

ultra light composite cylinders





ULTRALIGHT COMPOSITE CYLINDERS



INNOVATIVE **PRODUCT**

An innovation of our products is the result of many years of research and development in ultralight composite cylinders. The production process has been initiated with a successful blowing of a PET preform into a steel extinguisher.

The experiment allowed the company owners to use new materials in cylinder production process and to initiate production of 4th generation composite cylinders.

Also the availability of European funds has allowed to develop, implement and certify ultralight cylinders production technology.

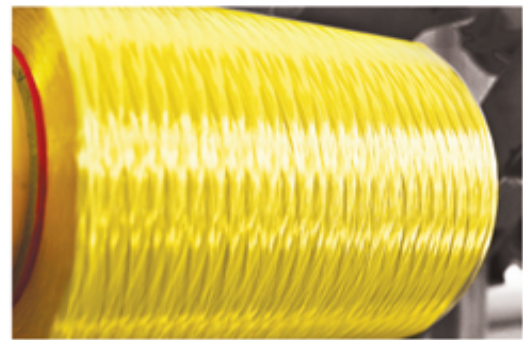
DEVELOPMENT OF **THE COMPANY**

The availability of European funds has allowed to develop, implement and certify ultralight cylinders production technology.

A method of winding a synthetic fibre on the PET liner guarantees high quality of manufactured products using patented technology and production process. The cylinders are manufactured under SAFER® trademark.

The company continues its research on new cylinder production techniques. Increased capacity and use of advanced synthetic fibres will allow cylinder application in newer and newer fields.

INNOVATIVE TECHNOLOGIES



Ultralight SAFER® composite cylinders have been developed with Polish science institutes.

The machines and the software used in a production process are designed and developed in accordance with the design criteria which are perfectly adapted to the production requirements.

The cylinders are manufactured in an automatic quality control process and are subject to comprehensive tests under TÜV SÜD supervision.

The highest quality materials guarantee the highest SAFER® cylinder quality.

COMPOSITE CYLINDERS

- FEATURES AND PROPERTIES

PET LINER

Use of PET liner in SAFER® cylinders has allowed the production of ultralight composite cylinders.

The liner protects the cylinder against reaction with gas, and thus prevents corrosion. The gases stored in cylinders are kept clean and are safe for cylinder users.

PET features high barrier properties that guarantee safe gas storage in SAFER® cylinders.

WARRANTY

The technology and research works allowed the development of products with 15 and 20 years life span. Further tests and research have confirmed possible use of our products for 30 years.

High quality materials used in the production process and a wide range of capacities allow to use the cylinders with various gases.



CONDITIONS

TEMPERATURE: 25°C

PRESSURE: 1 BAR

PERMEABILITY: 100%

$[m^3 \text{stp}/m^3] \times [m^2/s]$

PERMEABILITY

GAZ	PET (POLYETHYLENE TEREPHTHALATE ~100% CRYSTALLINE)	HDPE (HIGH DENSITY POLYETHYLENE)	LDPE (LOW DENSITY POLYETHYLENE)	PVC (POLYVINYL CHLORIDE)
CO2	$80 * 10^{-15}$	$3500 * 10^{-15}$	$9400 * 10^{-15}$	$120 * 10^{-15}$
O2	$51 * 10^{-15}$	$780 * 10^{-15}$	$2300 * 10^{-15}$	$35 * 10^{-15}$
N2	$3,6 * 10^{-15}$	$230 * 10^{-15}$	$640 * 10^{-15}$	$8,7 * 10^{-15}$
H2	$640 * 10^{-15}$	$1900 * 10^{-15}$	$7600 * 10^{-15}$	$1300 * 10^{-15}$
g/m*s				
CO2	$200 * 10^{-12}$	$6800 * 10^{-12}$	$18000 * 10^{-12}$	$240 * 10^{-12}$
O2	$72 * 10^{-12}$	$1100 * 10^{-12}$	$3200 * 10^{-12}$	$49 * 10^{-12}$
N2	$4,4 * 10^{-12}$	$280 * 10^{-12}$	$790 * 10^{-12}$	$11 * 10^{-12}$
H2	$57 * 10^{-12}$	$170 * 10^{-12}$	$680 * 10^{-12}$	$120 * 10^{-12}$

CYLINDER DESIGN

The SAFER® cylinders are made of ultralight polymers.

Carbon and aramid fibre braid in an epoxy matrix allows storage of high pressure gases. An external epoxy layer protects SAFER® cylinder against scratches and impacts, and ensures excellent durability.



ULTRALIGHT POLYMER LINER

CARBON FIBRE AND ARAMID FIBRE BRAID IN AN EPOXY MATRIX.

EPOXY COATING



SPECIFICATION

	weight	diameter	length	operating pressure	pressure test	thread	life span	operating temperature
1.2L	0.69 kg	116 mm	213 mm	300 bar	450 bar	5/8" 18 UNF	15 years	-40°C / +60°C
1.5L	0.83 kg	116 mm	238 mm	300 bar	450 bar	5/8" 18 UNF	15 years	-40°C / +60°C
2.0L	1.10 kg	116 mm	321 mm	300 bar	450 bar	5/8" 18 UNF M18 x 1,5	20 years	-40°C / +60°C
3.0L	1.6 kg	116 mm	445 mm	300 bar	450 bar	M18 x 1,5	20 years	-40°C / +60°C
6.8L	2.8 kg	158 mm	526 mm	300 bar	450 bar	M18 x 1,5	20 years	-40°C / +60°C

COMPOSITE CYLINDERS - USE AND ADVANTAGES

Lightweight SAFER® cylinders can be used in rescue operations where minimum equipment weight is an advantage.

The cylinders are a perfect alternative to steel cylinders used for storage of medical gases. Maintained gas purity ensures safety, without hazard to patient health.

Techplast also researches high pressure cylinders for use in automotive industry in fuel systems.

Light cylinder weight is an advantage in technical gas storage. It allows cylinder transport without use of heavy lifting equipment. The cylinders can be used for storage of freon, argon and other special gases.

Resistance to external and mechanical factors, and light cylinder weight make SAFER® cylinders perfect for paintball. Different capacities allow cylinder use in both short and long strategy games.



AWARDS AND CERTIFICATES

Only the highest quality materials with optimum specifications are used in composite cylinder manufacturing processes. SAFER® guarantees the highest product quality. 1.2L-3.0L and 6.8L Techplast cylinders are TÜV SÜD approved. Cylinders of different capacities are currently subject to the certification process.

The company have been awarded with a prestigious Kevlar® Innovation Award 2012 award for an innovative use of DuPont™ Kevlar® fibre in production of ultralight composite cylinders improving the safety of people and the environment.

KEVLAR® INNOVATION AWARD



CE T





www.safercylinders.net

Techplast Sp z o.o.
Wieprz 257, 34-122 Wieprz,
Poland