

# NBFD27

901-271  $n_d = 1.90110$   $\nu_d = 27.06$  ( 27.058 )  $n_F - n_C = 0.033302$   
 $n_e = 1.90896$   $\nu_e = 26.85$  ( 26.852 )  $n_{F'} - n_{C'} = 0.033851$

| 屈折率 Refractive Index |                |         |
|----------------------|----------------|---------|
|                      | $\lambda$ (nm) |         |
| $n_{1529.6}$         | 1529.60        | 1.85594 |
| $n_{1128.64}$        | 1128.64        | 1.86529 |
| $n_t$                | 1013.98        | 1.86893 |
| $n_s$                | 852.11         | 1.87597 |
| $n_{A'}$             | 768.195        | 1.88122 |
| $n_r$                | 706.519        | 1.88627 |
| $n_C$                | 656.273        | 1.89150 |
| $n_{C'}$             | 643.847        | 1.89299 |
| $n_{633}$            | 632.8          | 1.89440 |
| $n_D$                | 589.294        | 1.90081 |
| $n_d$                | 587.562        | 1.90110 |
| $n_e$                | 546.074        | 1.90896 |
| $n_F$                | 486.133        | 1.92480 |
| $n_{F'}$             | 479.991        | 1.92684 |
| $n_g$                | 435.834        | 1.94502 |
| $n_h$                | 404.656        | 1.96316 |
| $n_i$                | 365.015        | 1.99768 |

| 分散式の定数 Constants of dispersion formula |                             |
|----------------------------------------|-----------------------------|
| $A_0$                                  | 3.4613308                   |
| $A_1$                                  | $-1.5878094 \times 10^{-2}$ |
| $A_2$                                  | $4.6156752 \times 10^{-2}$  |
| $A_3$                                  | $3.3927184 \times 10^{-3}$  |
| $A_4$                                  | $-2.4749935 \times 10^{-4}$ |
| $A_5$                                  | $3.1073975 \times 10^{-5}$  |

| 部分分散 Partial dispersions |          |
|--------------------------|----------|
| $n_C - n_t$              | 0.022564 |
| $n_d - n_C$              | 0.009606 |
| $n_F - n_d$              | 0.023696 |
| $n_g - n_F$              | 0.020220 |
| $n_{C'} - n_t$           | 0.024059 |
| $n_e - n_{C'}$           | 0.015970 |
| $n_{F'} - n_e$           | 0.017881 |
| $n_g - n_{F'}$           | 0.018176 |

| 部分分散比 Partial dispersion rates |        |
|--------------------------------|--------|
| $P_{C,t}$                      | 0.6776 |
| $P_{d,C}$                      | 0.2885 |
| $P_{e,d}$                      | 0.2360 |
| $P_{F,e}$                      | 0.4756 |
| $P_{g,F}$                      | 0.6072 |
| $P_{h,g}$                      | 0.5447 |
| $P_{i,h}$                      | 1.0366 |
| $P'_{C,t}$                     | 0.7107 |
| $P'_{d,C}$                     | 0.2396 |
| $P'_{e,d}$                     | 0.2322 |
| $P'_{F,e}$                     | 0.5282 |
| $P'_{g,F}$                     | 0.5369 |
| $P'_{h,g}$                     | 0.5359 |
| $P'_{i,h}$                     | 1.0198 |

| 異常分散性 Anomalous dispersions |         |
|-----------------------------|---------|
| $\Delta P_{C,t}$            | 0.0053  |
| $\Delta P_{C,A'}$           | -0.0010 |
| $\Delta P_{g,d}$            | 0.0086  |
| $\Delta P_{g,F}$            | 0.0076  |
| $\Delta P_{i,g}$            | 0.0799  |

| 光弾性定数 Photoelastic Constant |      |
|-----------------------------|------|
| $B$ ( $10^{-12}$ /Pa)       | 2.02 |

| 比重 Specific Gravity |      |
|---------------------|------|
| $d$                 | 3.83 |

| 化学的性質 Chemical Properties |   |
|---------------------------|---|
| $D_W$                     | 1 |
| $D_A$                     | 1 |
| $T_{Blue}$                | 1 |
| $D_{NaOH}$                | 1 |
| $D_{STPP}$                | 1 |
| $D_0$                     | 1 |
| $D_H$                     |   |

| 熱的性質 Thermal Properties             |       |
|-------------------------------------|-------|
| $T_g$ (°C)                          | 647   |
| $T_s$ (°C)                          | 700   |
| $T_{10^{14.5}}$ (°C)                | 618   |
| $T_{10^{13}}$ (°C)                  | 647   |
| $T_{10^{7.6}}$ (°C)                 | 744   |
| $\alpha$ -30/+70°C ( $10^{-7}$ /°C) | 71    |
| $\alpha$ 100/300°C ( $10^{-7}$ /°C) | 86    |
| $\lambda$ [W/(m·K)]                 | 1.140 |
| $C_p$ [kJ/(kg·K)]                   | 0.634 |

| 機械的性質 Mechanical Properties |         |
|-----------------------------|---------|
| $H_K$                       | 550 (6) |
| $F_A$                       | 90      |
| $E$ (GPa)                   | 121     |
| $G$ (GPa)                   | 47.3    |
| $\mu$                       | 0.281   |
| $\sigma_b$ (MPa)            | 110     |

| 内部透過率 Internal Transmittance |            |            |             |
|------------------------------|------------|------------|-------------|
| $\lambda$ (nm)               | $\tau$ 2mm | $\tau$ 5mm | $\tau$ 10mm |
| 2500                         | 0.969      | 0.925      | 0.855       |
| 2400                         | 0.976      | 0.942      | 0.887       |
| 2200                         | 0.990      | 0.976      | 0.952       |
| 2000                         | 0.995      | 0.987      | 0.974       |
| 1800                         | 0.997      | 0.992      | 0.984       |
| 1600                         | 0.997      | 0.993      | 0.986       |
| 1550                         | 0.997      | 0.993      | 0.987       |
| 1500                         | 0.997      | 0.993      | 0.986       |
| 1400                         | 0.998      | 0.994      | 0.989       |
| 1300                         | 0.998      | 0.995      | 0.990       |
| 1200                         | 0.998      | 0.995      | 0.991       |
| 1100                         | 0.998      | 0.995      | 0.991       |
| 1060                         | 0.998      | 0.995      | 0.990       |
| 1050                         | 0.998      | 0.995      | 0.991       |
| 1000                         | 0.998      | 0.996      | 0.991       |
| 950                          | 0.998      | 0.996      | 0.992       |
| 900                          | 0.998      | 0.996      | 0.992       |
| 850                          | 0.998      | 0.996      | 0.992       |
| 830                          | 0.999      | 0.996      | 0.993       |
| 800                          | 0.999      | 0.998      | 0.997       |
| 780                          | 0.999      | 0.999      | 0.997       |
| 750                          | 0.999      | 0.998      | 0.996       |
| 700                          | 0.998      | 0.996      | 0.992       |
| 650                          | 0.997      | 0.993      | 0.985       |
| 600                          | 0.992      | 0.979      | 0.958       |
| 550                          | 0.984      | 0.960      | 0.922       |
| 500                          | 0.994      | 0.985      | 0.969       |
| 480                          | 0.992      | 0.979      | 0.958       |
| 460                          | 0.988      | 0.971      | 0.944       |
| 440                          | 0.984      | 0.960      | 0.922       |
| 420                          | 0.976      | 0.940      | 0.883       |
| 400                          | 0.956      | 0.893      | 0.797       |
| 390                          | 0.933      | 0.841      | 0.708       |
| 380                          | 0.884      | 0.734      | 0.539       |
| 370                          | 0.762      | 0.506      | 0.256       |
| 360                          | 0.463      | 0.146      | 0.021       |
| 350                          | 0.044      |            |             |
| 340                          |            |            |             |
| 330                          |            |            |             |
| 320                          |            |            |             |
| 310                          |            |            |             |
| 300                          |            |            |             |
| 290                          |            |            |             |
| 280                          |            |            |             |

| 屈折率の温度係数 $dn/dT$ ( $\times 10^{-6}/^\circ\text{C}$ )<br>Temperature Coefficient of Refractive Index |           |         |       |          |       |       |       |           |          |       |       |
|-----------------------------------------------------------------------------------------------------|-----------|---------|-------|----------|-------|-------|-------|-----------|----------|-------|-------|
| アッペ数の温度係数 $d\nu/dT$ ( $\times 10^{-3}/^\circ\text{C}$ )<br>Temperature Coefficient of Abbe-number   |           |         |       |          |       |       |       |           |          |       |       |
|                                                                                                     | (°C)      | $dn/dT$ |       |          |       |       |       |           |          |       |       |
|                                                                                                     |           | $n_h$   | $n_g$ | $n_{F'}$ | $n_F$ | $n_e$ | $n_d$ | $n_{633}$ | $n_{C'}$ | $n_C$ | $n_r$ |
| $dn/dT$ & $d\nu/dT$ (rel.)                                                                          | -40 / -20 | 9.1     | 7.5   | 6.0      | 5.9   | 4.8   | 4.3   | 3.8       | 3.8      | 3.7   | 3.4   |
|                                                                                                     | -20 / 0   | 9.5     | 7.8   | 6.3      | 6.1   | 4.9   | 4.4   | 3.9       | 3.9      | 3.8   | 3.4   |
|                                                                                                     | 0 / 20    | 10.0    | 8.1   | 6.5      | 6.3   | 5.1   | 4.5   | 4.1       | 4.0      | 3.9   | 3.6   |
|                                                                                                     | 20 / 40   | 10.4    | 8.5   | 6.8      | 6.6   | 5.3   | 4.7   | 4.2       | 4.1      | 4.0   | 3.7   |
|                                                                                                     | 40 / 60   | 10.8    | 8.8   | 7.0      | 6.8   | 5.5   | 4.8   | 4.3       | 4.2      | 4.1   | 3.7   |
|                                                                                                     | 60 / 80   | 11.3    | 9.2   | 7.3      | 7.1   | 5.6   | 5.0   | 4.4       | 4.3      | 4.2   | 3.8   |
|                                                                                                     | 80 / 100  | 11.7    | 9.5   | 7.5      | 7.3   | 5.8   | 5.1   | 4.5       | 4.4      | 4.3   | 3.9   |
|                                                                                                     | 100 / 120 | 12.0    | 9.7   | 7.7      | 7.5   | 5.9   | 5.2   | 4.6       | 4.5      | 4.3   | 3.9   |
|                                                                                                     | 120 / 140 | 12.4    | 10.0  | 7.8      | 7.6   | 6.0   | 5.2   | 4.6       | 4.5      | 4.4   | 3.9   |
|                                                                                                     | 140 / 150 | 12.6    | 10.1  | 7.9      | 7.7   | 6.0   | 5.2   | 4.6       | 4.5      | 4.4   | 3.9   |
| $dn/dT$ & $d\nu/dT$ (abs.)                                                                          | -40 / -20 | 6.4     | 4.8   | 3.4      | 3.3   | 2.2   | 1.7   | 1.3       | 1.2      | 1.1   | 0.8   |
|                                                                                                     | -20 / 0   | 7.2     | 5.5   | 4.0      | 3.8   | 2.7   | 2.2   | 1.8       | 1.7      | 1.6   | 1.3   |
|                                                                                                     | 0 / 20    | 8.0     | 6.2   | 4.6      | 4.4   | 3.2   | 2.6   | 2.2       | 2.1      | 2.0   | 1.7   |
|                                                                                                     | 20 / 40   | 8.7     | 6.8   | 5.1      | 4.9   | 3.6   | 3.0   | 2.5       | 2.4      | 2.3   | 2.0   |
|                                                                                                     | 40 / 60   | 9.3     | 7.3   | 5.5      | 5.3   | 4.0   | 3.4   | 2.9       | 2.8      | 2.7   | 2.3   |
|                                                                                                     | 60 / 80   | 9.9     | 7.8   | 5.9      | 5.7   | 4.3   | 3.7   | 3.1       | 3.0      | 2.9   | 2.6   |
|                                                                                                     | 80 / 100  | 10.5    | 8.3   | 6.3      | 6.1   | 4.6   | 3.9   | 3.4       | 3.3      | 3.1   | 2.8   |
|                                                                                                     | 100 / 120 | 11.0    | 8.7   | 6.6      | 6.4   | 4.8   | 4.1   | 3.6       | 3.4      | 3.3   | 2.9   |
|                                                                                                     | 120 / 140 | 11.4    | 9.0   | 6.9      | 6.6   | 5.0   | 4.3   | 3.7       | 3.6      | 3.4   | 3.0   |
|                                                                                                     | 140 / 150 | 11.7    | 9.2   | 7.0      | 6.8   | 5.1   | 4.4   | 3.8       | 3.6      | 3.5   | 3.1   |

| 線膨張係数 $\alpha$<br>( $\times 10^{-7}/^\circ\text{C}$ )<br>Coefficient of Thermal Expansion |          |
|-------------------------------------------------------------------------------------------|----------|
| (°C)                                                                                      | $\alpha$ |
| -40 / -30                                                                                 | 63       |
| -30 / -20                                                                                 | 65       |
| -20 / -10                                                                                 | 67       |
| -10 / 0                                                                                   | 69       |
| 0 / 10                                                                                    | 70       |
| 10 / 20                                                                                   | 71       |
| 20 / 30                                                                                   | 72       |
| 30 / 40                                                                                   | 72       |
| 40 / 50                                                                                   | 73       |
| 50 / 60                                                                                   | 73       |
| 60 / 70                                                                                   | 73       |
| 70 / 80                                                                                   | 73       |
| 80 / 90                                                                                   | 73       |
| 90 / 100                                                                                  | 73       |
| 100 / 110                                                                                 | 73       |
| 110 / 120                                                                                 | 74       |
| 120 / 130                                                                                 | 74       |
| 130 / 140                                                                                 | 75       |
| 140 / 150                                                                                 | 75       |

| 着色度 Coloration Code                              |           |
|--------------------------------------------------|-----------|
| $\lambda_{80}(\lambda_{70})/\lambda_5$           | (415)/365 |
| 着色度 (内部透過率) Coloration of Internal Transmittance |           |
| $\lambda_{\tau 80}/\lambda_{\tau 5}$             | 400/362   |
| CCI Color Contribution Index                     |           |
| CCI (G)                                          | 4.17      |
| CCI (R)                                          | 4.56      |

| 冷却速度による屈折率の変化 Difference of refractive indices by cooling rate |  |
|----------------------------------------------------------------|--|
| $\beta_C$                                                      |  |
| $\beta_d$                                                      |  |
| $\beta_F$                                                      |  |
| $\beta_g$                                                      |  |

| 備考 Remarks                        |         |        |       |        |        |      |
|-----------------------------------|---------|--------|-------|--------|--------|------|
| 硝種対照表 Glass Cross Reference Index |         |        |       |        |        |      |
|                                   | HOYA    | SCHOTT | OHARA | HIKARI | SUMITA | CDGM |
| Glass_Type                        | NBFD27  |        |       |        |        |      |
| Code                              | 901-271 |        |       |        |        |      |

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