PE-HD-PIPES

Ø 16-1600 mm

Installation of ø 900 mm PE-HD pipe in Munich, Germany

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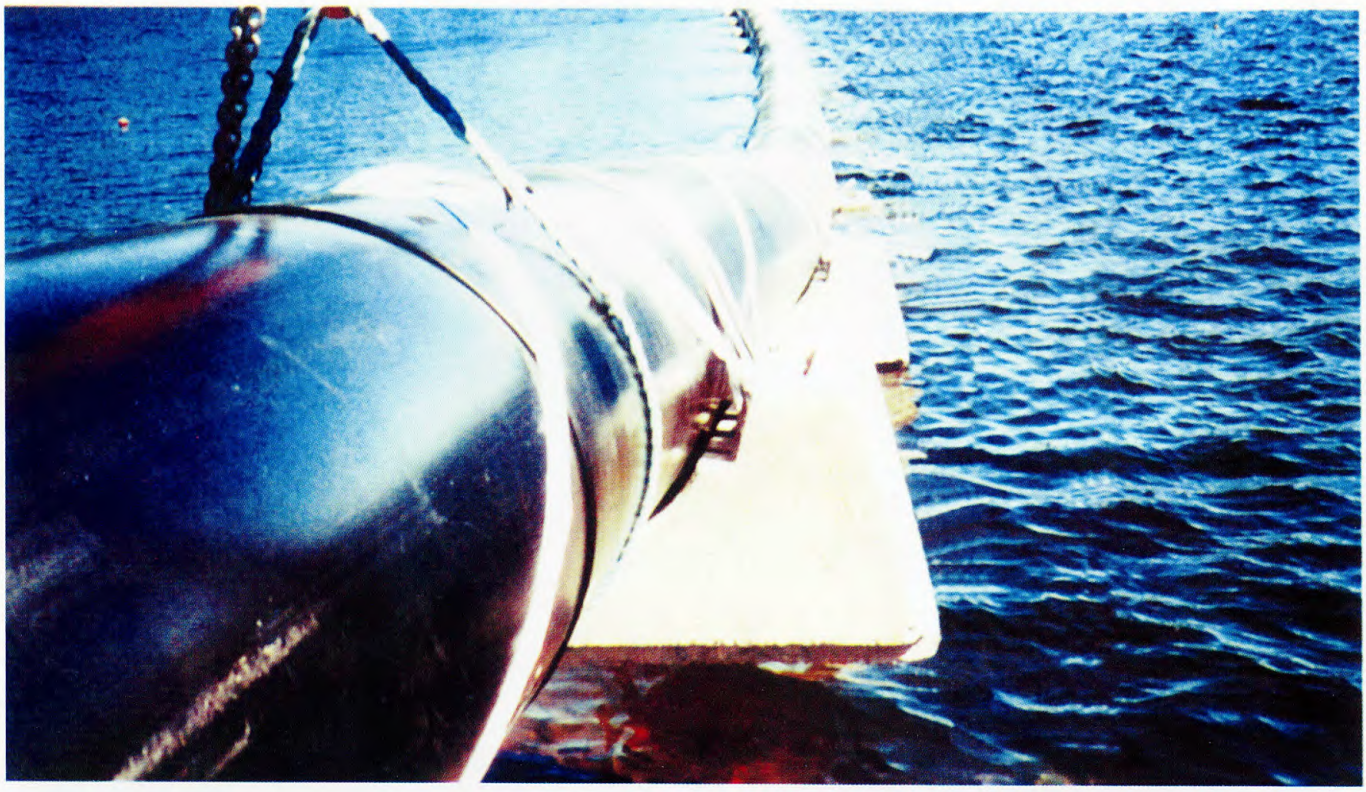
PE-HD Pipes



High Density Polyethlene (PE-HD) pipes have been used for more than fourty years. The experience show evidence that PE-HD pipes offer an optimal solution to most pipe problems. PE-HD pipes have outstanding advantages over conventional materials, such as:

- *corrosion resistance*
- *non toxicity*
- *long service life*
- *light weight*
- *flexibility*
- *impact strength*
- *weldability*
- *abrasion resistance*

Typical data for PE-HD

Design Stress		PE 63 5.0 N/mm² PE 80 6.3 N/mm²	PE 100 8.0 N/mm²
Density	kg/m³	945-960	958-960
Melt Index (5 kg)	g/10 min	0.4-0.7	0.4
Tensile Strength at yield	N/mm²	20	23
Elongation at break	%	>600	>600
Brittleness temperature	°C	<-70	<-70
Durometer hardness	Shore D	60-65	59
Charpy impact strength	kJ/m²	No failure	No failure
Linear expansion (20-90 °C)	mm/m • °C	0.17	0.2

KWH PE-HD-pipe PE 100 is produced according to relevant ISO and CEN documents.

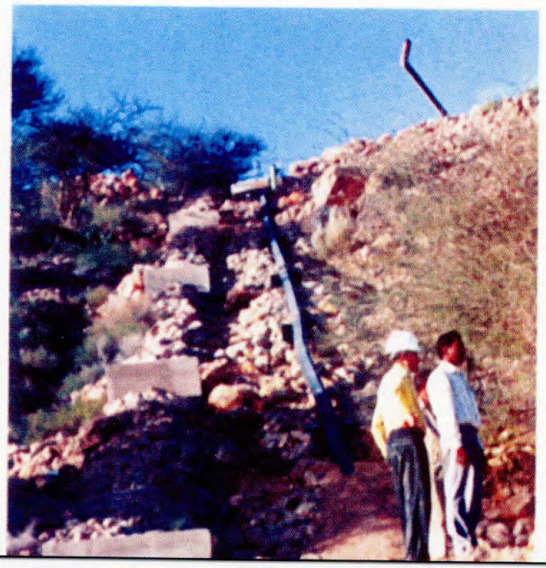
PE 100, Design Stress 8.0 MPa

Size designation DN	Wall series											
	S-12.5 (SDR 26)			S-8 (SDR 17)			S-5 (SDR 11)			S-4 (SDR 9)		
	Nominal pressures											
	PN 6,3			PN 10			PN 16			PN 20		
de mm	e mm	di mm	kg/m	e mm	di mm	kg/m	e mm	di mm	kg/m	e mm	di mm	kg/m
20	–	–	–	–	–	–	–	–	–	2,3	15,4	0,14
25	–	–	–	–	–	–	2,3	20,4	0,18	2,8	19,4	0,22
32	–	–	–	–	–	–	2,9	26,2	0,29	3,6	24,8	0,34
40	2,0	36,0	0,25	2,4	35,2	0,31	3,7	32,6	0,45	4,5	31,0	0,53
50	2,0	46,0	0,32	3,0	44,0	0,47	4,6	40,8	0,69	5,6	38,8	0,82
63	2,5	58,0	0,48	3,8	55,4	0,75	5,8	51,4	1,09	7,1	48,8	1,30
75	2,9	69,2	0,69	4,5	66,0	1,05	6,8	61,4	1,53	8,4	58,2	1,83
90	3,5	83,0	0,99	5,4	79,2	1,52	8,2	73,6	2,20	10,1	69,8	2,64
110	4,2	101,6	1,45	6,6	96,8	2,24	10,0	90,0	3,26	12,3	85,4	3,91
125	4,8	115,4	1,87	7,4	110,2	2,87	11,4	102,2	4,23	14,0	97,0	5,05
140	5,4	129,2	2,36	8,3	123,4	3,59	12,7	114,6	5,26	15,7	108,6	6,34
160	6,2	147,6	3,09	9,5	141,0	4,69	14,6	130,8	6,91	17,9	124,2	8,25
180	6,9	166,2	3,85	10,7	158,6	5,92	16,4	147,2	8,73	20,1	139,8	10,40
200	7,7	184,6	4,77	11,9	176,2	7,31	18,2	163,6	10,80	22,4	155,2	12,90
225	8,6	207,8	5,99	13,4	198,2	9,28	20,5	184,0	13,60	25,2	174,6	16,30
250	9,6	230,8	7,41	14,8	220,4	11,40	22,7	204,6	16,70	27,9	194,2	20,10
280	10,7	258,6	9,24	16,6	246,8	14,30	25,4	229,2	21,00	31,3	217,4	25,10
315	12,1	290,8	11,80	18,7	277,6	18,00	28,6	257,8	26,60	35,2	244,6	31,70
355	13,6	327,8	14,90	21,1	312,8	23,00	32,2	290,6	33,70	39,7	275,6	40,30
400	15,3	369,4	18,80	23,7	352,6	29,00	36,3	327,4	42,80	44,7	310,6	51,20
450	17,2	415,6	24,30	26,7	396,6	36,80	40,9	368,2	54,30	50,3	349,4	64,70
500	19,1	461,8	30,00	29,7	440,6	45,30	45,4	409,2	66,90	55,8	388,4	79,90
560	21,4	517,2	37,70	33,2	493,6	56,90	50,8	458,4	83,80	–	–	–
630	24,1	581,8	47,70	37,4	555,2	71,90	57,2	515,6	106,00	–	–	–
710	27,2	655,6	60,50	42,1	625,8	91,40	–	–	–	–	–	–
800	30,6	738,8	76,70	47,4	705,2	116,00	–	–	–	–	–	–
900	34,4	831,2	97,00	53,3	793,4	147,00	–	–	–	–	–	–
1000	38,2	923,6	120,00	59,3	881,4	181,00	–	–	–	–	–	–
1200	45,9	1108,2	172,00	–	–	–	–	–	–	–	–	–
1400	53,5	1293,0	234,00	–	–	–	–	–	–	–	–	–
1600	61,2	1477,6	306,00	–	–	–	–	–	–	–	–	–

S = Pipe series number
SDR = Standard dimension ratio
de = outside diameter of the pipe
di = inside diameter of the pipe
e = wall thickness
PN = nominal pressure rating (bar)

PE 100 Ø 500 mm PN 8 Kokkola, Finland fire fighting system

200 mm ø HDPE pipe installed above ground in rocky terrain in Oman



Chemical resistance

PE-HD pipes have a high chemical resistance. They are not attacked by dilute acids, alkalines or salts but ae not suitable with such aggressive chemicals as concentrated sulphuric and nitric acids, etc.

Advise should also be requested for applications with solvents, which can cause swelling and, in some cases, stress cracking.
Further data concerning chemical resistance can be fond in SFS 3154:E or in the ISO technical report TR 7472.

The only viable option for difficult terrain Hostalen® GM 5010 T2

Hostalen® GM 5010 T2 withstands all the rigors...

The advantage of HDPE pipe lies in its ability to conform to this difficult terrain. HDPE pipe was the prime choice for this application for the following reasons:

- The flexibility of HDPE pipe allows its to conform to the ground, which was made unstable by the occurrence of sinkholes (depressions). These sinkholes develop because water flushes the soil into underlying caves. They could be triggered by the leakage that occurs more readily with other types of rigid pipe. Therefore, a flexible, leaktight piping material was needed to prevent underground breaks where the ground subsides or collapses beneath the pipe.
- De to its flexibility, bending around obstacles in rocky areas was possible.

Light-duty equipment maneuvers a fused 90' long pipe into the trench for burial.

... of this difficult terrain

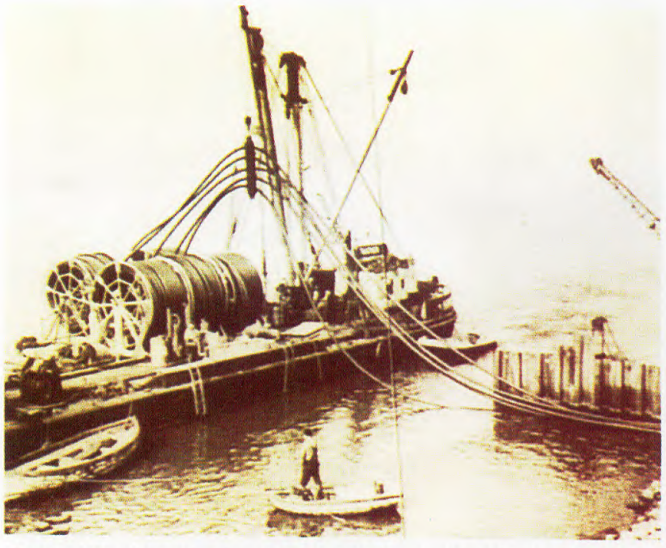
- Hostalen® GM 5010 T2 will not rust like a steel pipe; therefore, the integrity of the pipeline is assured over its entire service life.
- A weight savings of between 70% and 90% versus concrete and steel makes HDPE pipes easier to handle and to install.

Speed of installation

- In addition, the speed of installation due to the lack of physical joints was considerably better when compared to other traditional materials.

16" SDR 11 pipe passing under a high pressure natural gase line.

PE-HD Applications



One of the first export projects installed in the 1950s,. Since those days KWH Pipe has delivered hundreds of thousands of kilometers of PE-HD pipe in size range 16 - 1 600 mm.

Relining of old leaking water pipeline in Bangkok, Thailand. Dimensions ø 355 - 710 mm. Total length 9 300 mm.

ø 1200 mm sea outfall in Lisboa, Portugal. Length 3 180 m.

Umeå, Sweden Energy conservation system. Total length 45 km. Dimensions ø 280 - 710 mm.

315 mm ø Sewage line connected with gate valve in Oman

200 mm ø HDPE pipe connected with air valve in Oman

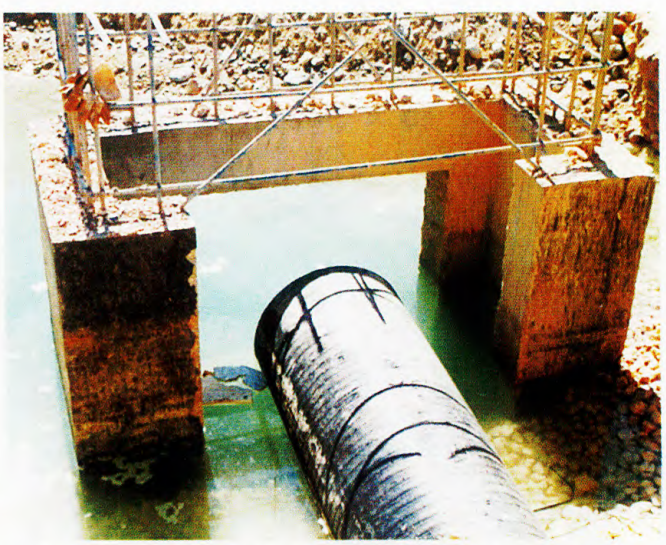
315 mm to 500 mm ø drainage facility in Oman.

710 mm ø crude oil Pipeline in Oman.

Replacement of Carbon Steel pipes with HDPE for crude oil with all interconnections, in Oman.

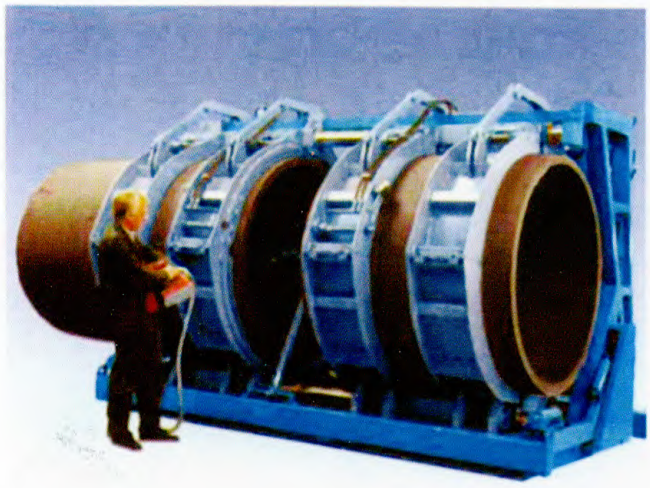
6" HDPE crude oil flow-line in lieu of C.S. pipe in Oman.

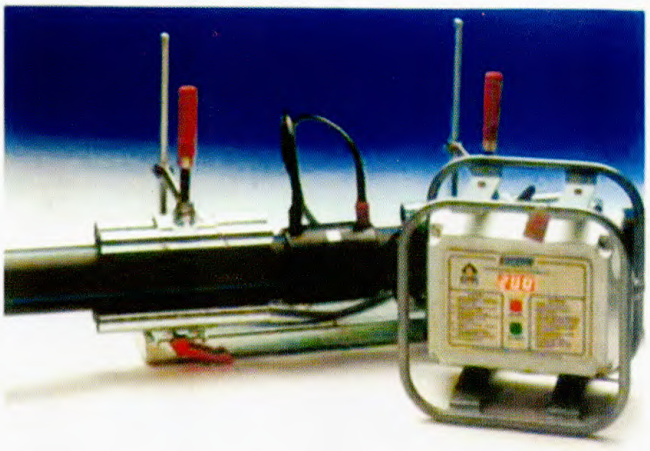
315 mm ø seawater intake pipeline in Oman.



600 mm to 1200 mm ø HDPF Weholite pipes for storm water drainage at port, in Oman.

Jointing methods for PE-HD pipes





1. Butt Welding

Butt welding (or buff fusion) is a simple and quick jointing method to connect pipes and fittings of PE-HD or PE-MD. The process starts by cutting the pipe ends straight and cleaning them carefully. A heater plate is then placed in between, and the ends are heated under pressure to temperatures of 200 - 220°C. The polyethylene becomes soft and a so called bead is formed between the pipe ends. The heater plate is then removed and the pipe ends are pressed unto each other and allowed to cool under pressure. This will form a welded joint that is water tight and homogeneous. To obtain the best results, the procedure should be well monitored and the welding parameters should be followed. These parameters depend on the wall thickness and the diameter of the pipes or fittings. An automatic recording unit is available for this welding process, and facilitates therefore the operation. It is also important that the pipes are made of the same resin. The same procedure is also used for welding stub-ends for flange joints.

2. Electrofusion jointing

This jointing method is utilised for jointing PE-HD and PE-MD pipes as well as fittings. This is an easy system where pre-installed resistance wires on the inside of the fittings are slightly coated with PE. When these wires are connected to a welding unit, they become warm and the polyethylene consequently melts. Having the ends of the pipes in the connection of fitting (socket, bend, etc.), the polyethylene then melt into each other and form a rigid and durable joint. This jointing method is very common for gas pipes and potable water pipes. A welding unit is available for this procedure and makes the whole operation very easy and practical.

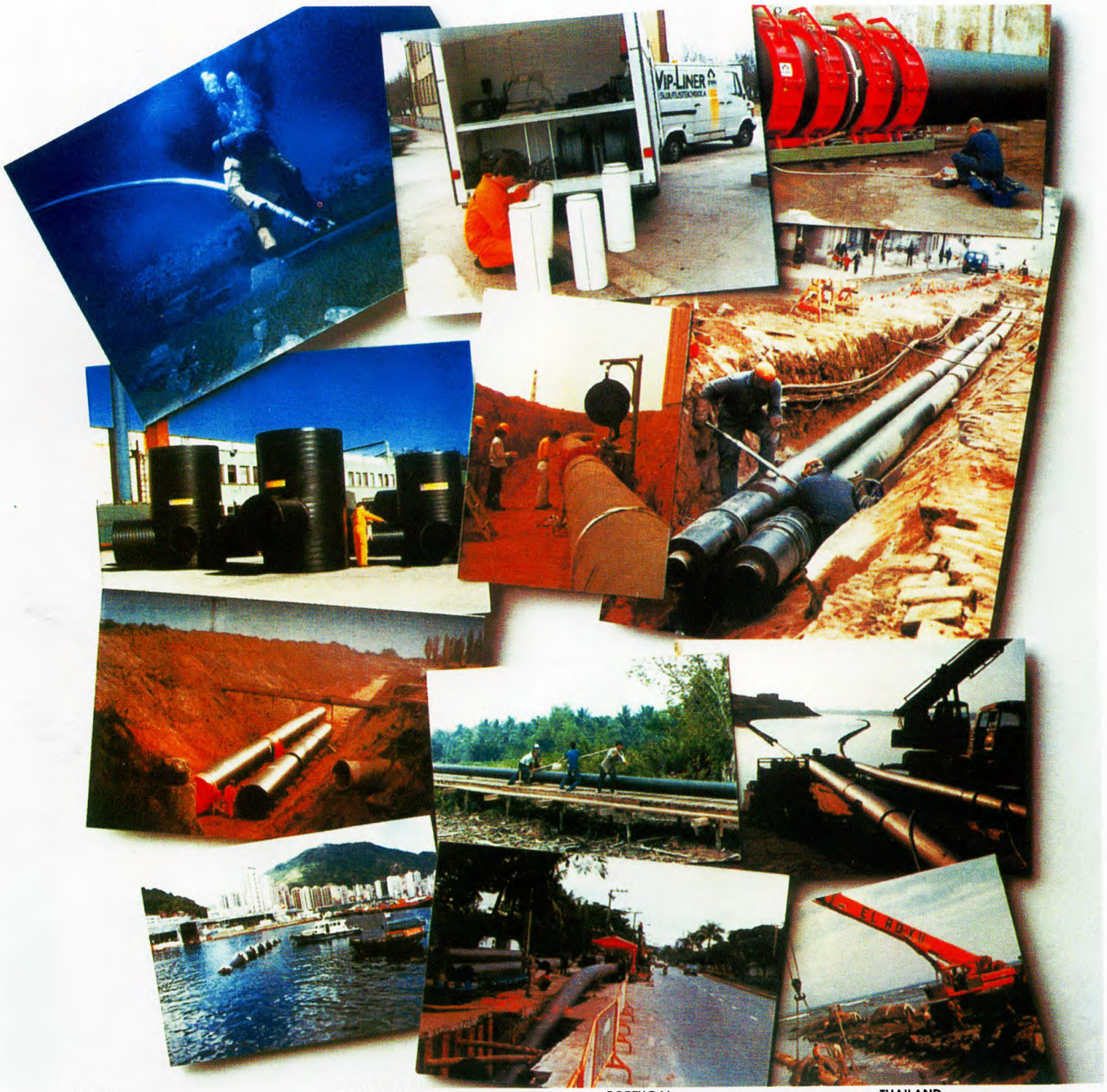
3. Flange joints

To be able to make a flange joint, a stub-end has to be welded to the end of each pipe. These are then connected to each other by loose flanges, nuts and bolts. Usually, flanges are used in connections which are to be disassembled at a later stage, or, in submarine pipe systems. The environment is very important for the choice of loose flange material, which could be made of steel, aluminium or plastic.

4. Compression fittings

Small diameter pipes are jointed by different mechanical couplings. These are usually made of corrosion-resistant metal or plastic and are very simple to use. These couplings are normally used when pipes are coiled and the number of joints is small.

Complete engineering - our speciality



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