

Optical Materials for Precision Molding

Product Information

SCHOTT offers various optical glasses specifically developed and suitable for precision molding, the so called low Tg glasses. In general, low Tg glasses have a low glass transformation temperature in the range of 550°C. Furthermore, low Tg glass compositions have been developed to lower the tendency for devitrification and to reduce the reaction with mold materials within the molding temperature range.

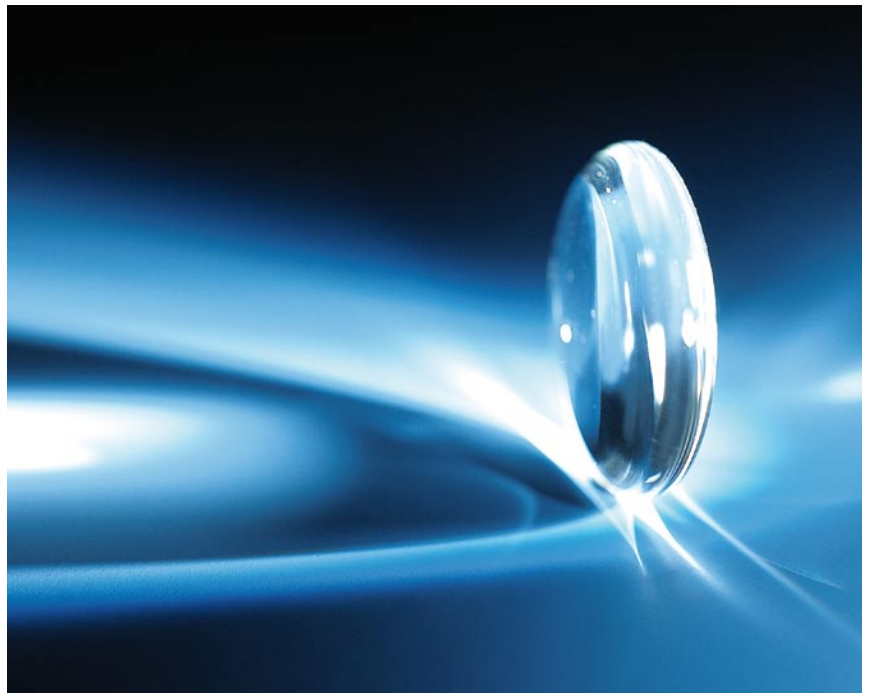
Advantages

- Low transformation temperatures, most below 550°C, to increase lifetime of molds and to reduce process time
- Low tendency to chemical interaction between glass constituents and mold materials within molding temperature range
- Tight optical tolerance available
- Wide range of dimensions available
- Various forms of supply
- Application support from SCHOTT

Forms of Supply

- Ball lens, diameter 0.25 – 8 mm
- Hot formed rod, diameter 0.1 – 12.5 mm; up to 1000 mm length
- NNS sphere, diameter range 5 – 300 mm (form of supply depending on glass type and specification)

Detailed material information can be found at Technical Information TIE40 on our website under www.schott.com/advanced_optics/english/tools_downloads/download/



Applications

Precision molding is the state-of-the-art- technology for the volume production of complex lenses, like aspheres, being used in various applications such as:

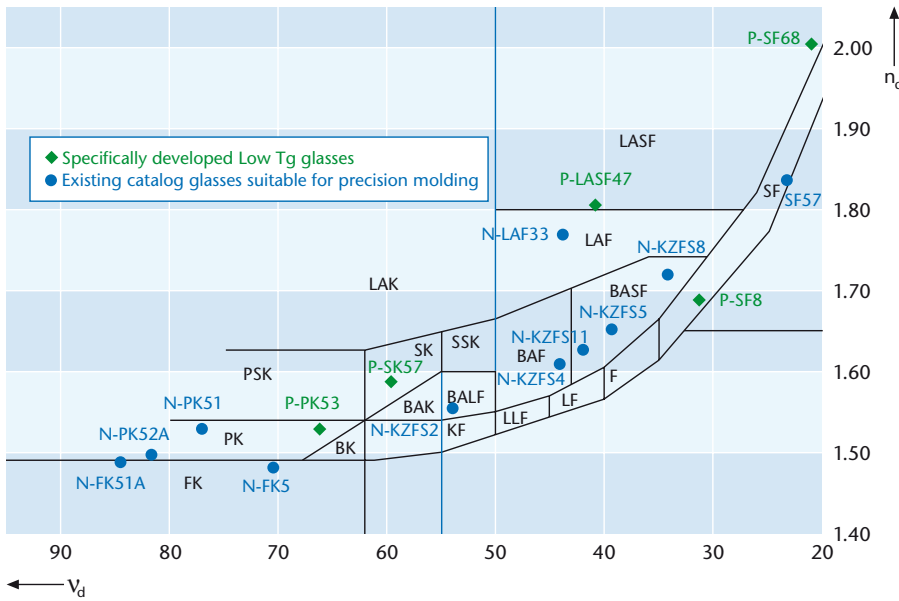
- Digital Cameras
- Camcorders
- Microscopy
- Industrial Applications

During a precision molding process, a polished or fire polished preform is shaped into a final geometry, while conserving its surface quality. The molding process is a low temperature process in a typical range between 500°C to 700°C. This enables the extension of the operating lifetime of the mold material and a significant time reduction of the press process.



Materials

SCHOTT Low Tg Glass



| Glass Type | Optical Properties | | | After Pressing ² | | Thermal Properties | | Chemical Res. | | Physical Properties | | | |
|-----------------------|---------------------|--------------------|------------|-----------------------------|-------|--------------------|------------------|--------------------------------|---------------------------------|---|------------------|-------------------------------|---------------------------------|
| | n_d^{11} | v_d^{11} | Color Code | n_d | v_d | Tg [°C] | AT [°C] | SR-J ³ Acid Res. | WR-J ³ Water Res. | CTE [10 ⁻⁶ K ⁻¹] ⁴ | Hardness (HK) | Grindability acc. to Jogis | Density [g/cm ³] |
| P-SK57 | 1.58700 | 59.60 | 34/31 | 1.5843 | 59.4 | 493 | 522 | 4 | 1 | 8.9 | 535 | 124 | 3.01 |
| P-LASF47 | 1.80610 | 40.90 | 39/33 | 1.8016 | 40.8 | 530 | 580 | 3 | 1 | 7.3 | 620 | 70 | 4.54 |
| P-PK53 ⁱ | 1.52690 | 66.22 | 36/31 | 1.5232 | 66.0 | 383 | 418 | 3 | 1 | 16 | 335 | 977 | 2.83 |
| N-FK51A ^p | 1.48656 | 84.47 | 34/28 | 1.4847 | 84.2 | 464 | 503 | 3 | 1 | 14.8 | 345 | 528 | 3.68 |
| N-FK5 ^p | 1.48749 | 70.41 | 30/27 | 1.4850 | 70.2 | 466 | 557 | 5 | 4 | 10 | 520 | 109 | 2.45 |
| N-PK52A ^p | 1.49700 | 81.61 | 34/28 | 1.4952 | 81.3 | 467 | 520 | 4 | 1 | 15 | 355 | 526 | 3.75 |
| N-PK51 ^p | 1.52855 | 76.98 | 34/29 | 1.5267 | 76.7 | 487 | 528 | 3 | 1 | 14.1 | 415 | 592 | 3.86 |
| P-SF8 | 1.68893 | 31.25 | 40/36 | 1.6814 | 31.7 | 524 | 580 | 1 | 1 | 11.1 | 533 | 200 | 2.90 |
| P-SF68 ⁵ | 2.0052 ⁶ | 21.00 ⁶ | 49/41 | 2.0017 | 20.9 | 428 ⁶ | 468 ⁶ | tbd | tbd | 9.7 ⁶ | 410 ⁶ | 298 ⁶ | 6.19 ⁶ |
| N-KZFS2 ^p | 1.55836 | 54.01 | 34/30 | tbd | tbd | 491 | 533 | 6 | 6 | 5.4 | 490 | tbd | 2.55 |
| N-KZFS4 ^p | 1.61336 | 44.49 | 36/32 | 1.6098 | 44.7 | 547 | 597 | 6 | 4 | 8.2 | 520 | 130 | 3.00 |
| N-KZFS5 ^p | 1.65412 | 39.70 | 37/32 | 1.6493 | 40.2 | 584 | 648 | 1 | 1 | 7.4 | 555 | 122 | 3.04 |
| N-KZFS8 ^p | 1.72047 | 34.70 | 38/33 | 1.7145 | 35.1 | 509 | 561 | 1 | 1 | 9.4 | 570 | 152 | 3.20 |
| N-KZFS11 ^p | 1.63775 | 42.41 | 36/30 | 1.6343 | 41.9 | 551 | tbd | tbd | tbd | 6.6 | 530 | tbd | 3.20 |
| SF57 ^{p, h} | 1.84666 | 23.83 | 40/37 | tbd | tbd | 414 | 449 | 6 | 1 | 9.2 | 350 | 344 | 5.51 |
| N-LAF33 ^p | 1.78582 | 44.05 | 39/32 | tbd | tbd | 600 | tbd | 6 | 1 | 6.7 | 730 | tbd | 4.36 |

¹ catalog value (reference annealing rate: 2K/h), ² as pressed @ SCHOTT. For details please consult SCHOTT, ³ SR-J and WR-J according JOGIS, ⁴ value between 20–300°C, ⁵ only prototype product available, ⁶ preliminary experimental data, ^h also in High Transmission version available, ⁱ will become inquiry glass as of 2014/01/01. Not recommended for new designs. ^p Glass type suitable for precision molding in P-quality (step 3/3 with 2 K/h obligatory), tbd = to be determined. Measurement in progress. General comment: In case the optical values don't fit exactly to your applications, please get in touch with your local sales office.

For more information please contact:

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 glass made of ideas