

## 4.0mm Diameter, Ruby Ball Lens

#43-824



Sapphire and Ruby Ball Lenses

사파이어와 루비 볼 렌즈는 AL203로 만들어 집니다. 루비 혹은 루비 첨가 사파이어는 산화 크롬의 소량으로 붉은 빛을 가지고 있습니다 (Ruby ball의 크롬 함량은 일반적으로 0.5% 초과). 물리적과 화학적 특성은 거의 같지만 광학 특성은 다릅니다. 사파이어는 광학 투과율이 훨씬 좋은 반면에 루비는 쉽게 보여서 물리적 용도로 다루기가 쉽습니다.

볼 렌즈들의 관한 더 자세한 정보와 NA와 초점거리를 구하는 공식은 [Understanding Ball Lenses](#)에 있습니다.

## General

Type: Ball Lens

## Physical & Mechanical Properties

Diameter (mm):	4.00
Specific Gravity (g/cm <sup>3</sup> ):	3.98
Compressive Strength (psi):	300,000
Diameter Tolerance (μm):	±2.54

## Optical Properties

Substrate:	Ruby Doped Sapphire (Al <sub>2</sub> O <sub>3</sub> )
Coating:	Uncoated
Wavelength Range (nm):	600 - 5500
Index of Refraction (n <sub>d</sub> ):	1.77
Sphericity (μm):	0.625
Wavelength Range (μm):	0.6 - 5.5

## Material Properties

Coefficient of Thermal Expansion CTE (10 <sup>-6</sup> /°C):	8.4
Porosity (%):	0.00

## Environmental & Durability Factors

Melting Temperature (°C): 2053.00



June 20, 2025

To Whom It May Concern,

This document certifies that the product stated below has been reviewed as requested by Edmund Optics:

재고 번호	제품설명
43-824	4.0mm Diameter, Ruby Ball Lens

This item is EU RoHS (2015/863/EU) compliant without the use of exemptions.

This certification means that:

- EO's suppliers have confirmed the material composition of this product.
- EO has implemented rigorous procedures to document this compliance.
- The information provided may, or may not, be based upon actual test data, or on information from our Vendors, Raw Material Suppliers or Subcontractors.



Jay Budd, Director of Corporate Compliance  
June 20, 2025

Edmund Optics Inc. - 101 E Gloucester Pike, Barrington, NJ 08007 | 1-800-363-1992 | [Compliance@edmundoptics.com](mailto:Compliance@edmundoptics.com)



June 20, 2025

재고 번호	제품설명
43-824	4.0mm Diameter, Ruby Ball Lens

Edmund Optics certifies that all articles included in this shipment are in compliance with the terms and conditions of this order. The company also certifies that the articles included in this shipment are in accordance to all agreed upon specifications and quality assurance provisions. Please call 1-800-363-1992 should any questions arise from this shipment.



Jeff Harvey- EVP of Operations



June 20, 2025

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This document certifies that the product stated below has been reviewed as requested by Edmund Optics:

재고 번호	제품설명
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This item does not contain any of the substances listed on the Reach SVHC list as of 21 January 2025 in quantities exceeding 0.1% weight by weight.

Please note the following:

- Entry 11 of Annex V of the REACH regulation EC 1907/2006 as amended by regulation 987/2008, exempts "non-hazardous" glass components from registration.
- Items considered to be packing materials and which do not form part of, or are not required for the operation of, the product, are not considered to be within scope of this declaration.
- EO does not routinely analyze products for substances not purposely added or specified within the design specifications, drawings and assembly procedures.

This certification means that:

- EO's suppliers have confirmed the material composition of this product.
- EO has implemented rigorous procedures to document this compliance.
- The information provided may, or may not, be based upon actual test data, or on information from our Vendors, Raw Material Suppliers or Subcontractors.

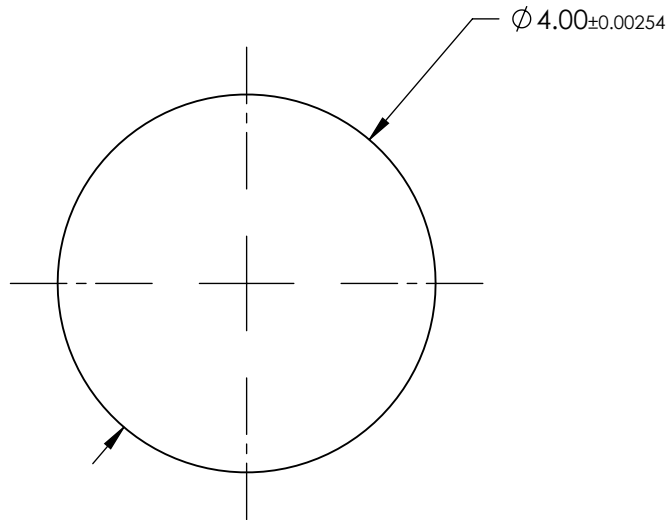


Jay Budd, Director of Corporate Compliance  
June 20, 2025

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NOTES:

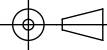
1. SUBSTRATE MATERIAL:  
RUBY DOPED SAPPHIRE (Al<sub>2</sub>O<sub>3</sub>)
2. COATING - NONE
3. FINISH: POLISHED
4. SPHERICITY:  
0.64μm
5. RoHS COMPLIANT



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE  
DIMENSIONS ARE FOR REFERENCE ONLY

**FOR INFORMATION ONLY:  
DO NOT MANUFACTURE  
PARTS TO THIS DRAWING**

**EO**® Edmund Optics®

THIRD ANGLE PROJECTION 	TITLE	4.0mm DIAMETER, RUBY BALL LENS	
		DWG NO	SHEET 1 OF 1

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