

## TEST CERTIFICATE

### ICL SpectroGrade™ KBr Powder

This material (SpectroGrade™ KBr powder) is certified to be suitable for IR and FTIR spectroscopy. This powder was produced from several crystal boules from which cleaved (clean and uncontaminated) samples at least 4mm thick of each of the boules from which we ground this powder were tested by transmission at 4 cm<sup>-1</sup> resolution at a peak/ band detection limit ranging from 1.6% to 1.99% on an FTIR spectrophotometer and no peaks were detected except background CO<sub>2</sub> and H<sub>2</sub>O. Sample testing includes a sample from the top and bottom of each boule, but does not involve testing of all of the material in the boule. The powder was bottled under low humidity conditions (relative humidity under 25%). A 13mm KBr pellet was pressed from a random sample of the material and tested by transmission at a peak/ band detection limit below 2.0 on an FTIR spectrophotometer.

KBr powder is graded solely by purity standards that are relevant to infrared spectroscopy. We do not use such terms as 5 9s (99.999%) , 6 9s (99.9999%) as the means used to test material for such certifications, such a emission spectroscopy, do not detect the types of contaminants that produce absorption bands in an infrared spectrophotometer. In the industry, the highest specification for transmission optics is beam splitter grade material which is generally specified by FTIR spectrophotometer OEMs as material having absorption bands due to impurities of less than 1% measured at 4 wave resolution between 4400cm<sup>-1</sup> and 450cm<sup>-1</sup>. The cut off for commercial grade KBr crystal optics at ICL is material having absorption bands due to impurities of less than 2% at 4 cm<sup>-1</sup> resolution. Other manufacturers use a looser standard.

International Crystal Laboratories

Customer:  
Purchase Order No:

Signed by:

  
Robert D. Herpst

Position: Managing Director

Date: \_\_\_/\_\_\_/\_\_\_

INTERNATIONAL CRYSTAL LABORATORIES

....the SOURCE

11 ERIE STREET

GARFIELD, NEW JERSEY 07026 USA

TEL. 973-478-8944

FAX. 973-478-4201

E-MAIL: [iclmail@internationalcrystal.net](mailto:iclmail@internationalcrystal.net)

[www.internationalcrystal.net](http://www.internationalcrystal.net)

## TEST CERTIFICATE

### ICL FTIR Grade SpectroGrade™ KBr Powder

This material (FTIR Grade SpectroGrade™ KBr powder ) is certified to be suitable for IR and FTIR spectroscopy. This powder was produced from several crystal boules from which cleaved (clean and uncontaminated) samples at least 4mm thick of each boule from which we ground this powder were tested by transmission at 4 cm<sup>-1</sup> resolution at a peak/ band detection limit ranging from 1.2% to 1.5% on an FTIR spectrophotometer and no peaks were detected except background CO<sub>2</sub> and H<sub>2</sub>O. Sample testing includes a sample from the top and bottom of each boule, but does not involve testing of all of the material in the boule. The powder was bottled under low humidity conditions (relative humidity under 25%). A 13mm KBr pellet was pressed from a random sample of the material and tested by transmission at a peak/ band detection limit below the factory detection setting of 1.5 on an FTIR spectrophotometer.

KBr powder is graded solely by purity standards that are relevant to infrared spectroscopy. We do not use such terms as 5 9s (99.999%) , 6 9s (99.9999%) as the means used to test material for such certifications, such a emission spectroscopy, do not detect the types of contaminants that produce absorption bands in an infrared spectrophotometer. In the industry, the highest specification for transmission optics is beam splitter grade material which is generally specified by FTIR spectrophotometer OEMs as material having absorption bands due to impurities of less than 1% measured at 4 wave resolution between 4400cm<sup>-1</sup> and 450cm<sup>-1</sup>. The cut off for commercial grade KBr crystal optics at ICL is material having absorption bands due to impurities of less than 2% at 4 cm<sup>-1</sup> resolution. Other manufacturers use a looser standard.

International Crystal Laboratories

Customer:

Purchase Order No:

Signed by: \_\_\_\_\_

Robert D. Herpst

Position: Managing Director

Date: \_\_\_/\_\_\_/\_\_\_

INTERNATIONAL CRYSTAL LABORATORIES

....the SOURCE

11 ERIE STREET

GARFIELD, NEW JERSEY 07026 USA

TEL. 973-478-8944

FAX. 973-478-4201

E-MAIL: [iclmail@internationalcrystal.net](mailto:iclmail@internationalcrystal.net)

[www.internationalcrystal.net](http://www.internationalcrystal.net)

## TEST CERTIFICATE

### ICL FTIR Premium SpectroGrade™ KBr Powder

This material (FTIR Premium Grade SpectroGrade™ KBr powder) is certified to be suitable for IR and FTIR spectroscopy. This powder was produced from several crystal boules from which cleaved (clean and uncontaminated) samples at least 4mm thick of each boule from which we ground this powder were tested by transmission at 4 cm<sup>-1</sup> resolution at a peak/ band detection limit ranging from 1.1% to 0.9% on an FTIR spectrophotometer and no peaks were detected except background CO<sub>2</sub> and H<sub>2</sub>O. Sample testing includes a sample from the top and bottom of each boule, but does not involve testing of all of the material in the boule. The powder was bottled under low humidity conditions (relative humidity under 25%). A 13mm KBr pellet was pressed from a random sample of the material and tested by transmission at a peak/ band detection limit below the factory detection setting of 1.1 on an FTIR spectrophotometer.

KBr powder is graded solely by purity standards that are relevant to infrared spectroscopy. We do not use such terms as 5 9s (99.999%) , 6 9s (99.9999%) as the means used to test material for such certifications, such as emission spectroscopy, do not detect the types of contaminants that produce absorption bands in an infrared spectrophotometer. In the industry, the highest specification for transmission optics is beam splitter grade material which is generally specified by FTIR spectrophotometer OEMs as material having absorption bands due to impurities of less than 1% measured at 4 wave resolution between 4400cm<sup>-1</sup> and 450cm<sup>-1</sup>. The cut off for commercial grade KBr crystal optics at ICL is material having absorption bands due to impurities of less than 2% at 4 cm<sup>-1</sup> resolution.

International Crystal Laboratories

Customer:

Purchase Order No:

Signed by: \_\_\_\_\_

Robert D. Herpst

Position: Managing Director

Date: \_\_\_/\_\_\_/\_\_\_

INTERNATIONAL CRYSTAL LABORATORIES

....the SOURCE

11 ERIE STREET

GARFIELD, NEW JERSEY 07026 USA

TEL. 973-478-8944

FAX. 973-478-4201

E-MAIL: [iclmail@internationalcrystal.net](mailto:iclmail@internationalcrystal.net)

[www.internationalcrystal.net](http://www.internationalcrystal.net)

## TEST CERTIFICATE

### ICL XL Ultrapure SpectroGrade™ KBr Powder

This material (XL Ultrapure SpectroGrade™ KBr powder) is certified to be suitable for IR and FTIR spectroscopy. This powder was produced from several crystal boules from which cleaved (clean and uncontaminated) samples at least 4mm thick of each boule from which we ground this powder were tested by transmission at 4 cm<sup>-1</sup> resolution at a peak/ band detection limit ranging from 0.2% to 0.8% on an FTIR spectrophotometer and no peaks were detected except background CO<sub>2</sub> and H<sub>2</sub>O. Sample testing includes a sample from the top and bottom of each boule, but does not involve testing of all of the material in the boule. The powder was bottled under low humidity conditions (relative humidity under 25%). A 13mm KBr pellet was pressed from a random sample of the material and tested by transmission at a peak/ band detection limit below the factory detection setting of 0.8 on an FTIR spectrophotometer.

KBr powder is graded solely by purity standards that are relevant to infrared spectroscopy. We do not use such terms as 5 9s (99.999%) , 6 9s (99.9999%) as the means used to test material for such certifications, such a emission spectroscopy, do not detect the types of contaminants that produce absorption bands in an infrared spectrophotometer. In the industry, the highest specification for transmission optics is beam splitter grade material which is generally specified by FTIR spectrophotometer OEMs as material having absorption bands due to impurities of less than 1% measured at 4 wave resolution between 4400cm<sup>-1</sup> and 450cm<sup>-1</sup>. The cut off for commercial grade KBr crystal optics at ICL is material having absorption bands due to impurities of less than 2% at 4 cm<sup>-1</sup> resolution. Other manufacturers use a looser standard.

International Crystal Laboratories

Customer:  
Purchase Order No:

Signed by: \_\_\_\_\_

Robert D. Herpst

Position: Managing Director

Date: \_\_\_ / \_\_\_ / \_\_\_

INTERNATIONAL CRYSTAL LABORATORIES

....the SOURCE

11 ERIE STREET

GARFIELD, NEW JERSEY 07026 USA

TEL. 973-478-8944

FAX. 973-478-4201

E-MAIL: [iclmail@internationalcrystal.net](mailto:iclmail@internationalcrystal.net)

[www.internationalcrystal.net](http://www.internationalcrystal.net)