PE-XA PIPE MATERIAL FOR TEMPERATURES OF 230°F & DIAMETERS UP TO 28”

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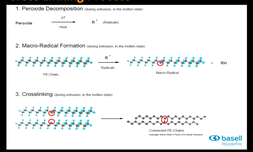
PE-Xa Pipe material is well known and is accepted as the leading pipe material for heating carrier pipe material for decades.
However, as systems grow in capacity, there has been a need for larger size of PE-Xa pipes, than the commercial manufacturers were offering.
In the 1980’s one of the largest PE-Xa manufacturer developed an industrial grade of PE-Xa with sizes up to 28” and DR down to 6.
This Work is aimed to show in brief the track record of PE-Xa pipe in high temperature services, larger sizes and coiling options.
This knowledge will benefit system designers in their material selection process, as they are already familiar with the smaller size PE-Xa performance.

HISTORY OF PE-Xa

In the late 1950s scientists worked on the structure of polyethylene to strengthen the connections between the polymer chains. They developed ways to create additional ties between the PE molecules through covalent or chemical bonding.

The result was a PE structure that did not “flow” or move to a softened state as quickly when the temperature is increased.

Cross Linking Process



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)							
		25	21	16.2	13	11	9	7.4	6
10	50	38	123	162	196	247	310	390	491
21	70	60	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	125	156	196	247	311
60	140	59	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

High Temp History

In 1985 Pe-Xa pipes (Pexgol) were installed for Sylvinite hot crystallization process
Operating Temperatures are 237f@72psi
Based on maintenance report between 1985 to 2017 the system runs with 3 days of shutdown a year.

PEXa Key Features & Operational Benefits:

Significant **CAPEX** and **OPEX** cost reduction
Direct replacement for Carbon Steel & Exotic piping materials
Straight lengths up to 28” diameter.
Coils up to 14” diameter **NO JOINTS UNDERGROUND**
100 year + Life Cycle
Scaling resistant
Shortest Bend Radius
Design Flow Velocities
up to 2.44 m/s (8 Feet/Second)
Scratch Depth of 20% of wall thickness
Retains max psi and temp ratings

LESS KNOWN FACTS ABOUT PE-Xa

237f (114c) – the highest documented operating temperature. Pe-Xa (Pexgol Brand) has been used at a potash processing plant since 1985, same pipes are still in use today
No Creep; interesting phenomena is that Pe-Xa does not creep over time, it has a 3%-7% “stretch” when used vertically to hold a load. It is used in hundreds of boreholes as a non supported raiser.
NO Slow Crack growth
Does **not required sand embedding** when laid in a trench.
UV Resistant black UV resistant are available since 1974

NO CREEP: BOREHOLE RIZER: Un supported while holding weight of pump, pipe, cable and water

NO Slow Crack Growth: A 16” PE-Xa pipe installed in 1999, under constant load on an bedded ground.

PE-Xa Sizes : up to 28” DR availability down to DR 6 allowing design flexibility of pressure and temperatures

Length [mile]	Pipe Size (OD) SDR 11 - number of connections per pipe size							
	4”		6”		8”		10”	
	#coils	#40’	#coils	#40’	#coils	#40’	#coils	#40’
2	3	264	6	264	10	264	24	264
4	6	528	12	528	19	528	48	528
6	9	792	18	792	28	792	72	792
8	11	1056	24	1056	37	1056	96	1056
10	14	1320	30	1320	46	1320	120	1320

12” SDR11 coils 3000ft long

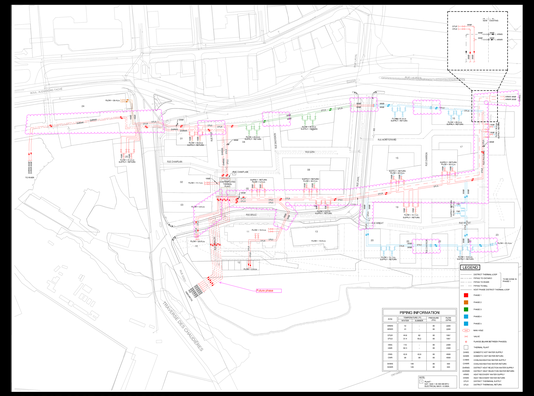
Coils Deployment: PE-Xa 8” DR11 3000ft in under 5 hours

Combining Coils with Quick Clam Insulation

To see the full video of installation follow the QR

The combination between long coils options and quick insulation kits allows :

- Reduce labor cost
- Quick install, minimizing construction area presence time
- Reducing risk by minimizing buried connections
- Easy to maneuver were existing infrastructure exists



PROJECT COST COMPARISON

HDPE SDR 11		
Systems:	**Material:**	**Labour:**
HWR & S	$214,490.06	$229,002.00
OTLL & R	$626,356.06	$626,328.00
To Ontario	$197,909.68	$126,315.00
(HWR)S & R	$670,541.51	$464,496.00
Sub-Total:	$1,709,407.11	$1,177,341.00
TOTAL: Material & Labour: $2,886,748.11		
Labour % Average: 40%		

PEXGOL SDR 11		
	Material:	**Labour:**
Coils	$632,389.65	$97,032.20
Coils	$653,380.47	$82,965.60
Coils	$224,949.79	$95,488.00
Straights	$1,019,342.92	$486,136.00
Coils	$1,631,700.09	$233,372.00
Sub-Total 1:	$2,390,226.75	$642,760.80
Straights/Coils:		
Sub-Total 2: Coils	$2,402,316.94	$585,996.80
	TOTAL: Material & Labour: $3,054,337.74	
	Labour % Average: 19%	
	TOTAL: Material & Labour: $2,784,571.70	
	Labour % Average (Coils): 14%	