

3.3 STATIČNI IZRAČUN CEVI

3.3.1 PP cev DN 315 SN 12

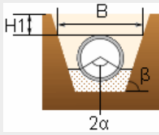
3.3.1.1 PP cev DN 315 SN 12, minimalno kritje

Pipe

☒ Standard smooth pipe
Material PP
Outside diameter 315 [mm]
Wall thickness 11.9 [mm]
☐ Pragma pipe

Configuration

B 1.6 [m]
H1 0.925 [m]
 β 90 [°]
Bedding angle 2α 120°
Soil density ρ 25 [kN/m³]



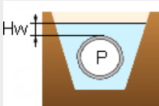
Soil configuration (backfill and sidewalls)

Backfill installation type Compacted backfill in all the height of the trench
Backfill soil type Group 3 - mixed cohesive
Backfill compaction 95%
Sidewalls soil type Group 1 - non cohesive
Sidewalls compaction 85%

[Advice](#)

Ground water/internal pressure

☒ Ignore ground water/internal pressure
Ground water height 1 [m]
Internal pressure 2 [bar]

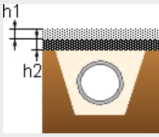


Traffic

☐ Ignore traffic
Truck HT 26 - 26 tons, 2 axles
Frequency Normal

Paving

☐ Ignore paving
h1 0.1 [m]
Ep1 12000 [MPa]
h2 0.35 [m]
Ep2 150 [MPa]



[Advice](#)

Vertical pressure caused by soil load		Short term	Long term	
Soil load	qv	15.5	13.0	[kN/m ²]
Concentrated surcharges	Pvc	7.68	7.68	[kN/m ²]
Deformation		Short term	Long term	
Displacement	ΔD_v	2.36	3.17	[mm]
Deformation	δ_v	0.780	1.04	[%]
	δ_v	<5%	<5%	
		OK	OK	
Maximum tangential stress		Short term	Long term	
Top	σ	2.99	2.50	[MPa]
Side	σ	2.49	2.08	[MPa]
Base	σ	3.43	2.91	[MPa]
Material strength	σ	35.0	20.0	[MPa]
		OK	OK	
Crack safety coefficient		Short term	Long term	
Top	η_1	11.7	8.00	
Side	η_1	14.1	9.63	
Base	η_1	10.2	6.88	
Material safety coefficient	η_1	2.00	2.00	
		OK	OK	

3.3.1.2 PP cev DN 315 SN 12, maksimalno kritje

Pipe

☒ Standard smooth pipe

Material

PP ▼

Outside diameter

315 [mm]

Wall thickness

11.9 [mm]

☐ Pragma pipe

Configuration

B

1.6 [m]

H1

4.075 [m]

β

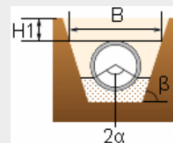
90 [°]

Bedding angle 2α

120° ▼

Soil density ρ

25 [kN/m³]



Soil configuration (backfill and sidewalls)

Backfill installation type

Compacted backfill in all the height of the trench ▼

Backfill soil type

Group 3 - mixed cohesive ▼

Backfill compaction

95% ▼

Sidewalls soil type

Group 1 - non cohesive ▼

Sidewalls compaction

85% ▼

[Advice](#)

Ground water/internal pressure

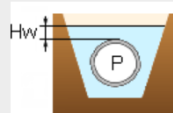
☒ Ignore ground water/internal pressure

Ground water height

1 [m]

Internal pressure

2 [bar]



Traffic

☐ Ignore traffic

Truck

HT 26 - 26 tons, 2 axles ▼

Frequency

Normal ▼

Paving

☐ Ignore paving

h1

0.1 [m]

Ep1

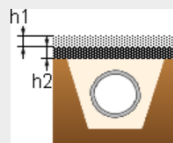
12000 [MPa]

h2

0.35 [m]

Ep2

150 [MPa]



[Advice](#)

Vertical pressure caused by soil load	Short term	Long term	
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Soil load	qv	42.2	34.3 [kN/m ²]
Concentrated surcharges	Pvc	3.18	3.18 [kN/m ²]

Deformation	Short term	Long term	
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Displacement	ΔD_v	4.05	4.70 [mm]
Deformation	δ_v	1.34	1.55 [%]
	δ_v	<5%	<5%
		OK	OK

Maximum tangential stress	Short term	Long term	
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Top	σ	2.87	1.58 [MPa]
Side	σ	1.92	0.862 [MPa]
Base	σ	3.61	2.21 [MPa]
Material strength	σ	35.0	20.0 [MPa]
		OK	OK

Crack safety coefficient	Short term	Long term	
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Top	η_1	12.2	12.7
Side	η_1	18.2	23.2
Base	η_1	9.70	9.05
Material safety coefficient	η_1	2.00	2.00
		OK	OK

3.3.2 PP cev DN 250 SN 12

3.3.2.1 PP cev DN 250 SN 12, minimalno kritje

Pipe

☒ Standard smooth pipe

Material

PP ▼

Outside diameter

250 [mm]

Wall thickness

8.6 [mm]

☐ Pragma pipe

Configuration

B

1.5 [m]

H1

0.85 [m]

β

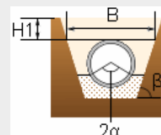
90 [°]

Bedding angle 2α

120° ▼

Soil density ρ

25 [kN/m³]



Soil configuration (backfill and sidewalls)

Backfill installation type

Compacted backfill in all the height of the trench ▼

Backfill soil type

Group 3 - mixed cohesive ▼

Backfill compaction

95% ▼

Sidewalls soil type

Group 1 - non cohesive ▼

Sidewalls compaction

85% ▼

[Advice](#)

Ground water/internal pressure

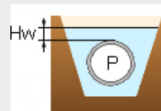
☒ Ignore ground water/internal pressure

Ground water height

1 [m]

Internal pressure

2 [bar]



Traffic

☐ Ignore traffic

Truck

HT 26 - 26 tons, 2 axles ▼

Frequency

Normal ▼

Paving

☐ Ignore paving

h1

0.1 [m]

Ep1

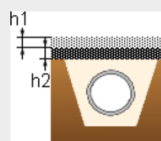
12000 [MPa]

h2

0.35 [m]

Ep2

150 [MPa]



[Advice](#)

Vertical pressure caused by soil load		Short term	Long term	
Soil load	qv	13.9	11.4	[kN/m ²]
Concentrated surcharges	Pvc	7.91	7.91	[kN/m ²]
Deformation		Short term	Long term	
Displacement	ΔD_v	1.84	2.55	[mm]
Deformation	δ_v	0.764	1.05	[%]
	δ_v	<5%	<5%	
		OK	OK	
Maximum tangential stress		Short term	Long term	
Top	σ	3.36	2.96	[MPa]
Side	σ	2.82	2.51	[MPa]
Base	σ	3.84	3.40	[MPa]
Material strength	σ	35.0	20.0	[MPa]
		OK	OK	
Crack safety coefficient		Short term	Long term	
Top	η_1	10.4	6.76	
Side	η_1	12.4	7.96	
Base	η_1	9.10	5.88	
Material safety coefficient	η_1	2.00	2.00	
		OK	OK	

3.3.2.2 PP cev DN 250 SN 12, maksimalno kritje

Pipe

☒ Standard smooth pipe

Material

PP ▼

Outside diameter

250 [mm]

Wall thickness

8.6 [mm]

☐ Pragma pipe

Configuration

B

1.5 [m]

H1

3.32 [m]

β

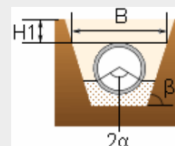
90 [°]

Bedding angle 2α

120° ▼

Soil density ρ

25 [kN/m³]



Soil configuration (backfill and sidewalls)

Backfill installation type

Compacted backfill in all the height of the trench ▼

Backfill soil type

Group 3 - mixed cohesive ▼

Backfill compaction

95% ▼

Sidewalls soil type

Group 1 - non cohesive ▼

Sidewalls compaction

85% ▼

[Advice](#)

Ground water/internal pressure

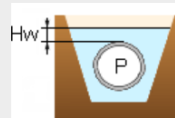
☒ Ignore ground water/internal pressure

Ground water height

1 [m]

Internal pressure

2 [bar]



Traffic

☐ Ignore traffic

Truck

HT 26 - 26 tons, 2 axles ▼

Frequency

Normal ▼

Paving

☐ Ignore paving

h1

0.1 [m]

Ep1

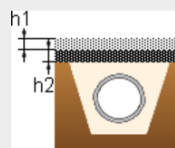
12000 [MPa]

h2

0.35 [m]

Ep2

150 [MPa]



[Advice](#)

Vertical pressure caused by soil load		Short term	Long term	
Soil load	qv	36.0	28.8	[kN/m ²]
Concentrated surcharges	Pvc	3.81	3.81	[kN/m ²]
Deformation		Short term	Long term	
Displacement	ΔD_v	2.94	3.50	[mm]
Deformation	δ_v	1.22	1.45	[%]
	δ_v	<5%	<5%	
		OK	OK	
Maximum tangential stress		Short term	Long term	
Top	σ	2.90	1.87	[MPa]
Side	σ	1.91	1.15	[MPa]
Base	σ	3.67	2.53	[MPa]
Material strength	σ	35.0	20.0	[MPa]
		OK	OK	
Crack safety coefficient		Short term	Long term	
Top	η_1	12.1	10.7	
Side	η_1	18.3	17.3	
Base	η_1	9.53	7.91	
Material safety coefficient	η_1	2.00	2.00	
		OK	OK	

3.3.3 HDPE cev DN 90

3.3.3.1 HDPE cev DN 90, minimalno kritje

Pipe

☒ Standard smooth pipe

Material

HDPE ▼

Outside diameter

90 [mm]

Wall thickness

5.4 [mm]

☐ Pragma pipe

Configuration

B

1.3 [m]

H1

1.16 [m]

 β

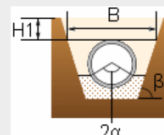
90 [°]

Bedding angle 2α

120° ▼

Soil density ρ

25 [kN/m³]



Soil configuration (backfill and sidewalls)

Backfill installation type

Compacted backfill in all the height of the trench ▼

Backfill soil type

Group 3 - mixed cohesive ▼

Backfill compaction

95% ▼

Sidewalls soil type

Group 1 - non cohesive ▼

Sidewalls compaction

95% ▼

[Advice](#)

Ground water/internal pressure

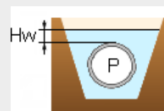
☒ Ignore ground water/internal pressure

Ground water height

1 [m]

Internal pressure

2 [bar]



Traffic

☒ Ignore traffic

Truck

LT 12 - 12 tons, 2 axles ▼

Frequency

Normal ▼

Paving

☒ Ignore paving

h1

0.2 [m]

Ep1

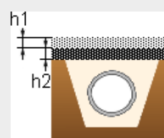
2000 [MPa]

h2

0.2 [m]

Ep2

1000 [MPa]


[Advice](#)

Vertical pressure caused by soil load		Short term	Long term	
Soil load	qv	20.3	14.6	[kN/m ²]
Concentrated surcharges	Pvc	0.000	0.000	[kN/m ²]
Deformation		Short term	Long term	
Displacement	ΔD_v	0.353	0.439	[mm]
Deformation	δ_v	0.417	0.518	[%]
	δ_v	<5%	<5%	
		OK	OK	
Maximum tangential stress		Short term	Long term	
Top	σ	0.813	0.148	[MPa]
Side	σ	0.598	0.0235	[MPa]
Base	σ	0.930	0.236	[MPa]
Material strength	σ	30.0	14.4	[MPa]
		OK	OK	
Crack safety coefficient		Short term	Long term	
Top	η_1	36.9	97.4	
Side	η_1	50.1	612	
Base	η_1	32.3	60.9	
Material safety coefficient	η_1	2.00	2.00	
		OK	OK	

3.3.3.2 HDPE cev DN 90, maksimalno kritje

Pipe

☒ Standard smooth pipe

Material

HDPE ▾

Outside diameter

90 [mm]

Wall thickness

5.4 [mm]

☐ Pragma pipe

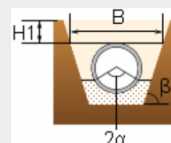
Configuration

B 1.3 [m]

H1 1.26 [m]

 β 90 [°]

Bedding angle 2α 120° ▾

Soil density ρ 25 [kN/m³]


Soil configuration (backfill and sidewalls)

Backfill installation type Compacted backfill in all the height of the trench ▾

Backfill soil type Group 3 - mixed cohesive ▾

Backfill compaction 95% ▾

Sidewalls soil type Group 1 - non cohesive ▾

Sidewalls compaction 95% ▾

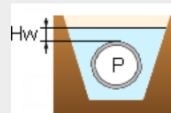
[Advice](#)

Ground water/internal pressure

☒ Ignore ground water/internal pressure

Ground water height 1 [m]

Internal pressure 2 [bar]



Traffic

☒ Ignore traffic

Truck LT 12 - 12 tons, 2 axes ▾

Frequency Normal ▾

Paving

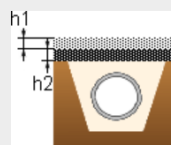
☒ Ignore paving

h1 0.2 [m]

Ep1 2000 [MPa]

h2 0.2 [m]

Ep2 1000 [MPa]


[Advice](#)

Vertical pressure caused by soil load		Short term	Long term	
Soil load	qv	21.6	15.5	[kN/m ²]
Concentrated surcharges	Pvc	0.000	0.000	[kN/m ²]
Deformation		Short term	Long term	
Displacement	ΔD_v	0.377	0.466	[mm]
Deformation	δ_v	0.445	0.551	[%]
	δ_v	<5%	<5%	
		OK	OK	
Maximum tangential stress		Short term	Long term	
Top	σ	0.864	0.155	[MPa]
Side	σ	0.635	0.0226	[MPa]
Base	σ	0.988	0.248	[MPa]
Material strength	σ	30.0	14.4	[MPa]
		OK	OK	
Crack safety coefficient		Short term	Long term	
Top	η_1	34.7	93.1	
Side	η_1	47.2	637	
Base	η_1	30.4	58.0	
Material safety coefficient	η_1	2.00	2.00	
		OK	OK	

Računala:
Ana Cvikl