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## SynTherm® H (Polyimide film)

SynTherm® H is a polyimide film manufactured with the raw materials of pyromellitic dianhydride and 4.4-diaminodiphenyl ether synthetic resin.

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### Attributes

SynTherm® H offers a unique combination of properties at the highest level, which are recommended for many applications in numerous branches. SynTherm® H sustains its excellent physical, electrical and mechanical properties within a wide temperature range. For short time it is also applicable for temperatures from -269 °C to +400 °C and it is used in systems of class H. It has low flammability, is self-extinguishing and has no melting point. SynTherm® H offers a high chemical resistance - an organic solvent is unknown up to now. It has also a high resistance to beta and gamma radiation.

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### Application

SynTherm® H is especially for applications with high operating temperatures for which other films are not applicable.

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### Standards

- UL listed(E358562), UL 94 V-0, UL RTI >200 °C

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### Delivery forms

#### Film thickness in µm:

25, 50, 75, 100, 125, 150, 175, 200

#### SynTherm® H can be supplied:

- in slit rolls from widths of 6 mm (depending on thickness)
- in rolls approx. width 500 mm up to 1000 mm

### Feathering:

- depth approx. 1 - 12 mm, distance approx. 1 - 10 mm
- from widths of 10 to 240 mm and thickness on request

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### Base

Pyromellitic dianhydride and 4.4-diaminodiphenyl ether synthetic resin

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SynTherm® is a registered trademark of SynFlex.



| Typical mechanical properties    | Unit of measure   |           |      |      |      |         |       |
|----------------------------------|-------------------|-----------|------|------|------|---------|-------|
| Nominal thickness                | µm                | 12.5      | 25   | 40   | 50   | 75      | 100   |
| Thickness tolerance              | µm                | +1.5/-2.5 | ±2.5 | ±4   | ±5   | +7.5/-6 | +8/-7 |
| Density                          | g/cm <sup>3</sup> | 1.42      | 1.42 | 1.42 | 1.42 | 1.42    | 1.42  |
| Shrinkage at 150 °C              | %                 | 1.0       | 1.0  | 1.0  | 1.0  | 1.0     | 1.0   |
| Tensile strength longitudinal    | MPa               | ≥135      | ≥150 | ≥150 | ≥150 | ≥150    | ≥150  |
| Tensile strength transversal     | MPa               | ≥115      | ≥130 | ≥130 | ≥130 | ≥130    | ≥130  |
| Elongation at break longitudinal | %                 | ≥50       | ≥60  | ≥60  | ≥60  | ≥60     | ≥60   |
| Elongation at break transversal  | %                 | ≥50       | ≥60  | ≥60  | ≥60  | ≥60     | ≥60   |

| Typical mechanical properties | Unit of measure   |      |      |      |      |
|-------------------------------|-------------------|------|------|------|------|
| Nominal thickness             | µm                | 125  | 150  | 175  | 200  |
| Thickness tolerance           | µm                | ±8   | ±8   | ±8   | ±8   |
| Density                       | g/cm <sup>3</sup> | 1.42 | 1.42 | 1.42 | 1.42 |
| Shrinkage at 150 °C           | %                 | 1.0  | 1.0  | 1.0  | 1.0  |

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| Typical mechanical properties    | Unit of measure |      |      |      |      |
|----------------------------------|-----------------|------|------|------|------|
| Tensile strength longitudinal    | MPa             | ≥150 | ≥135 | ≥135 | ≥135 |
| Tensile strength transversal     | MPa             | ≥130 | ≥115 | ≥115 | ≥115 |
| Elongation at break longitudinal | %               | ≥60  | ≥60  | ≥60  | ≥60  |
| Elongation at break transversal  | %               | ≥60  | ≥60  | ≥60  | ≥60  |

| Typical electrical properties            | Unit of measure |                     |                     |                     |                     |                     |                     |
|--|-----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Nominal thickness                        | µm              | 12.5                | 25                  | 40                  | 50                  | 75                  | 100                 |
| Dielectric strength short term AC        | kV/mm           | ≥130                | ≥150                | ≥150                | ≥150                | ≥150                | ≥150                |
| Specific surface resistivity             | Ω/m             | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> |
| Volume resistivity                       | Ω.m             | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> |
| Dielectric constant (AC 50 Hz, 25 °C)    |                 | 3.5±0.4             | 3.5±0.4             | 3.5±0.4             | 3.5±0.4             | 3.5±0.4             | 3.5±0.4             |
| Dielectric loss factor (AC 50 Hz, 25 °C) |                 | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    |

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| Typical electrical properties            | Unit of measure |                     |                     |                     |                     |
|--|-----------------|---------------------|---------------------|---------------------|---------------------|
| Nominal thickness                        | µm              | 125                 | 150                 | 175                 | 200                 |
| Dielectric strength short term AC        | kV/mm           | ≥150                | ≥120                | ≥120                | ≥110                |
| Specific surface resistivity             | Ω/m             | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> | ≥1x10 <sup>13</sup> |
| Volume resistivity                       | Ω.m             | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> | ≥1x10 <sup>10</sup> |
| Dielectric constant (AC 50 Hz, 25 °C)    |                 | 3.5±0.4             | 3.5±0.4             | 3.5±0.4             | 3.5±0.4             |
| Dielectric loss factor (AC 50 Hz, 25 °C) |                 | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    | 10 <sup>-3</sup>    |

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