Optinova
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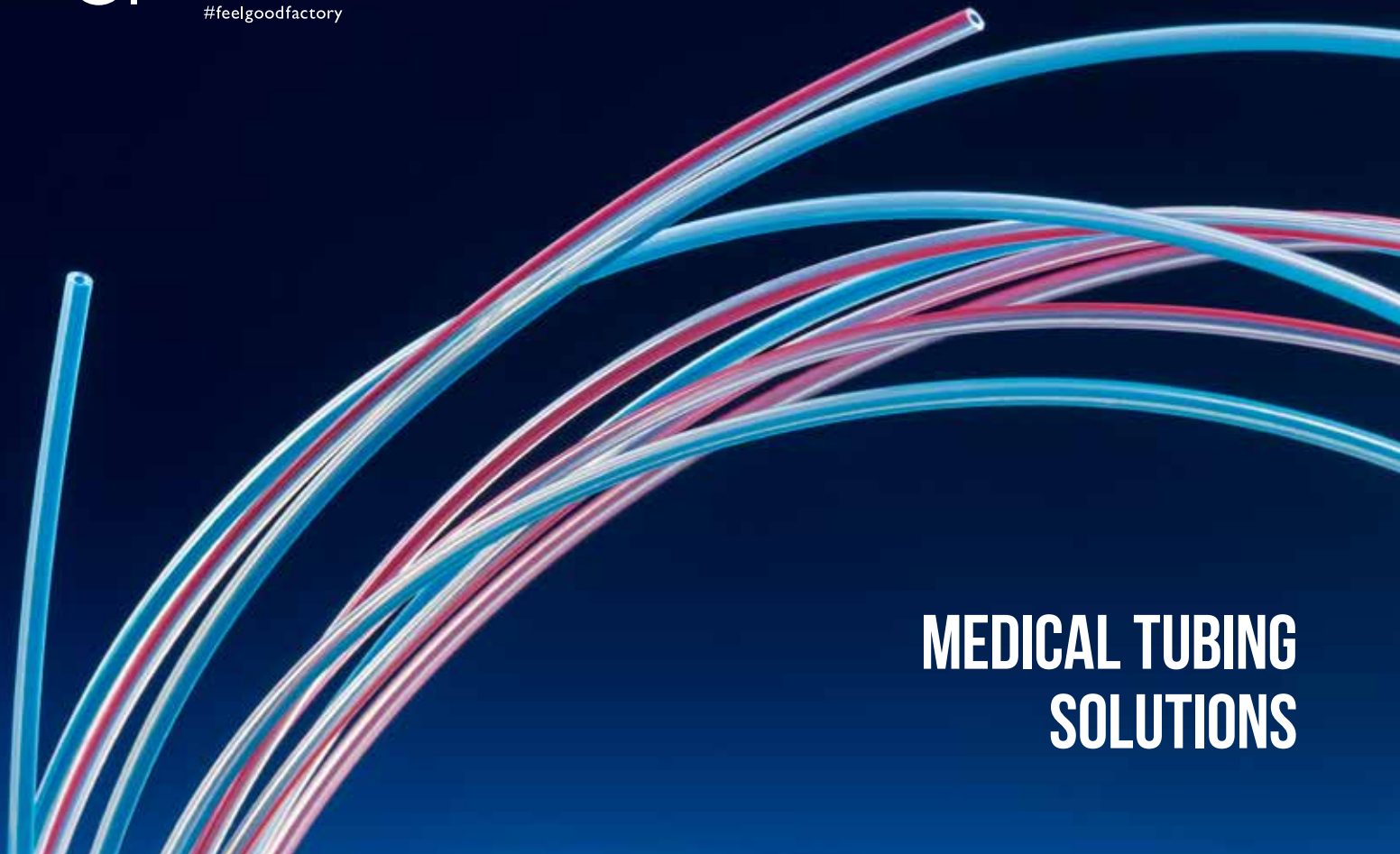

# MEDICAL TUBING SOLUTIONS

# IN BRIEF

The Optinova Group is a leading global supplier of advanced tubing solutions for the global medical device industry and for challenging industrial applications. We use our experience and knowledge in extrusion, combined with a sustainable business mindset, to develop top quality components which are part of innovative solutions, increasing the quality of everyday life.

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# DECADES OF ADVANCED TUBING

**1971**
Godby Plast founded by Habia, of Sweden

**1985**
Expansion of plastic material in use

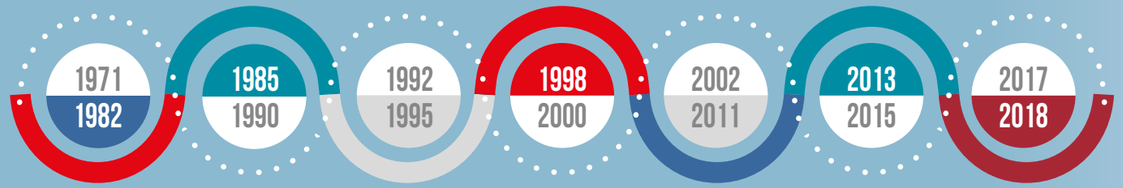
**1992**
Eriksson Capital acquires 100% ownership

**1998**
Established in China

**2002**
Hall 6 finished; 300 m² clean room

**2013**
Second plant in Minneapolis, USA established

**2017**
Sales office in Bangkok, Thailand, established




**1982**
First clean room

**1990**
New company name: Optinova

**1995**
100% focus on medical tubing

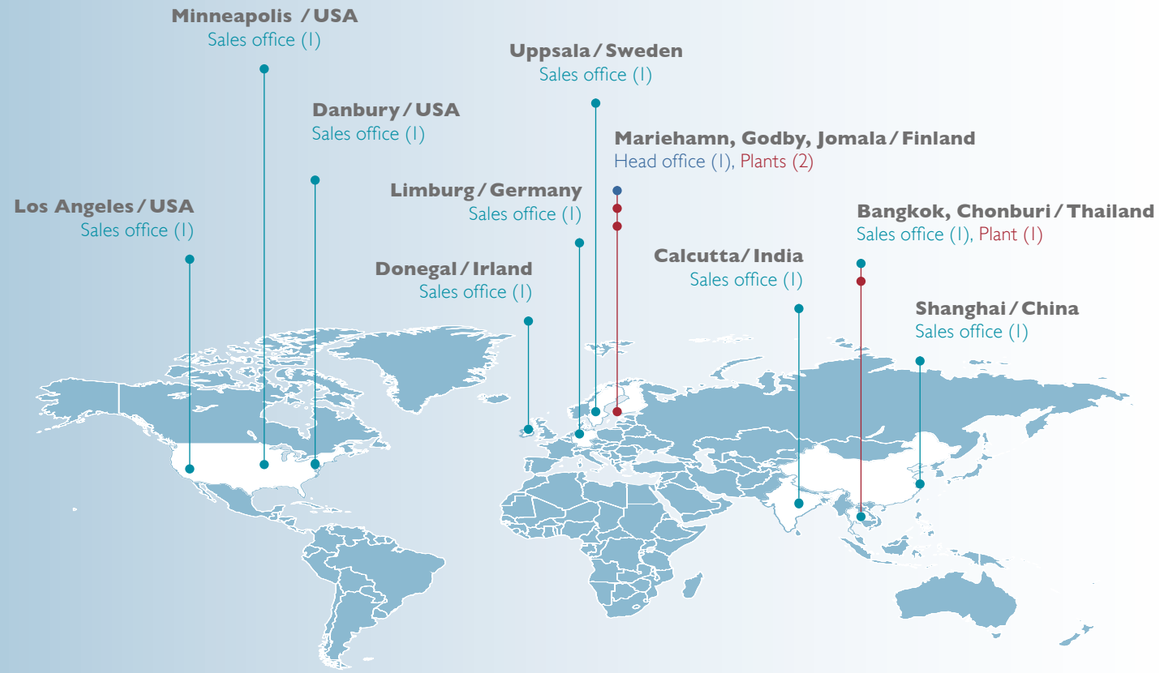
**2000**
Established in the USA

**2011**
Acquisition of Medicin Lake Extrusion in Minneapolis, USA

**2015**
Acquisition of ScanTube Group; industrial tubing added to portfolio

**2018**
Transition to only one brand: Optinova





# WHY WE ARE IN THE BUSINESS OF EXTRUSION

The Optinova Group is a leading global supplier of advanced tubing solutions for the global medical device industry and for challenging industrial applications.

## Our greater purpose

We use our experience and knowledge in extrusion, combined with a sustainable business mindset, to develop top quality components which are part of innovative solutions, increasing the quality of everyday life.

## Our guiding star

All in all, we describe how and what we do with our guiding star:

**#feelgoodfactory**

# SUSTAINABILITY

We strive to be at the forefront by operating in a sustainable way in our industry and society. Our efforts are important for the growth of our employees and business. Together we can contribute to a better world towards higher purpose. We invite and encourage everyone at Optinova to promote sustainability at any level.

## Diversity

The diversity among Optinova employees is a competitive advantage. We are inclusive with respect to gender, age, nationality, culture and experience. With this we can get plenty of different views, ideas and input to help us make the best decisions.

**430+** Employees

**26** Nationalities

**40 / 60 %** Women / Men

**41,5 YR.** Average age

**3,200** Working years

**LEADERSHIP**
development at all levels to inspire and create engagement and a meaningful everyday

**LOWERING ENERGY**
consumption in plants and office spaces

**SUSTAINABILITY**
social, environmental and financial requirements on suppliers and partners

**WATER REDUCTION**
reducing fresh water and reuse water

**OPTIMIZING VENTILATION**
in production areas

**BRAND BUILDING**
for securing new competence attraction

**LOGISTICS FOCUS**
to optimize transportation paths, touch points and $CO_2$ emission

**RECYCLING**
production materials, primarily plastics

# QUALITY COMMITMENT

We are committed to achieving customer satisfaction by supplying superior quality grade tubing and services that are delivered on time. We will accomplish this by continuing to improve our capabilities, complying with requirements, and maintaining the effectiveness of the quality management system.

| Category | Certificate | Godby | Jomala | Thailand |
|---|---|---|---|---|
| Quality | ISO 9001 | ✓ | ✓ | ✓ |
| | ISO 13485 | ✓ | | ✓ |
| | ISO 14001 | | ✓ | ✓ |
| Material | REACH | ✓* | ✓* | ✓* |
| | RoHS | ✓* | ✓* | ✓* |
| | NSF/ANSI standard 51 | | ✓ | |
| Clean room | ISO 14644 | ✓* | | ✓ |
| Product specific | UL 224 | | ✓ | ✓ |

* Not certified but compliant with self check

**Medical Device**
ISO 13485

**Clean Room**
ISO 14644-1, class 8

**Business Management**
ISO 9001

**Environment**
ISO 14001

# WHY OPTINOVA?

We strive to create value and celebrate your success #feelgoodfactory

### Material knowledge

We possess in-dept knowledge of raw material, having our own polymer experts (PhD level) as well as laboratories for research. We combine this with external partner collaborations that ensure our expertise in polymers and raw-material processing.

### Extrusion specialist

We know extrusion inside out, the core of our business with over 100 extrusion lines globally, making us the biggest in the world. We continue to push the limits and develop our processes with new innovations.

### Secondary operations

We provide secondary operations according to our partners´ needs, many times custom made just for them. Our R&D center provides valuable consultancy, and we've even created the robots needed to make the operations as automatic and efficient as possible.

### Magical world of polymers

It all starts in the magical world of polymers. Our PhD-level polymer scientists provide in-depth knowledge of raw material experience in polymer processing. Material properties and purity is investigated in our own polymer laboratory. Can we share some polymer magic with you?

# RAW MATERIAL AND ADDITIVES

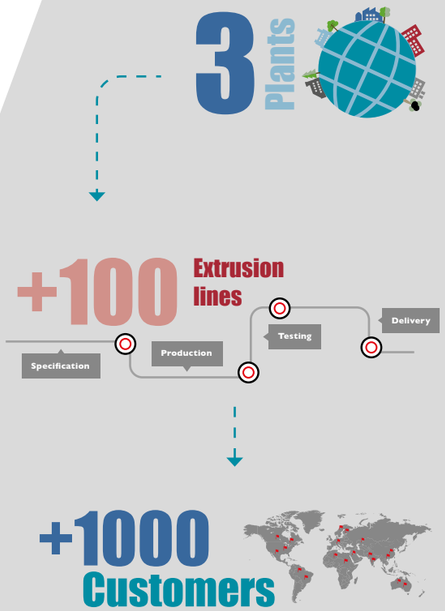
# PUSHING THE LIMITS OF EXTRUSION

Extrusion is our passion and our core. The several decades of experience collection across the 100 extrusion lines globally has allowed us to accumulate an unparalleled knowledge library.

Come feel the passion

&

push the limits with us



# WE DARE TO BE DIFFERENT

Engineering is the basis for customization and creating true value. Automating customization is unbeatable for handling high volume production to meet a wide varying market need. Creating difference is fun…

# PRODUCT CATEGORIES

Strategic fit for minimally invasive devices.

- Beading, monofliaments, profiles
- Etched OD liner
- Heat Shrink tubing
- Zebra spiral Heat Shrink

- Single- and multi-lumen tubing
- Co-extrusion and multilayer tubing
- Braided reinforced tubing

» CRM lead components
» Balloon tubing
» Stent and balloon protectors
» IV catheter tubing
» Dispenser (protective) tubing

## Etched OD Liner

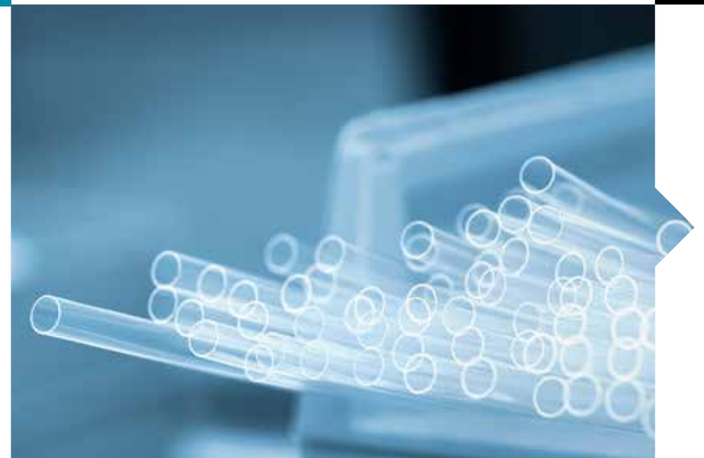
Lubricious inner layer for medical catheter shafts used in reflow manufacturing processes.

- Low Coefficient of friction
- Excellent adhesion
- Outstanding tensile properties

## Beading, monofilaments and profiles

A stable inner core used as a building block for high precision medical catheter shafts, endoscopic devices and more.

- Manufacturing aid for minimally invasive delivery devices
- Braided reinforcement
- Precision extrusion



## Heat Shrink and QuickShrink™ 2.0 tubing

FEP Heat Shrink is used to reflow the jackets over the braid, as a protective covering and many more.

- Reflow processing tool
- Recovery temperature from 80°C–205°C to
- Splicing, tipping, bonding

## PTFE Zebra Spiral HS

Used in flexible endoscopic devices and urology guide wires.

- Different colour patterns
- Visual aid for surgeons
- Lubricious surface

## Multi-layer tube/co-extrusions

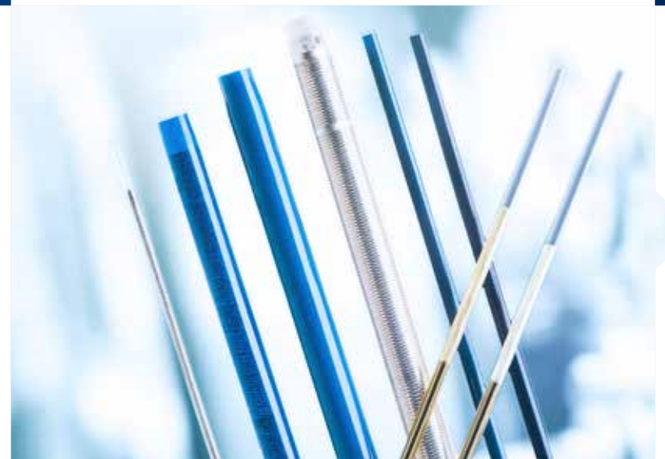
Stiff inner layer for torque momentum and kink resistance and a soft inner layer for patient comfort. Various layers can also contain additives or stripes for radiopacity/MRI.

- Various properties in one tube
- Material choices to fit your needs
- Chemically inert and superior mechanical properties

## Single – and multi-lumen tubing

Various polymers extruded into single or multi-lumen cut to length or spooled.

- Value added services/secondary operation
- Delivery device shafts
- Custom design

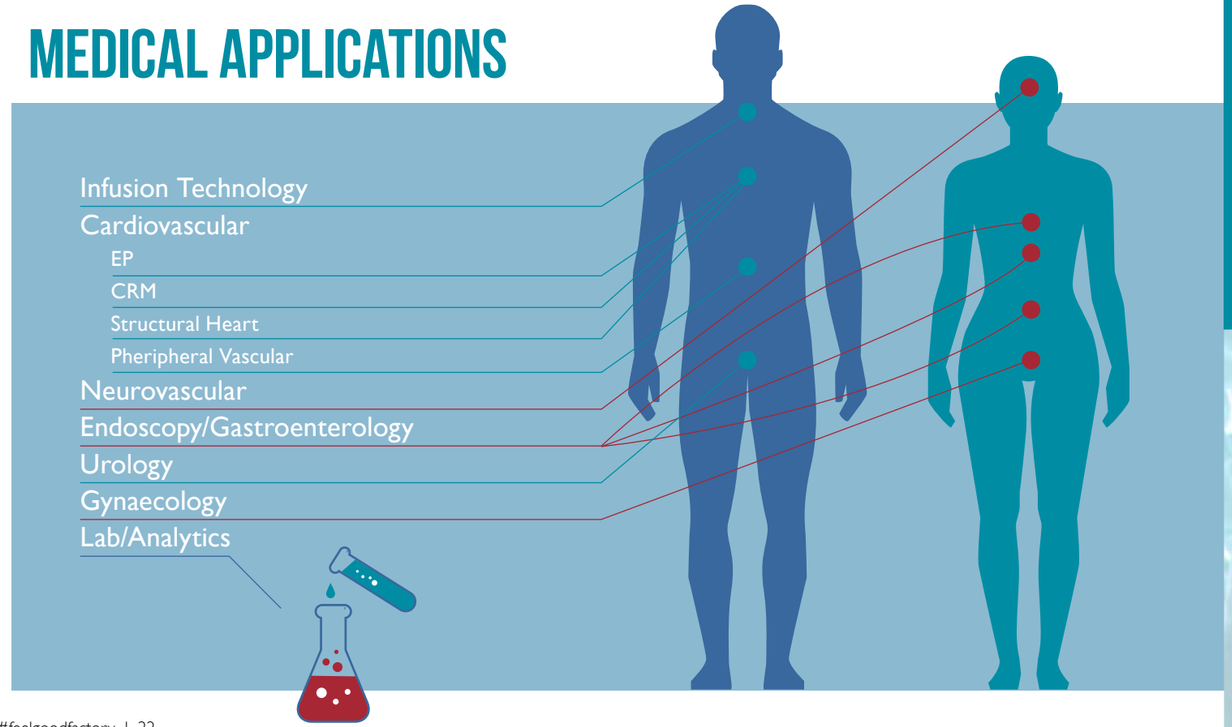


## Braided/reinforced tubing

Metal or polymer-based braiding for catheter shafts.

- Torqueability
- Steerability
- Custom design

# MEDICAL APPLICATIONS






# APPLICATIONS EXAMPLES

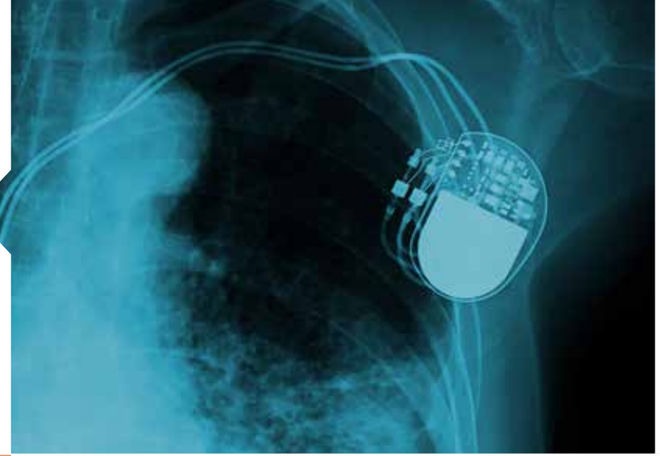
We are a world leader in precision extrusion of tubing for medical applications. We have developed a world-wide reputation of fulfilling customer expectations; not only with fluoropolymer extrusions, but also with a wide variety of thermoplastics.

### Balloons that save lives

In order to have a superior balloon, you will need to start with a high quality tube that shows superior concentricity and elongation properties, as well as consistent wall thickness. We also support your engineers to design the custom balloons and stent protector for your device.

## Keep up the pace of the heart

Heart rhythm disorders can be addressed in several ways. Our CRM lead tubing components are used as insulating coatings in long term implants. With braid-reinforced shafts for electrophysiology, a physician can map the electrical system of your heart to beat optimally – the Optinova Way.



## Fulfilling a dream

In vitro fertilization (IVF) has revolutionized the medical science and boosted the hope for infertile couples. At Optinova we are proud to support life at this early stage.

Oocyte (egg cell) retrieval (OCR) is a critical step during in IVF procedures as it enables fertilization outside the body. The minimally invasive medical device consists of a high quality tube for oocyte retrieval and transportation.

## A tiny tunnel to deliver

Wearable infusion sets have proven to be very convenient for mobile patients, as they are used for delivering fluid, medication, and pain treatment. A tiny-sized polymer tube serves as a "tunnel", through which medication or fluid is delivered to the body. The disposable infusion sets are light and practical medical devices, critical for patients to live their lives to the fullest after a diagnosis.

## Keeping your inside intact

Optinova´s extrusions are used in various flexible endoscopic surgical devices. The Zebra Heat Shrink is used as a visual aid for physicians, the lubricious PTFE single- or multi-lumen tubing is used for therapy delivery alongside steerability of a flexible tip through wires.

## Urology and OB Gyn

Tubing in various sizes, shapes, and lumen designs are used in ureteral access delivery and retrieval devices. Properties such as flexibility, rigidity, and antibacterial play a crucial role for increasing functionality for these application areas, as well as patient comfort.

## Into your veins

Intravenous (IV) cannulation provides critical venous access for precise delivery of life-saving fluids, nutrients, and medication. Optinova has collaborated with OEMs for almost 5 decades to increase patient safety and comfort in the field of high-volume IV tubing.



## General summary of properties

| | | Fluoropolymers | | | | | Thermoplastic polymers | | | | | | | | | Thermoplastic elastomers | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Thermoplastic Fluoropolymers | | | | | Polyolefines | | | Polyamides | | | | | | | | | | |
| **Feature** | | PTFE | FEP | PFA | ETFE | PVDF | LDPE | HDPE | PP | PA 6 | PA 11 | PA 12 | POM | PET/ PBT | PC | TPE –U | TPE –A | TPE –E | TPE –S | TPE –O |
| Tensile strength at break | MPa | 20–34 | 20–28 | 25–30 | 40–47 | 35–50 | 10–20 | 25–45 | 20–460 | 35–80 | 40–90 | 38–60 | 40–70 | 30–50 | 70 | 25–70 | 30–62 | 14–25 | 5–40 | |
| Elongation at break | % | 200–400 | 300–325 | 300 | 230 | 15–50 | 350–700 | 50–1000 | 10–500 | 40–300 | 30–400 | 50–400 | 10–200 | 20–350 | 50–120 | 160–750 | 50–700 | 200–800 | 400–1000 | 700–1000 |
| Flexural modulus | MPa | 275–620 | 550–700 | 590–700 | 1200 | 2100 | 100–600 | 500–1500 | 900–2000 | 500–2900 | 400–1400 | 260–1600 | 1400–3000 | 1000–2400 | 2300 | 70–2300 | 15–730 | 40–1200 | | 600–900 |
| Hardness | Shore D | 55–65 | 55–60 | 55–64 | 63–75 | 75–78 | 49–55 | 58–65 | 72–81 | 70 | 72 | 72 | 85 | 55–65 | 90 | 40–75 | 25–72 | 35–80 | 8–62 | 5–40 |
| Density | g/cm³ | 2,17 | 2,15 | 2,15 | 1,7 | 1,8 | 0,91–0,94 | 0,94–0,96 | 0,90–0,91 | 1,03–1,17 | 1,0–1,05 | 1,0–1,17 | 1,3–1,4 | 1,2–1,3 | 1,20 | 1,05–1,20 | 0,96–1,10 | 1,12–1,27 | 0,89–1,04 | 0,85–0,98 |
| Coefficient of friction | | 0,10 | 0,25 | 0,21 | 0,23 | 0,30 | 0,60 | 0,28 | 0,30 | 0,40 | 0,35 | 0,40 | 0,35 | 0,35 | 0,30 | 0,22 /0,5 | 0,55 | 0,2–0,8 | | |
| Transparency | See note | *** | **** | ***** | *** | * | **** | *** | *** | ** | *** | *** | * | ***** | ***** | **** | **** | ** | **** | **** |
| Melting point | °C | 330 | 257–275 | 300–310 | 270 | 175 | 110 | 125 | 134–165 | 220 | 175–190 | 170–185 | 160–175 | 230–250 | 240 | 170–240 | 135–275 | 160–215 | | 125–165 |
| Min/max service temp. | °C | –240 +260 | –200 +200 | –200 +260 | –190 +150 | –60 +150 | –30 +80 | –20 +100 | –10 +120 | –40 +150 | –50 +100 | –50 +100 | –40 +100 | –40 +140 | –40 +120 | –50 +80 | –40 +130 | –40 +130 | –50 +125 | –40 +115 |
| Water absorption | % | <0,01 | <0,01 | <0,03 | 0,02 | 0,04 | 0,01 | 0,01 | 0,01 | 1–10 | 0,2–2,0 | 0,2–1,6 | 0,2–1 | 0,1–0,5 | 0,3 | 0,1–0,4 | 0,9–1,2 | 0,6–2,5 | | |
| Chemical resistance | See note | ***** | **** | ***** | **** | **** | *** | *** | **** | ** | ** | ** | *** | **** | * | *** | *** | *** | **** | **** |
| ETO | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Steam | | X | X | X | X | X | – | – | X | X | X | X | X | – | – | – | X | X | (X) | X |
| Radiation | | – | – | – | X | X | X | X | (X) | X | X | X | (X) | X | X | X | X | X | X | – |

**Notes:** The property data are taken from different sources and are not necessarily typical for any specific grade. This table is unsuitable for specification, since all values are indicative and for guidance only. Optinova Ab takes no responsibility for data given in the table. Excellent: * * * * * Poor: *

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