

## Design Stresses of Pexgol Pipes

Pexgol pipes are produced according to the DIN Standards 16892/16893 and the Israeli standard 1519 Part 1. These standards show the working pressures of Pexgol pipes at various temperatures.

Pipes according to other standards (IPS according to ASTM 2788, for example), are available by special order.

The working pressures for Pexgol pipe are determined by the following equation:

$$P = \frac{2\sigma t}{D-t} \quad \text{or} \quad P = \frac{2\sigma}{\text{SDR}-1} \quad \text{or} \quad \frac{\sigma}{S}$$

P = Maximum working pressure (kg/cm<sup>2</sup>)

$\sigma$  = Long term strength at the design temperature (kg/cm<sup>2</sup>) (10.1)

D = Outside diameter (mm)

t = Wall thickness (mm)

S = ISO 4065 series

SDR (Standard Dimensions Ratio) =  $\frac{D}{t} = 2s + 1$

### Allowable working pressures

The working pressures of Pexgol pipes are based on DIN 16893-2000 and the accumulated experience of Pexgol pipes in Infrastructure and Industry including pipes that were installed 30 years ago at the Dead Sea Hot leach crystallization facility carrying Hot Sylvinit at 114 deg. C and are still working today.

The design stresses  $\sigma$  in tables 11.1 and the working

**Table No. 11.1: Changes of design stress values  $\sigma$  with temperature:**

Temp. (°C)	$\sigma$ (kg/cm <sup>2</sup> )
10°C	85
20°C	76
30°C	66.5
40°C	59
50°C	52.5
60°C	48
70°C	42.5
80°C	37.5
90°C	33.5
95°C	32
100°C	27.5
105°C	22.5
110°C	18.75

pressures in tables 11.2 & 12.1 were calculated with a safety factor of 1.25 According to DIN 16893-2000 these values are for water.

In case of chemicals and corrosive agents, the working pressures might have to be de-rated according to the data in the chemical resistance tables.

**Table No 11.2: Allowable working pressures [bar] for conveying water in Pexgol pipes, with a safety factor C = 1.25**

Temp °C	Class 6	Class 8	Class 10	Class 12	Class 15	Class 19	Class 24	Class 30
	Pipe series (S)							
	12.5	10	7.6	6.3	5	4	3.2	2.5
	Standard dimension ratio (SDR)							
	26	21	16.2	13.6	11	9	7.4	6
10°	6.8	8.5	11.20	13.50	17.00	21.40	26.90	33.89
20°	6.0	7.6	9.90	11.90	15.00	18.90	23.80	29.99
30°	5.3	6.7	8.80	10.60	13.30	16.80	21.10	26.59
40°	4.7	5.9	7.80	9.40	11.80	14.90	18.70	23.56
50°	4.1	5.2	7.00	8.30	10.50	13.20	16.70	21.04
60°	3.8	4.8	6.30	7.50	9.50	11.90	15.00	18.90
70°	3.4	4.3	5.60	6.70	8.50	10.70	13.40	16.88
80°	3.0	3.8	5.10	6.10	7.50	9.50	12.00	15.12
90°	2.7	3.4	4.50	5.40	6.80	8.60	10.90	13.73
95°	2.6	3.2	4.10	4.90	6.40	8.10	10.30	12.98
100°	2.1	2.7	3.5	4.2	5.5	7.0	9.0	11.2
105°	1.8	2.2	2.8	3.4	4.5	5.5	7.0	8.7
110°	1.5	1.9	2.40	2.90	3.80	4.70	5.90	7.43



Table No 12.1: Allowable working pressures [psi] for conveying water in Pexgol pipes, with a design factor DF= 0.8; safety factor C = 1.25

Temp		Class 6	Class 8	Class 10	Class 12	Class 15	Class 19	Class 24	Class 30
		Pipe series (S)							
°C	°F	12.5	10	7.6	6.3	5	4	3.2	2.5
		Dimension ratio (DR)							
		26	21	16.2	13.6	11	9	7.4	6
10	50	99	123	162	196	247	310	390	491
21	70	83	105	137	164	207	261	329	414
32	90	72	91	120	144	181	228	287	361
38	100	72	90	119	143	180	227	285	360
49	120	61	77	104	123	155	195	247	311
60	140	55	70	91	109	138	173	218	274
71	160	49	61	80	96	122	153	192	241
82	180	42	54	72	86	106	134	170	214
88	190	40	50	67	80	101	128	162	204
93	200	39	47	61	73	95	120	153	192
99	210	31	40	51	62	81	103	132	164
104.5	220	26	32	41	50	66	81	102	127
110	230	22	28	35	42	55	68	86	108