

# TECHNICAL MANUAL

## Elysee ReCyFilm Piping System



### PRODUCT DESCRIPTION

ReCy-Film product series launches green low-density poly(ethylene) (LDPE) pipes that consist of recycled raw material (~70%). The production method of the new recycled pipes adopts the circular economy model (reduce, reuse and recycle). The recycled LDPE raw material is derived from the mechanical recycling of post-consumer agricultural plastic greenhouse films to stop plastics from filling our nature and piling up in landfills, reduce our greenhouse gas emissions, and slow the spread of microplastics.

### QUALITY MANAGEMENT

Elysee quality system, ISO 9001:2015, is approved by CCC and IQNet. The pipes are tested and approved based on CYS106 standard where all dimensional, physical, mechanical, performance and system performance requirements are fully satisfied. The complete range of piping system has been tested and approved by the leading certification body of Cyprus, CCC.

### APPLICATION AREA

**Landscaping water supply network** - Landscaping need lots of water pipe, PE pipe toughness and low cost, make it become the best choice.

**Agricultural irrigation pipe** - PE pipe inside sleek, great flow, good impact resistance, it is the ideal tool for agricultural irrigation.

### DIMENSIONS AND CHARACTERISTICS

Comply with dimensional requirements and characteristics of the standard CYS106 & ISO8779.

### OPERATING TEMPERATURE

Can withstand temperatures up to 40°C limited by the pipe's material thermal resistance properties.

### OPERATING PRESSURE

Maximum 4 bar @ 20°C for the complete range.

### MATERIAL CHARACTERISTICS

LDPE is composed of highly branched polymer chains that do not pack closely together and are randomly oriented relative to one another, i.e. LDPE is amorphous. The large distance between adjacent polymers weakens the intermolecular forces between polymers which are easily overcome.

### RESISTANCE TO IMPACT

PE Pipes are unbreakable at temperatures > 5 °C. The high impact strength of PE pipes compared with other materials ensures a greater resistance to the rigors of pipe laying conditions.

### ELASTIC AND FLEXIBLE

PE pipes are flexible and can be bent to a bending radius of minimum 30 times the pipe's outside diameter. This inherent resiliency and flexibility allow the pipe to absorb surge pressures, vibration and stresses caused by soil movement.

### WEATHERING AND UV RESISTANT

PE pipes are stabilized against ultraviolet (UV) light degradation by the inclusion of carbon black in the raw material. Black PE pipes are, therefore, suitable for installations where the pipes are exposed to direct sunlight.

### PROJECTED LIFE EXPECTANCY

Based on performance under normal operating conditions, the life expectancy is rated to 50 years, before replacement or major repair. This rating is only a general guide to life expectancy. It may increase or decrease depending on the quality of the installation, system operation, environmental conditions as well as other geographical and site-specific factors.



## QUALITY INSPECTIONS AND TESTING

Several tests are carried out to verify the compliance of our polyethylene pipes with the relevant standards through in-house testing as well as tests in external accredited laboratories. Furthermore, all quality procedures and practices are checked from the entry of raw material, until the delivery of the pipes to the customers. Out of the regular inspections of appearance, color, marking and geometric characteristics, several mechanical and material tests are carried out as mentioned below.

Test Description	Conditions		Duration	Method	Requirements	Applied Standard
	Temp.	Env.				
Hydrostatic Strength	20°C	Water	1h	ISO 1167-½	No failure during test period of any test piece	CYS 106 / ISO 8779
Hydrostatic Strength	80°C	Water	165h	ISO 1167-½	No failure during test period of any test piece	ISO 8779
Hydrostatic Strength	80°C	Water	1000h	ISO 1167-½	No failure during test period of any test piece	CYS 106 / ISO 8779
Ultimate Tensile Strength	23±2°C	Air	/	EN ISO 6259-3	> 11 N/mm <sup>2</sup>	CYS 106
Elongation At Break	23±2°C	Air	/	EN ISO 6259-3	≥ 350%	CYS 106
Longitudinal Reversion	100±3°C	Air	1h	ISO 2505	≤ 3% / No effect on surface	CYS 106 / ISO 8779
Oxidation Induction Time Susceptibility to	200±3°C Nitrogen		/	ISO 11357-6	20 min	ISO 8779
Env. Stress Cracking	70±2°C	RS	1h	ISO 8796	No visible cracks at the area of the folds (≤10% failures)	CYS 106 / ISO 8779
Melt Flow Index	190°C	Air	/	ISO 1133	0.2-0.55g/10min (max 20% deviation from Supplier value)	CYS 106 / ISO 8779
Carbon Black Content and Dispersion	190°C	Air	/	BS 2782-8 ISO6964 ISO 18553	Uniformity of appearance and Rating of dispersion should comply with relevant standards	CYS 106 / ISO 8779

## LDPE STANDARDS

**CYS 106** - Low Density Polyethylene (LDPE) for agricultural applications. This standard specifies the characteristics of preferable black LDPE pipes intended to be used for conveyance of water for agricultural applications. This standard covers pipes with nominal outside diameters from 16 mm to 40 mm and nominal pressures of 4 bar and 6 bar. It also specifies the test parameters for the test methods referred to in this standard.

**ISO 8779** - Plastics piping systems, Polyethylene (PE) pipes for irrigation, Specifications. This International Standard specifies the pipes (mains, sub-mains and laterals) with nominal outside diameters from 12 mm up to and including 63 mm made from polyethylene (PE) intended to be used for the conveyance of water for irrigation. It also specifies the general properties of PE and the test parameters for the pipes designated.

### CYS 106

PN4 / SDR:13.6 / PE32			
Code	Nominal Diameter (mm)	Min. Wall Thickness (mm)	Approximate Weight (Kg/m)
12 040 016***	16	1.5	0.077
12 040 020***	20	1.6	0.099
12 040 025***	25	1.9	0.139

### ISO 8779

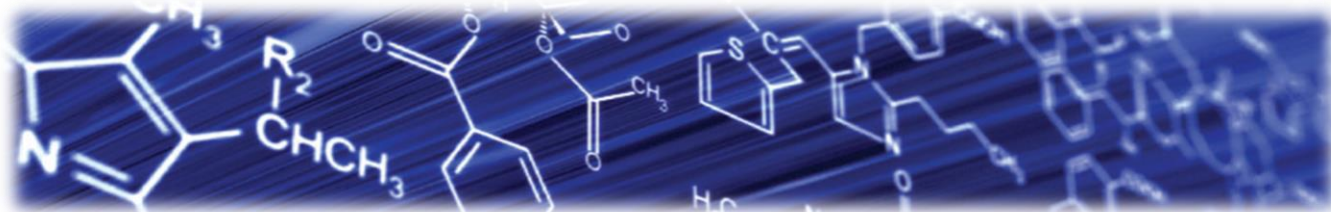
PN4 / SDR:13.6 / PE32			
Code	Nominal Diameter (mm)	Min. Wall Thickness (mm)	Approximate Weight (Kg/m)
13 040 016***	16	1.4	0.067
13 040 020***	20	1.5	0.090

## EFFECTS OF CHEMICALS ON POLYETHYLENE

Chemicals can affect the strength, flexibility, surface appearance, color, dimensions or weight of polyethylene. The basic modes of interaction which cause these changes are:

1. Chemical attack on the polymer chain, which results in reduction of physical properties, including oxidation, reaction of functional groups in or on the chain and de-polymerisation. Physical change, including absorption of solvents resulting in softening and swelling of the plastic, permeation of solvent through the plastic and dissolution in a solvent.
2. Stress cracking from the interaction of a “stress cracking agent” with internal or external stresses.
3. The available Chemical Resistance is a general guide only. Because so many factors can affect the chemical resistance of a given product, you should test under your own conditions if required.

If the inquired chemical is not included on the following one, a more detailed chart will be made upon request.



## JOINTING POLYETHYLENE PIPES

**Mechanical Compression Joints** - PE pipes 16mm & 20mm outside diameters may be joined by mechanical compression fittings. Elysee offers a complete range of mechanical compression fittings designed for conveyance of fluids, gaseous fuels, compressed air, chemical solutions and slurries under high pressure. Our mechanical compression fittings comply with all relevant international standards in terms of dimensions and mechanical properties. They are also ideal for the conveyance of potable water and fluids for human Consumption, since they are produced in accordance with national and international standards and regulations for health and safety. To ensure that all requirements of standards and regulations are fulfilled, our fittings are tested regularly and approved worldwide by the main testing institutes and certification bodies applicable for all grades of PE.



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