

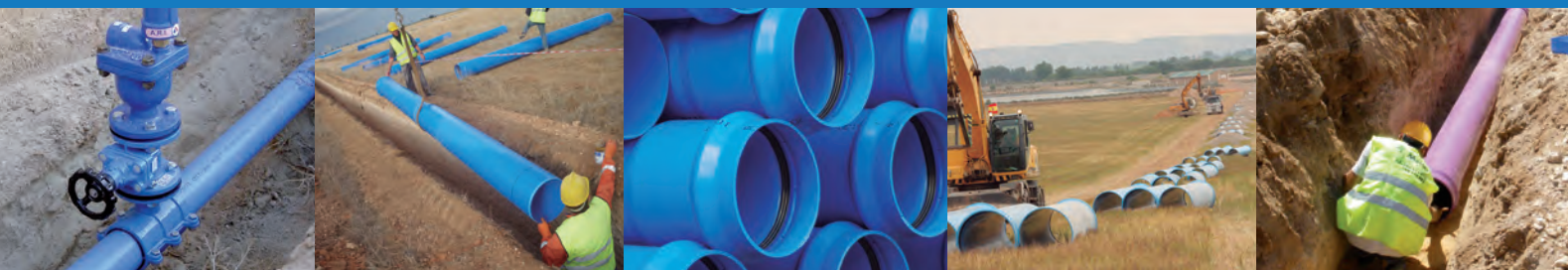
# TECHNICAL SHEET



**TOM**



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



## Applicable standards

- **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”.
- **SANS 16422:2016** (South Africa) “Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure”.
- **NP-ISO 16.422/2014** (Paraguay) “Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure”.
- **GOST R 56927-2016** (Russia) “Трубы из ориентированного непластифицированного поливинилхлорида для водоснабжения. Технические условия”.
- **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	115.3	4.3
140	140.0	140.5	132.3	2.5	132.3	3.1	131.1	3.9	129.1	4.8
160	160.0	160.5	152.1	2.8	151.2	3.5	149.8	4.4	147.5	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	207.5	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	461.1	17.1
630	630.0	631.9	598.8	11.0	595.4	13.8	590.0	17.3	581.0	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 <sup>(1)</sup>	1100.0	1103.3	1045.5	-	1039.6	-	1026.1	-	1007.2	-
1200 <sup>(1)</sup>	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 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 <sup>(1)</sup> / 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	675	
110	76	12	912	5426	1220	850	6130	715	775	775	1005	
125	60	12	720	4284	1220	850	6135	725	725	790	960	
140	45	12	540	3213	1220	850	6140	650	650	745	905	
160	33	12	396	2356	1220	800	6150	570	625	715	865	
200	23	12	276	1642	1170	950	6185	615	680	780	1005	
225	14	16	224	1333	1220	700	6190	480	525	605	730	
250	11	12	132	785	1100	800	6215	465	510	585	755	
315	13	8	104	619	2200	700	6260	860	950	1090	1410	
355	11	6	66	393	2200	800	6295	925	1020	1165	1510	
400	11	6	66	393	2400	850	6325	1165	1285	1475	1910	
450	5	10	50	298	2200	550	6330	685	755	860	1110	
500	4	8	32	190	1950	600	6335	675	740	850	1025	
630	3	6	18	107	1950	730	6410	795	875	1005	1215	
710	3	6	18	107	2200	810	6425	1005	1105	1270	1535	
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	1755	2175	
1100	2	4	8	48	2200	1250	6540	1585	1750	2120	2630	
1200	2	4	8	48	2400	1350	6575	1885	2080	2520	3125	

(1) Nominal metres (5.95 metres per pipe). The effective length is the total length minus the length limit marked for the assembly. 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.

### AENOR Product certification

nº 001/007104 according to UNE-EN 17176-1:2019. Mark

nº 001/006537 according to ISO 16422:2014. Mark

## 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 <sup>(1)</sup>	AENOR  001/000857	72/01
Material and Class	PVC - O 500	PVC - BO
Diameter, Wall Thickness and Nominal Diameter	200 x 4.4 - PN 16	200 PN 16 BARS
Coefficient C	C 1.4	-
Date - Hour - Batch	17/02/2019 02:55 59011	17/02/2019 02:55 59011
Reference standard	UNE-EN 17176 ISO 16422 SANS 16422	NF -T54-948

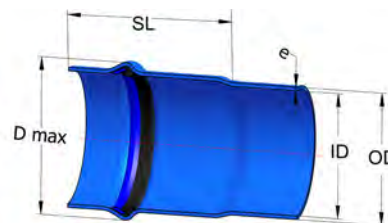


(1) The updated certificates of the certificated references can be downloaded at [www.molecor.com](http://www.molecor.com).

## 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	345	419	281	277	270	258
400	355	472	297	292	284	271
450	375	527	314	308	298	283
500	385	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	530	1034	430	419	395	354
1000	565	1143	455	443	416	371
1100	590	1250	475	461	431	382
1200	625	1360	499	484	452	398



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”.



## Health standards for drinking water

- Tests according to the Spanish **Royal Decree (RD140/2003)**: “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) 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 ( $\sigma$ ) (MPa)	36.0				
Burst pressure over 50 years (bar) <sup>(1)</sup>	17.5	22.4	28.0	35.0	
Burst pressure over 10 hours (bar) <sup>(1)</sup>	23.1	28.9	36.7	48.1	
Minimum breaking pressure by burst (bar) <sup>(1)</sup>	32.0	38.0	48.0	60.0	
Maximum trial pressure onsite (bar) <sup>(2)</sup>	17.5	21.0	25.0	30.0	
Circumferential stiffness (kN/m <sup>2</sup> ) <sup>(3)</sup>	5	7	11	20	
Tangential stress of pipe design to flexion-traction Short-term (N/mm <sup>2</sup> ) <sup>(4)</sup>	100				
Tangential stress of pipe design to flexion-traction Long-term (N/mm <sup>2</sup> ) <sup>(4)</sup>	70				
Modulus of elasticity in transverse flexion Short-term (N/mm <sup>2</sup> ) <sup>(5)</sup>	4,000				
Modulus of elasticity in transverse flexion Long-term (N/mm <sup>2</sup> ) <sup>(5)</sup>	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 <sup>3</sup>	1.35 - 1.46 <sup>(1)</sup>
PVC Resin K value	-	>64
VCM Vinyl chloride monomer <sup>(2)</sup>	ppm	<1
Shore hardness D at 20 °C	-	81 - 85
Poisson coefficient	-	0.35 - 0.41
Vicat temperature	°C	≥80
Lineal expansion coefficient	°C <sup>-1</sup>	8·10 <sup>-5</sup>
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 <sup>16</sup>
Absolute roughness (ka)	mm	0.007
Roughness C (Hazen Williams)	-	150
Manning roughness coefficient (n)	-	0.009

(1) Although the standard allowance includes this range, TOM® PVC-O pipe is between 1.37 and 1.43 kg/dm<sup>3</sup>.

(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 <sup>(1)</sup>	Depending on DN			
Density	1370 a 1430 kg/m <sup>3</sup>			
Impact resistance (0 °C) <sup>(2)</sup>				
∅90	98 N·m			
∅110, ∅125	124 N·m			
∅140, ∅160	157 N·m			
∅200	196 N·m			
≥∅225 - ∅800	245 N·m			
Circumferential stiffness RCE (kN/m <sup>2</sup> ) <sup>(3)</sup>	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 tempered 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



## 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**, 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 production center (Madrid) with AENOR Product Certificate No. 001/007104 in accordance with UNE-EN 17176: 2019.

## 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	
	Speed (m/s)	Flow l/s	J m/km	Flow l/s	J m/km	Flow l/s	J m/km	Flow l/s	J m/km	Flow l/s	J m/km	Flow l/s
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	29.39</																				

### 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	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	0.83	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	568.2																	

### 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	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.

## Pressure loss tables

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	347.32	29.90	440.84	26.01	557.88																	

### 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 115.3		DN140 PN25 129.1		DN160 PN25 147.5		DN200 PN25 183.3	
	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	1.04	0.11	1.31	0.10	1.71	0.08	2.64	0.06
0.2	1.08	0.59	1.60	0.47	2.09	0.40	2.62	0.35	3.42	0.30	5.28	0.23
0.3	1.62	1.24	2.39	0.99	3.13	0.85	3.93	0.75	5.13	0.64	7.92	0.49
0.4	2.16	2.12	3.19	1.69	4.18	1.45	5.24	1.27	6.83	1.08	10.56	0.84
0.5	2.71	3.22	3.99	2.56	5.22	2.19	6.55	1.92	8.54	1.64	13.19	1.27
0.6	3.25	4.51	4.79	3.59	6.26	3.06	7.85	2.68	10.25	2.30	15.83	1.78
0.7	3.79	5.99	5.59	4.78	7.31	4.08	9.16	3.57	11.96	3.06	18.47	2.37
0.8	4.33	7.67	6.38	6.10	8.35	5.22	10.47	4.58	13.67	3.92	21.11	3.04
0.9	4.87	9.53	7.18	7.59	9.40	6.50	11.78	5.69	15.38	4.87	23.75	3.78
1.0	5.41	11.58	7.98	9.24	10.44	7.89	13.09	6.92	17.09	5.92	26.39	4.60
1.1	5.95	13.82	8.78	11.02	11.49	9.43	14.40	8.26	18.80	7.07	29.03	5.48
1.2	6.49	16.23	9.58	12.96	12.53	11.07	15.71	9.70	20.50	8.30	31.67	6.44
1.3	7.03	18.82	10.37	15.00	13.57	12.83	17.02	11.25	22.21	9.63	34.31	7.47
1.4	7.57	21.58	11.17	17.22	14.62	14.73	18.33	12.91	23.92	11.04	36.94	8.57
1.5	8.12	24.57	11.97	19.57	15.66	16.73	19.64	14.67	25.63	12.55	39.58	9.74
1.6	8.66	27.69	12.77	22.06	16.71	18.86	20.94	16.52	27.34	14.14	42.22	10.98
1.7	9.20	30.97	13.57	24.69	17.75	21.09	22.25	18.48	29.05	15.83	44.86	12.28
1.8	9.74	34.42	14.36	27.42	18.79	23.44	23.56	20.55	30.76	17.59	47.50	13.65
1.9	10.28	38.04	15.16	30.31	19.84	25.92	24.87	22.71	32.47	19.45	50.14	15.09
2.0	10.82	41.82	15.96	33.34	20.88	28.50	26.18	24.98	34.17	21.38	52.78	16.59
2.1	11.36	45.77	16.76	36.50	21.93	31.21	27.49	27.34	35.88	23.40	55.42	18.16
2.2	11.90	49.88	17.56	39.79	22.97	34.00	28.80	29.81	37.59	25.51	58.05	19.79
2.3	12.44	54.15	18.35	43.17	24.01	36.91	30.11	32.36	39.30	27.70	60.69	21.49
2.4	12.99	58.67	19.15	46.72	25.06	39.95	31.42	35.02	41.01	29.97	63.33	23.26
2.5	13.53	63.26	19.95	50.40	26.10	43.08	32.73	37.77	42.72	32.33	65.97	25.08
2.6	14.07	68.02	20.75	54.21	27.15	46.34	34.03	40.60	44.43	34.76	68.61	26.97
2.7	14.61	72.93	21.55	58.14	28.19	49.69	35.34	43.54	46.14	37.28	71.25	28.93
2.8	15.15	78.00	22.34	62.15	29.24	53.17	36.65	46.58	47.84	39.87	73.89	30.94
2.9	15.69	83.23	23.14	66.34	30.28	56.72	37.96	49.71	49.55	42.55	76.53	33.02
3.0	16.23	88.61	23.94	70.65	31.32	60.38	39.27	52.93	51.26	45.30	79.17	35.16
3.1	16.77	94.15	24.74	75.08	32.37	64.19	40.58	56.25	52.97	48.14	81.80	37.36
3.2	17.31	99.84	25.54	79.64	33.41	68.06	41.89	59.66	54.68	51.06	84.44	39.62
3.3	17.86	105.80	26.33	84.26	34.46	72.07	43.20	63.16	56.39	54.06	87.08	41.95
3.4	18.40	111.80	27.13	89.07	35.50	76.15	44.51	66.75	58.10	57.13	89.72	44.33
3.5	18.94	117.95	27.93	93.99	36.54	80.33	45.82	70.43	59.81	60.29	92.36	46.78
3.6	19.48	124.25	28.73	99.04	37.59	84.66	47.12	74.18	61.51	63.50	95.00	49.28
3.7	20.02	130.71	29.53	104.21	38.63	89.05	48.43	78.04	63.22	66.81	97.64	51.85
3.8	20.56	137.31	30.32	109.43	39.68	93.58	49.74	82.00	64.93	70.19	100.28	54.48
3.9	21.10	144.07	31.12	114.83	40.72	98.18	51.05	86.04	66.64	73.65	102.92	57.16
4.0	21.64	150.97	31.92	120.36	41.76	102.87	52.36	90.18	68.35	77.19	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.

## Pressure loss tables

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 207.5		DN250 PN25 229.1		DN315 PN25 288.6		DN355 PN25 325.3		DN400 PN25 366.5		DN450 PN25 412.3		DN500 PN25 461.1		DN630 PN25 581.0		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
3.38	0.06	4.12	0.05	6.54	0.04	8.31	0.03	10.55	0.03	13.35	0.03	16.70	0.02	26.51	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
6.76	0.20	8.24	0.18	13.08	0.14	16.62	0.12	21.10	0.10	26.70	0.09	33.40	0.08	53.02	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
10.14	0.43	12.37	0.38	19.62	0.29	24.93	0.25	31.65	0.22	40.05	0.19	50.10	0.17	79.54	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
13.53	0.73	16.49	0.65	26.17	0.50	33.24	0.43	42.20	0.38	53.40	0.33	66.79	0.29	106.05	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
16.91	1.10	20.61	0.98	32.71	0.75	41.56	0.65	52.75	0.57	66.76	0.49	83.49	0.43	132.56	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
20.29	1.54	24.73	1.38	39.25	1.05	49.87	0.91	63.30	0.80	80.11	0.69	100.19	0.61	159.07	0.46	201.99	0.40	253.19	0.35	320.04	0.31	395.05	0.27	478.05	0.24	568.96	0.22
23.67	2.05	28.86	1.83	45.79	1.40	58.18	1.22	73.85	1.06	93.46	0.92	116.89	0.81	185.58	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
27.05	2.63	32.98	2.34	52.33	1.79	66.49	1.56	84.40	1.35	106.81	1.18	133.59	1.04	212.10	0.79	269.32	0.69	337.59	0.60	426.72	0.53	526.73	0.47	637.40	0.42	758.61	0.38
30.43	3.27	37.10	2.91	58.87	2.23	74.80	1.94	94.95	1.68	120.16	1.47	150.29	1.29	238.61	0.98	302.98	0.86	379.79	0.75	480.06	0.65	592.58	0.58	717.07	0.52	853.43	0.47
33.82	3.98	41.22	3.54	65.42	2.71	83.11	2.35	105.50	2.05	133.51	1.78	166.99	1.57	265.12	1.20	336.65	1.04	421.99	0.91	533.40	0.80	658.42	0.70	796.75	0.63	948.26	0.57
37.20	4.75	45.35	4.23	71.96	3.23	91.42	2.81	116.05	2.44	146.86	2.13	183.68	1.87	291.63	1.43	370.31	1.24	464.18	1.09	586.74	0.95	724.26	0.84	876.42	0.75	1043.09	0.68
40.58	5.57	49.47	4.97	78.50	3.79	99.73	3.30	126.60	2.87	160.21	2.50	200.38	2.20	318.14	1.68	403.98	1.46	506.38	1.28	640.08	1.11	790.10	0.99	956.10	0.88	1137.91	0.80
43.96	6.46	53.59	5.76	85.04	4.40	108.04	3.83	137.15	3.33	173.56	2.90	217.08	2.55	344.66	1.94	437.64	1.69	548.58	1.48	693.41	1.29	855.94	1.14	1035.77	1.02	1232.74	0.92
47.34	7.42	57.71	6.61	91.58	5.05	116.36	4.39	147.70	3.82	186.92	3.33	233.78	2.92	371.17	2.23	471.31	1.94	590.78	1.70	746.75	1.48	921.78	1.31	1115.45	1.17	1327.56	1.06
50.72	8.43	61.83	7.51	98.12	5.73	124.67	4.99	158.24	4.34	200.27	3.78	250.48	3.32	397.68	2.53	504.97	2.20	632.98	1.93	800.09	1.69	987.63	1.49	1195.12	1.33	1422.39	1.20
54.11	9.50	65.96	8.46	104.67	6.46	132.98	5.62	168.79	4.89	213.62	4.26	267.18	3.74	424.19	2.86	538.63	2.48	675.18	2.18	853.43	1.90	1053.47	1.68	1274.80	1.50	1517.22	1.36
57.49	10.63	70.08	9.47	111.21	7.23	141.29	6.29	179.34	5.47	226.97	4.77	283.88	4.18	450.70	3.20	572.30	2.78	717.38	2.44	906.77	2.13	1119.31	1.88	1354.47	1.68	1612.04	1.52
60.87	11.81	74.20	10.52	117.75	8.04	149.60	6.99	189.89	6.08	240.32	5.30	300.57	4.65	477.22	3.55	605.96	3.09	759.57	2.71	960.11	2.36	1185.15	2.09	1434.15	1.87	1706.87	1.69
64.25	13.06	78.32	11.63	124.29	8.88	157.91	7.73	200.44	6.72	253.67	5.86	317.27	5.14	503.73	3.93	639.63	3.42	801.77	2.99	1013.45	2.61	1250.99	2.31	1513.82	2.07	1801.69	1.87
67.63	14.36	82.45	12.79	130.83	9.77	166.22	8.50	210.99	7.39	267.02	6.44	333.97	5.65	530.24	4.32	673.29	3.76	843.97	3.29	1066.79	2.87	1316.84	2.54	1593.50	2.27	1896.52	2.05
71.01	15.71	86.57	14.00	137.37	10.69	174.53	9.30	221.54	8.09	280.37	7.05	350.67	6.19	556.75	4.73	706.96	4.11	886.17	3.60	1120.13	3.14	1382.68	2.78	1673.17	2.49	1991.34	2.25
74.40	17.13	90.69	15.26	143.91	11.65	182.84	10.14	232.09	8.82	293.72	7.69	367.37	6.75	583.26	5.15	740.62	4.48	928.37	3.93	1173.47	3.43	1448.52	3.03	1752.85	2.71	2086.17	2.45
77.78	18.60	94.81	16.57	150.46	12.66	191.16	11.01	242.64	9.58	307.07	8.35	384.07	7.32	609.78	5.59	774.29	4.87	970.57	4.26	1226.81	3.72	1514.36	3.29	1832.52	2.94	2181.00	2.66
81.16	20.12	98.94	17.93	157.00	13.69	199.47	11.91	253.19	10.36	320.43	9.03	400.77	7.93	636.29	6.05	807.95	5.26	1012.77	4.61	1280.15	4.02	1580.20	3.56	1912.20	3.18	2275.82	2.88
84.54	21.70	103.06	19.34	163.54	14.77	207.78	12.84	263.74	11.17	333.78	9.74	417.47	8.55	662.80	6.53	841.62	5.68	1054.96	4.98	1333.49	4.34	1646.04	3.84	1991.87	3.43	2370.65	3.10
87.92	23.34	107.18	20.79	170.08	15.88	216.09	13.81	274.29	12.02	347.13	10.47	434.16	9.19	689.31	7.02	875.28	6.11	1097.16	5.35	1386.83	4.67	1711.89	4.13	2071.55	3.69	2465.47	3.34
91.30	25.03	111.30	22.30	176.62	17.03	224.40	14.81	284.84	12.89	360.48	11.23	450.86	9.86	715.82	7.53	908.95	6.55	1139.36	5.74	1440.17	5.01	1777.73	4.43	2151.22	3.96	2560.30	3.58
94.69	26.78	115.42	23.85	183.16	18.22	232.71	15.84	295.39	13.78	373.83	12.01	467.56	10.54	742.34	8.05	942.61	7.00	1181.56	6.14	1493.51	5.35	1843.57	4.74	2230.90	4.24	2655.13	3.83
98.07	28.57	119.55	25.45	189.71	19.44	241.02	16.91	305.94	14.71	387.18	12.82	484.26	11.25	768.85	8.59	976.28	7.47	1223.76	6.55	1546.85	5.71	1909.41	5.05	2310.57	4.52	2749.95	4.08
101.45	30.42	123.67	27.10	196.25	20.70	249.33	18.00	316.49	15.66	400.53	13.65	500.96	11.98	795.36	9.15	1009.94	7.96	1265.96	6.98	1600.19	6.08	1975.25	5.38	2390.25	4.81	2844.78	4.35
104.83	32.33	127.79	28.80	202.79	22.00	257.64	19.13	327.04	16.64	413.88	14.51	517.66	12.73	821.87	9.72	1043.61	8.46	1308.16	7.41	1653.53	6.47	2041.09	5.72	2469.92	5.12	2939.60	4.62
108.21	34.28	131.91	30.54	209.33	23.33	265.95	20.29	337.59	17.65	427.23	15.39	534.36	13.50	848.38	10.31	1077.27	8.97	1350.35	7.86	1706.87	6.86	2106.94	6.06	2549.60	5.43	3034.43	4.90
111.59	36.29	136.04	32.34	215.87	24.70	274.27	21.48	348.14	18.69	440.59	16.29	551.05	14.29	874.90	10.92	1110.93	9.49	1392.55	8.32	1760.21	7.26	2172.78	6.42	2629.27	5.74	3129.26	5.19
114.98	38.36	140.16	34.17	222.41	26.10	282.58	22.70	358.69	19.75	453.94	17.21	567.75	15.11	901.41	11.54	1144.60	10.03	1434.75	8.80	1813.55	7.67	2238.62	6.78	2708.95	6.07	3224.08	5.48
118.36	40.48	144.28	36.06	228.96	27.54	290.89	23.95	369.24	20.84	467.29	18.16	584.45	15.94	927.92	12.17	1178.26	10.59	1476.95	9.28	1866.89	8.09	2304.46	7.16	2788.62	6.40	3318.91	5.79
121.74	42.64	148.40	37.99	235.50	29.02	299.20	25.23	379.79	21.95	480.64	19.14	601.15	16.79	954.43	12.82	1211.93	11.16	1519.15	9.78	1920.23	8.53	2370.30	7.54	2868.30	6.75	3413.73	6.10
125.12	44.86	152.53	39.97	242.04	30.53	307.51	26.55	390.34	23.10	493.99	20.13	617.85	17.67	980.94	13.49	1245.59	11.74	1561.35	10.29	1973.56	8.97	2436.15	7.93	2947.97	7.10	3508.56	6.41
128.50	47.13	156.65	41.99	248.58	32.07	315.82	27.89	400.89	24.27	507.34	21.15	634.55	18.56	1007.46	14.17	1279.26	12.33	1603.55	10.81	2026.90	9.43	2501.99	8.34	3027.64	7.46	3603.39	6.74
131.88	49.45	160.77	44.06	255.12	33.65	324.13	29.26	411.44	25.46	520.69	22.19	651.25	19.48	1033.97	14.87	1312.92	12.94	1645.74	11.34	2080.24	9.89	2567.83	8.75	3107.32	7.83	3698.21	7.07
135.27	51.83	164.89	46.17	261.66	35.27	332.44	30.67	421.99	26.69	534.04	23.26																



## The new generation of PVC-O pipes

Ctra. M-206 Torrejón - Loeches Km 3.1  
28890 Loeches  
Madrid - Spain  
**phone:** +34 911 337 088  
**fax:** +34 916 682 884  
**e-mail:** [canalizaciones@molecor.com](mailto:canalizaciones@molecor.com)  
**www.molecor.com**



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