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TOM

Technical Sheet

TOM PVC-O High Pressure Oriented PVC Pipes (PVC-O)

Applicable standards to Oriented PVC TOM® pipes

- **UNE-EN 17176** (Spain) "Plastic piping systems for water supply and for buried and above ground drainage, sewerage and irrigation under pressure- Oriented unplasticized poly(vinyl chloride) (PVC-O). Part 1: General. Part 2: Pipes and Part 5: Fitness for purpose of the system" (comprehensive adaptation of the European Standard EN 17176).
- **ISO 16422** (International Standard) "Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure".
- **SANS 16422** (South Africa) "Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure".
- **NP-ISO 16.422** (Paraguay) "Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure".

Other international standards that cover PVC-O pipes:

- **GOST R 56927** (Russia) "Трубы из ориентированного непластифицированного поливинилхлорида для водоснабжения".
- **IS 16647** (India) "Oriented Unplasticized Polyvinyl Chloride (PVC-O) Pipes for Water Supply – Specification".
- **GOST R 56927** (Rusia) "Трубы из ориентированного непластифицированного поливинилхлорида для водоснабжения".
- **ASTM F1483** (USA) "Standard Specification for Oriented Poly(Vinyl Chloride), PVCO, Pressure Pipe"
- **ANSI/AWWA C909** (USA) "Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe" (USA).
- **AS/NZS 4441** (Australia) "Oriented PVC (PVC-O) pipes for pressure applications".
- **ABNT NBR 15750** (Brasil) "Tubulações de PVC-O (cloreto de polivinila não plastificado orientado) para sistemas de transporte de água ou esgoto sob pressão".
- **NTC 5425** (Colombia) "Tubos de presion de poli(cloruro de vinilo) orientado, PVCO".
- **B137.3.1** (Canadá) "Molecularly oriented polyvinylchloride (PVCO) pipe for pressure applications".

Range and dimensions

TOM® PVC-O 500 Pipe										
Nominal Pressure (bar)			PN12.5		PN16*		PN20		PN25*	
Nominal Diameter (DN)	Outside Diameter (OD)		Inside Diameter (ID)	Wall Thickness	Inside Diameter (ID)	Wall Thickness	Inside Diameter (ID)	Wall Thickness	Inside Diameter (ID)	Wall Thickness
mm	min.	max.	average	min.	average	min.	average	min.	average	min.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
90*	90.0	90.3	84.8	1.6	84.3	2.0	84.3	2.5	83.0	3.1
110*	110.0	110.4	103.6	2.0	103.1	2.4	103.0	3.1	100.8	3.8
125*	125.0	125.4	117.8	2.2	117.8	2.8	117.1	3.5	114.5	4.3
140*	140.0	140.5	132.3	2.5	132.3	3.1	131.1	3.9	128.3	4.8
160*	160.0	160.5	152.1	2.8	151.2	3.5	149.8	4.4	146.6	5.5
200*	200.0	200.6	190.1	3.5	189.0	4.4	187.3	5.5	183.3	6.9
225*	225.0	225.7	213.9	4.0	212.6	5.0	210.7	6.2	206.2	7.7
250*	250.0	250.8	237.6	4.4	236.3	5.5	234.1	6.9	229.1	8.6
315*	315.0	316.0	299.4	5.5	297.7	6.9	295.0	8.7	288.6	10.8
355*	355.0	356.1	337.4	6.2	335.5	7.8	332.5	9.8	325.3	12.2
400*	400.0	401.2	380.2	7.0	378.0	8.8	374.6	11.0	366.5	13.7
450*	450.0	451.4	427.7	7.9	425.3	9.9	421.4	12.4	412.3	15.4
500*	500.0	501.5	475.2	8.8	472.5	11.0	468.2	13.7	458.1	17.1
630	630.0	631.9	598.8	11.0	595.4	13.8	590.0	17.3	577.2	21.6
710	710.0	712.0	674.8	12.4	671.0	15.4	664.9	19.2	654.7	24.4
800	800.0	802.0	760.4	14.0	756.1	17.4	749.2	21.6	733.0	27.4
900	900.0	902.7	855.4	15.7	850.6	19.6	839.5	24.3	824.1	30.9
1000	1000.0	1003.0	950.5	17.5	945.1	21.7	932.8	27.0	915.6	34.3
1100(1)	1100.0	1103.3	1045.5	19.3	1039.6	24.0	1026.1	29.7	1007.2	37.9
1200	1200.0	1203.6	1140.6	21.1	1134.1	26.2	1119.4	32.4	1098.8	41.4

TOM® PVC-O pipes are supplied in total length of 5.95 metres (including the length limit mark for the socket). The inside diameters may be subjected to variation according to manufacturing tolerances.

(1) Items upon request. Consult delivery time. For other lengths for special projects, price on request.

DN1100: Not contemplated in EN 17176-2.

Available in blue (supply) and purple (reuse). For other colours, please contact us.

AENOR Product Certification

nº 001/007104 and **001/007374** according to **UNE-EN 17176**.

nº 001/006537 and **001/007376** according to **ISO 16422**.

NF CSTB Product Certificate

nº 72-01-P-BO-16.

(*) NF P pipes. DN90 mm only in PN16

Packaging

TOM® PVC-O 500 Pipe											
DN	Pipes/ Pallet	Pallet/ Truck	Pipes/ Truck	Metres/ Truck	Pallet Width	Pallet Height	Pallet Length	Pallet Weight			
								PN12.5	PN16	PN20	PN25
mm	pipes	pallet	pipes	m	mm	mm	mm	kg	kg	kg	kg
90	81	16	1296	7711	1220	670	6110	515	555	560	680
110	76	12	912	5426	1220	850	6130	715	775	780	1005
125	60	12	720	4284	1220	850	6135	725	725	795	1025
140	45	12	540	3213	1220	850	6140	650	655	750	965
160	33	12	396	2356	1220	800	6150	570	625	720	925
200	23	12	276	1642	1170	950	6395	620	680	780	1005
225	14	16	224	1333	1220	700	6190	480	530	605	780
250	11	12	132	785	1100	800	6215	465	515	585	755
315	13	8	104	619	2200	700	6260	865	955	1090	1410
355	11	6	66	393	2200	800	6295	930	1020	1170	1510
400	11	6	66	393	2400	850	6325	1170	1290	1480	1910
450	5	10	50	298	2200	550	6330	685	755	860	1115
500	4	8	32	190	1950	600	6335	675	740	850	1095
630	3	6	18	107	1950	730	6410	800	875	1005	1300
710	3	6	18	107	2200	810	6425	1010	1105	1270	1645
800	3	6	18	107	2400	900	6425	1270	1400	1605	2080
900	2	4	8	48	1800	1000	6480	1070	1180	1425	1765
1000	2	4	8	48	2000	1100	6515	1315	1450	1670	2160
1100	2	4	8	48	2200	1250	6540	1585	1750	2120	2630
1200	2	4	8	48	2400	1350	6575	1885	2080	2520	3125

Other packagings or lengths, on request.
The combined pallet height shall not exceed 2,550 mm for a standard truck.
In case the load exceeds the height of 2,550 mm, it will be necessary to use a special truck.

Pipe marking

The pipes are marked in order to guarantee their traceability:

	N Mark	NF Mark
Manufacturer Company and Trade Mark	MOLECOR TOM	MOLECOR TOM
Product certification (1)	AENOR 001/000857	72/01
Material and Class	PVC- O 500	PVC- BO
Diameter, Wall Tickness and Nominal Diameter	200 x 4.4- PN 16	200 PN 16 BARS
Coefficient C	C 1.4	-
Date - Hour - Batch	12/03/24 17:11 100324018	12/03/24 17:11 100324018
Reference standard	UNE-EN 17176 ISO 16422 SANS 16422	NF EN 17176

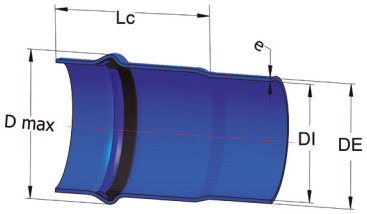
(1) The updated certificates of the certificated references can be downloaded at www.molecor.com.

Connection system and watertight seal

The connection is done by introducing the male part of the pipe in the socket of the other where the elastic joint is placed. The watertight seal includes a Polypropylene ring and a synthetic rubber lip which allows the seal to be integrated with the pipe, avoiding joint displacement or movement while the installation is taking place.

Nominal Diameter (DN)	Socket Length (SL)	Maximum Diameter (D max)	Length limit mark for the assembly of the pipes (1)			
			PN12.5	PN16	PN20	PN25
mm	mm	mm	mm	mm	mm	mm
90	160	117	132	131	131	127
110	175	140	146	145	145	141
125	185	154	160	160	158	154
140	190	174	149	149	146	141
160	200	197	169	166	163	158
200	225	243	185	182	178	171
225	240	271	197	194	190	182
250	265	301	221	217	212	204
315	310	374	260	256	250	239
355	335	419	281	277	270	258
400	355	472	297	292	284	271
450	375	527	314	308	298	283
500	395	587	330	324	312	295
630	460	734	384	376	360	340
710	475	815	392	383	369	342
800	475	925	385	375	359	329
900	565	1034	464	453	434	401
1000	565	1143	455	443	424	376
1100	590	1250	475	461	431	382
1200	615	1360	487	472	447	403

(1)Nominal metres (5.95 metres per pipe). The effective length is the total length minus the length limit marked for the assembly. TOM® pipes have a mark in the spigot, being the limit mark to which the male end of the pipe should be introduced during installation and thus assure water-tightness.





The length limit mark for the assembly of the pipes is the distance from the beveled end of the pipe to the printed cutting mark.



Management of Quality System

Certified by **AENOR** according to the **UNE ISO 9001** and **ISO 14001** standards for the production of PVC-O pipes for high pressure fluid transport: “La producción de tubería de Poli(Cloruro de Vinilo) Orientado (PVC-O) para transporte de fluidos a presión”.

AENOR GESTIÓN DE LA CALIDAD ISO 9001

AENOR GESTIÓN AMBIENTAL ISO 14001

IQNET RECOGNIZED CERTIFICATION





Health standards for drinking water

- Tests according to the **Spanish Royal Decree** (RD140): “Criterios sanitarios de la calidad del agua de consumo humano”.
- **ACS** (Attestation de Conformité Sanitaire) certificate according to the standards of the French Ministry of Health.
- **WRAS** (Water Regulations Advisory Scheme) certificate according to the standards of United Kingdom.
- **HYDROCHECK** certificate according to the Belgian requirements by Belgaqua (Federation Belge du Secteur de l’eau).
- Declaration of **EPAL** approval in accordance with the specifications of the EPAL type approval system Empresa Portuguesa das Águas Livres (Portugal).

Technical features

TOM® PVC-O 500 Pipe				
Nominal pressure (bar)	**PN12,5**	**PN16**	**PN20**	**PN25**
Material Class	500			
Minimum required strength MRS (Mpa)	50,0			
Overal service coefficient (C)	1,4			
Design Stress (σ) (MPa)	36,0			
Burst pressure over 50 years (bar) (1)	17,5	22,4	28,0	35,0
Burst pressure over 10 hours (bar) (1)	23,1	28,9	36,7	48,1
Minimum breaking pressure by burst (bar) (1)	32,0	38,0	48,0	60,0
Maximum trial pressure onsite (bar) (2)	17,5	21,0	25,0	30,0
Circumferential stiffness (kN/m²) (3)	5	7	11	20
Tangential stress of pipe design to flexion-traction Short-term (N/mm²) (4)	106			
Tangential stress of pipe design to flexion-traction Long- term (N/mm²) (4)	75			
Modulus of elasticity in transverse flexion Short-term (N/mm²) (4)	4.078			
Modulus of elasticity in transverse flexion Long- term (N/mm²) (4)	2.982			
Short term elasticity modulus (MPa)	4.000			
Standard dimension ratio (SDR)	57,0	45,8	37,0	29,0
Resistance to uniaxial traction (MPa)	≥48			
Resistance to hoop traction (MPa)	>85			

(1) With a temperature of 20 °C.
(2) According to UNE-EN 805 with an estimated Water Hammer.
(3) Average stiffness per pipe according to established tolerances.
(4) 3D architecture and anisotropic mechanical perfomance of commercial Oriented PVC pressure pipes, 2026 and Report number 1316, SKZ.

Other characteristics of the material

	Units	**Value**
Density (1) (2)	kg/dm3	1.35- 1.46
PVC Resin K value (2)	-	>64
VCM Vinyl chloride monomer (2)	ppm	<1
Shore hardness D at 20 °C	-	81-85
Poisson coefficient (2)	-	0.4
Vicat temperature (2)	°C	≥80
Lineal expansion coefficient (2)	$°C^{-1}$	$7 \cdot 10^{-5}$
Thermal conductivity	Kcal/mh°C	0.14- 0.18
Specific heat at 20 °C	cal/g°C	0.20- 0.28
Dielectric stiffness	kV/mm	20- 40
Dielectric constant at 60 Hz	-	3.2- 3.6
Transverse resistivity at 20 °C	Ω/cm	$>10^{16}$
Absolute roughness (ka)	mm	0.001
Roughness C (Hazen Williams)	$m^{0.37}/s$	155
Manning roughness coefficient (n)	$m^{-1/3}s$	0.0074

(1) Although the standard allowance includes this range, TOM® PVC-O pipe is between 1.37 and 1.43 kg/dm3.
(2) According to EN 17176 standard.

Characteristics of the water-tight joint

	Units	**Value**
Elastomer hardness	IRHD	60 ±5

Pipe tests

TOM® PVC-O 500 Pipe				
	PN12.5	PN16	PN20	PN25
Tests	**Testing parameters**			
Dimensional [1]	Depending on DN			
Density	1370 to 1430 kg/m³			
Impact resistance (0 °C) [2]				
Ø90	98 N·m			
Ø110, Ø125	124 N·m			
Ø140, Ø160	157 N·m			
Ø200	196 N·m			
≥Ø225 - Ø1200	245 N·m			
Circumferential stiffness RCE (kN/m²) [3]	5	7	11	20
Resistance to uniaxial traction	≥ 48 MPa			
Internal pressure resistance				
10 hours – 20 °C	25.0 bar	30.0 bar	37.0 bar	48.0 bar
1000 hours – 20 °C	22.0 bar	26.0 bar	33.0 bar	42.0 bar
1000 hours – 60 °C	11.5 bar	14.0 bar	17.5 bar	22.0 bar
Internal pressure socket resistance				
10 hours – 20 °C	25.0 bar	30.0 bar	37.0 bar	48.0 bar
Watertightness of joints with internal pressure and angular deflection (20 °C – 2° angle)	0 to 25 bar cycle	0 to 32 bar cycle	0 to 40 bar cycle	0 a 50 bar cycle
Watertightness of joints with negative pressure (20 °C – 2° angle – 5% strain)	Up to-0.8 bar cycle			
Watertightness of joints with cyclic internal pressure (24,000 cycles – 20 °C – no angular deflection nor diametric strain) [4]	6.3 to 12.5 bar cycle	8 to 16 bar cycle	10 to 20 bar cycle	12.5 to 25 bar cycle
Watertightness with long term internal pressure				
1000 hours – 20 °C	17.5 bar	22.4 bar	28.0 bar	35.0 bar
1000 hours – 40 °C	13.8 bar	17.6 bar	22.0 bar	27.5 bar

(1) Average outside diameter, wall thickness, out-of-roundness, socket dimensions, lengths.
(2) Mass and height impact energy has been calculated according to EN 17176.
(3) Average stiffness per pipe according to established tolerances.
(4) TOM® pipe has better fatigue performance than the requirements specified in EN 17176-5 (cycles between 0.2-PFA-PFA).






Pipe assemblies and ductile iron fitting tests

TOM® PVC-O 500 Pipe				
	PN12.5	PN16	PN20	PN25
Tests	Testing Parameters			
Watertightness of joints with internal pressure and angular deflection (20 °C – Deflection DN ≤ 315: 3.5 °; 355 ≥ DN ≤ 630:2.5 ; DN >= DN715; 1,5")	23.75 bar (2 hours)	29.0 bar (2 hours)	35,0 bar (2 hours)	42,5 bar (2 hours)
Watertightness of joints with negative pressure (20 °C – Deflection DN ≤ 315: 3.5 °; 355 ≥ DN ≤ 630 2.5 °)	-0.8 bar (2 hours)			
Watertightness of joints with cyclic internal pressure (24,000 cycles – 20 °C – no angular deflection nor diametric strain) (1)	0 to 12.5 bar cycle	0 to 16 bar cycle	0 to 20 bar cycle	0 to 25 bar cycle

(1) TOM® pipe has better fatigue performance than the requirements specified in EN 17176-5 (cycles between 0.2-PFA-PFA).
Tests according to EN 12842.

Mechanic calculation software

Geoposition your network pieces. Download the official app throught this QR code.

Quality guarantee



Molecor offers and provides the market with products and services with an added guarantee value, satisfying both the needs of its clients and interested parties, as well as the applicable legal, regulatory requirements. Thus offering quality products oriented to customer satisfaction and committed to the environment.

Thanks to its technology, unique worldwide, **Molecor** has exclusive products that it makes available to the market. Its product range includes **PVC-O pipes** with diameters such as DN500 mm, DN630 mm, DN710 mm, DN800 mm, DN900, DN1000 mm and now up to DN1200 mm, diameters that have been turning points in the sector, since their manufacture was unthinkable until the appearance of **Molecor**'s technology.

TOM® PVC-O pipes of the maximum quality.
Product guaranteed for 50 years.

TOM® PVC-O pipes manufactured by **Molecor** are of the highest quality and have become the best alternative for the conveyance of water under pressure, being also a **product guaranteed for 50 years** thanks to its excellent physical-mechanical properties and its high durability.

More information here

Guarantee exclusively applicable to PVC-O pipes manufactured in the Loeches (Madrid) and Antequera (Málaga) production centers with AENOR Product Certificate No. 001/007104 and 001/007374 respectively, in accordance with UNE-EN 17176-1-2 and 5.

Pressure loss tables

TOM® PVC-O 500 PN12.5

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

Internal Diameter	DN90 PN12.5 84.8		DN110 PN12.5 103.6		DN125 PN12.5 117.8		DN140 PN12.5 132.3		DN160 PN12.5 152.1		DN200 PN12.5 190.1	
Speed	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
(m/s)	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
0.1	0.56	0.16	0.84	0.12	1.09	0.11	1.37	0.09	1.82	0.08	2.84	0.06
0.2	1.13	0.57	1.69	0.46	2.18	0.39	2.75	0.34	3.63	0.29	5.68	0.22
0.3	1.69	1.21	2.53	0.96	3.27	0.83	4.12	0.72	5.45	0.61	8.51	0.47
0.4	2.26	2.07	3.37	1.64	4.36	1.41	5.50	1.23	7.27	1.05	11.35	0.81
0.5	2.82	3.12	4.21	2.47	5.45	2.13	6.87	1.86	9.08	1.58	14.19	1.22
0.6	3.39	4.39	5.06	3.48	6.54	2.99	8.25	2.61	10.90	2.22	17.03	1.71
0.7	3.95	5.83	5.90	4.62	7.63	3.98	9.62	3.47	12.72	2.95	19.87	2.28
0.8	4.52	7.48	6.74	5.91	8.72	5.09	11.00	4.45	14.54	3.78	22.71	2.91
0.9	5.08	9.29	7.59	7.37	9.81	6.34	12.37	5.53	16.35	4.70	25.54	3.62
1.0	5.65	11.31	8.43	8.95	10.90	7.70	13.75	6.73	18.17	5.71	28.38	4.40
1.1	6.21	13.47	9.27	10.67	11.99	9.19	15.12	8.02	19.99	6.82	31.22	5.26
1.2	6.78	15.85	10.12	12.55	13.08	10.80	16.50	9.43	21.80	8.01	34.06	6.17
1.3	7.34	18.36	10.96	14.55	14.17	12.52	17.87	10.93	23.62	9.29	36.90	7.16
1.4	7.91	21.09	11.80	16.68	15.26	14.36	19.25	12.54	25.44	10.66	39.74	8.22
1.5	8.47	23.94	12.64	18.94	16.35	16.32	20.62	14.25	27.25	12.11	42.57	9.33
1.6	9.04	27.00	13.49	21.37	17.44	18.39	22.00	16.06	29.07	13.64	45.41	10.52
1.7	9.60	30.18	14.33	23.90	18.53	20.58	23.37	17.97	30.89	15.27	48.25	11.77
1.8	10.17	33.59	15.17	26.56	19.62	22.87	24.74	19.97	32.71	16.98	51.09	13.08
1.9	10.73	37.09	16.02	29.38	20.71	25.28	26.12	22.08	34.52	18.76	53.93	14.46
2.0	11.30	40.82	16.86	32.30	21.80	27.80	27.49	24.27	36.34	20.63	56.77	15.90
2.1	11.86	44.65	17.70	35.34	22.89	30.43	28.87	26.57	38.16	22.58	59.60	17.40
2.2	12.43	48.70	18.55	38.55	23.98	33.17	30.24	28.96	39.97	24.61	62.44	18.97
2.3	12.99	52.85	19.39	41.84	25.07	36.02	31.62	31.45	41.79	26.72	65.28	20.60
2.4	13.55	57.14	20.23	45.26	26.16	38.97	32.99	34.02	43.61	28.92	68.12	22.29
2.5	14.12	61.67	21.07	48.80	27.25	42.03	34.37	36.70	45.42	31.18	70.96	24.04
2.6	14.68	66.28	21.92	52.51	28.34	45.20	35.74	39.46	47.24	33.53	73.80	25.85
2.7	15.25	71.12	22.76	56.30	29.43	48.47	37.12	42.33	49.06	35.97	76.63	27.72
2.8	15.81	76.04	23.60	60.21	30.52	51.85	38.49	45.27	50.88	38.48	79.47	29.65
2.9	16.38	81.19	24.45	64.28	31.61	55.33	39.87	48.32	52.69	41.05	82.31	31.65
3.0	16.94	86.41	25.29	68.43	32.70	58.91	41.24	51.44	54.51	43.71	85.15	33.70
3.1	17.51	91.87	26.13	72.70	33.79	62.60	42.62	54.67	56.33	46.46	87.99	35.81
3.2	18.07	97.38	26.97	77.09	34.88	66.39	43.99	57.97	58.14	49.26	90.82	37.97
3.3	18.64	103.15	27.82	81.65	35.97	70.29	45.37	61.38	59.96	52.15	93.66	40.20
3.4	19.20	108.96	28.66	86.27	37.06	74.28	46.74	64.86	61.78	55.12	96.50	42.49
3.5	19.77	115.03	29.50	91.02	38.15	78.38	48.11	68.42	63.59	58.15	99.34	44.83
3.6	20.33	121.14	30.35	95.93	39.24	82.58	49.49	72.10	65.41	61.27	102.18	47.23
3.7	20.90	127.50	31.19	100.91	40.33	86.88	50.86	75.84	67.23	64.46	105.02	49.69
3.8	21.46	133.90	32.03	106.00	41.42	91.27	52.24	79.70	69.04	67.71	107.85	52.20
3.9	22.03	140.56	32.88	111.27	42.51	95.77	53.61	83.61	70.86	71.06	110.69	54.78
4.0	22.59	147.25	33.72	116.59	43.60	100.37	54.99	87.64	72.68	74.47	113.53	57.41

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

TOM® PVC-O 500 PN12.5

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

DN225 PN12.5 213.9		DN250 PN12.5 237.6		DN315 PN12.5 299.4		DN355 PN12.5 337.4		DN400 PN12.5 380.2		DN450 PN12.5 427.7		DN500 PN12.5 475.2		DN630 PN12.5 598.8		DN710 PN12.5 674.8		DN800 PN12.5 760.4		DN900 PN12.5 855.4		DN1000 PN12.5 950.5		DN1100 PN12.5 1045.5		DN1200 PN12.5 1140.6	
Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
3.59	0.05	4.43	0.05	7.04	0.04	8.94	0.03	11.35	0.03	14.37	0.02	17.74	0.02	28.16	0.02	35.76	0.01	45.41	0.01	57.47	0.01	70.96	0.01	85.85	0.01	102.18	0.01
7.19	0.19	8.87	0.17	14.08	0.13	17.88	0.11	22.71	0.10	28.73	0.09	35.47	0.08	56.32	0.06	71.53	0.05	90.82	0.04	114.94	0.04	141.91	0.03	171.70	0.03	204.36	0.03
10.78	0.41	13.30	0.37	21.12	0.28	26.82	0.24	34.06	0.21	43.10	0.18	53.21	0.16	84.48	0.12	107.29	0.11	136.24	0.09	172.40	0.08	212.87	0.07	257.55	0.06	306.53	0.06
14.37	0.70	17.74	0.62	28.16	0.48	35.76	0.41	45.41	0.36	57.47	0.31	70.94	0.28	112.65	0.21	143.05	0.18	181.65	0.16	229.87	0.14	283.83	0.12	343.40	0.11	408.71	0.10
17.97	1.06	22.17	0.94	35.20	0.72	44.70	0.62	56.77	0.54	71.84	0.47	88.68	0.42	140.81	0.32	178.82	0.28	227.06	0.24	287.34	0.21	354.78	0.19	429.25	0.17	510.89	0.15
21.56	1.49	26.60	1.32	42.24	1.01	53.65	0.88	68.12	0.76	86.20	0.66	106.41	0.59	168.97	0.45	214.58	0.39	272.47	0.34	344.81	0.30	425.74	0.26	515.10	0.23	613.07	0.21
25.15	1.98	31.04	1.75	49.28	1.34	62.59	1.17	79.47	1.01	100.57	0.88	124.15	0.78	197.13	0.60	250.34	0.52	317.89	0.45	402.28	0.39	496.70	0.35	600.95	0.31	715.24	0.28
28.75	2.54	35.47	2.25	56.32	1.71	71.53	1.49	90.82	1.30	114.94	1.13	141.88	1.00	225.29	0.76	286.11	0.66	363.30	0.58	459.75	0.50	567.65	0.45	686.80	0.40	817.42	0.36
32.34	3.16	39.90	2.79	63.36	2.13	80.47	1.86	102.18	1.61	129.30	1.41	159.62	1.24	253.45	0.95	321.87	0.83	408.71	0.72	517.21	0.63	638.61	0.55	772.65	0.50	919.60	0.45
35.93	3.84	44.34	3.40	70.40	2.59	89.41	2.26	113.53	1.96	143.67	1.71	177.35	1.51	281.61	1.15	357.64	1.00	454.12	0.87	574.68	0.76	709.57	0.67	858.50	0.60	1021.78	0.54
39.53	4.58	48.77	4.05	77.44	3.09	98.35	2.69	124.88	2.34	158.04	2.04	195.09	1.80	309.77	1.38	393.40	1.20	499.54	1.04	632.15	0.91	780.52	0.80	944.34	0.72	1123.96	0.65
43.12	5.38	53.21	4.76	84.48	3.63	107.29	3.16	136.24	2.75	172.40	2.40	212.83	2.12	337.94	1.62	429.16	1.41	544.95	1.22	689.62	1.07	851.48	0.94	1030.19	0.84	1226.13	0.76
46.71	6.24	57.64	5.52	91.52	4.21	116.23	3.67	147.59	3.19	186.77	2.78	230.56	2.46	366.10	1.88	464.93	1.63	590.36	1.42	747.09	1.24	922.44	1.09	1116.04	0.98	1328.31	0.88
50.31	7.16	62.07	6.33	98.56	4.83	125.17	4.21	158.94	3.66	201.14	3.19	248.30	2.82	394.26	2.15	500.69	1.87	635.77	1.63	804.56	1.42	993.40	1.26	1201.89	1.12	1430.49	1.02
53.90	8.13	66.51	7.20	105.61	5.49	134.11	4.78	170.30	4.16	215.51	3.62	266.03	3.20	422.42	2.45	536.45	2.13	681.19	1.85	862.02	1.61	1064.35	1.43	1287.74	1.28	1532.67	1.15
57.50	9.17	70.94	8.11	112.65	6.19	143.05	5.39	181.65	4.68	229.87	4.08	283.77	3.61	450.58	2.76	572.22	2.40	726.60	2.09	919.49	1.82	1135.31	1.61	1373.59	1.44	1634.85	1.30
61.09	10.26	75.38	9.07	119.69	6.93	151.99	6.02	193.00	5.24	244.24	4.57	301.50	4.04	478.74	3.08	607.98	2.68	772.01	2.33	976.96	2.03	1206.27	1.80	1459.44	1.61	1737.02	1.45
64.68	11.40	79.81	10.09	126.73	7.70	160.94	6.70	204.36	5.83	258.61	5.08	319.24	4.49	506.90	3.43	643.74	2.98	817.42	2.59	1034.43	2.26	1277.22	2.00	1545.29	1.79	1839.20	1.62
68.28	12.60	84.24	11.15	133.77	8.51	169.88	7.40	215.71	6.44	272.97	5.61	336.97	4.96	535.07	3.79	679.51	3.30	862.83	2.87	1091.90	2.50	1348.18	2.21	1631.14	1.98	1941.38	1.79
71.87	13.86	88.68	12.26	140.81	9.36	178.82	8.14	227.06	7.08	287.34	6.17	354.71	5.46	563.23	4.17	715.27	3.63	908.25	3.15	1149.37	2.75	1419.14	2.43	1716.99	2.18	2043.56	1.96
75.46	15.17	93.11	13.42	147.85	10.24	187.76	8.91	238.41	7.75	301.71	6.76	372.44	5.98	591.39	4.56	751.03	3.97	953.66	3.45	1206.83	3.01	1490.09	2.66	1802.84	2.38	2145.73	2.15
79.06	16.53	97.55	14.63	154.89	11.17	196.70	9.71	249.77	8.45	316.08	7.36	390.18	6.51	619.55	4.97	786.80	4.33	999.07	3.76	1264.30	3.28	1561.05	2.90	1888.69	2.60	2247.91	2.34
82.65	17.95	101.98	15.88	161.93	12.12	205.64	10.55	261.12	9.17	330.44	8.00	407.92	7.07	647.71	5.40	822.56	4.70	1044.48	4.09	1321.77	3.56	1632.01	3.15	1974.54	2.82	2350.09	2.55
86.24	19.42	106.41	17.18	168.97	13.12	214.58	11.41	272.47	9.93	344.81	8.65	425.65	7.65	675.87	5.84	858.32	5.08	1089.90	4.42	1379.24	3.85	1702.96	3.41	2060.39	3.05	2452.27	2.75
89.84	20.95	110.85	18.53	176.01	14.15	223.52	12.31	283.83	10.71	359.18	9.33	443.39	8.25	704.03	6.30	894.09	5.48	1135.31	4.77	1436.71	4.16	1773.92	3.67	2146.24	3.29	2554.45	2.97
93.43	22.53	115.28	19.93	183.05	15.22	232.46	13.23	295.18	11.51	373.54	10.03	461.12	8.87	732.20	6.78	929.85	5.89	1180.72	5.13	1494.18	4.47	1844.88	3.95	2232.09	3.54	2656.62	3.19
97.02	24.16	119.71	21.37	190.09	16.32	241.40	14.19	306.53	12.35	387.91	10.76	478.86	9.52	760.36	7.27	965.61	6.32	1226.13	5.50	1551.64	4.79	1915.83	4.24	2317.94	3.79	2758.80	3.43
100.62	25.84	124.15	22.86	197.13	17.45	250.34	15.18	317.89	13.21	402.28	11.51	496.59	10.18	788.52	7.77	1001.38	6.76	1271.55	5.88	1609.11	5.13	1986.79	4.53	2403.79	4.06	2860.98	3.66
104.21	27.58	128.58	24.39	204.17	18.63	259.29	16.20	329.24	14.09	416.65	12.28	514.33	10.86	816.68	8.29	1037.14	7.22	1316.96	6.28	1666.58	5.47	2057.75	4.84	2489.64	4.33	2963.16	3.91
107.80	29.36	133.02	25.98	211.21	19.83	268.23	17.25	340.59	15.01	431.01	13.08	532.06	11.57	844.84	8.83	1072.91	7.68	1362.37	6.68	1724.05	5.83	2128.70	5.15	2575.49	4.61	3065.33	4.16
111.40	31.20	137.45	27.60	218.25	21.07	277.17	18.33	351.95	15.95	445.38	13.90	549.80	12.29	873.00	9.39	1108.67	8.16	1407.78	7.10	1781.52	6.19	2199.66	5.47	2661.34	4.90	3167.51	4.42
114.99	33.09	141.88	29.27	225.29	22.35	286.11	19.44	363.30	16.91	459.75	14.74	567.54	13.04	901.16	9.95	1144.43	8.66	1453.20	7.53	1838.99	6.56	2270.62	5.80	2747.19	5.19	3269.69	4.69
118.58	35.03	146.32	30.99	232.33	23.66	295.05	20.58	374.65	17.90	474.11	15.61	585.27	13.80	929.32	10.54	1180.20	9.17	1498.61	7.97	1896.45	6.95	2341.57	6.15	2833.03	5.50	3371.87	4.97
122.18	37.02	150.75	32.75	239.37	25.01	303.99	21.75	386.01	18.92	488.48	16.49	603.01	14.59	957.49	11.14	1215.96	9.69	1544.02	8.43	1953.92	7.34	2412.53	6.49	2918.88	5.81	3474.05	5.25
125.77	39.06	155.19	34.56	246.41	26.38	312.93	22.95	397.36	19.97	502.85	17.40	620.74	15.39	985.65	11.75	1251.72	10.22	1589.43	8.89	2011.39	7.75	2483.49	6.85	3004.73	6.13	3576.22	5.54
129.36	41.15	159.62	36.41	253.45	27.80	321.87	24.18	408.71	21.03	517.21	18.33	638.48	16.21	1013.81	12.38	1287.49	10.77	1634.85	9.37	2068.86	8.17	2554.45	7.22	3090.58	6.46	3678.40	5.84
132.96	43.30	164.05	38.30	260.49	29.24	330.81	25.44	420.06	22.13	531.58	19.29	656.21	17.06	1041.97	13.02	1323.25	11.33	1680.26	9.86	2126.33	8.59	2625.40	7.60	3176.43	6.80	3780.58	6.14
136.55	45.49	168.49	40.24	267.53	30.73	339.75	26.73	431.42	23.25	545.95	20.27	673.95	17.92	1070.13	13.68	1359.01	11.90	1725.67	10.35	2183.80	9.02	2696.36	7.98	3262.28	7.14	3882.76	6.45
140.14	47.73	172.92	42.22	274.57	32.24	348.69	28.04	442.77	24.40	560.32	21.26	691.68	18.80	1098.29	14.36	1394.78	12.49	1771.08	10.86	2241.26	9.47	2767.32	8.37	3348.13	7.49	3984.93	6.77
143.74	50.03	177.35	44.25	281.61	33.79	357.64	29.39	454.12	25.57	574.68	22.28	709.42	19.71	1126.45	15.05	1430.54	13.09	1816.49	11.39	2298.73	9.92	2838.27	8.78	3433.98	7.85	4087.11	7.09

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

TOM® PVC-O 500 PN16

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

Internal Diameter	DN90 PN16 84.3		DN110 PN16 103.1		DN125 PN16 117.8		DN140 PN16 132.3		DN160 PN16 151.2		DN200 PN16 189.0	
Speed	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
(m/s)	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
0.1	0.56	0.16	0.83	0.13	1.09	0.11	1.37	0.09	1.80	0.08	2.81	0.06
0.2	1.12	0.58	1.67	0.46	2.18	0.39	2.75	0.34	3.59	0.29	5.61	0.23
0.3	1.67	1.22	2.50	0.96	3.27	0.83	4.12	0.72	5.39	0.62	8.42	0.48
0.4	2.23	2.08	3.34	1.65	4.36	1.41	5.50	1.23	7.18	1.05	11.22	0.81
0.5	2.79	3.15	4.17	2.49	5.45	2.13	6.87	1.86	8.98	1.59	14.03	1.23
0.6	3.35	4.42	5.01	3.49	6.54	2.99	8.25	2.61	10.77	2.23	16.83	1.72
0.7	3.91	5.89	5.84	4.64	7.63	3.98	9.62	3.47	12.57	2.97	19.64	2.29
0.8	4.47	7.54	6.68	5.95	8.72	5.09	11.00	4.45	14.36	3.80	22.44	2.93
0.9	5.02	9.35	7.51	7.39	9.81	6.34	12.37	5.53	16.16	4.73	25.25	3.65
1.0	5.58	11.37	8.35	9.00	10.90	7.70	13.75	6.73	17.96	5.76	28.06	4.44
1.1	6.14	13.58	9.18	10.73	11.99	9.19	15.12	8.02	19.75	6.86	30.86	5.29
1.2	6.70	15.96	10.02	12.61	13.08	10.80	16.50	9.43	21.55	8.07	33.67	6.22
1.3	7.26	18.52	10.85	14.62	14.17	12.52	17.87	10.93	23.34	9.35	36.47	7.21
1.4	7.81	21.20	11.69	16.78	15.26	14.36	19.25	12.54	25.14	10.73	39.28	8.27
1.5	8.37	24.10	12.52	19.05	16.35	16.32	20.62	14.25	26.93	12.19	42.08	9.40
1.6	8.93	27.17	13.36	21.49	17.44	18.39	22.00	16.06	28.73	13.74	44.89	10.59
1.7	9.49	30.41	14.19	24.03	18.53	20.58	23.37	17.97	30.52	15.37	47.69	11.85
1.8	10.05	33.82	15.03	26.73	19.62	22.87	24.74	19.97	32.32	17.09	50.50	13.17
1.9	10.60	37.32	15.86	29.53	20.71	25.28	26.12	22.08	34.12	18.90	53.30	14.56
2.0	11.16	41.06	16.70	32.49	21.80	27.80	27.49	24.27	35.91	20.77	56.11	16.01
2.1	11.72	44.95	17.53	35.54	22.89	30.43	28.87	26.57	37.71	22.74	58.92	17.53
2.2	12.28	49.01	18.37	38.76	23.98	33.17	30.24	28.96	39.50	24.78	61.72	19.10
2.3	12.84	53.23	19.20	42.06	25.07	36.02	31.62	31.45	41.30	26.91	64.53	20.74
2.4	13.40	57.61	20.04	45.54	26.16	38.97	32.99	34.02	43.09	29.11	67.33	22.44
2.5	13.95	62.07	20.87	49.09	27.25	42.03	34.37	36.70	44.89	31.41	70.14	24.20
2.6	14.51	66.76	21.71	52.81	28.34	45.20	35.74	39.46	46.68	33.76	72.94	26.02
2.7	15.07	71.61	22.54	56.61	29.43	48.47	37.12	42.33	48.48	36.21	75.75	27.91
2.8	15.63	76.62	23.38	60.58	30.52	51.85	38.49	45.27	50.27	38.73	78.55	29.85
2.9	16.19	81.78	24.21	64.62	31.61	55.33	39.87	48.32	52.07	41.34	81.36	31.86
3.0	16.74	87.00	25.05	68.84	32.70	58.91	41.24	51.44	53.87	44.02	84.17	33.93
3.1	17.30	92.46	25.88	73.12	33.79	62.60	42.62	54.67	55.66	46.77	86.97	36.05
3.2	17.86	98.08	26.72	77.58	34.88	66.39	43.99	57.97	57.46	49.61	89.78	38.24
3.3	18.42	103.86	27.55	82.10	35.97	70.29	45.37	61.38	59.25	52.51	92.58	40.47
3.4	18.98	109.78	28.38	86.74	37.06	74.28	46.74	64.86	61.05	55.50	95.39	42.78
3.5	19.53	115.74	29.22	91.55	38.15	78.38	48.11	68.42	62.84	58.55	98.19	45.13
3.6	20.09	121.96	30.05	96.43	39.24	82.58	49.49	72.10	64.64	61.70	101.00	47.55
3.7	20.65	128.34	30.89	101.48	40.33	86.88	50.86	75.84	66.43	64.90	103.80	50.02
3.8	21.21	134.86	31.72	106.59	41.42	91.27	52.24	79.70	68.23	68.19	106.61	52.56
3.9	21.77	141.52	32.56	111.87	42.51	95.77	53.61	83.61	70.03	71.56	109.42	55.15
4.0	22.33	148.34	33.39	117.21	43.60	100.37	54.99	87.64	71.82	74.99	112.22	57.80

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

Pressure loss tables

TOM® PVC-O 500 PN16

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

DN225 PN16 212.6		DN250 PN16 236.3		DN315 PN16 297.7		DN355 PN16 335.5		DN400 PN16 378.0		DN450 PN16 425.3		DN500 PN16 472.5		DN630 PN16 595.4		DN710 PN16 671.0		DN800 PN16 756.1		DN900 PN16 850.6		DN1000 PN16 945.1		DN1100 PN16 1039.6		DN1200 PN16 1134.1	
Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
3.55	0.05	4.39	0.05	6.96	0.04	8.84	0.03	11.22	0.03	14.21	0.02	17.53	0.02	27.84	0.02	35.36	0.01	44.90	0.01	56.83	0.01	70.15	0.01	84.88	0.01	101.02	0.01
7.10	0.20	8.77	0.17	13.92	0.13	17.68	0.12	22.44	0.10	28.41	0.09	35.07	0.08	55.68	0.06	70.72	0.05	89.80	0.04	113.65	0.04	140.31	0.03	169.77	0.03	202.03	0.03
10.65	0.42	13.16	0.37	20.88	0.28	26.52	0.24	33.67	0.21	42.62	0.19	52.60	0.16	83.53	0.13	106.09	0.11	134.70	0.09	170.48	0.08	210.46	0.07	254.65	0.07	303.05	0.06
14.20	0.71	17.54	0.63	27.84	0.48	35.36	0.42	44.89	0.36	56.83	0.32	70.14	0.28	111.37	0.21	141.45	0.19	179.60	0.16	227.30	0.14	280.61	0.12	339.53	0.11	404.07	0.10
17.75	1.07	21.93	0.95	34.80	0.72	44.20	0.63	56.11	0.55	71.03	0.48	87.67	0.42	139.21	0.32	176.81	0.28	224.50	0.24	284.13	0.21	350.76	0.19	424.42	0.17	505.08	0.15
21.30	1.50	26.31	1.33	41.76	1.01	53.04	0.88	67.33	0.77	85.24	0.67	105.21	0.59	167.05	0.45	212.17	0.39	269.40	0.34	340.95	0.30	420.92	0.26	509.30	0.24	606.10	0.21
24.85	2.00	30.70	1.77	48.72	1.35	61.88	1.17	78.55	1.02	99.44	0.89	122.74	0.79	194.90	0.60	247.53	0.52	314.30	0.45	397.78	0.40	491.07	0.35	594.18	0.31	707.12	0.28
28.40	2.56	35.08	2.26	55.68	1.73	70.72	1.50	89.78	1.31	113.65	1.14	140.28	1.01	222.74	0.77	282.89	0.67	359.20	0.58	454.60	0.51	561.22	0.45	679.07	0.40	808.13	0.36
31.95	3.18	39.47	2.81	62.65	2.15	79.56	1.87	101.00	1.63	127.86	1.42	157.81	1.25	250.58	0.96	318.26	0.83	404.10	0.72	511.43	0.63	631.38	0.56	763.95	0.50	909.15	0.45
35.50	3.87	43.85	3.42	69.61	2.61	88.40	2.27	112.22	1.98	142.06	1.72	175.35	1.52	278.42	1.16	353.62	1.01	449.00	0.88	568.25	0.77	701.53	0.68	848.83	0.61	1010.17	0.55
39.05	4.61	48.24	4.08	76.57	3.11	97.25	2.71	123.44	2.36	156.27	2.05	192.88	1.82	306.27	1.39	388.98	1.21	493.90	1.05	625.08	0.91	771.68	0.81	933.72	0.72	1111.18	0.65
42.60	5.42	52.63	4.79	83.53	3.66	106.09	3.18	134.66	2.77	170.48	2.41	210.41	2.13	334.11	1.63	424.34	1.42	538.80	1.23	681.90	1.07	841.83	0.95	1018.60	0.85	1212.20	0.77
46.15	6.29	57.01	5.56	90.49	4.24	114.93	3.69	145.89	3.21	184.68	2.80	227.95	2.47	361.95	1.89	459.70	1.64	583.70	1.43	738.73	1.25	911.99	1.10	1103.48	0.99	1313.22	0.89
49.70	7.21	61.40	6.37	97.45	4.87	123.77	4.23	157.11	3.68	198.89	3.21	245.48	2.84	389.79	2.17	495.07	1.89	628.60	1.64	795.55	1.43	982.14	1.26	1188.37	1.13	1414.23	1.02
53.25	8.19	65.78	7.24	104.41	5.53	132.61	4.81	168.33	4.19	213.09	3.65	263.02	3.23	417.64	2.46	530.43	2.14	673.50	1.86	852.38	1.62	1052.29	1.44	1273.25	1.29	1515.25	1.16
56.80	9.23	70.17	8.16	111.37	6.23	141.45	5.42	179.55	4.72	227.30	4.11	280.55	3.64	445.48	2.78	565.79	2.41	718.40	2.10	909.20	1.83	1122.45	1.62	1358.13	1.45	1616.26	1.31
60.35	10.33	74.55	9.13	118.33	6.97	150.29	6.07	190.78	5.28	241.51	4.60	298.09	4.07	473.32	3.11	601.15	2.70	763.30	2.35	966.03	2.05	1192.60	1.81	1443.02	1.62	1717.28	1.46
63.90	11.48	78.94	10.15	125.29	7.75	159.13	6.74	202.00	5.87	255.71	5.11	315.62	4.52	501.16	3.45	636.51	3.00	808.20	2.61	1022.85	2.28	1262.75	2.01	1527.90	1.80	1818.30	1.63
67.45	12.69	83.32	11.22	132.25	8.57	167.97	7.45	213.22	6.48	269.92	5.65	333.16	5.00	529.01	3.82	671.88	3.32	853.10	2.89	1079.68	2.52	1332.90	2.23	1612.78	1.99	1919.31	1.80
71.00	13.96	87.71	12.34	139.21	9.42	176.81	8.20	224.44	7.13	284.13	6.21	350.69	5.50	556.85	4.20	707.24	3.65	898.00	3.17	1136.50	2.77	1403.06	2.45	1697.67	2.19	2020.33	1.98
74.55	15.28	92.10	13.50	146.17	10.31	185.65	8.97	235.66	7.80	298.33	6.80	368.22	6.02	584.69	4.59	742.60	3.99	942.90	3.48	1193.33	3.03	1473.21	2.68	1782.55	2.40	2121.35	2.17
78.10	16.65	96.48	14.72	153.13	11.24	194.49	9.78	246.89	8.51	312.54	7.41	385.76	6.56	612.53	5.01	777.96	4.35	987.80	3.79	1250.15	3.30	1543.36	2.92	1867.43	2.61	2222.36	2.36
81.65	18.08	100.87	15.98	160.09	12.20	203.33	10.62	258.11	9.24	326.74	8.05	403.29	7.12	640.38	5.44	813.32	4.73	1032.70	4.11	1306.98	3.58	1613.52	3.17	1952.32	2.84	2323.38	2.56
85.20	19.56	105.25	17.29	167.05	13.21	212.17	11.49	269.33	9.99	340.95	8.71	420.83	7.70	668.22	5.88	848.68	5.12	1077.61	4.45	1363.80	3.88	1683.67	3.43	2037.20	3.07	2424.40	2.77
88.75	21.10	109.64	18.65	174.02	14.24	221.01	12.39	280.55	10.78	355.16	9.39	438.36	8.31	696.06	6.34	884.05	5.52	1122.51	4.80	1420.63	4.18	1753.82	3.70	2122.08	3.31	2525.41	2.99
92.30	22.69	114.02	20.05	180.98	15.32	229.85	13.32	291.77	11.59	369.36	10.10	455.90	8.93	723.90	6.82	919.41	5.93	1167.41	5.16	1477.45	4.50	1823.97	3.98	2206.97	3.56	2626.43	3.22
95.85	24.33	118.41	21.51	187.94	16.43	238.69	14.29	303.00	12.43	383.57	10.83	473.43	9.58	751.75	7.32	954.77	6.36	1212.31	5.53	1534.28	4.82	1894.13	4.27	2291.85	3.82	2727.45	3.45
99.40	26.03	122.79	23.00	194.90	17.57	247.53	15.28	314.22	13.30	397.78	11.59	490.97	10.25	779.59	7.82	990.13	6.81	1257.21	5.92	1591.10	5.16	1964.28	4.56	2376.73	4.08	2828.46	3.69
102.95	27.77	127.18	24.55	201.86	18.75	256.37	16.31	325.44	14.19	411.98	12.37	508.50	10.94	807.43	8.35	1025.49	7.26	1302.11	6.32	1647.93	5.51	2034.43	4.87	2461.62	4.36	2929.48	3.94
106.50	29.57	131.56	26.14	208.82	19.96	265.21	17.36	336.66	15.11	426.19	13.17	526.04	11.64	835.27	8.89	1060.86	7.73	1347.01	6.73	1704.75	5.86	2104.59	5.19	2546.50	4.64	3030.50	4.19
110.05	31.43	135.95	27.78	215.78	21.21	274.05	18.45	347.88	16.05	440.39	13.99	543.57	12.37	863.12	9.45	1096.22	8.22	1391.91	7.15	1761.58	6.23	2174.74	5.51	2631.38	4.93	3131.51	4.45
113.60	33.33	140.34	29.46	222.74	22.50	282.89	19.57	359.11	17.03	454.60	14.84	561.10	13.12	890.96	10.02	1131.58	8.72	1436.81	7.58	1818.40	6.61	2244.89	5.84	2716.27	5.23	3232.53	4.72
117.15	35.28	144.72	31.19	229.70	23.82	291.74	20.72	370.33	18.03	468.81	15.71	578.64	13.89	918.80	10.61	1166.94	9.23	1481.71	8.03	1875.23	7.00	2315.04	6.19	2801.15	5.54	3333.55	5.00
120.70	37.29	149.11	32.96	236.66	25.17	300.58	21.90	381.55	19.05	483.01	16.60	596.17	14.68	946.64	11.21	1202.30	9.75	1526.61	8.48	1932.06	7.39	2385.20	6.54	2886.03	5.85	3434.56	5.29
124.25	39.35	153.49	34.78	243.62	26.56	309.42	23.10	392.77	20.10	497.22	17.52	613.71	15.49	974.49	11.83	1237.66	10.29	1571.51	8.95	1988.88	7.80	2455.35	6.90	2970.92	6.17	3535.58	5.58
127.80	41.45	157.88	36.64	250.58	27.98	318.26	24.34	403.99	21.18	511.43	18.46	631.24	16.32	1002.33	12.46	1273.03	10.84	1616.41	9.43	2045.71	8.22	2525.50	7.27	3055.80	6.50	3636.60	5.88
131.35	43.61	162.26	38.55	257.54	29.44	327.10	25.61	415.22	22.28	525.63	19.42	648.78	17.17	1030.17	13.11	1308.39	11.40	1661.31	9.92	2102.53	8.65	2595.66	7.65	3140.68	6.84	3737.61	6.18
134.90	45.82	166.65	40.50	264.50	30.93	335.94	26.90	426.44	23.41	539.84	20.40	666.31	18.04	1058.01	13.77	1343.75	11.98	1706.21	10.42	2159.36	9.08	2665.81	8.03	3225.57	7.19	3838.63	6.49
138.45	48.08	171.03	42.49	271.46	32.45	344.78	28.23	437.66	24.56	554.05	21.40	683.85	18.93	1085.86	14.45	1379.11	12.57	1751.11	10.94	2216.18	9.53	2735.96	8.43	3310.45	7.54	3939.65	6.81
142.00	50.38	175.42	44.54	278.42	34.01	353.62	29.58	448.88	25.74	568.25	22.43	701.38	19.84	1113.70	15.15	1414.47	13.18	1796.01	11.46	2273.01	9.99	2806.11	8.83	3395.33	7.90	4040.66	7.14

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

Pressure loss tables

TOM® PVC-O 500 PN20

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

Internal Diameter	DN90 PN20 84.3		DN110 PN20 103.0		DN125 PN20 117.1		DN140 PN20 131.1		DN160 PN20 149.8		DN200 PN20 187.3	
Speed	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
(m/s)	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
0.1	0.56	0.16	0.83	0.13	1.08	0.11	1.35	0.10	1.76	0.08	2.76	0.06
0.2	1.12	0.58	1.67	0.46	2.15	0.39	2.70	0.35	3.52	0.29	5.51	0.23
0.3	1.67	1.22	2.50	0.97	3.23	0.83	4.05	0.73	5.29	0.63	8.27	0.48
0.4	2.23	2.08	3.33	1.65	4.31	1.42	5.40	1.25	7.05	1.07	11.02	0.82
0.5	2.79	3.15	4.17	2.50	5.38	2.14	6.75	1.88	8.81	1.61	13.78	1.24
0.6	3.35	4.42	5.00	3.50	6.46	3.01	8.10	2.64	10.57	2.26	16.53	1.74
0.7	3.91	5.89	5.83	4.65	7.54	4.01	9.45	3.51	12.34	3.01	19.29	2.32
0.8	4.47	7.54	6.67	5.96	8.62	5.13	10.80	4.50	14.10	3.85	22.04	2.96
0.9	5.02	9.35	7.50	7.41	9.69	6.38	12.15	5.59	15.86	4.78	24.80	3.69
1.0	5.58	11.37	8.33	9.00	10.77	7.75	13.50	6.80	17.62	5.81	27.55	4.48
1.1	6.14	13.58	9.17	10.75	11.85	9.26	14.85	8.11	19.39	6.94	30.31	5.35
1.2	6.70	15.96	10.00	12.63	12.92	10.86	16.20	9.53	21.15	8.15	33.06	6.28
1.3	7.26	18.52	10.83	14.64	14.00	12.60	17.55	11.05	22.91	9.46	35.82	7.29
1.4	7.81	21.20	11.67	16.81	15.08	14.46	18.90	12.68	24.67	10.84	38.57	8.36
1.5	8.37	24.10	12.50	19.09	16.15	16.42	20.25	14.40	26.44	12.33	41.33	9.50
1.6	8.93	27.17	13.33	21.50	17.23	18.51	21.60	16.23	28.20	13.89	44.08	10.70
1.7	9.49	30.41	14.16	24.05	18.31	20.72	22.95	18.16	29.96	15.54	46.84	11.97
1.8	10.05	33.82	15.00	26.76	19.39	23.04	24.30	20.19	31.72	17.27	49.60	13.31
1.9	10.60	37.32	15.83	29.56	20.46	25.45	25.65	22.32	33.49	19.10	52.35	14.71
2.0	11.16	41.06	16.66	32.50	21.54	27.99	27.00	24.54	35.25	21.00	55.11	16.18
2.1	11.72	44.95	17.50	35.60	22.62	30.65	28.35	26.86	37.01	22.98	57.86	17.71
2.2	12.28	49.01	18.33	38.79	23.69	33.39	29.70	29.28	38.77	25.05	60.62	19.31
2.3	12.84	53.23	19.16	42.10	24.77	36.26	31.05	31.79	40.54	27.21	63.37	20.96
2.4	13.40	57.61	20.00	45.58	25.85	39.24	32.40	34.40	42.30	29.44	66.13	22.68
2.5	13.95	62.07	20.83	49.15	26.92	42.30	33.75	37.10	44.06	31.74	68.88	24.46
2.6	14.51	66.76	21.66	52.84	28.00	45.50	35.10	39.89	45.82	34.13	71.64	26.30
2.7	15.07	71.61	22.50	56.69	29.08	48.80	36.45	42.78	47.59	36.62	74.39	28.21
2.8	15.63	76.62	23.33	60.63	30.16	52.21	37.80	45.76	49.35	39.16	77.15	30.17
2.9	16.19	81.78	24.16	64.68	31.23	55.70	39.15	48.83	51.11	41.79	79.90	32.20
3.0	16.74	87.00	25.00	68.91	32.31	59.32	40.50	52.00	52.87	44.49	82.66	34.29
3.1	17.30	92.46	25.83	73.21	33.39	63.04	41.85	55.25	54.64	47.29	85.41	36.43
3.2	17.86	98.08	26.66	77.62	34.46	66.83	43.20	58.60	56.40	50.15	88.17	38.64
3.3	18.42	103.86	27.50	82.21	35.54	70.76	44.55	62.04	58.16	53.09	90.92	40.90
3.4	18.98	109.78	28.33	86.87	36.62	74.80	45.90	65.56	59.92	56.10	93.68	43.23
3.5	19.53	115.74	29.16	91.64	37.69	78.90	47.25	69.18	61.69	59.21	96.43	45.61
3.6	20.09	121.96	30.00	96.59	38.77	83.13	48.60	72.88	63.45	62.37	99.19	48.06
3.7	20.65	128.34	30.83	101.59	39.85	87.47	49.95	76.68	65.21	65.62	101.95	50.56
3.8	21.21	134.86	31.66	106.72	40.92	91.87	51.30	80.56	66.97	68.93	104.70	53.12
3.9	21.77	141.52	32.50	112.02	42.00	96.41	52.65	84.53	68.74	72.35	107.46	55.74
4.0	22.33	148.34	33.33	117.38	43.08	101.06	54.00	88.59	70.50	75.81	110.21	58.41

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

TOM® PVC-O 500 PN20

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

DN225 PN20 210.7		DN250 PN20 234.1		DN315 PN20 295.0		DN355 PN20 332.5		DN400 PN20 374.6		DN450 PN20 421.4		DN500 PN20 468.2		DN630 PN20 590.0		DN710 PN20 664.9		DN800 PN20 749.2		DN900 PN20 839.5		DN1000 PN20 932.8		DN1100 PN20 1026.1		DN1200 PN20 1119.4	
Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
3.49	0.06	4.30	0.05	6.83	0.04	8.68	0.03	11.02	0.03	13.95	0.02	17.22	0.02	27.34	0.02	34.72	0.01	44.08	0.01	55.35	0.01	68.34	0.01	82.69	0.01	98.41	0.01
6.97	0.20	8.61	0.18	13.67	0.13	17.37	0.12	22.04	0.10	27.89	0.09	34.43	0.08	54.68	0.06	69.44	0.05	88.17	0.05	110.70	0.04	136.68	0.03	165.39	0.03	196.83	0.03
10.46	0.42	12.91	0.37	20.50	0.28	26.05	0.25	33.06	0.21	41.84	0.19	51.65	0.17	82.02	0.13	104.17	0.11	132.25	0.10	166.06	0.08	205.02	0.07	248.08	0.07	295.24	0.06
13.95	0.72	17.22	0.63	27.34	0.48	34.73	0.42	44.08	0.37	55.79	0.32	68.87	0.28	109.36	0.22	138.89	0.19	176.34	0.16	221.41	0.14	273.35	0.13	330.77	0.11	393.66	0.10
17.43	1.08	21.52	0.96	34.17	0.73	43.42	0.64	55.11	0.55	69.73	0.48	86.08	0.43	136.70	0.33	173.61	0.28	220.42	0.25	276.76	0.22	341.69	0.19	413.47	0.17	492.07	0.15
20.92	1.52	25.83	1.34	41.01	1.02	52.10	0.89	66.13	0.78	83.68	0.68	103.30	0.60	164.04	0.46	208.33	0.40	264.51	0.35	332.11	0.30	410.03	0.27	496.16	0.24	590.49	0.22
24.41	2.02	30.13	1.78	47.84	1.36	60.78	1.18	77.15	1.03	97.63	0.90	120.52	0.79	191.38	0.61	243.05	0.53	308.59	0.46	387.46	0.40	478.37	0.36	578.85	0.32	688.90	0.29
27.89	2.58	34.43	2.28	54.68	1.74	69.46	1.52	88.17	1.32	111.58	1.15	137.73	1.02	218.72	0.78	277.77	0.68	352.68	0.59	442.81	0.51	546.71	0.46	661.54	0.41	787.32	0.37
31.38	3.21	38.74	2.84	61.51	2.17	78.15	1.89	99.19	1.64	125.52	1.43	154.95	1.27	246.06	0.97	312.50	0.84	396.76	0.73	498.17	0.64	615.05	0.57	744.24	0.51	885.73	0.46
34.87	3.91	43.04	3.45	68.35	2.64	86.83	2.29	110.21	2.00	139.47	1.74	172.17	1.54	273.40	1.17	347.22	1.02	440.84	0.89	553.52	0.78	683.39	0.69	826.93	0.62	984.15	0.56
38.35	4.66	47.35	4.12	75.18	3.15	95.51	2.74	121.23	2.38	153.42	2.08	189.38	1.84	300.74	1.40	381.94	1.22	484.93	1.06	608.87	0.93	751.73	0.82	909.62	0.73	1082.56	0.66
41.84	5.48	51.65	4.84	82.02	3.70	104.20	3.22	132.25	2.80	167.36	2.44	206.60	2.16	328.08	1.65	416.66	1.43	529.01	1.25	664.22	1.09	820.06	0.96	992.32	0.86	1180.98	0.78
45.33	6.35	55.95	5.62	88.85	4.29	112.88	3.73	143.27	3.24	181.31	2.83	223.82	2.50	355.42	1.91	451.38	1.66	573.10	1.45	719.57	1.27	888.40	1.12	1075.01	1.00	1279.39	0.90
48.81	7.28	60.26	6.44	95.69	4.92	121.56	4.28	154.30	3.72	195.26	3.24	241.04	2.87	382.76	2.19	486.11	1.91	617.18	1.66	774.92	1.45	956.74	1.28	1157.70	1.15	1377.81	1.04
52.30	8.28	64.56	7.32	102.52	5.59	130.25	4.86	165.32	4.23	209.20	3.69	258.25	3.26	410.10	2.49	520.83	2.17	661.27	1.88	830.28	1.65	1025.08	1.46	1240.40	1.30	1476.22	1.18
55.79	9.33	68.87	8.25	109.36	6.30	138.93	5.48	176.34	4.77	223.15	4.15	275.47	3.67	437.44	2.81	555.55	2.44	705.35	2.12	885.63	1.86	1093.42	1.64	1323.09	1.47	1574.64	1.33
59.27	10.44	73.17	9.23	116.19	7.05	147.61	6.13	187.36	5.33	237.10	4.65	292.69	4.11	464.78	3.14	590.27	2.73	749.44	2.38	940.98	2.08	1161.76	1.84	1405.78	1.65	1673.05	1.49
62.76	11.60	77.48	10.26	123.03	7.83	156.30	6.81	198.38	5.93	251.04	5.17	309.90	4.57	492.11	3.49	624.99	3.03	793.52	2.64	996.33	2.31	1230.10	2.04	1488.48	1.83	1771.47	1.65
66.25	12.83	81.78	11.34	129.86	8.66	164.98	7.53	209.40	6.55	264.99	5.71	327.12	5.05	519.45	3.86	659.71	3.35	837.60	2.92	1051.68	2.56	1298.44	2.26	1571.17	2.02	1869.88	1.83
69.73	14.10	86.08	12.47	136.70	9.52	173.66	8.28	220.42	7.21	278.94	6.28	344.34	5.55	546.79	4.24	694.44	3.69	881.69	3.21	1107.03	2.81	1366.77	2.48	1653.86	2.22	1968.30	2.01
73.22	15.44	90.39	13.65	143.53	10.42	182.34	9.06	231.44	7.89	292.89	6.87	361.55	6.08	574.13	4.64	729.16	4.04	925.77	3.51	1162.39	3.08	1435.11	2.72	1736.56	2.43	2066.71	2.20
76.71	16.83	94.69	14.88	150.37	11.36	191.03	9.88	242.46	8.60	306.83	7.49	378.77	6.63	601.47	5.06	763.88	4.40	969.86	3.83	1217.74	3.35	1503.45	2.96	1819.25	2.65	2165.13	2.40
80.19	18.27	99.00	16.16	157.20	12.34	199.71	10.73	253.49	9.33	320.78	8.14	395.99	7.20	628.81	5.49	798.60	4.78	1013.94	4.16	1273.09	3.64	1571.79	3.22	1901.94	2.88	2263.54	2.60
83.68	19.77	103.30	17.48	164.04	13.35	208.39	11.61	264.51	10.10	334.73	8.80	413.20	7.79	656.15	5.94	833.32	5.17	1058.03	4.50	1328.44	3.94	1640.13	3.48	1984.63	3.12	2361.96	2.82
87.17	21.32	107.61	18.86	170.87	14.40	217.08	12.52	275.53	10.89	348.67	9.49	430.42	8.40	683.49	6.41	868.05	5.58	1102.11	4.85	1383.79	4.25	1708.47	3.76	2067.33	3.36	2460.37	3.04
90.66	22.93	111.91	20.28	177.71	15.48	225.76	13.46	286.55	11.71	362.62	10.21	447.64	9.03	710.83	6.89	902.77	6.00	1146.20	5.22	1439.15	4.57	1776.81	4.04	2150.02	3.61	2558.79	3.27
94.14	24.59	116.21	21.74	184.54	16.60	234.44	14.44	297.57	12.56	376.57	10.95	464.85	9.68	738.17	7.39	937.49	6.43	1190.28	5.59	1494.50	4.90	1845.15	4.33	2232.71	3.88	2657.20	3.50
97.63	26.30	120.52	23.26	191.38	17.76	243.13	15.44	308.59	13.44	390.51	11.71	482.07	10.36	765.51	7.91	972.21	6.88	1234.36	5.98	1549.85	5.24	1913.48	4.63	2315.41	4.15	2755.61	3.75
101.12	28.07	124.82	24.82	198.21	18.95	251.81	16.48	319.61	14.34	404.46	12.50	499.29	11.05	792.85	8.44	1006.93	7.34	1278.45	6.39	1605.20	5.59	1981.82	4.94	2398.10	4.42	2854.03	4.00
104.60	29.88	129.13	26.43	205.05	20.18	260.49	17.55	330.63	15.27	418.41	13.31	516.50	11.77	820.19	8.99	1041.65	7.82	1322.53	6.80	1660.55	5.95	2050.16	5.27	2480.79	4.71	2952.44	4.26
108.09	31.76	133.43	28.08	211.88	21.44	269.18	18.65	341.65	16.22	432.36	14.14	533.72	12.51	847.53	9.55	1076.38	8.31	1366.62	7.23	1715.90	6.33	2118.50	5.59	2563.49	5.01	3050.86	4.52
111.58	33.68	137.73	29.78	218.72	22.74	277.86	19.78	352.68	17.21	446.30	15.00	550.94	13.26	874.87	10.13	1111.10	8.81	1410.70	7.66	1771.26	6.71	2186.84	5.93	2646.18	5.31	3149.27	4.80
115.06	35.65	142.04	31.53	225.55	24.07	286.54	20.94	363.70	18.22	460.25	15.88	568.15	14.04	902.21	10.72	1145.82	9.33	1454.79	8.11	1826.61	7.10	2255.18	6.28	2728.87	5.62	3247.69	5.08
118.55	37.68	146.34	33.32	232.39	25.44	295.22	22.13	374.72	19.25	474.20	16.78	585.37	14.84	929.55	11.33	1180.54	9.86	1498.87	8.57	1881.96	7.51	2323.52	6.64	2811.57	5.94	3346.10	5.37
122.04	39.76	150.65	35.16	239.22	26.84	303.91	23.35	385.74	20.31	488.14	17.71	602.59	15.66	956.89	11.96	1215.26	10.40	1542.96	9.05	1937.31	7.92	2391.86	7.00	2894.26	6.27	3444.52	5.66
125.52	41.89	154.95	37.04	246.06	28.28	312.59	24.60	396.76	21.40	502.09	18.65	619.81	16.50	984.23	12.60	1249.99	10.96	1587.04	9.53	1992.66	8.35	2460.19	7.38	2976.95	6.60	3542.93	5.97
129.01	44.07	159.26	38.97	252.89	29.75	321.27	25.88	407.78	22.52	516.04	19.63	637.02	17.36	1011.57	13.25	1284.71	11.53	1631.12	10.03	2048.01	8.78	2528.53	7.76	3059.64	6.95	3641.35	6.28
132.50	46.30	163.56	40.94	259.73	31.26	329.96	27.19	418.80	23.66	529.98	20.62	654.24	18.23	1038.91	13.92	1319.43	12.11	1675.21	10.53	2103.37	9.22	2596.87	8.16	3142.34	7.30	3739.76	6.59
135.98	48.58	167.86	42.96	266.56	32.80	338.64	28.53	429.82	24.82	543.93	21.64	671.46	19.13	1066.25	14.61	1354.15	12.71	1719.29	11.05	2158.72	9.68	2665.21	8.56	3225.03	7.66	3838.18	6.92
139.47	50.91	172.17	45.03	273.40	34.38	347.32	29.90	440.84	26.01	557.88	22.67	688.67	20.05	1093.59	15.31	1388.87	13.32	1763.38	11.58	2214.07	10.14	2733.55	8.97	3307.72	8.03	3936.59	7.25

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

Pressure loss tables

TOM® PVC-O 500 PN25

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

Internal Diameter	DN90 PN25 83.0		DN110 PN25 100.8		DN125 PN25 114.5		DN140 PN25 128.3		DN160 PN25 146.6		DN200 PN25 183.3	
Speed	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
(m/s)	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
0.1	0.54	0.16	0.80	0.13	1.03	0.11	1.29	0.10	1.69	0.08	2.64	0.06
0.2	1.08	0.59	1.60	0.47	2.06	0.40	2.59	0.35	3.38	0.30	5.28	0.23
0.3	1.62	1.24	2.39	0.99	3.09	0.86	3.88	0.75	5.06	0.64	7.92	0.49
0.4	2.16	2.12	3.19	1.69	4.12	1.46	5.17	1.28	6.75	1.09	10.56	0.84
0.5	2.71	3.22	3.99	2.56	5.15	2.21	6.46	1.93	8.44	1.65	13.19	1.27
0.6	3.25	4.51	4.79	3.59	6.18	3.09	7.76	2.71	10.13	2.32	15.83	1.78
0.7	3.79	5.99	5.59	4.78	7.21	4.11	9.05	3.60	11.82	3.08	18.47	2.37
0.8	4.33	7.67	6.38	6.10	8.24	5.27	10.34	4.61	13.50	3.94	21.11	3.04
0.9	4.87	9.53	7.18	7.59	9.27	6.55	11.64	5.74	15.19	4.91	23.75	3.78
1.0	5.41	11.58	7.98	9.24	10.30	7.96	12.93	6.97	16.88	5.97	26.39	4.60
1.1	5.95	13.82	8.78	11.02	11.33	9.50	14.22	8.31	18.57	7.12	29.03	5.48
1.2	6.49	16.23	9.58	12.96	12.36	11.16	15.51	9.76	20.26	8.37	31.67	6.44
1.3	7.03	18.82	10.37	15.00	13.39	12.95	16.81	11.33	21.94	9.70	34.31	7.47
1.4	7.57	21.58	11.17	17.22	14.42	14.85	18.10	13.00	23.63	11.12	36.94	8.57
1.5	8.12	24.57	11.97	19.57	15.45	16.88	19.39	14.77	25.32	12.64	39.58	9.74
1.6	8.66	27.69	12.77	22.06	16.47	19.00	20.69	16.65	27.01	14.25	42.22	10.98
1.7	9.20	30.97	13.57	24.69	17.50	21.26	21.98	18.62	28.70	15.94	44.86	12.28
1.8	9.74	34.42	14.36	27.42	18.53	23.63	23.27	20.70	30.38	17.71	47.50	13.65
1.9	10.28	38.04	15.16	30.31	19.56	26.12	24.56	22.87	32.07	19.58	50.14	15.09
2.0	10.82	41.82	15.96	33.34	20.59	28.73	25.86	25.17	33.76	21.54	52.78	16.59
2.1	11.36	45.77	16.76	36.50	21.62	31.44	27.15	27.54	35.45	23.58	55.42	18.16
2.2	11.90	49.88	17.56	39.79	22.65	34.27	28.44	30.01	37.13	25.69	58.05	19.79
2.3	12.44	54.15	18.35	43.17	23.68	37.22	29.74	32.60	38.82	27.89	60.69	21.49
2.4	12.99	58.67	19.15	46.72	24.71	40.27	31.03	35.27	40.51	30.18	63.33	23.26
2.5	13.53	63.26	19.95	50.40	25.74	43.43	32.32	38.04	42.20	32.56	65.97	25.08
2.6	14.07	68.02	20.75	54.21	26.77	46.71	33.61	40.89	43.89	35.01	68.61	26.97
2.7	14.61	72.93	21.55	58.14	27.80	50.09	34.91	43.87	45.57	37.54	71.25	28.93
2.8	15.15	78.00	22.34	62.15	28.83	53.58	36.20	46.92	47.26	40.16	73.89	30.94
2.9	15.69	83.23	23.14	66.34	29.86	57.18	37.49	50.07	48.95	42.86	76.53	33.02
3.0	16.23	88.61	23.94	70.65	30.89	60.89	38.79	53.33	50.64	45.64	79.17	35.16
3.1	16.77	94.15	24.74	75.08	31.92	64.70	40.08	56.66	52.33	48.50	81.80	37.36
3.2	17.31	99.84	25.54	79.64	32.95	68.62	41.37	60.08	54.01	51.42	84.44	39.62
3.3	17.86	105.80	26.33	84.26	33.98	72.64	42.66	63.60	55.70	54.44	87.08	41.95
3.4	18.40	111.80	27.13	89.07	35.01	76.78	43.96	67.23	57.39	57.54	89.72	44.33
3.5	18.94	117.95	27.93	93.99	36.04	81.01	45.25	70.93	59.08	60.71	92.36	46.78
3.6	19.48	124.25	28.73	99.04	37.07	85.35	46.54	74.72	60.77	63.97	95.00	49.28
3.7	20.02	130.71	29.53	104.21	38.10	89.79	47.83	78.61	62.45	67.28	97.64	51.85
3.8	20.56	137.31	30.32	109.43	39.13	94.34	49.13	82.61	64.14	70.69	100.28	54.48
3.9	21.10	144.07	31.12	114.83	40.16	98.99	50.42	86.67	65.83	74.18	102.92	57.16
4.0	21.64	150.97	31.92	120.36	41.19	103.75	51.71	90.82	67.52	77.75	105.55	59.90

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

TOM® PVC-O 500 PN25

Pipe head loss is the energy of a hydraulic fluid that is lost along itself due to friction. Below is the calculation of estimated water speeds depending on the selected pipe for installation.

DN225 PN25 206.2		DN250 PN25 229.1		DN315 PN25 288.6		DN355 PN25 325.3		DN400 PN25 366.5		DN450 PN25 412.3		DN500 PN25 458.1		DN630 PN25 577,2		DN710 PN25 654.7		DN800 PN25 733.0		DN900 PN25 824.1		DN1000 PN25 915.6		DN1100 PN25 1007.2		DN1200 PN25 1098.8	
Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km	l/s	m/km
3.34	0.06	4.12	0.05	6.54	0.04	8.31	0.03	10.55	0.03	13.35	0.03	16.48	0.02	26.17	0.02	33.66	0.01	42.20	0.01	53.34	0.01	65.84	0.01	79.67	0.01	94.83	0.01
6.68	0.20	8.24	0.18	13.08	0.14	16.62	0.12	21.10	0.10	26.70	0.09	32.96	0.08	52.33	0.06	67.33	0.05	84.40	0.05	106.68	0.04	131.68	0.04	159.35	0.03	189.65	0.03
10.02	0.43	12.37	0.38	19.62	0.29	24.93	0.25	31.65	0.22	40.05	0.19	49.45	0.17	78.50	0.13	100.99	0.11	126.60	0.10	160.02	0.09	197.53	0.08	239.02	0.07	284.48	0.06
13.36	0.73	16.49	0.65	26.17	0.50	33.24	0.43	42.20	0.38	53.40	0.33	65.93	0.29	104.67	0.22	134.66	0.19	168.79	0.17	213.36	0.15	263.37	0.13	318.70	0.12	379.30	0.10
16.70	1.11	20.61	0.98	32.71	0.75	41.56	0.65	52.75	0.57	66.76	0.49	82.41	0.44	130.83	0.33	168.32	0.29	210.99	0.25	266.70	0.22	329.21	0.19	398.37	0.17	474.13	0.16
20.04	1.56	24.73	1.38	39.25	1.05	49.87	0.91	63.30	0.80	80.11	0.69	98.89	0.61	157.00	0.47	201.99	0.40	253.19	0.35	320.04	0.31	395.05	0.27	478.05	0.24	568.96	0.22
23.38	2.07	28.86	1.83	45.79	1.40	58.18	1.22	73.85	1.06	93.46	0.92	115.37	0.82	183.16	0.62	235.65	0.54	295.39	0.47	373.38	0.41	460.89	0.36	557.72	0.33	663.78	0.29
26.72	2.65	32.98	2.34	52.33	1.79	66.49	1.56	84.40	1.35	106.81	1.18	131.86	1.04	209.33	0.80	269.32	0.69	337.59	0.60	426.72	0.53	526.73	0.47	637.40	0.42	758.61	0.38
30.05	3.30	37.10	2.91	58.87	2.23	74.80	1.94	94.95	1.68	120.16	1.47	148.34	1.30	235.50	0.99	302.98	0.86	379.79	0.75	480.06	0.65	592.58	0.58	717.07	0.52	853.43	0.47
33.39	4.01	41.22	3.54	65.42	2.71	83.11	2.35	105.50	2.05	133.51	1.78	164.82	1.58	261.66	1.21	336.65	1.04	421.99	0.91	533.40	0.80	658.42	0.70	796.75	0.63	948.26	0.57
36.73	4.78	45.35	4.23	71.96	3.23	91.42	2.81	116.05	2.44	146.86	2.13	181.30	1.88	287.83	1.44	370.31	1.24	464.18	1.09	586.74	0.95	724.26	0.84	876.42	0.75	1043.09	0.68
40.07	5.61	49.47	4.97	78.50	3.79	99.73	3.30	126.60	2.87	160.21	2.50	197.78	2.21	314.00	1.69	403.98	1.46	506.38	1.28	640.08	1.11	790.10	0.99	956.10	0.88	1137.91	0.80
43.41	6.51	53.59	5.76	85.04	4.40	108.04	3.83	137.15	3.33	173.56	2.90	214.27	2.57	340.16	1.96	437.64	1.69	548.58	1.48	693.41	1.29	855.94	1.14	1035.77	1.02	1232.74	0.92
46.75	7.47	57.71	6.61	91.58	5.05	116.36	4.39	147.70	3.82	186.92	3.33	230.75	2.94	366.33	2.25	471.31	1.94	590.78	1.70	746.75	1.48	921.78	1.31	1115.45	1.17	1327.56	1.06
50.09	8.49	61.83	7.51	98.12	5.73	124.67	4.99	158.24	4.34	200.27	3.78	247.23	3.34	392.49	2.55	504.97	2.20	632.98	1.93	800.09	1.69	987.63	1.49	1195.12	1.33	1422.39	1.20
53.43	9.57	65.96	8.46	104.67	6.46	132.98	5.62	168.79	4.89	213.62	4.26	263.71	3.77	418.66	2.88	538.63	2.48	675.18	2.18	853.43	1.90	1053.47	1.68	1274.80	1.50	1517.22	1.36
56.77	10.70	70.08	9.47	111.21	7.23	141.29	6.29	179.34	5.47	226.97	4.77	280.19	4.22	444.83	3.22	572.30	2.78	717.38	2.44	906.77	2.13	1119.31	1.88	1354.47	1.68	1612.04	1.52
60.11	11.90	74.20	10.52	117.75	8.04	149.60	6.99	189.89	6.08	240.32	5.30	296.68	4.69	470.99	3.58	605.96	3.09	759.57	2.71	960.11	2.36	1185.15	2.09	1434.15	1.87	1706.87	1.69
63.45	13.15	78.32	11.63	124.29	8.88	157.91	7.73	200.44	6.72	253.67	5.86	313.16	5.18	497.16	3.96	639.63	3.42	801.77	2.99	1013.45	2.61	1250.99	2.31	1513.82	2.07	1801.69	1.87
66.79	14.46	82.45	12.79	130.83	9.77	166.22	8.50	210.99	7.39	267.02	6.44	329.64	5.70	523.33	4.35	673.29	3.76	843.97	3.29	1066.79	2.87	1316.84	2.54	1593.50	2.27	1896.52	2.05
70.13	15.83	86.57	14.00	137.37	10.69	174.53	9.30	221.54	8.09	280.37	7.05	346.12	6.24	549.49	4.76	706.96	4.11	886.17	3.60	1120.13	3.14	1382.68	2.78	1673.17	2.49	1991.34	2.25
73.47	17.26	90.69	15.26	143.91	11.65	182.84	10.14	232.09	8.82	293.72	7.69	362.60	6.80	575.66	5.19	740.62	4.48	928.37	3.93	1173.47	3.43	1448.52	3.03	1752.85	2.71	2086.17	2.45
76.81	18.74	94.81	16.57	150.46	12.66	191.16	11.01	242.64	9.58	307.07	8.35	379.09	7.38	601.83	5.64	774.29	4.87	970.57	4.26	1226.81	3.72	1514.36	3.29	1832.52	2.94	2181.00	2.66
80.15	20.27	98.94	17.93	157.00	13.69	199.47	11.91	253.19	10.36	320.43	9.03	395.57	7.99	627.99	6.10	807.95	5.26	1012.77	4.61	1280.15	4.02	1580.20	3.56	1912.20	3.18	2275.82	2.88
83.48	21.86	103.06	19.34	163.54	14.77	207.78	12.84	263.74	11.17	333.78	9.74	412.05	8.61	654.16	6.58	841.62	5.68	1054.96	4.98	1333.49	4.34	1646.04	3.84	1991.87	3.43	2370.65	3.10
86.82	23.51	107.18	20.79	170.08	15.88	216.09	13.81	274.29	12.02	347.13	10.47	428.53	9.26	680.32	7.07	875.28	6.11	1097.16	5.35	1386.83	4.67	1711.89	4.13	2071.55	3.69	2465.47	3.34
90.16	25.21	111.30	22.30	176.62	17.03	224.40	14.81	284.84	12.89	360.48	11.23	445.01	9.93	706.49	7.58	908.95	6.55	1139.36	5.74	1440.17	5.01	1777.73	4.43	2151.22	3.96	2560.30	3.58
93.50	26.97	115.42	23.85	183.16	18.22	232.71	15.84	295.39	13.78	373.83	12.01	461.50	10.63	732.66	8.11	942.61	7.00	1181.56	6.14	1493.51	5.35	1843.57	4.74	2230.90	4.24	2655.13	3.83
96.84	28.78	119.55	25.45	189.71	19.44	241.02	16.91	305.94	14.71	387.18	12.82	477.98	11.34	758.82	8.66	976.28	7.47	1223.76	6.55	1546.85	5.71	1909.41	5.05	2310.57	4.52	2749.95	4.08
100.18	30.65	123.67	27.10	196.25	20.70	249.33	18.00	316.49	15.66	400.53	13.65	494.46	12.07	784.99	9.22	1009.94	7.96	1265.96	6.98	1600.19	6.08	1975.25	5.38	2390.25	4.81	2844.78	4.35
103.52	32.56	127.79	28.80	202.79	22.00	257.64	19.13	327.04	16.64	413.88	14.51	510.94	12.83	811.16	9.80	1043.61	8.46	1308.16	7.41	1653.53	6.47	2041.09	5.72	2469.92	5.12	2939.60	4.62
106.86	34.54	131.91	30.54	209.33	23.33	265.95	20.29	337.59	17.65	427.23	15.39	527.42	13.61	837.32	10.39	1077.27	8.97	1350.35	7.86	1706.87	6.86	2106.94	6.06	2549.60	5.43	3034.43	4.90
110.20	36.56	136.04	32.34	215.87	24.70	274.27	21.48	348.14	18.69	440.59	16.29	543.91	14.40	863.49	11.00	1110.93	9.49	1392.55	8.32	1760.21	7.26	2172.78	6.42	2629.27	5.74	3129.26	5.19
113.54	38.64	140.16	34.17	222.41	26.10	282.58	22.70	358.69	19.75	453.94	17.21	560.39	15.22	889.65	11.62	1144.60	10.03	1434.75	8.80	1813.55	7.67	2238.62	6.78	2708.95	6.07	3224.08	5.48
116.88	40.77	144.28	36.06	228.96	27.54	290.89	23.95	369.24	20.84	467.29	18.16	576.87	16.06	915.82	12.27	1178.26	10.59	1476.95	9.28	1866.89	8.09	2304.46	7.16	2788.62	6.40	3318.91	5.79
120.22	42.96	148.40	37.99	235.50	29.02	299.20	25.23	379.79	21.95	480.64	19.14	593.35	16.92	941.99	12.92	1211.93	11.16	1519.15	9.78	1920.23	8.53	2370.30	7.54	2868.30	6.75	3413.73	6.10
123.56	45.19	152.53	39.97	242.04	30.53	307.51	26.55	390.34	23.10	493.99	20.13	609.83	17.80	968.15	13.59	1245.59	11.74	1561.35	10.29	1973.56	8.97	2436.15	7.93	2947.97	7.10	3508.56	6.41
126.90	47.48	156.65	41.99	248.58	32.07	315.82	27.89	400.89	24.27	507.34	21.15	626.32	18.70	994.32	14.28	1279.26	12.33	1603.55	10.81	2026.90	9.43	2501.99	8.34	3027.64	7.46	3603.39	6.74
130.24	49.82	160.77	44.06	255.12	33.65	324.13	29.26	411.44	25.46	520.69	22.19	642.80	19.63	1020.49	14.99	1312.92	12.94	1645.74	11.34	2080.24	9.89	2567.83	8.75	3107.32	7.83	3698.21	7.07
133.58	52.21	164.89	46.17	261.66	35.27	332.44	30.67	421.99	26.69	534.04	23.26	659.28	20.57	1046.65	15.71	1346.59	13.56	1687.94	11.88	2133.58	10.37	2633.67	9.17	3186.99	8.20	3793.04	7.41

Shaded values: estimation of recommended water speeds to avoid sedimentation, water hammer, noises, erosion and high values of head loss according to Manning formula.

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