



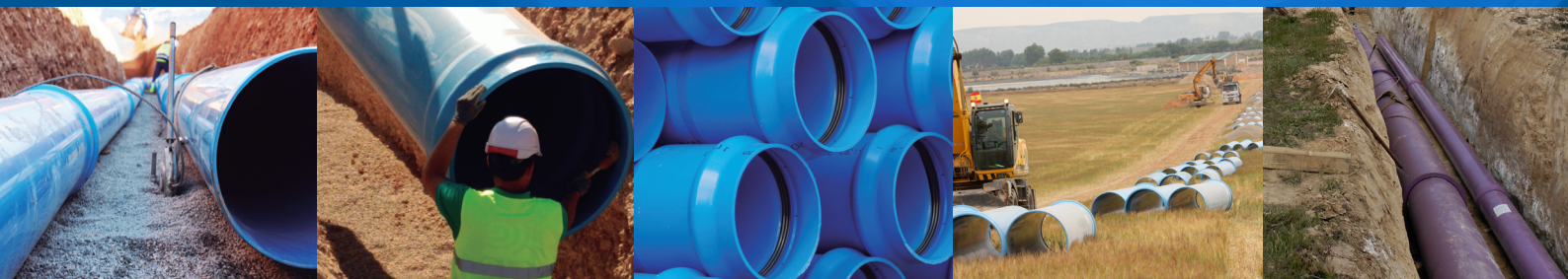
MOLECOR
South East Asia



TOM

Technical Sheet

TOM[®] High Pressure Oriented PVC Pipes (PVC-O)



Applicable standards

- **SNI ISO 16422:2014** (Indonesia) "Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure".
- **UNE-EN 17176:2019** (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 16422:2014** (International Standard) "Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure".
- **AS/NZS 4441:2017** (Australia) "Oriented PVC (PVC-O) pipes for pressure applications".
- **ASTM F1483-17** (USA) "Standard Specification for Oriented Poly(Vinyl Chloride), PVCO, Pressure Pipe"; and ANSI/AWWA C909-16 "Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe".
- **CAN/CSA-B137.3.1-13** (Canada) "Molecularly oriented polyvinylchloride (PVCO) pipe for pressure applications".
- **IS 16647-2017** (India) "Oriented Unplasticized Polyvinyl Chloride (PVC-O) Pipes for Water Supply – Specification".



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 C1.4 (e)	Inside Diameter (ID)	Wall Thickness C1.4 (e)	Inside Diameter (ID)	Wall Thickness C1.4 (e)	Inside Diameter (ID)	Wall Thickness C1.4 (e)
	min.	max.								
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 ⁽¹⁾	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	-	1039.6	-	1026.1	-	1007.2	-
1200 ⁽¹⁾	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 6.00 metres (including the length limit mark for the socket). The inside diameters may be subjected to variation according to manufacturing tolerances. 5.95 metres for export purposes and other lengths upon request. Consult manufacturing specifications.

(1) Items upon request. Consult delivery time.

DN1100: Not contemplated in ISO 16422: 2014 nor EN 17176: 2019.

DN1200: Not contemplated in ISO 16422: 2014 standard, manufactured according to EN 17176: 2019 standard specifications.

Packaging

TOM® PVC-O 500 Pipe											
DN	Pipes/ Pallet	Pallet/ Truck	Pipes/ Truck	Metres ⁽¹⁾ / 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	115	8	920	5520	1190	885	6200	736	828	794	966
110	76	8	608	3648	1190	885	6200	714	638	775	935
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	28	8	224	1344	1100	795	6240	484	521	610	739
200	18	8	144	864	1100	795	6260	486	518	610	745
225	14	16	224	1333	1220	700	6190	480	530	603	780
250	11	8	88	528	1100	795	6320	465	488	585	706
315	13	6	78	468	2310	670	6220	865	920	1089	1326
355	11	6	66	396	2150	740	6300	930	990	1170	1426
400	9	4	36	216	2020	850	6220	958	1031	1211	1480
450	5	6	30	180	2270	550	6220	685	723	860	1098
500	4	6	24	144	2020	600	6220	675	715	850	1085
630	3	6	18	108	1910	730	6220	800	851	1005	1292
710	3	6	18	107	2200	810	6425	1010	1105	1270	1645
800	2	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	2000	1250	6540	1585	1750	2120	2630
1200	2	4	8	48	2000	1350	6575	1885	2080	2520	3125

(1) Nominal metres (6.00 metres per pipe). The effective length is the total length minus the length limit marked for the assembly. 5.95 metres for export purposes. Other packagings or lengths upon request. The combined pallet height shall not exceed 2,400 mm for a standard truck. In case the load exceeds the height of 2,400 mm, it will be necessary to use a special truck.

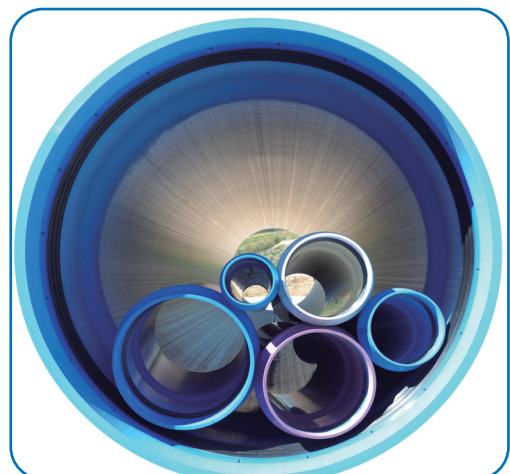
SIRIM - Product Certification License
 N° PC002014 according to ISO 16422:2014



AENOR Product Certification



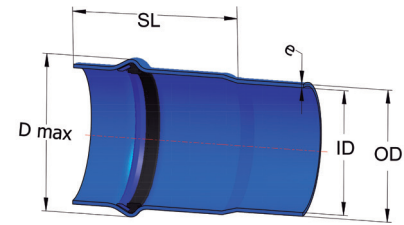
n° 001/007104 according to UNE-EN 17176-1:2019
 n° 001/006537 according to ISO 16422:2014



Connection system and elastomeric rubber 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 EPDM rubber 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	165	117	138	137	137	133
110	180	140	151	150	150	146
125	185	154	160	160	158	154
140	190	174	149	149	146	141
160	210	197	179	176	173	168
200	230	243	190	187	183	176
225	240	271	197	194	190	182
250	270	301	226	222	217	209
315	305	374	255	251	245	234
355	335	419	281	277	270	258
400	345	472	287	282	274	261
450	375	527	314	308	298	283
500	420	587	355	349	337	320
630	485	734	409	401	385	365
710	475	815	392	383	369	342
800	475	925	385	375	359	329
900	530	1034	430	419	395	354
1000	565	1143	455	443	424	371
1100	590	1250	475	461	431	382
1200	615	1360	487	472	447	403



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.



(1) 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.

Management of Quality System

Certified by AENOR according to the **UNE-ISO 9001:2015** and **UNE-ISO 14001:2015** 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”. “The production of Oriented Poly(Vinyl Chloride) (PVC-O) pipe for the transport of fluids under pressure”.



ER-1644/2008
ER-0440/1996



GA-2014/0250
GA-2001/0255



Health standards for drinking water

- Tests according to the Spanish **Royal Decree (RD140/2003)**: “Criterios sanitarios de la calidad del agua de consumo humano” (Sanitary criteria for the quality of drinking water).
- **ACS** (Attestation de Conformité Sanitaire) certificate according to the standards of the French Ministry of Health.
- **WRAS** (Water Regulations Advisory Scheme) and **DWI** (Drinking Water Inspectorate) certificates according to the standards of United Kingdom.
- **HYDROCHECK** certificate according to the Belgian requirements by Belgaqua (Federation Belge du Secteur de l’eau).

Technical features

Mechanical properties of the pipe		TOM® PVC-O 500 Pipe			
Nominal Pressure (bar)	PN12.5	PN16	PN20	PN25	
Material Class	500				
Minimum required strength MRS (Mpa)	50.0				
Overall 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/m ²) ⁽³⁾	5	7	11	20	
Tangential stress of pipe design to flexion-traction Short-term (N/mm ²) ⁽⁴⁾	100				
Tangential stress of pipe design to flexion-traction Long-term (N/mm ²) ⁽⁴⁾	70				
Modulus of elasticity in transverse flexion Short-term (N/mm ²) ⁽⁵⁾	4,000				
Modulus of elasticity in transverse flexion Long-term (N/mm ²) ⁽⁵⁾	2,800				
Short term elasticity modulus (E) (MPa)	4,000				
Standard dimension ratio (SDR)	51.0	45.8	36.0	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 805:2000 with an estimated Water Hammer.

(3) Average stiffness per pipe according to established tolerances.

(4) According to UNE 53331:2020, table 11.

(5) According to UNE 53331:2020, table 1.

Other characteristics of the material	Units	Value
Density	kg/dm ³	1.35 - 1.46 ⁽¹⁾
PVC Resin K value	-	>64
VCM Vinyl chloride monomer ⁽²⁾	ppm	<1
Shore hardness D at 20 °C	-	81 - 85
Poisson coefficient	-	0.4
Vicat temperature	°C	≥80
Lineal expansion coefficient	°C ⁻¹	7·10 ⁻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

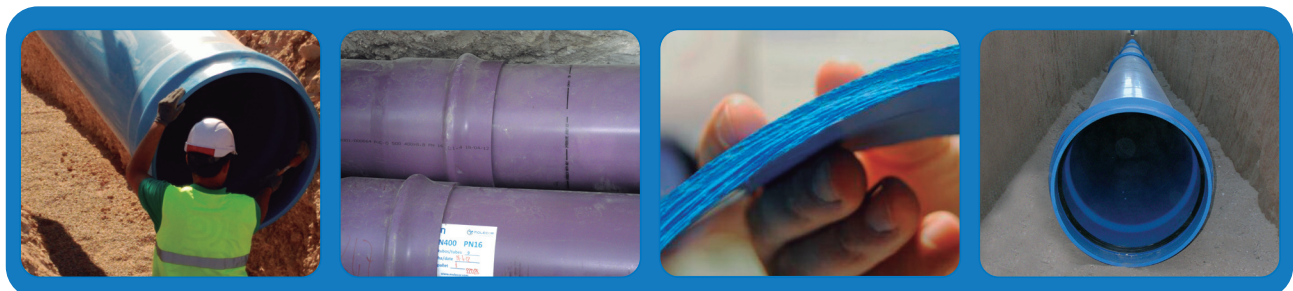
Pipe tests

TOM® PVC-O 500 Pipe				
	PN12.5	PN16	PN20	PN25
Tests	Testing Parameters			
Dimensional ⁽¹⁾	Depending on DN			
Density	1370 a 1430 kg/m ³			
Impact resistance (0 °C) ⁽²⁾				
Ø90	98 N·m			
Ø110, Ø125	124 N·m			
Ø140, Ø160	157 N·m			
Ø200	196 N·m			
≥Ø225 - Ø800	245 N·m			
Circumferential stiffness RCE (kN/m ²) ⁽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)	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) Falling weight impact energy (depending on DN) from a 2 meters drop height tested in test-pipes temperature at 0 °C.

(3) Average stiffness per pipe according to established tolerances.



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 °)	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)	6.3 to 12.5 bar cycle	8 to 16 bar cycle	10 to 20 bar cycle	12.5 to 25 bar cycle



Mechanical calculation program

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Pressure loss tables (J): 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	
	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
Speed (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.

Pressure loss tables (J): 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	2																				

Pressure loss tables (J): 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	
	Flow (m/s)	J (l/s)	Flow (m/s)	J (l/s)	Flow (m/s)	J (l/s)	Flow (m/s)	J (l/s)	Flow (m/s)	J (l/s)	Flow (m/s)	J (l/s)
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

Pressure loss tables (J): 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.																	

Pressure loss tables (J): 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	
	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J	Flow	J
	(m/s) l/s	m/km	(m/s) l/s	m/km	(m/s) l/s	m/km	(m/s) l/s	m/km	(m/s) l/s	m/km	(m/s) 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

Pressure loss tables

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 (J): 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																						

Pressure loss tables (J): 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	
	Flow (m/s)	J l/s	Flow (m/s)	J l/s	Flow (m/s)	J l/s	Flow (m/s)	J l/s	Flow (m/s)	J l/s	Flow (m/s)	J l/s
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

Pressure loss tables

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 (J): 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	332.4																					



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