EUROCAVI HT

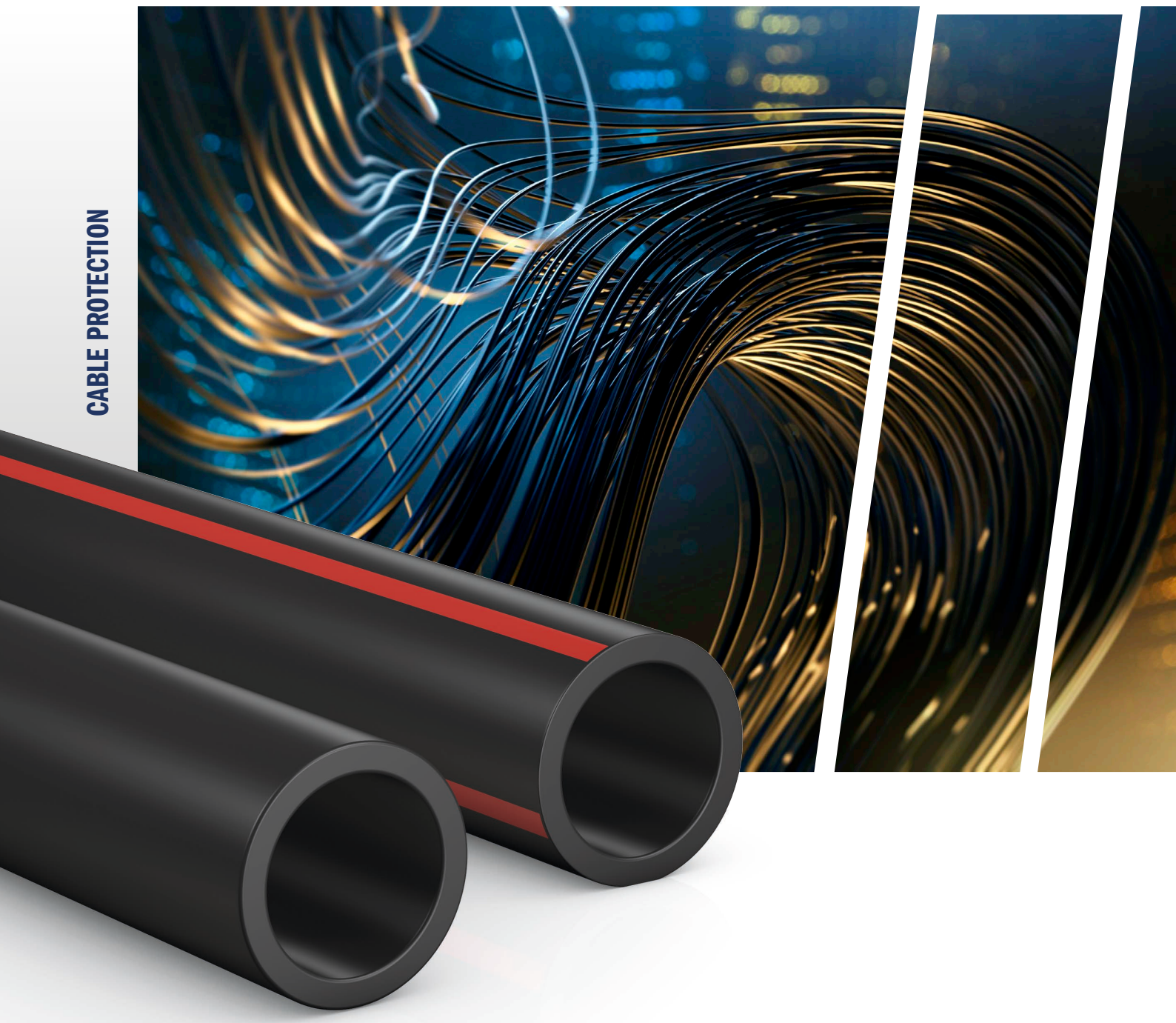
EURO TUBI

EN

PE100 RC-RT WITH ENHANCED STRESS CRACKING AND RAISED TEMPERATURE RESISTANCE

Polyethylene pipes, with monolayer structure, intended to be used for the protection of high voltage power cables and compliant with DIN 8074, DIN 8075, DIN 16833, IEC EN 61386-24, EN ISO 15494 and ISO 24033.

CABLE PROTECTION



PROPERTIES

The main mechanical characteristics of a cable protection pipe are crush resistance and impact resistance. The crush resistance is essential in view of the pipes being buried under the static loads above and the stresses caused by dynamic loads, while the impact resistance is necessary to guarantee the integrity of the cable conduit during laying.
The pipes in the Eurocavi HT range meet the requirements of standard CEI EN 61386-24 for both properties.

PIPE JUNCTIONS

EUROCAVI HT pipes can be mechanically jointed with special fittings. For this purpose, the use of butt-welded sockets or double sockets is highly recommended in order to avoid any welding activity on site, thus resulting in a fast and easy operation.
Butt-welded sockets are distinguished by an internal EPDM gasket and a lock ring which prevents any axial displacement of the inserted pipe, whereas the double sockets have two internal EPDM gaskets for the double insertion of the pipes.
Alternatively, EUROCAVI HT pipes can be connected by butt welding, paying attention not to adversely affect the junctions during the withdrawal of the welded pipes from the welding equipment and not exceeding the permitted tensile force, or electrofusion sockets can be possibly used for pipe junction.
Junctions must be compliant with international reference standards.
A pipe cutter or saw with fine teeth must be used to cut pipes to length and the ends of the pipes must be securely attached in case of coils or reels in order to avoid any bending load.
Installation conditions and accident prevention regulations must be observed at any time.
The removal of the welding bead is not necessary (on the contrary, this operation might make more difficult the assessment of the welding without improving quality).
Care must be paid to ensure that the pipe is not damaged or notched and it is also important not to go below the nominal wall thickness of the pipe in the proximity of the weld seam.
Pipe junctions must not be affected in any way during the installation procedure.

PACKAGING AND TRANSPORT

Eurocavi HT pipes are available in bars (for all diameters) and in coils (up to DN 160) with lengths varying according to DN and customer specifications.

APPLICATIONS AT HIGH TEMPERATURE

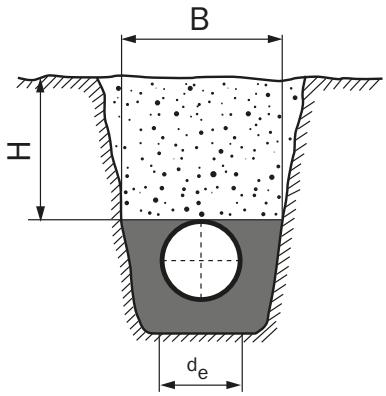
Facing the new challenges coming from the need to bury high voltage lines, the highest requirements for the pipe material are strongly recommended. For high voltage lines up to 525 kV, a continuous temperature up to 70 °C has to be assumed, therefore only a special type of polyethylene with increased resistance to temperature, namely PE100 RT, is the proper choice for long-term uses.

Properties	Value
Density	≥ 0,959 g/cm^3
Yield strength (23°C)	≥ 19 N/mm^2
Modulus of elasticity (23°C)	> 1000 Mpa
Elongation at break (23°C)	≥ 350%
Compressive strength (23°C)	≥ 250 N (tipo 250)
	≥ 450 N (tipo 450)
	≥ 750 N (tipo 750)
Coefficient of linear thermal expansion	~ 0,2 mm/m·K
Specific heat capacity	2300-2900 J/kg·K
Thermal conductivity	~ 0,4 W/m·K
Surface resistance	> 10^{13} Ω

INSTALLATION

The choice of excavation type for conduit networks depends on the soil conditions and the resulting stresses on the installed pipes. Excavations can be classified based on their geometric dimensions, primarily the backfill height (H) and trench width (B), measured at the upper generatrix level of the pipe and related to the external diameter (DN) of the installed pipe.

The "narrow" trench type is the best option for laying conduits, as the overlying load is distributed onto the trench walls. Therefore, it should be used whenever possible, considering the soil conditions.



Type of trench	Conditions	
Stretta	$H \geq 2B$	$B \leq 3\ d_e$
Larga	$H \geq 2B$	$3\ DN \leq B \leq 10\ d_e$
$H \geq 2B$	$H \leq 2B$	$B > 10\ d_e$

The "wide" trench, mainly used when the soil has a gravelly or sandy consistency, results in a greater load on the conduit compared to the previous case, which must be considered during the design phase.

The bedding layer, ideally composed of sand mixed with gravel (with a maximum gravel size of less than 10 mm), must be carefully compacted to ensure a uniform distribution of loads across the entire conduit. The sidefill should be done using sand, avoiding clay materials that hinder proper compaction.

Backfilling is the most critical phase of the installation process, as it must ensure perfect interaction between the conduit and the soil, allowing the pipe to withstand both ground settlement deformations and the loads acting on the trench. The best backfilling technique is to proceed in successive layers to avoid damaging the conduit.

EUROCAVI HT pipes are suitable for installation using trenchless (no-dig) technologies.

Some installation techniques, including Guided Horizontal Drilling (HDD), involve pulling the pipe by applying an axial force at one end of the pipe.

In this case, it is necessary to verify that the applied force is below a maximum allowable value, which depends on the pipe geometry and the yield strength of high-density polyethylene (HDPE). The maximum tensile load F_t, applied in the axial direction, must be lower than:

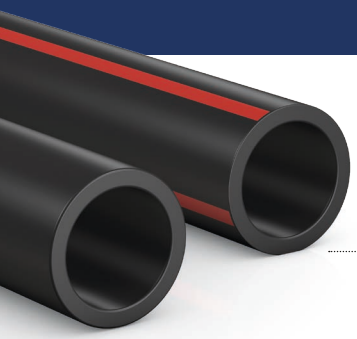
$$F_t < 0{,}35 \cdot \pi \cdot \sigma_y \cdot d_e^2 \cdot \left(\frac{1}{SDR} - \frac{1}{SDR^2}\right)$$

where σ y is the yield strength of high-density polyethylene (HDPE) at the installation temperature.

Temperature (° C)	σ_y (MPa)
-20	34
-10	32
0	30
10	28
20	24
40	18

Alternatively, "microtunneling" is a trenchless push technology suitable for installing new pipelines, allowing tunnel crossings under roads, railways, watercourses, and environmentally protected areas without the need for trench excavation. The technique involves drilling with a full-section cutting head, and its use is primarily focused on underground networks that require a high degree of precision.

In particular, thanks to the special long-length coil format available up to DN 160, EUROCAVI HT pipes can also be used for railway and other transport infrastructure crossings.



EUROCAVI HT

	SDR 26		SDR 17		SDR 13,6		SDR 11		SDR 9		SDR 7,4	
DN mm	e_n mm	DI mm	e_n mm	DI mm	e_n mm	DI mm	e_n mm	DI mm	e_n mm	DI mm	e_n mm	DI mm
40	-	-	-	-	3,0	34,0	3,7	32,6	4,5	31,0	5,5	29,0
50	-	-	3,0	44,0	3,7	42,6	4,6	40,8	5,6	38,8	6,9	36,2
63	-	-	3,8	55,4	4,7	53,6	5,8	51,4	7,1	48,8	8,6	45,8
75	-	-	4,5	66,0	5,6	63,8	6,8	61,4	8,4	58,2	10,3	54,4
90	3,5	83,0	5,4	79,2	6,7	76,6	8,2	73,6	10,1	69,8	12,3	65,4
110	4,2	101,6	6,6	96,8	8,1	93,8	10,0	90,0	12,3	85,4	15,1	79,8
125	4,8	115,4	7,4	110,2	9,2	106,6	11,4	102,2	14,0	97,0	17,1	90,8
140	5,4	129,2	8,3	123,4	10,3	119,4	12,7	114,6	15,7	108,6	19,2	101,6
160	6,2	147,6	9,5	141,0	11,8	136,4	14,6	130,8	17,9	124,2	21,9	116,2
180	6,9	166,2	10,7	158,6	13,3	153,4	16,4	147,2	20,1	139,8	24,6	130,8
200	7,7	184,6	11,9	176,2	14,7	170,6	18,2	163,6	22,4	155,2	27,4	145,2
225	8,6	207,8	13,4	198,2	16,6	191,8	20,5	184,0	25,2	174,6	30,8	163,4
250	9,6	230,8	14,8	220,4	18,4	213,2	22,7	204,6	27,9	194,2	34,2	181,6
280	10,7	258,6	16,6	246,8	20,6	238,8	25,4	229,2	31,3	217,4	38,3	203,4
315	12,1	290,8	18,7	277,6	23,2	268,6	28,6	257,8	35,2	244,6	43,1	228,8
355	13,6	327,8	21,1	312,8	26,1	302,8	32,2	290,6	39,7	275,6	48,5	258,0
400	15,3	369,4	23,7	352,6	29,4	341,2	36,3	327,4	44,7	310,6	54,7	290,6
450	17,2	415,6	26,7	396,6	33,1	383,8	40,9	368,2	50,3	349,4	61,5	327,0
500	19,1	461,8	29,7	440,6	36,8	426,4	45,4	409,2	55,8	388,4	-	-
560	21,4	517,2	33,2	493,6	41,2	477,6	50,8	458,4	62,5	435,0	-	-
630	24,1	581,8	37,4	555,2	46,3	537,4	57,2	515,6	-	-	-	-
710	27,2	655,6	42,1	625,8	52,2	605,6	64,5	581,0	-	-	-	-
800	30,6	738,8	47,4	705,2	58,8	682,4	72,6	654,8	-	-	-	-
900	34,4	831,2	53,3	793,4	66,1	767,8	81,7	736,6	-	-	-	-
1000	38,2	923,6	59,3	881,4	73,5	853,0	90,8	818,4	-	-	-	-

Altri formati a disposizione su richiesta

DN = diametro nominale DI = diametro interno e_n = spessore nominale

La scelta del tubo è vincolata alle variabili dello specifico progetto (portata della condotta, natura del terreno interessato alla posa, tecnica di installazione, ecc.) ed alle prescrizioni normative in vigore, la cui valutazione è sempre di competenza del responsabile della progettazione.

IDROTHERM 2000

EUROTUBI is a commercial division of Idrotherm 2000 S.p.A.

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