pekem ® V

PE pressure pipe systems for water supply according to EN 12201

Kemoplast
d.o.o. za preradu i proizvodnju plastičnih masa i trgovinu

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PURPOSE

Pekem ® V – PE pipes for water supply are manufactured according to EN 12201-2:2003[1]. The raw material used in pipe production nowdays is an improved Polyethylene – material with high density (PEHD) featuring an advanced flexibility as well as a high resistance. PEHD pipes possess a high durability and therefore a long term efficiency.

Polyethylene is organic material and consists entirely of carbon and hydrogen. It has absolutely no effect on the environment. PE, a thermoplastic, can be remelted practically without restriction, for processing to new products. Pipe remnants and life-expired plastic piping material can therefore be recycled without difficulty.

Pekem ® V – PEHD pipes for water supply are used for the transport and distribution of potable water, for industrial applications and pressure sewers

COLOUR

pekem V – PEHD pipes for water supply are coloured black and marked with blue strips (approximately RAL 5005 or 5012[2]).

BENEFITS

- **Safe for potable water supply**

  Pekem ® V pipes are proven to be one of the most reliable and safe piping materials for potable water.

- **Smooth interior, excellent hydraulic characteristics, free of incrustations**

  Due to smooth interior of **pekem ® V pipes** allows higher flow velocities, less generation of micro organism and less incrustation.

- **Easy to assembly**

  Because of the good fuse-ability and flexibility of PE, long lengths can be assembled outside the (narrow) trench. The fused joints are strong and highly reliable.

  Jointing: electrofusion welding (favoured), heating element butt fusion, flange joint and adaptor PE/steel

[1] **EN 12201-2:2003**
Plastics piping systems for water supply -- Polyethylene (E) -- Part 2: Pipes

[2] According to the colour register RAL 840-HR

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- **Resistance to weathering**

  Pekem ® V pipes are protected against degradation caused by UV rays during exposure to direct sunlight

- **Resistance to low temperatures**

  Due to its high ductility, toughness and elasticity, **pekem ® V pipes** give no problems during installation and operation at lows temperatures

- **High impact resistance**

  The enormous resistance against surge and fatigue eliminates the necessity of a higher pressure rating and investments in anti surge devices.

- **Light weight**

  The low weight of the system makes it easy to install. It also reduces transportation, handling and installation costs.

- **Cost effective**

  Easy installation and versatile installation possibilities due to endless pipe delivery and variable connections of **pekem V pipes** ensure a lower installed cost compared to other piping systems.

- **Maintenance free**

  Pekem ® V pipes do not rust, corrode or promote build-up of deposits on the system interior.

- **Reliable and durable**

  Pekem ® V pipes are highly durable with high tensile and high impact strength with service life of at least 50 years.

PACKING AND DELIVERY

Pekem ® V pipes are delivered in coils (Ø 20 -110 mm) and rods (Ø 63 -225 mm).

Standard lengths of pipes in coils are 50 m and 100 m (Ø 20 -110 mm), 150m (Ø 20 - 90 mm), 200 m (Ø 20 - 75 mm) and 300 m (Ø 20 - 50 mm)

Standard lengths of pipes in rods are 6 or 12m. These pipes are delivered pre-packed in block bundles of standard quantities. In these bundles, pipes are held by straps and timber stretchers.

MARKING OF PIPES

Longitudinal:
Number of standard (EN 12201), manufacturer's name (KEMOPLAST), diameter x wall thickness (d x s), SDR series, material and designation (e.g. PE 100), pressure rating (PN), production period (mmyy), length in m

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FEATURES AND CLASSIFICATION OF PE MATERIAL

MRS (Minimum Required Strength) value in MPa is the basis for the classification of plastics for piping systems.

The MRS value represents the long-term circumferential stress in the pipe where the break may occur after 50 years at the earliest (ISO/DIS 9080, ISO 12162). The calculation design stress σ_s is applied for dimensioning of the piping network. This is calculated

$$\sigma_s = MRS/C$$

with C= Overall service (design) coefficient. **C=1,25 for PEHD**

Minimum Required Strength for PE 80 is **MRS= 8 MPa**.

Minimum Required Strength for PE 100 is **MRS= 10 MPa**.

Each pipe series is geometrically defined by the SDR code = Standard Dimension Ratio, whereby:

$$SDR = d / s$$

Where: **d** – Outside diameter of pipe

s – Wall thickness of pipe

Pipe series **S** is a dimensional number for pipe designation:

$$S = (SDR-1) / 2 = (d – s)/2s$$

The nominal pressure **PN** the pipe series **S** and the design stress σ_s are connected by the following relationship:

$$PN = 10\ \sigma_s / S$$

The applicable overall service (design) coefficient, pipe series and operating nominal pressure for PE pipes shall be taken from Table 1:

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Table 1

C	SDR = d / s	S = (SDR-1) / 2	PE 80 Operating nominal pressure (bar)	PE 100 Operating nominal pressure (bar)
1,25	26	12,5	**5**	**6,3**
1,25	21	10	**6,3**	**8**
1,25	17	8	**8**	**10**
1,25	13,6	6,3	**10**	**12,5**
1,25	11	5	**12,5**	**16**
1,25	9	4	**16**	**20**

C– Overall service (design) coefficient.
SDR –Standard Dimension Ratio
d – Outside diameter of pipe
s – Wall thickness of pipe
S – Pipe series

Properties of PEHD pipes

Characteristic	Standard	PE 80 Typical value	PE 100 Typical value	Unit
MRS	EN ISO 9080	8,0	10,0	MPa
Density at 23°C	EN ISO 1183-2	> 930	> 950	kg/m^3
MFI 190°/5 kg	EN ISO 1133	0,4 - 1,3	0,4 – 0,55	g/10 min
Tensile strength	ISO 527-2	22	25	MPa
Tensile Elongation at Break	ISO 527-2	> 300	> 350	%
Tensile Modulus	ISO 527-2	> 800	> 1100	MPa
Thermal conductivity	DIN 52612	0,38		W/mK
Coefficient of linear thermal expansion	DIN 53752	$1,8 \times 10^{-4}$	$1,3 \times 10^{-4}$	K^{-1}
Surface resistance	DIN 53482	10^{13}	$>10^{14}$	Ω
Fire behaviour	DIN 4012	B2	B2	class
Minimum radius of curvature at 20°C			25 x d	

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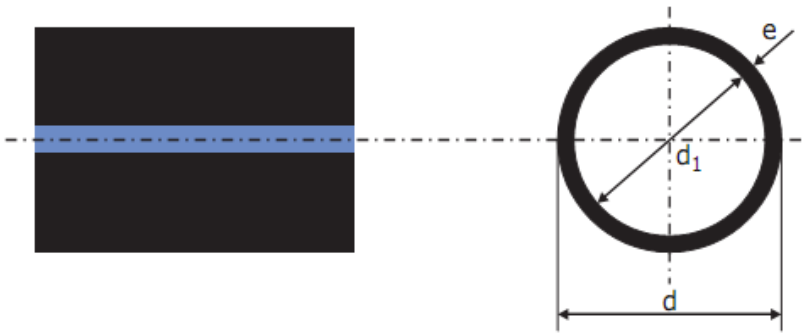

			PE 80											
Pipe series			S 8			S 6,3			S 5			S 4		
Standard Dimension Ratio			SDR 17			SDR 13,6			SDR 11			SDR 9		
Operating nominal pressure			PN 8			PN 10			PN 12,5			PN 16		
--	d_{min}	d_{max}	e_{min}	e_{max}	d_1	e_{min}	e_{max}	d_1	e_{min}	e_{max}	d_1	e_{min}	e_{max}	d_1
04	20	20,3							2,0	2,3	15,9	2,3	2,7	15,2
05	25	25,3				2,0	2,3	20,9	2,3	2,7	20,2	3,0	3,4	18,8
06	32	32,3	2,0	2,3	27,9	2,4	2,8	27,0	3,0	3,4	25,8	3,6	4,1	24,5
07	40	40,4	2,4	2,8	35,0	3,0	3,5	33,7	3,7	4,2	32,3	4,5	5,1	30,6
08	50	50,4	3,0	3,4	43,8	3,7	4,2	42,3	4,6	5,2	40,4	5,6	6,3	38,3
09	63	63,4	3,8	4,3	55,1	4,7	5,3	53,2	5,8	6,5	50,9	7,1	8	48,1
10	75	75,5	4,5	5,1	65,7	5,6	6,3	63,4	6,8	7,6	60,9	8,4	9,4	57,5
11	90	90,6	5,4	6,1	78,8	6,7	7,5	76,1	8,2	9,2	72,9	10,1	11,3	68,9
12	110	110,7	6,6	7,4	96,4	8,1	9,1	93,2	10,0	11,1	89,3	12,3	13,7	84,4
13	125	125,8	7,4	8,3	109,7	9,2	10,3	105,9	11,4	12,7	101,3	14,0	15,6	95,8
14	140	140,9	8,3	9,3	122,9	10,3	11,5	118,7	12,7	14,1	113,7	15,7	17,4	107,4
15	160	161,0	9,5	10,6	140,4	11,8	13,1	135,6	14,6	16,2	129,7	17,9	19,8	122,8
16	180	181,1	10,7	11,9	158,0	13,3	14,8	152,5	16,4	18,2	146,0	20,1	22,3	138,2
17	200	201,2	11,9	13,2	175,5	14,7	16,3	169,6	18,2	20,2	162,2			
18	225	226,4	13,4	14,9	197,4	16,6	18,4	190,7	20,5	22,7	182,5			

Pipe is black with blue strips (RAL 5012)

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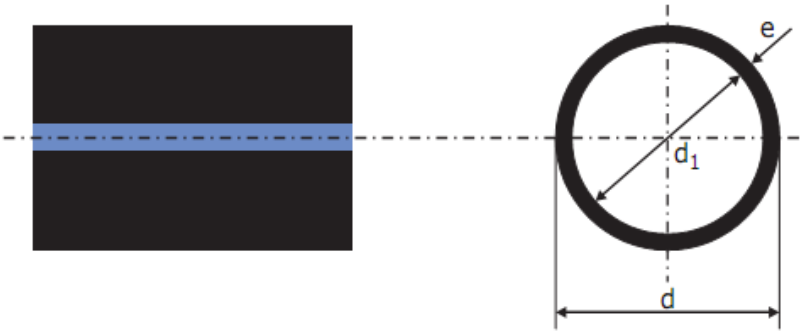

			PE 100											
Pipe series			S 8			S 6,3			S 5			S 4		
Standard Dimension Ratio			SDR 17			SDR 13,6			SDR 11			SDR 9		
Operating nominal pressure			PN 10			PN 12,5			PN 16			PN 20		
--	d_{min}	d_{max}	e_{min}	e_{max}	d_1	e_{min}	e_{max}	d_1	e_{min}	e_{max}	d_1	e_{min}	e_{max}	d_1
04	20	20,3							2,0	2,3	15,9	2,3	2,7	15,2
05	25	25,3				2,0	2,3	20,9	2,3	2,7	20,2	3,0	3,4	18,8
06	32	32,3	2,0	2,3	27,9	2,4	2,8	27,0	3,0	3,4	25,8	3,6	4,1	24,5
07	40	40,4	2,4	2,8	35,0	3,0	3,5	33,7	3,7	4,2	32,3	4,5	5,1	30,6
08	50	50,4	3,0	3,4	43,8	3,7	4,2	42,3	4,6	5,2	40,4	5,6	6,3	38,3
09	63	63,4	3,8	4,3	55,1	4,7	5,3	53,2	5,8	6,5	50,9	7,1	8	48,1
10	75	75,5	4,5	5,1	65,7	5,6	6,3	63,4	6,8	7,6	60,9	8,4	9,4	57,5
11	90	90,6	5,4	6,1	78,8	6,7	7,5	76,1	8,2	9,2	72,9	10,1	11,3	68,9
12	110	110,7	6,6	7,4	96,4	8,1	9,1	93,2	10,0	11,1	89,3	12,3	13,7	84,4
13	125	125,8	7,4	8,3	109,7	9,2	10,3	105,9	11,4	12,7	101,3	14,0	15,6	95,8
14	140	140,9	8,3	9,3	122,9	10,3	11,5	118,7	12,7	14,1	113,7	15,7	17,4	107,4
15	160	161,0	9,5	10,6	140,4	11,8	13,1	135,6	14,6	16,2	129,7	17,9	19,8	122,8
16	180	181,1	10,7	11,9	158,0	13,3	14,8	152,5	16,4	18,2	146,0	20,1	22,3	138,2
17	200	201,2	11,9	13,2	175,5	14,7	16,3	169,6	18,2	20,2	162,2			
18	225	226,4	13,4	14,9	197,4	16,6	18,4	190,7	20,5	22,7	182,5			

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