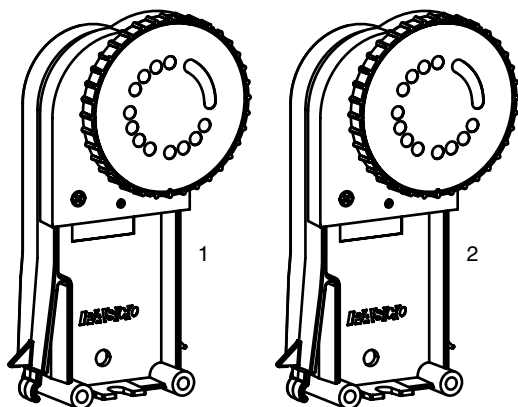


# High Precision Diffraction Slits

OS-8453



## Included Parts

1. Single-slit wheel with holder
2. Double-slit wheel with holder

## Additional Parts Required

- Basic Optics Diode Laser, OS-8525A (Red) or OS-8458 (Green)
- Basic Optics Bench, part of OS-8515C system<sup>1</sup>

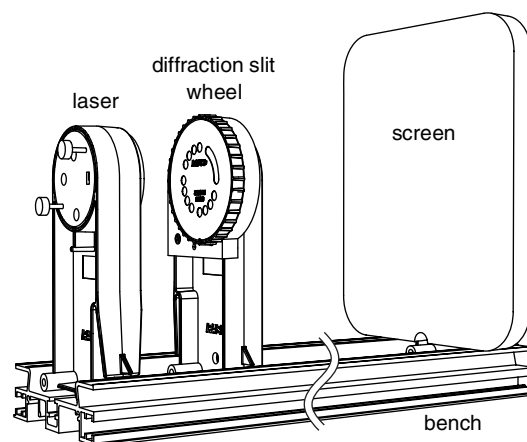
## Introduction

Model OS-8453 includes two slit wheels with holders designed for use on a Basic Optics bench with a laser and other Basic Optics components. Each wheel contains several slits and other patterns. The wheels can be rotated to change the slit pattern illuminated by the laser.

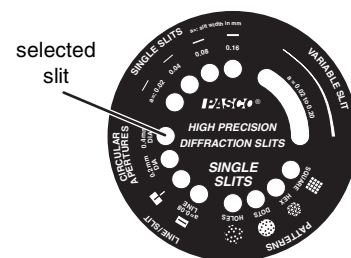
<sup>1</sup>An optics bench can also be purchased separately (part OS-8541 or OS-8508). A PASCO dynamics track with Optics Carriages (OS-8472) can be used instead of an optics bench.

## Set-up

1. Snap one of the wheels onto an optics bench with a laser and screen as illustrated.



2. Aim the laser at the slit pattern in the “9 o’clock” position.
3. Turn the wheel to select the slit pattern to be illuminated by the laser.
4. Observe the diffraction pattern on the screen.



## Beam Widening

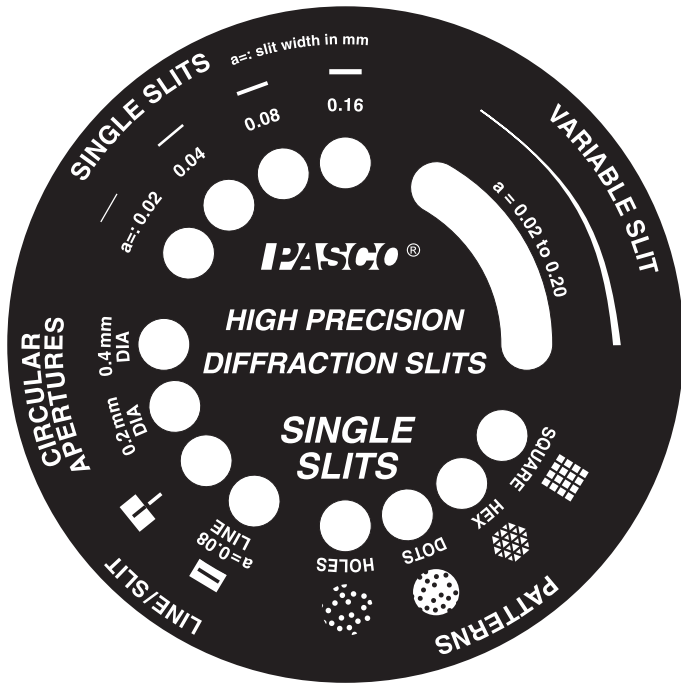
When using a green laser (which has a narrow beam) with the “comparisons” patterns, place a lens between the laser and the slits. This will spread the beam, making it easier to illuminate both sets of slits simultaneously.

## Sensor-based Set-up

To make sensor-based measurements, use a Linear Translator (OS-8535), Aperture Bracket (OS-8534A), Rotary Motion sensor, and High Sensitivity Light Sensor. For set-up instructions, see the manual included with the Linear Translator.

# About the Diffraction Slits and Other Apertures

## Single Slits Wheel



### Circular Apertures

The two circular apertures have diameters of 0.2 mm and 0.4 mm.

### Single Slits

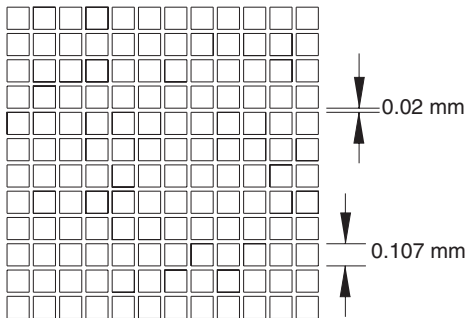
The four single slits have widths of 0.02 mm, 0.04 mm, 0.08 mm, and 0.16 mm.

### Variable Slit

The "Variable Slit" is a wedge-shaped aperture ranging from 0.02 mm to 0.20 mm wide. Rotate the wheel to illuminate any point along the length of the slit.

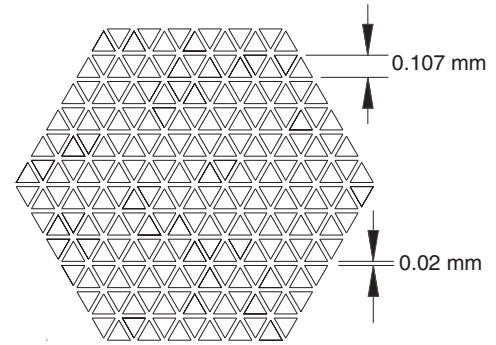
### Square Pattern

Transparent squares are arranged in a grid. Each square is 0.107 mm wide. The center-to-center spacing between adjacent squares is 0.109 mm.



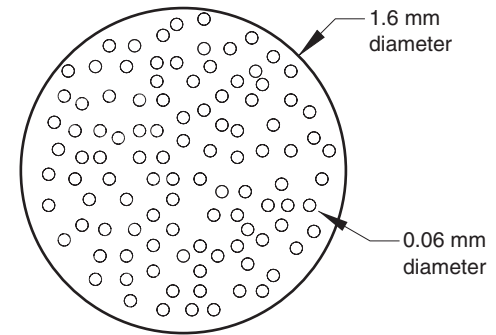
### Hex Pattern

Transparent, equilateral triangles are arranged as illustrated.



### Dots Pattern

100 opaque circles are scattered on a transparent background as illustrated.



### Holes Pattern

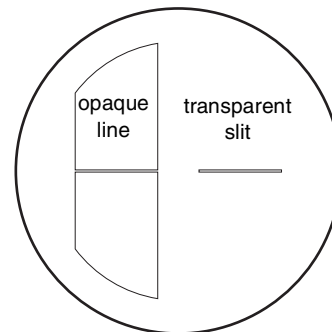
100 transparent circles are scattered on an opaque background. The holes pattern is the same as the dots pattern, but with transparent and opaque areas switched.

### Line

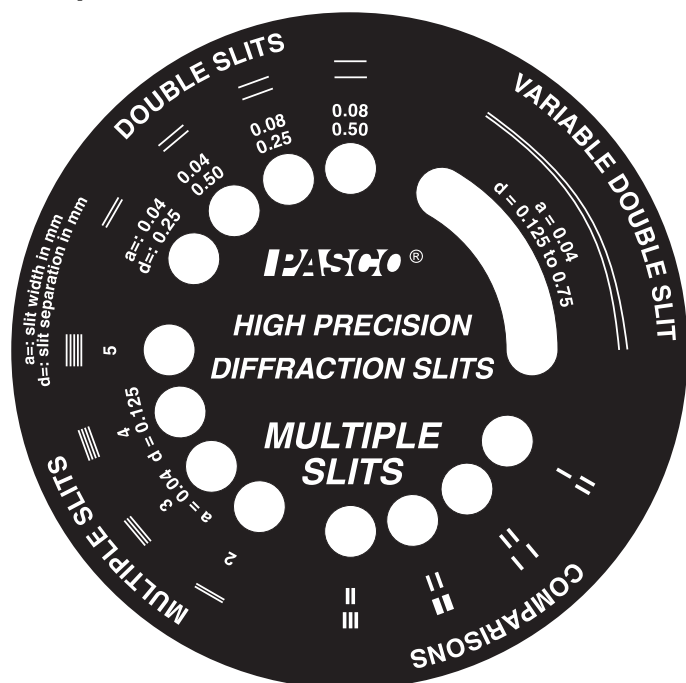
The opaque line on a transparent background is 0.08 mm wide.

### Line/Slit Comparison

The opaque line on a transparent background and the transparent slit on an opaque background can be illuminated simultaneously. The line and slit are each  $0.040 \pm 0.005$  mm wide.



### Multiple Slits Wheel



#### Multiple Slits and Double Slits

Each slit pattern is characterized by the number of slits, the slit width (*a*), and the center-to-center spacing (*d*).

	Number of Slits	Slit Width (mm)	Slit Spacing (mm)
Multiple Slits	2	0.04	0.125
	3	0.04	0.125
	4	0.04	0.125
	5	0.04	0.125
Double Slits	2	0.04	0.25
	2	0.04	0.50
	2	0.08	0.25
	2	0.08	0.50

#### Variable Double Slit

The “Variable Double Slit” is a pair of long slits with spacing ranging from 0.125 mm to 0.75 mm. Rotate the wheel to illuminate any point along the length of the pair.

### Comparisons

Each comparison is a pair of patterns that can be illuminated simultaneously.

Width (mm)	0.04	0.04	0.08	0.04
Spacing (mm)	0.25	0.50	0.25	0.125

### Specifications

Slit width tolerance	±0.005 mm
Slit spacing tolerance	±0.01 mm or ±0.005 mm if spacing is 0.125 mm

### Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific  
10101 Foothills Blvd.  
Roseville, CA 95747-7100  
Phone: 916-786-3800 (worldwide)  
800-772-8700 (U.S.)  
Fax: (916) 786-7565  
Web: www.pasco.com  
Email: support@pasco.com

For more information about the High Precision Diffraction Slits and the latest revision of this Instruction Sheet, visit:

[www.pasco.com/go?OS-8453](http://www.pasco.com/go?OS-8453)

**Limited Warranty** For a description of the product warranty, see the PASCO catalog.

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