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**Titanised mesh  
implants for general  
and visceral surgery**

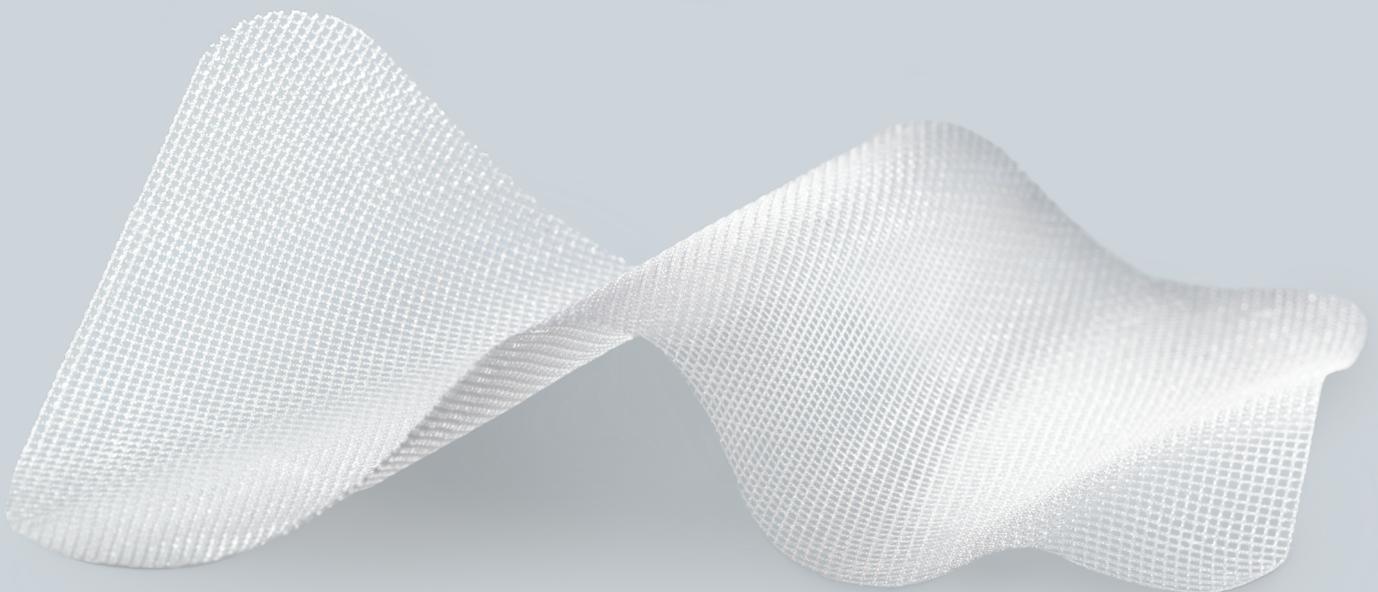
› **TILENE**<sup>®</sup>

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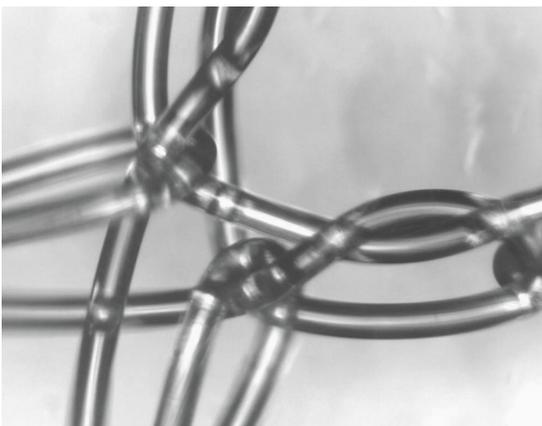
Our complete portfolio of **titanised hernia meshes** covers multiple indications (including inguinal and ventral hernias). TiLENE® mesh implants help surgeons achieve excellent patient outcomes thanks to their hydrophilic and biocompatibility properties.

### General Benefits

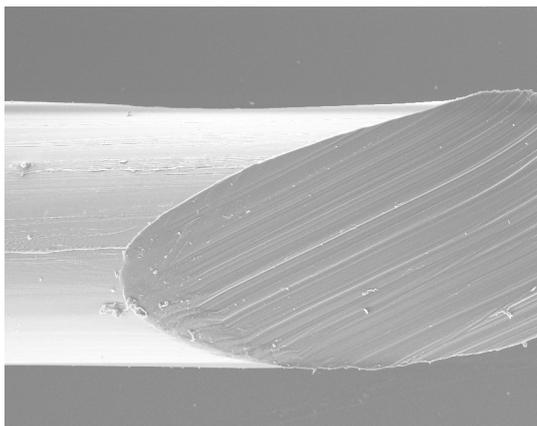
- ▶ Titanium's body compatibility properties transferred to a hernia mesh
- ▶ A better quality of life for patients<sup>1</sup>
- ▶ Easy handling and excellent visibility
- ▶ Imaging diagnostics are not affected

### General Details

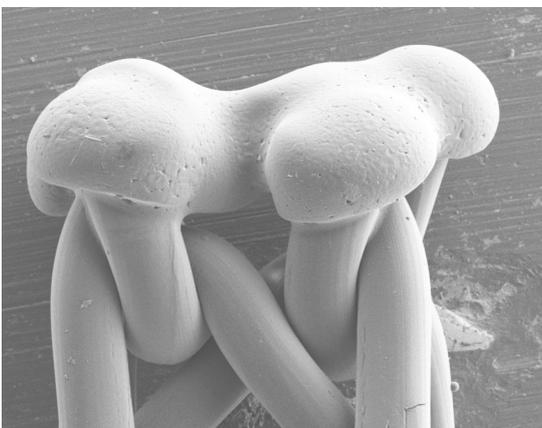
- ▶ **Titanised type 1a polypropylene meshes**
- ▶ **Macroporous:** pore size of 1 mm
- ▶ **Lightweight:** 16, 35 or 65 g/m<sup>2</sup>
- ▶ **Monofilament fabric**
- ▶ **Laser cut atraumatic edges**
- ▶ **Non-absorbable**
- ▶ **EO-sterilised (ethylene oxide), pyrogen-free**



Monofilament fabric



Thread cross-section (titanium layer is not visible due to being less than 100 nm)



Atraumatic, laser cut mesh border

## Mesh configurations

You have the choice – 3 different weight classes:

65 g/m <sup>2</sup>	<b>TiLENE® strong</b>	<b>Especially strong:</b> For more pronounced hernia defects
35 g/m <sup>2</sup>	<b>TiLENE® light</b>	<b>Versatile:</b> Suitable for various kinds of hernias and surgical techniques (incl. IPOM)
16 g/m <sup>2</sup>	<b>TiLENE® extralight</b>	<b>Especially light:</b> Ideal for inguinal hernias

## Relative reactive surface area

Following mesh implantation, the immune system reacts to the foreign body. This means that the surface of the mesh thread becomes a reactive area. The relative reactive surface area is defined by the ratio of the reactive area to the total area of the mesh. The pore size of the mesh has a significant influence on this. Macroporous meshes have a smaller relative reactive surface area and reduced inflammatory responses.<sup>2</sup> Biocompatible mesh materials with a surface coating have also proven beneficial.<sup>3,4,5,6</sup>

Our meshes combine both of these properties: a small relative reactive surface area and a titanised mesh surface. Both have a beneficial effect on the body's inflammatory response to the mesh, which enables increased ingrowth of soft tissue.

Weight	Colour	Pore size	Relative reactive surface area
16 g/m <sup>2</sup>	White	> 1 mm	1.29
35 g/m <sup>2</sup>	White	> 1 mm	1.95
65 g/m <sup>2</sup>	White	> 1 mm	2.70

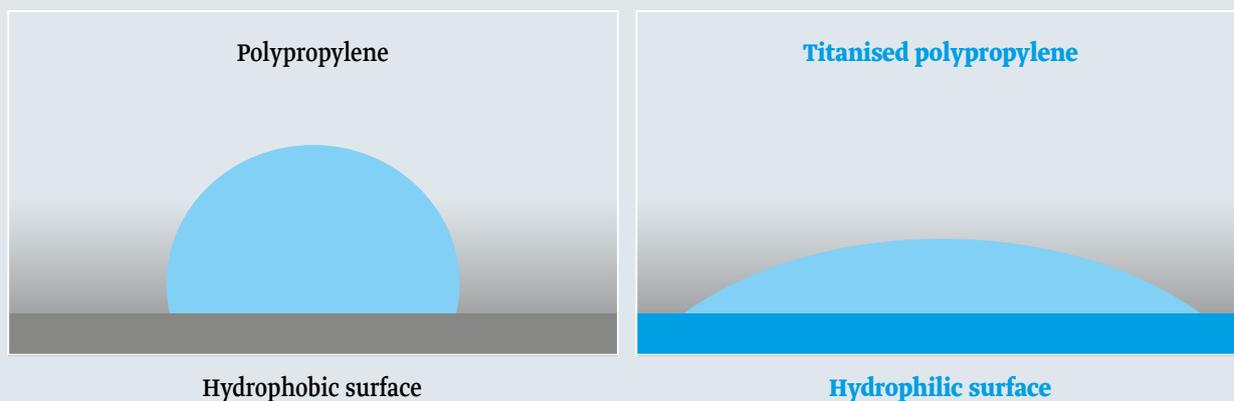
**Knowledge**

**Titanisation of mesh implants**

In 2002, pfmmmedical successfully developed the first procedure worldwide that permits the application of titanium to flexible and elastic primary materials, specifically polypropylene meshes.

TILENE® mesh implants are type 1a polypropylene meshes (macroporous, lightweight and monofilament) with a hydrophilic (“water-loving”) surface due to titanisation. A hydrophilic mesh implant integrates better into the surrounding tissue than a hydrophobic (“water-repellent”) material.

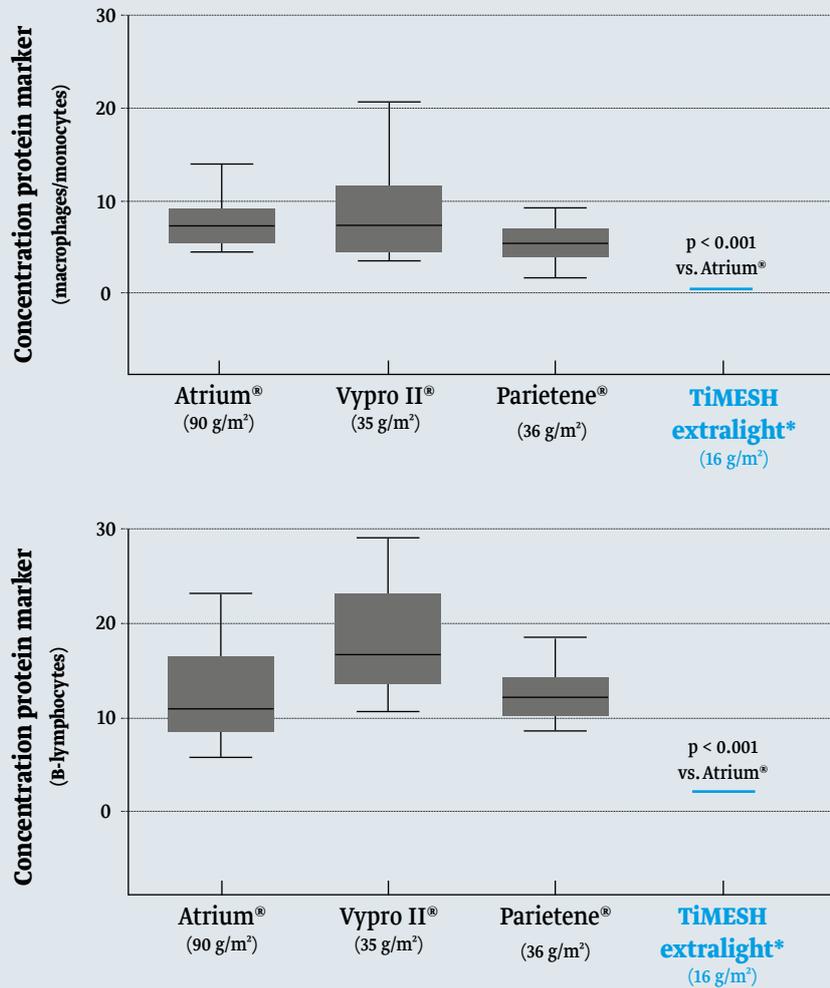
**Water droplet behaviour on a hydrophobic and hydrophilic surface**



You can find more information about titanisation here: [www.pfmmmedical.com/knowledge/titanisation](http://www.pfmmmedical.com/knowledge/titanisation)



Reduced inflammatory reaction through titanisation



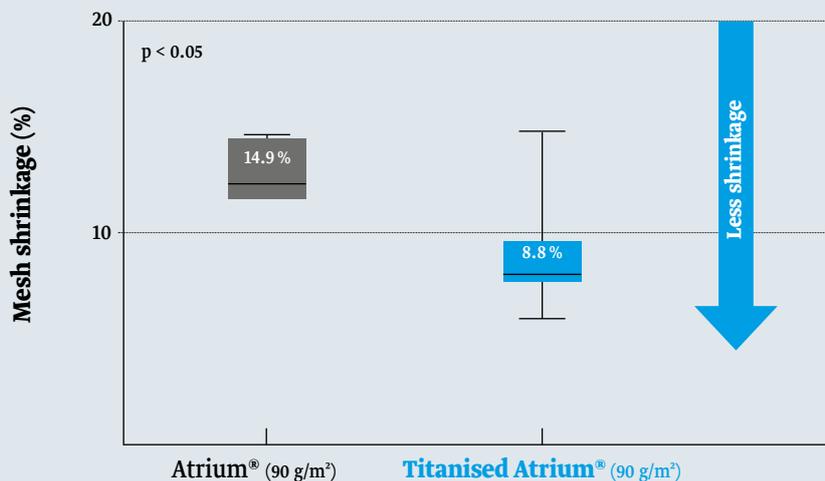
Reduced inflammation risk and better tolerability

All implants cause an inflammatory response, the lower the inflammatory response, the better. Titanised polypropylene meshes cause a lower inflammatory response than standard polypropylene meshes.<sup>3</sup>

Modified according to Scheidbach et al., Surg Endosc, 2004, 18: 211-220

\* TiLENE® is equivalent to TiMESH.

Less shrinkage through titanisation



Less scar formation and decreased mesh shrinkage

The higher the inflammation, the thicker the scar tissue.

The inflammatory response to a titanised polypropylene mesh is lower than to a standard mesh, resulting in less scar formation. As a vital result, the fibrous scar tissue surrounding the mesh shrinks less over time.<sup>4,5,6</sup>

Modified according to Scheidbach et al., Eur Surg Res, 2004, 36: 313-317

**Benefits for patients**

**Better tolerability**

Lighter weight titanised mesh implants (16 g/m<sup>2</sup>) show lower volumes of post-operative seromas compared to standard, heavy-weight meshes (35 g/m<sup>2</sup> - 100 g/m<sup>2</sup>).<sup>1</sup>

**Less postoperative pain**

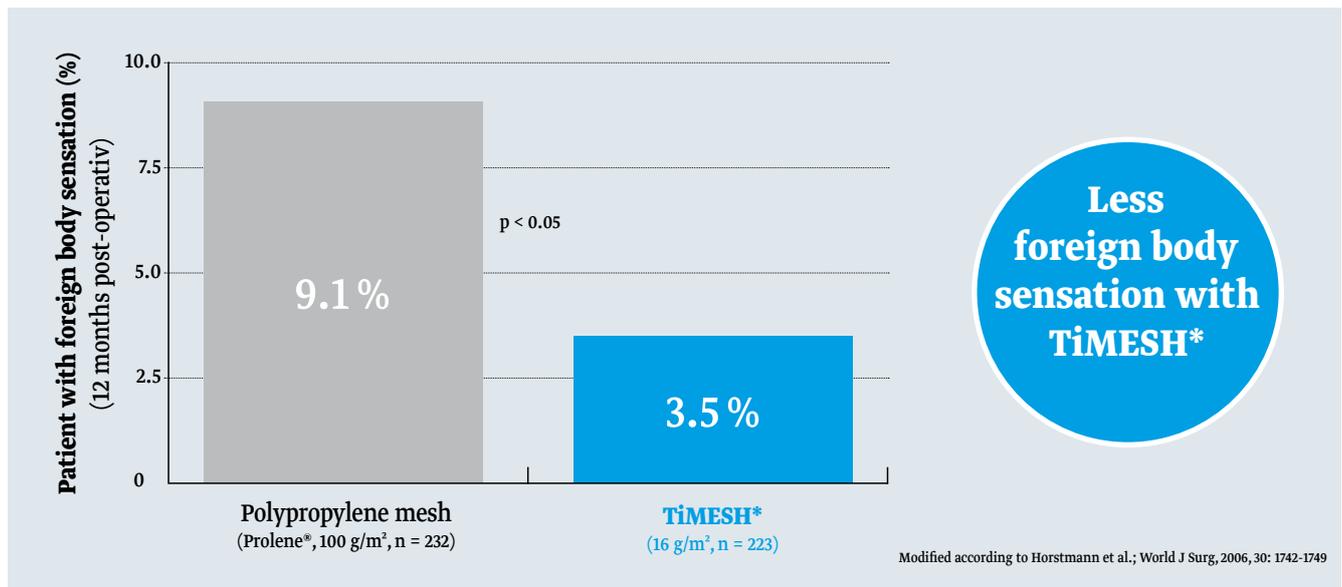
Patients suffer from less pain and thus, the consumption of analgesics is lower with titanium-coated meshes (equivalent to TiLENE® light, 35 g/m<sup>2</sup>) compared to heavier, standard meshes (75 g/m<sup>2</sup>).<sup>2</sup>

**Quicker recovery time**

The use of light-weight titanised mesh implants (35 g/m<sup>2</sup>) allows patients to return to a symptom-free everyday life earlier when compared to heavyweight meshes (75 g/m<sup>2</sup> - 80 g/m<sup>2</sup>).<sup>2,7</sup>

**Decreased foreign body sensation**

The titanisation reduces the inflammatory response, which causes less scarring and decreased mesh shrinkage.<sup>4,5,6</sup> Patients experience reduced foreign body sensation with light-weight titanised implants (16 g/m<sup>2</sup>) due to the excellent ingrowth compared to heavier meshes (35 g/m<sup>2</sup> - 100 g/m<sup>2</sup>) without titanium coating.<sup>1</sup>



\* TiLENE® is equivalent to TiMESH.

**Improved quality of life**

In addition to the skills of the surgeon, the quality of the mesh material is a critical factor in the long-term success of hernia repair. Studies show: Titanised meshes increase the patients' quality of life.<sup>1,8</sup>

**Benefits for users**

**Easy handling**

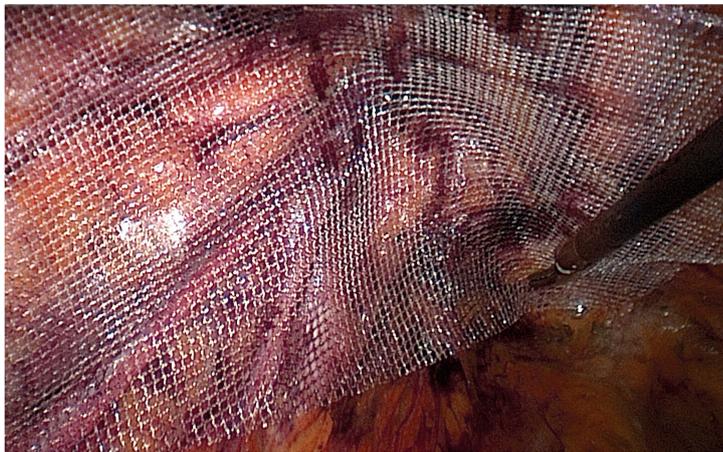
The hydrophilic properties of the titanised surface allow the mesh to stick to the abdominal wall. Thus, excellent modelling characteristics are given.

**Outstanding visibility**

When the mesh sticks to the abdominal wall, the surgical field remains visible. This outstanding visibility minimises the risk of injury to nerves or vessels.

**Smooth trocar insertion**

Rolled-up titanised meshes can be directly inserted into the trocar (up to 3 mm trocar with TiLENE® extralight 16 g/m<sup>2</sup>). The excellent plasticity makes the unrolling just as straightforward.



**Easy handling**

TiLENE® light (35 g/m<sup>2</sup>)  
during TEP surgery  
(with the kind permission of Professor  
Dr. Ferdinand Köckerling, Vivantes  
Klinikum Spandau, Berlin, Germany)



**Outstanding visibility**

TiLENE® extralight (16 g/m<sup>2</sup>)  
during TAPP surgery  
(with the kind permission of Professor  
Dr. Hans Martin Schardey, Krankenhaus  
Agatharied GmbH, Hausham, Germany)



**Optimised workflow for surgeons**

## Application

### One mesh for multiple hernia types

The titanised mesh implants are designed for application in both intra- and extraperitoneal types of hernias and are suitable for a number of surgical techniques. After selecting the appropriate mesh size, the surgeon can use it for a number of surgical techniques including IPOM. Individual mesh adaptation is possible at the discretion of the surgeon (e.g. cutting of mesh to preferred shape/size for the defect).

### Suitable for multiple kinds of hernias, such as:

- ▶ Inguinal
- ▶ Incisional
- ▶ Umbilical
- ▶ Epigastric
- ▶ Parastomal
- ▶ Hiatal

### Advantages of standardisation

- ▶ Reduced number of articles
- ▶ Simplified ordering process
- ▶ Less storage required in surgery rooms

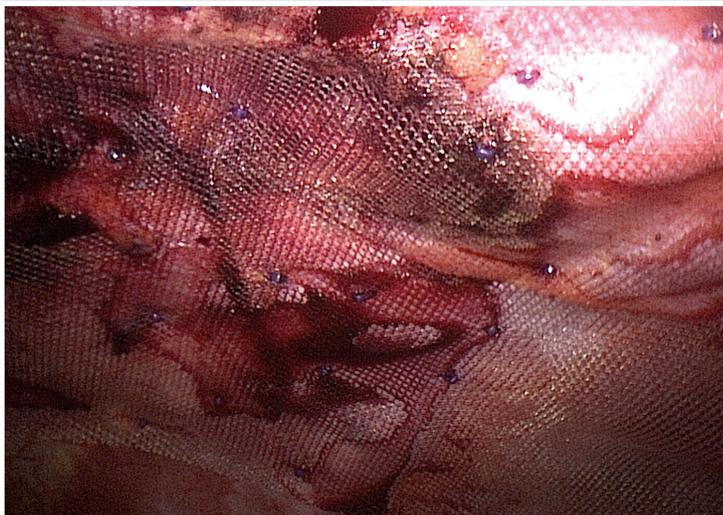
### Intraperitoneal implantation procedures

The IEHS guidelines permit the use of TiLENE® for laparoscopic treatment of ventral and incisional hernias due to the titanisation.<sup>9</sup>

Additional adhesion prophylaxis (e.g. collagen coating) is not necessary.<sup>9,10</sup> Compared to other IPOM meshes, both surfaces of the mesh implant are the same, hence simplifying the application.

### Easy-IPOM advantages

- ▶ The mesh implant does not require preparation (e.g. moistening)
- ▶ No confusion between the peritoneal and visceral mesh surface
- ▶ Smooth trocar insertion
- ▶ All fixation systems can be used
- ▶ Excellent peritoneal ingrowth

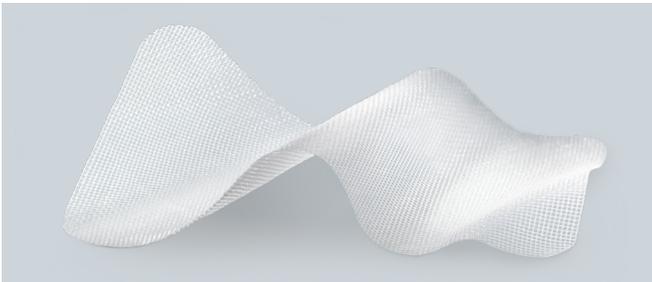


### Easy peritoneal application

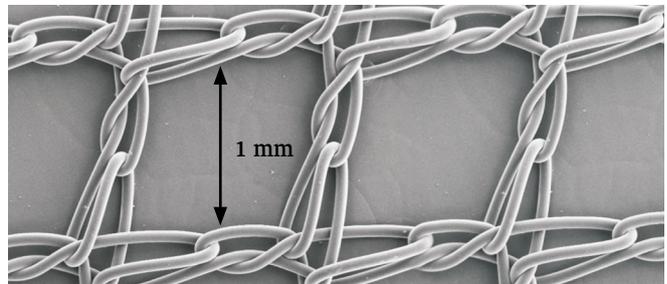
TiLENE® strong (65 g/m<sup>2</sup>)  
during IPOM surgery  
(with the kind permission of Professor  
Dr. Ferdinand Köckerling, Vivantes  
Klinikum Spandau, Berlin, Germany)

**TiLENE®**

Indicated for use in hernia surgery for various types of hernias and surgical techniques incl. IPOM.

**View**

TiLENE®

**Detail**

1 mm pore, macroporous

**Benefits****Standardisation**

TiLENE® is suitable for both intra- and extraperitoneal hernias and a number of surgical techniques (including IPOM).

**Time and cost savings**

The hydrophilic surface of TiLENE® facilitates the handling during laparoscopic surgery. Furthermore, certain indications do not require fixation.<sup>11,12</sup> Consequently, the entire procedure becomes more time and cost efficient.

**Different weights according to need**

TiLENE® is available in a variety of weights. TiLENE® extralight (16 g/m<sup>2</sup>) is ideally suited to the treatment of inguinal hernias. The mesh weight of TiLENE® light (35 g/m<sup>2</sup>) allows it to be applied universally to multiple types of hernias using a variety of surgical techniques. TiLENE® strong (65 g/m<sup>2</sup>) can be selected as required for more pronounced hernia defects.

**Order information**

Indication	Product name	Mesh shape	Size (L × W/cm)	Weight	REF
Multiple hernia types	TiLENE®		10 × 15	16 g/m <sup>2</sup>	6000674
			15 × 15	16 g/m <sup>2</sup>	6000676
			10 × 15	35 g/m <sup>2</sup>	6000609
			15 × 15	35 g/m <sup>2</sup>	6000677
			20 × 15	35 g/m <sup>2</sup>	6000680
			30 × 30	35 g/m <sup>2</sup>	6000659
			10 × 15	65 g/m <sup>2</sup>	6000675
			15 × 15	65 g/m <sup>2</sup>	6000678
			20 × 15	65 g/m <sup>2</sup>	6000681
			30 × 30	65 g/m <sup>2</sup>	6000660

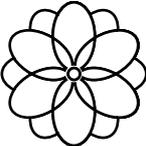
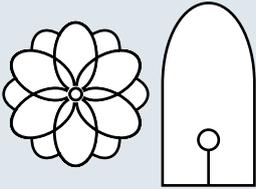
## TiLENE® Plug

TiLENE® Plug is a self-forming plug with three layers of fabric and is used in inguinal hernia repair. The plug is pushed through the internal ring, deep into the preperitoneal space.

The TiLENE® Onlay Patch is placed on the anterior surface of the posterior wall of the inguinal canal. The opening is placed around the spermatic duct in order to repair an additional existing direct hernia and/or to provide strengthening.

The pore size is 1 mm.

### Order information

Indication	Product name	Mesh blank	Size (L × W/cm)	Weight	REF
Inguinal hernias	TiLENE® Plug		Small (Ø 5)	35/65 g/m <sup>2</sup>	6000529
			Medium (Ø 7)	35/65 g/m <sup>2</sup>	6000530
			Large (Ø 9)	35/65 g/m <sup>2</sup>	6000531
	TiLENE® Plug Set		Medium (Ø 7) 4.5 × 9 (patch)	35/65 g/m <sup>2</sup> 35 g/m <sup>2</sup>	6000611

## Literature

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