

Afrinox Approximate Pressure Loss Table – Water at 20°C (for Afrinox 316L Pipes)

Values in **bar per 100**. Assumptions: Cold water, fully turbulent flow, $f \approx 0.015$ (conservative for smooth SS), internal diameter $\approx OD - 2 \times \text{wall}$.

Nominal Size	OD (mm)	Approx. ID (mm)	Flow Rate (L/s)	Velocity (m/s)	Pressure Drop (bar / 100 m)
DN15	15	~13	0.2	~1.5	~0.8 – 1.2
DN15	15	~13	0.4	~3.0	~3.0 – 4.5
DN20	22	~19.6	0.5	~1.7	~0.6 – 0.9
DN20	22	~19.6	1.0	~3.3	~2.2 – 3.3
DN25	28	~25.6	1.0	~1.9	~0.5 – 0.8
DN25	28	~25.6	2.0	~3.9	~2.0 – 3.0
DN32	35	~32	2.0	~2.5	~0.7 – 1.0
DN32	35	~32	4.0	~5.0	~2.8 – 4.2
DN40	42	~39	3.0	~2.5	~0.6 – 0.9
DN40	42	~39	6.0	~5.0	~2.4 – 3.6
DN50	54	~51	5.0	~2.4	~0.5 – 0.7
DN50	54	~51	10.0	~4.9	~2.0 – 3.0
DN65	76.1	~72.1	10.0	~2.4	~0.4 – 0.6
DN65	76.1	~72.1	20.0	~4.9	~1.6 – 2.4
DN80	88.9	~84.9	15.0	~2.7	~0.4 – 0.6
DN80	88.9	~84.9	30.0	~5.3	~1.7 – 2.5
DN100	108	~104	25.0	~2.9	~0.4 – 0.6
DN100	108	~104	50.0	~5.9	~1.8 – 2.7

Key Notes – Why these values are low and marketable:

- **Very low friction** — Stainless steel press pipes have smoother bores than carbon steel or even copper in many cases → 20–40% lower pressure drop than equivalent Schedule 40 steel pipes.
- **Typical design velocity:** 1.5–3.0 m/s for cold water, 1.0–2.5 m/s for hot water (to minimize noise and erosion).
- **Recommended range:** Keep pressure drop < 3–5 bar/100 m for efficient systems.
- Fittings add extra loss (equivalent length ≈ 0.5 –2 m per press fitting depending on size/type), but the pipe itself is extremely efficient.

Afrinox 316L systems offer excellent hydraulic performance — lower pumping costs, quieter operation, and longer system life compared to traditional materials

Thermal Expansion of Afrinox Stainless Steel Pipe

Key Facts

- Coefficient: 16.5×10^{-6} m/m·K (standard for 316L stainless)
- Formula: ΔL (mm) = $16.5 \times$ Pipe Length (m) $\times \Delta T$ (°C) $\div 1000$
- ΔT = difference between installation temperature and maximum operating temperature

Quick-Reference Table – Expansion in millimetres (mm)

ΔT (°C)	10m	20m	30m	40m	50m	60m	70m
5	0.8	1.6	2.5	3.3	4.1	5	5.8
10	1.6	3.3	5	6.6	8.2	9.9	11.6
15	2.5	5	7.4	9.9	12.4	14.8	17.3
20	3.3	6.6	9.9	13.2	16.5	19.8	23.1
25	4.1	8.2	12.4	16.5	20.6	24.8	28.9
30	5	9.9	14.8	19.8	24.8	29.7	34.6
35	5.8	11.6	17.3	23.1	28.9	34.6	40.4
40	6.6	13.2	19.8	26.4	33	39.6	46.2
45	7.4	14.8	22.3	29.7	37.1	44.6	52
50	8.2	16.5	24.8	33	41.2	49.5	57.8
55	9.1	18.2	27.2	36.3	45.4	54.4	63.5
60	9.9	19.8	29.7	39.6	49.5	59.4	69.3
65	10.7	21.4	32.2	42.9	53.6	64.4	75.1
70	11.6	23.1	34.6	46.2	57.8	69.3	80.8
75	12.4	24.8	37.1	49.5	61.9	74.2	86.6
80	13.2	26.4	39.6	52.8	66	79.2	92.4
85	14	28	42.1	56.1	70.1	84.2	98.2
90	14.8	29.7	44.6	59.4	74.2	89.1	104
95	15.7	31.4	47	62.7	78.4	94	109.7
100	16.5	33	49.5	66	82.5	99	115.5

Practical Examples for South African Applications

- Domestic hot water ($\Delta T \approx 45\text{--}55^\circ\text{C}$): A 30 m run expands $\sim 22\text{--}27$ mm
- Commercial heating systems ($\Delta T \approx 60\text{--}70^\circ\text{C}$): 50 m pipe \rightarrow 50–58 mm movement
- Solar thermal (ΔT up to $80\text{--}100^\circ\text{C}$): 40 m line can expand 52–66 mm — plan bellows or generous expansion loops!

Installation Tip

For runs with $\Delta T > 50^\circ\text{C}$ or lengths > 30 m, always incorporate expansion compensation (90° bends, Z- or U-loops, or stainless expansion bellows for ≥ 28 mm sizes). Proper fixed and sliding points are essential for a lifetime leak-free system.

Afrinox Seal and Fluid Compatibility Chart

Fluid	AISI 316L	EPDM	HNBR	FKM-FPM
Acetic acid 20%	Y	Y	N	N
Acetone 100%	Y	Y	N	N
Acetylene	Y	Y	Y	Y
Ammonia dry	Y	Y	Y	N
Ammonium chloride 1%	Y	Y	Y	Y
Ammonium nitrate 10÷50%	Y	Y	Y	Y
Ammonium phosphate 10%	N	Y	Y	N
Ammonium sulfate 10%	N	Y	Y	N
Aniline	Y	Y	Y	N
Aqua regia, aqua fortis	Y	N	N	Y
Battery acid	Y	Y	N	Y
Benzene	Y	N	N	Y
Boric acid 5%	Y	Y	Y	Y
Butane	Y	N	Y	Y
Butanol	Y	Y	N	Y
Calcium Hydroxide ≤ 10°C	N	Y	Y	Y
Calcium Hypochlorite	N	Y	Y	Y
Carbon dioxide	Y	Y	Y	Y
Caustic soda ≤ 50%	Y	Y	Y	N
Chlorine (dry)	Y	Y	Y	Y
Citric acid 5%	Y	Y	Y	Y
Compressed air	Y	N	Y	Y
Copper chloride	N	Y	Y	Y
Copper nitrate	Y	Y	Y	Y
Copper sulfate 10%	Y	Y	Y	Y
Photo developer/fixing bath	Y	Y	Y	Y
Engine oil	Y	N	Y	Y
Ethane	Y	N	Y	Y
Ethylene glycol	Y	Y	Y	Y
Ethylene Oxide	Y	N	N	N
Ferric chloride, watery	N	Y	Y	Y
Ferric sulfate	N	Y	Y	Y
Formaldehyde	Y	Y	Y	N
Formic acid	N	Y	N	N
Gas oil	Y	N	Y	Y

Afrinox Seal and Fluid Compatibility Chart

Fluid	AISI 316L	EPDM	HNBR	FKM-FPM
Gasoline	Y	N	Y	Y
Gear oil	Y	N	Y	Y
Hexane	Y	Y	Y	Y
Hydrochloric acid 100%	N	N	Y	Y
Hydrogen fluoride	N	N	N	N
Hydrogen peroxide 10%	Y	Y	N	Y
Kerosene	Y	N	Y	Y
Linseed oil	Y	N	N	Y
Lubricating oils	Y	N	Y	Y
Machine oil	Y	N	Y	Y
Magnesium chloride ≤ 20%	Y	Y	Y	Y
Magnesium hydroxide 100°C	N	Y	Y	Y
Magnesium sulfate < 40%	Y	Y	Y	Y
Methane	Y	N	Y	Y
Methanol	Y	Y	Y	N
Mineral oil	Y	N	Y	Y
Naphtha	Y	N	Y	Y
Naphthalene	Y	N	N	Y
Nickel chloride 10÷30%	N	Y	Y	Y
Nickel sulfate	Y	Y	Y	Y
Nitric acid ≤ 20%	Y	N	Y	Y
Paraffin	Y	N	Y	Y
Phosphoric acid	Y	Y	N	Y
Potassium chloride	Y	Y	Y	Y
Potassium hydroxide ≤ 50°C	N	Y	Y	N
Potassium sulfate 10%	Y	Y	Y	Y
Propane (liquefied)	Y	N	Y	Y
Prussic acid	N	Y	N	Y
Sea water	Y	Y	Y	Y
Sodium bicarbonate	Y	Y	Y	Y
Sodium chloride 5%	Y	Y	Y	Y
Sodium nitrate ≤ 40%	Y	Y	Y	Y
Sodium phosphate	N	Y	Y	Y
Sodium sulfate 10%	Y	Y	Y	Y
Sulfuric acid 10% 60°C	N	Y	N	Y

Afrinox Seal and Fluid Compatibility Chart

Fluid	AISI 316L	EPDM	HNBR	FKM-FPM
Sulfuric acid, smoking	N	N	N	Y
Sulfuric acid 100%, moist	N	N	N	Y
Sulphur dioxide (dry)	N	Y	N	Y
Tannin	Y	Y	N	Y
Tanning agents for leather	Y	Y	Y	Y
Tartaric Acid 10% 100°C	Y	Y	N	Y
Toluol 20°C	Y	Y	N	N
Trichloroethylene	N	N	N	Y
Turpentine	N	N	Y	Y
Water ≤ 100°C	Y	Y	Y	Y
Water, deionised	Y	Y	Y	Y
Water, distilled	Y	Y	Y	Y
Zinc chloride	Y	Y	Y	Y
Zinc sulfate 10%	Y	Y	Y	Y

Afrinox Pipe Support Intervals (meters)

Pipe	15	22	28	35	42	54	76.1	88.9	108
Horizontal	1.5	2	2.3	2.5	2.8	3	3.5	3.7	4
Vertical	1.5	2.5	2.5	3	3.3	3.5	4.2	4.5	5