends a maximum of 0.5m into carriageway and a maximum of 0.2 m into pedestrian area.

D400

Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all types of road vehicles.

Installation place:



Single wheel load:

10 kN

60 kN

100 kN

120 kN

Minimum depth of embedment

DN/OD 50 mm:

0.3 m

0.4 m

0.5 m

0.6 m

DN/OD 63 mm:

0.3 m

0.5 m

0.6 m

0.6 m

DN/OD 75 mm:

0.3 m

0.5 m

0.6 m

0.7 m

DN/OD 90 mm:

0.3 m

0.5 m

0.6 m

0.7 m

DN/OD 110 mm:

0.3 m

0.5 m

0.7 m

0.8 m

DN/OD 125 mm:

0.3 m

0.5 m

0.7 m

0.8 m

DN/OD 160 mm:

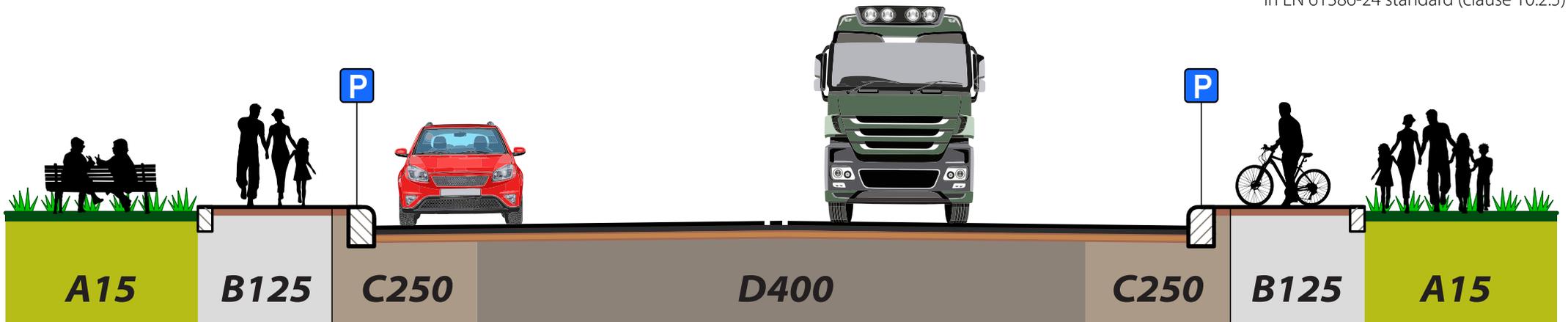
0.3 m

0.6 m

0.7 m

0.8 m

* by not exceeding 5% borderline value of initial deflection specified in EN 61386-24 standard (clause 10.2.5)



CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 50 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		62.3	40.1	30.9	26.9	25.3	25.0	25.5	26.4	29.7	33.2	35.0	38.9	43.2	45.2	75.8	117.0
Initial deflection of the pipe after construction, %		2.87	2.56	2.43	2.37	2.35	2.34	2.35	2.36	2.40	2.44	2.46	2.51	2.56	2.59	2.93	3.33
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		340.1	196.3	130.9	96.4	76.3	64.1	56.4	51.4	49.8	50.0	50.6	52.7	57.3	58.9	84.9	122.1
Initial deflection of the pipe after construction, %		6.62	4.66	3.76	3.29	3.02	2.85	2.75	2.68	2.65	2.65	2.65	2.67	2.73	2.74	3.01	3.35
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		562.3	321.3	210.9	151.9	117.2	95.4	81.1	71.4	67.3	65.5	65.3	67.3	73.6	74.9	93.1	126.7
Initial deflection of the pipe after construction, %		9.64	6.35	4.84	4.04	3.56	3.27	3.07	2.94	2.88	2.85	2.84	2.86	2.93	2.95	3.11	3.40
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		673.4	383.8	250.9	179.7	137.6	111.0	93.4	81.4	75.6	72.7	71.9	73.5	80.2	81.4	96.9	128.8
Initial deflection of the pipe after construction, %		11.15	7.19	5.38	4.41	3.84	3.47	3.24	3.07	2.99	2.94	2.93	2.94	3.02	3.03	3.15	3.42

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 63 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		62.4	40.2	31.1	27.1	25.5	25.2	25.6	26.6	29.8	33.3	35.2	39.0	43.3	45.3	75.9	117.1
Initial deflection of the pipe after construction, %		3.00	2.64	2.49	2.43	2.40	2.39	2.40	2.41	2.46	2.51	2.53	2.58	2.64	2.67	3.05	3.48
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		340.2	196.5	131.1	96.5	76.5	64.2	56.5	51.6	49.9	50.2	50.7	52.9	57.4	59.1	85.1	122.2
Initial deflection of the pipe after construction, %		7.29	5.04	4.02	3.48	3.16	2.97	2.85	2.77	2.74	2.74	2.74	2.77	2.82	2.84	3.14	3.50
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		562.4	321.5	211.1	152.1	117.3	95.5	81.2	71.6	67.4	65.7	65.4	67.4	73.7	75.1	93.2	126.8
Initial deflection of the pipe after construction, %		10.74	6.97	5.25	4.33	3.79	3.45	3.22	3.07	3.00	2.97	2.96	2.98	3.06	3.07	3.25	3.56
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		673.5	384.0	251.1	179.8	137.7	111.1	93.5	81.6	75.8	72.8	72.1	73.6	80.4	81.6	97.1	129.0
Initial deflection of the pipe after construction, %		12.47	7.94	5.86	4.75	4.10	3.68	3.41	3.22	3.13	3.07	3.06	3.07	3.15	3.17	3.30	3.58

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 75 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		62.5	40.3	31.2	27.2	25.6	25.3	25.8	26.7	29.9	33.5	35.3	39.2	43.4	45.4	76.0	117.2
Initial deflection of the pipe after construction, %		3.10	2.70	2.54	2.47	2.44	2.43	2.44	2.45	2.50	2.55	2.58	2.64	2.70	2.73	3.13	3.59
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		340.3	196.6	131.2	96.6	76.6	64.4	56.6	51.7	50.1	50.3	50.9	53.0	57.5	59.2	85.2	122.4
Initial deflection of the pipe after construction, %		7.77	5.32	4.20	3.61	3.27	3.06	2.93	2.84	2.81	2.80	2.81	2.83	2.90	2.92	3.23	3.61
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		562.5	321.6	211.2	152.2	117.4	95.6	81.3	71.7	67.6	65.8	65.5	67.5	73.8	75.2	93.4	126.9
Initial deflection of the pipe after construction, %		11.54	7.43	5.54	4.54	3.95	3.58	3.33	3.17	3.09	3.05	3.04	3.06	3.15	3.16	3.34	3.67
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		673.7	384.1	251.2	180.0	137.8	111.2	93.7	81.7	75.9	72.9	72.2	73.8	80.5	81.7	97.2	129.1
Initial deflection of the pipe after construction, %		13.43	8.48	6.21	5.00	4.29	3.84	3.54	3.33	3.23	3.17	3.15	3.16	3.25	3.27	3.40	3.70

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 90 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		62.7	40.5	31.3	27.3	25.7	25.5	25.9	26.8	30.1	33.6	35.5	39.3	43.6	45.6	76.2	117.4
Initial deflection of the pipe after construction, %		3.27	2.81	2.63	2.54	2.51	2.50	2.50	2.52	2.57	2.64	2.67	2.73	2.80	2.83	3.28	3.78
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		340.5	196.7	131.3	96.8	76.8	64.5	56.8	51.8	50.2	50.4	51.0	53.2	57.7	59.3	85.4	122.5
Initial deflection of the pipe after construction, %		8.62	5.80	4.52	3.85	3.46	3.22	3.06	2.96	2.92	2.92	2.92	2.95	3.02	3.04	3.38	3.79
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		562.7	321.7	211.3	152.3	117.6	95.8	81.5	71.8	67.7	66.0	65.7	67.7	74.0	75.3	93.5	127.1
Initial deflection of the pipe after construction, %		12.94	8.22	6.06	4.91	4.23	3.80	3.53	3.34	3.24	3.20	3.19	3.21	3.30	3.32	3.51	3.86
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		673.8	384.2	251.3	180.1	138.0	111.4	93.8	81.8	76.0	73.1	72.3	73.9	80.6	81.8	97.4	129.2
Initial deflection of the pipe after construction, %		15.10	9.43	6.82	5.44	4.62	4.10	3.76	3.52	3.40	3.33	3.31	3.32	3.42	3.44	3.57	3.89

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 110 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		62.9	40.7	31.6	27.5	26.0	25.7	26.1	27.1	30.3	33.8	35.7	39.5	43.8	45.8	76.4	117.6
Initial deflection of the pipe after construction, %		3.47	2.95	2.73	2.63	2.59	2.58	2.59	2.60	2.66	2.73	2.77	2.84	2.92	2.96	3.45	3.98
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		340.7	197.0	131.6	97.0	77.0	64.7	57.0	52.1	50.4	50.7	51.2	53.4	57.9	59.6	85.6	122.7
Initial deflection of the pipe after construction, %		9.62	6.38	4.90	4.12	3.67	3.40	3.22	3.11	3.06	3.05	3.05	3.08	3.16	3.18	3.55	3.99
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		562.9	322.0	211.6	152.5	117.8	96.0	81.7	72.1	67.9	66.2	65.9	67.9	74.2	75.6	93.7	127.3
Initial deflection of the pipe after construction, %		14.60	9.15	6.66	5.34	4.56	4.07	3.75	3.53	3.43	3.37	3.35	3.38	3.49	3.50	3.70	4.06
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		674.0	384.5	251.6	180.3	138.2	111.6	94.0	82.1	76.3	73.3	72.6	74.1	80.8	82.1	97.6	129.4
Initial deflection of the pipe after construction, %		17.08	10.54	7.55	5.95	5.00	4.41	4.02	3.75	3.60	3.52	3.49	3.50	3.62	3.63	3.77	4.10

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 125 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		63.1	40.9	31.7	27.7	26.1	25.8	26.3	27.2	30.4	34.0	35.8	39.7	43.9	46.0	76.5	117.7
Initial deflection of the pipe after construction, %		3.48	2.95	2.74	2.64	2.60	2.59	2.59	2.61	2.67	2.74	2.77	2.85	2.93	2.96	3.46	3.99
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		340.8	197.1	131.7	97.1	77.1	64.9	57.1	52.2	50.6	50.8	51.4	53.5	58.1	59.7	85.7	122.9
Initial deflection of the pipe after construction, %		9.66	6.40	4.92	4.14	3.68	3.41	3.23	3.12	3.07	3.06	3.06	3.09	3.17	3.19	3.56	4.00
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		563.1	322.1	211.7	152.7	118.0	96.1	81.8	72.2	68.1	66.3	66.0	68.1	74.4	75.7	93.9	127.5
Initial deflection of the pipe after construction, %		14.65	9.19	6.69	5.36	4.58	4.08	3.76	3.54	3.43	3.38	3.36	3.39	3.49	3.51	3.71	4.07
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		674.2	384.6	251.7	180.5	138.4	111.8	94.2	82.2	76.4	73.5	72.7	74.3	81.0	82.2	97.7	129.6
Initial deflection of the pipe after construction, %		17.15	10.58	7.57	5.97	5.02	4.42	4.03	3.76	3.61	3.53	3.50	3.51	3.63	3.64	3.78	4.11

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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CABLE PROTECTION PIPES FOR UNDERGROUND SYSTEMS

DN/OD 160 mm

EVOcab HARD N450

Characteristics accepted in the calculations:

Water table level from the top of the ground surface - 0,1 m

Unit weight of dry soil - 20 kN/m³

Unit weight of wet soil - 11 kN/m³

Unit weight of water - 10 kN/m³

Standard Proctor Density (SPD) ≥ 95 %	Place of installation:	Group 1 (class A15) - Areas which can only be used by pedestrians and pedal cyclists (single wheel load <10 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		63.4	41.2	32.1	28.1	26.5	26.2	26.7	27.6	30.8	34.3	36.2	40.0	44.3	46.3	76.9	118.1
Initial deflection of the pipe after construction, %		3.63	3.05	2.81	2.71	2.66	2.65	2.65	2.67	2.74	2.81	2.85	2.93	3.01	3.05	3.57	4.13
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 2 (class B125) - Pedestrian areas and comparable areas, car parks or car parking decks (single wheel load 60 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		341.2	197.5	132.1	97.5	77.5	65.3	57.5	52.6	50.9	51.2	51.7	53.9	58.4	60.1	86.1	123.3
Initial deflection of the pipe after construction, %		10.36	6.80	5.18	4.33	3.84	3.54	3.34	3.22	3.16	3.15	3.16	3.19	3.27	3.29	3.68	4.13
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 3 (class C250) - For gully tops, installed in the area of kerbside channels of roads which, when measured from the kerb edge, extends a maximum of 0,5 m into carriageway and a maximum of 0,2 m into the pedestrian area (single wheel load 100 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		563.4	322.5	212.1	153.1	118.3	96.5	82.2	72.6	68.4	66.7	66.4	68.4	74.7	76.1	94.3	127.8
Initial deflection of the pipe after construction, %		15.80	9.84	7.11	5.66	4.81	4.27	3.92	3.68	3.56	3.50	3.48	3.51	3.62	3.64	3.84	4.21
Standard Proctor Density (SPD) ≥ 98 %	Place of installation:	Group 4 (class D400) - Carriageways of roads (including pedestrian streets), hard shoulders and parking areas, for all type of road vehicles (single wheel load 120 kN) .															
Depth of embedment (H) from the ground surface to the top of the pipe, m		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	3.5	5.5
Total vertical load (Q) to the pipe after construction, kN/m ²		674.5	385.0	252.1	180.8	138.7	112.1	94.6	82.6	76.8	73.8	73.1	74.7	81.4	82.6	98.1	130.0
Initial deflection of the pipe after construction, %		18.52	11.36	8.07	6.32	5.29	4.64	4.21	3.91	3.75	3.66	3.63	3.64	3.77	3.78	3.91	4.25

5.38

— Initial deflection of the pipe exceeds 5% borderline specified in EN 61386-24 standard (clause 10.2.5)

Notes.

Groups of place of installation according to EN 124-1 standard.

For backfilling of the trench, it is recommended to use G1, G2, G3, G4 soil group material.

Soil groups - according to CEN/TR 1046 standard annex A table A.1.

Soil type: G1, G2, G3 – granular, e.g., crushed rock, river and beach gravel, dune and drift sand, moraine sand, weathered gravel, liquid sand, loamy sand, G4 - cohesive, e.g., loess, loam, alluvial marl, clay.

Initial deflection of the pipe must not exceed 5% borderline specified in EN 61386-24 standard.



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