



Raw Material Data Sheet

CenFuse HDPE for use in Geothermal, ground source heat pump applications.

ASTM Standards that CenFuse HDPE Meets or Exceeds:

- D 3035...Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
- D 3350...Standard Specification for Polyethylene Plastic Pipe and Fittings Material.

CenFuse HDPE Raw Material Properties

Property	ASTM Test Method	Typical Values	
		English Units	SI Units
Density (Natural)	D 4883	-	0.944 g/cc
Density (Black)		-	0.955 g/cc
Melt Index ¹	D 1238	-	12.5 g/10 min
Tensile Strength			
@ Yield (2 in/min)	D 638	3300 psi	22.8 MPa
@ Break (2 in/min)	D 638	4500 psi	31.0 MPa
Elongation			
@ Break (2 in/min)	D 638	>800%	>800%
Flexural Modulus ²	D 790	120,000 psi	827 MPa
Notched Izod Impact Strength	D 256	6.0 ft-lbf/in	0.32 kJ/m
Hardness (Shore D)	D 2240	68	68
Vicat Softening Point	D 1525	259° F	126° C
Brittleness Temperature	D 746	<-180° F	<-118° C
Hydrostatic Design Basis			
@ 23° C	D 2837	1600 psi	11.0 MPa
@ 60° C	D 2837	800 psi	5.5 MPa
Environmental Stress			
Crack Resistance ³	D 1693	>5000 hrs.	>5000 hrs.
Notch Tensile (Pent)	F 1473	>100 hrs.	>100 hrs.
Carbon Black			
Concentration	D 1603	2.30%	2.30%
Cell Classification	D 3350	345464C	345464C

¹ 190°C/21600 g

² 2% Secant-Method 1

³ Condition C



CenFuse is certified by NSF.

CenFuse meets AWWA C901 and C906 Requirements.

CenFuse HDPE is certified by NSF Standards 14 and 61.

Listed April, 2002; Updated June, 2005

CenFuse SDR 11 HDPE Critical Dimensions

Nominal Size	O.D.	Wall	Nominal ID	Weight/Ft.
3/4" IPS	1.050" +/- .004"	.095" + .020"	.860"	.122 lbs
1" IPS	1.315" +/- .005"	.120" + .020"	1.077"	.191 lbs
1 1/4" IPS	1.660" +/- .005"	.151" + .020"	1.358"	.306 lbs
1 1/2" IPS	1.900" +/- .006"	.173" + .021"	1.554"	.402 lbs
2" IPS	2.375" +/- .006"	.216" + .026"	1.943"	.627 lbs
3" IPS	3.500" +/- .008"	.318" + .038"	2.864"	1.360 lbs
4" IPS	4.500" +/- .009"	.409" + .049"	3.682"	2.249 lbs

CenFuse SDR 13.5 HDPE Critical Dimensions

Nominal Size	O.D.	Wall	Nominal ID	Weight/Ft.
3/4" IPS	1.050" +/- .004"	.078" + .020"	.894"	.102 lbs
1" IPS	1.315" +/- .005"	.097" + .020"	1.121"	.159 lbs
1 1/4" IPS	1.660" +/- .005"	.123" + .020"	1.414"	.254 lbs
1 1/2" IPS	1.900" +/- .006"	.141" + .020"	1.618"	.333 lbs
2" IPS	2.375" +/- .006"	.176" + .021"	2.023"	.520 lbs
3" IPS	3.500" +/- .008"	.259" + .031"	2.982"	1.128 lbs
4" IPS	4.500" +/- .009"	.333" + .040"	3.834"	1.865 lbs

CenFuse SDR 15.5 HDPE Critical Dimensions

Nominal Size	O.D.	Wall	Nominal ID	Weight/Ft.
3/4" IPS	1.050" +/- .004"	.068" + .020"	.915"	.089 lbs
1" IPS	1.315" +/- .005"	.084" + .020"	1.145"	.141 lbs
1 1/4" IPS	1.660" +/- .005"	.107" + .020"	1.446"	.223 lbs
1 1/2" IPS	1.900" +/- .006"	.123" + .020"	1.655"	.293 lbs
2" IPS	2.375" +/- .006"	.153" + .020"	2.069"	.457 lbs
3" IPS	3.500" +/- .008"	.226" + .027"	3.048"	.995 lbs
4" IPS	4.500" +/- .009"	.290" + .035"	3.919"	1.644 lbs

Hazen-Williams Head Loss and Flow Velocity for SDR 11 CenFuse HDPE

	Flow (US GPM)	Velocity (FPS)	Head Loss (FT/100')
3/4" IPS	1	0.57	0.22
3/4" IPS	2	1.14	0.79
3/4" IPS	3	1.70	1.68
3/4" IPS	4	2.27	2.86
3/4" IPS	5	2.84	4.32
3/4" IPS	6	3.41	6.05
3/4" IPS	7	3.98	8.06
3/4" IPS	8	4.54	10.32
3/4" IPS	9	5.11	12.83
3/4" IPS	10	5.68	15.59
3/4" IPS	15	8.52	33.04
1" IPS	1	0.36	0.07
1" IPS	2	0.72	0.26
1" IPS	3	1.09	0.56
1" IPS	4	1.45	0.96
1" IPS	5	1.81	1.45
1" IPS	10	3.62	5.22
1" IPS	15	5.43	11.06
1" IPS	20	7.24	18.84
1" IPS	30	10.87	39.91
1" IPS	50	18.11	102.79
1 1/4" IPS	5	1.14	0.47
1 1/4" IPS	10	2.28	1.68
1 1/4" IPS	15	3.41	3.57
1 1/4" IPS	20	4.55	6.08
1 1/4" IPS	25	5.69	9.19
1 1/4" IPS	30	6.83	12.88
1 1/4" IPS	35	7.96	17.13
1 1/4" IPS	40	9.10	21.94
1 1/4" IPS	45	10.24	27.28
1 1/4" IPS	50	11.38	33.16
1 1/2" IPS	5	0.87	0.24
1 1/2" IPS	10	1.74	0.87
1 1/2" IPS	15	2.60	1.85
1 1/2" IPS	20	3.47	3.15
1 1/2" IPS	30	5.21	6.67
1 1/2" IPS	40	6.94	11.36
1 1/2" IPS	50	8.68	17.18
1 1/2" IPS	60	10.42	24.08
1 1/2" IPS	70	12.15	32.03
1 1/2" IPS	80	13.89	41.02

2" IPS	10	1.11	0.29
2" IPS	15	1.67	0.62
2" IPS	20	2.22	1.06
2" IPS	30	3.33	2.25
2" IPS	40	4.45	3.84
2" IPS	50	5.56	5.81
2" IPS	75	8.34	12.31
2" IPS	100	11.12	20.96
2" IPS	125	13.89	31.69
2" IPS	150	16.67	44.42

3" IPS	25	1.28	0.24
3" IPS	50	2.56	0.88
3" IPS	75	3.84	1.87
3" IPS	100	5.12	3.18
3" IPS	125	6.40	4.80
3" IPS	150	7.68	6.73
3" IPS	175	8.96	8.96
3" IPS	200	10.24	11.47
3" IPS	250	12.80	17.34
3" IPS	300	15.36	24.31

4" IPS	50	1.55	0.26
4" IPS	75	2.32	0.55
4" IPS	100	3.10	0.93
4" IPS	125	3.87	1.41
4" IPS	150	4.64	1.98
4" IPS	175	5.42	2.63
4" IPS	200	6.19	3.37
4" IPS	250	7.74	5.10
4" IPS	300	9.29	7.15
4" IPS	350	10.83	9.51