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Measuring method for temperature coefficient of refractive index of optical glass—Part 2: Interferometry

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Japan Optical Glass Manufacturers' Association (JOGMA)/Japanese Standards Association (JSA) with a draft prepared from the association standard (**JOGIS 18**) of JOGMA being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, published patent application or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, published patent application or utility model rights.

JIS B 7072 series consists of the following 2 parts under the general title *Measuring method for temperature coefficient of refractive index of optical glass*:

Part 1: Minimum deviation method

Part 2: Interferometry

Measuring method for temperature coefficient of refractive index of optical glass—Part 2: Interferometry

1 Scope

This Japanese Industrial Standard specifies a measuring method in which the variation of optical path length with temperature change of optical glass is read by the number of periods of brightness changes of interference fringes using the interferometry method, and the temperature coefficient of refractive index is calculated from the variation of the optical path length.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7072-1 *Measuring method for temperature coefficient of refractive index of optical glass—Part 1: Minimum deviation method*

JIS Z 8120 *Glossary of optical terms*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS B 7072-1** and **JIS Z 8120** apply.

4 Principle of measurement

When light from a light source is perpendicularly incident on the surface of an optical glass specimen polished on a parallel plane having a specimen length L and an absolute refractive index n_{abs}, interference fringes are generated by interference of reflected light from the surface and the back surface. When the specimen is subjected to continuous temperature changes, a change $(2 \times \Delta s)$ in the optical path length is caused when the light goes and returns on the light path in the specimen due to the change in the specimen length (ΔL) and the change in the refractive index (Δn_{abs}) of the specimen. This change in the optical path length is read as the number of periods of brightness changes of interference fringes [p (hereafter referred to as number of periods)]. At the same time, the temperature change of the specimen (ΔT) is also read to calculate the temperature coefficient of optical path length change. This temperature coefficient of optical path length change is expressed as a sum of the temperature coefficient of optical path length change attributable to the temperature coefficient of refractive index $[(\Delta n_{abs}/\Delta T) \times L]$ and the temperature coefficient of optical path length change attributable to the linear expansion $[(\Delta L/\Delta T) \times n_{abs}]$ [see Formula (1)]. The temperature coefficient of refractive index can be obtained by subtracting the product of the linear expansion coefficient within a specified temperature range $[\Delta L/(L \times \Delta T)]$ and the refractive index from the product of the temperature coefficient of optical path length change $(\Delta s/\Delta T)$ and $(1/L)$ [see Formulae (2) and (3)].