

# BenQ Business Projector Buying Guide

By Environment | By Specifications



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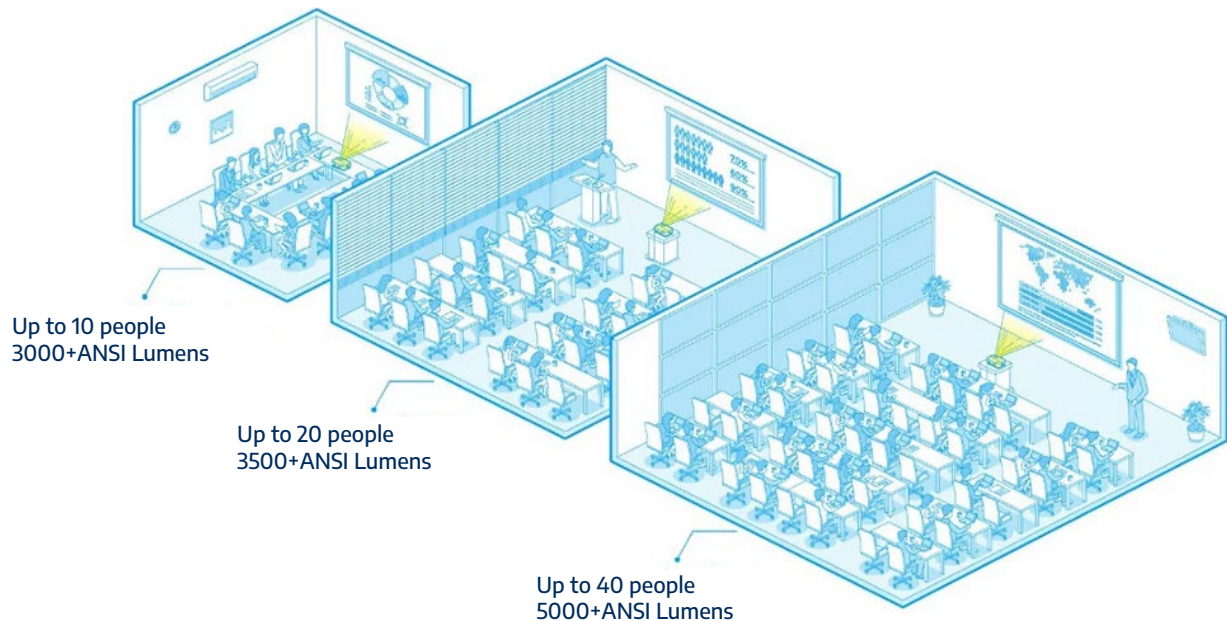
## Buying Guide by Environment

### From SOHO to Enterprise Applications, Business Projectors Create More Opportunities

Keeping pace with increasing diversity in modern business types, a multitude of design and functional innovations are available on business projectors. Taking everything into consideration, three simple steps can enable home office pros, small business owners, and even large corporations to find the right projector to create more business opportunities.

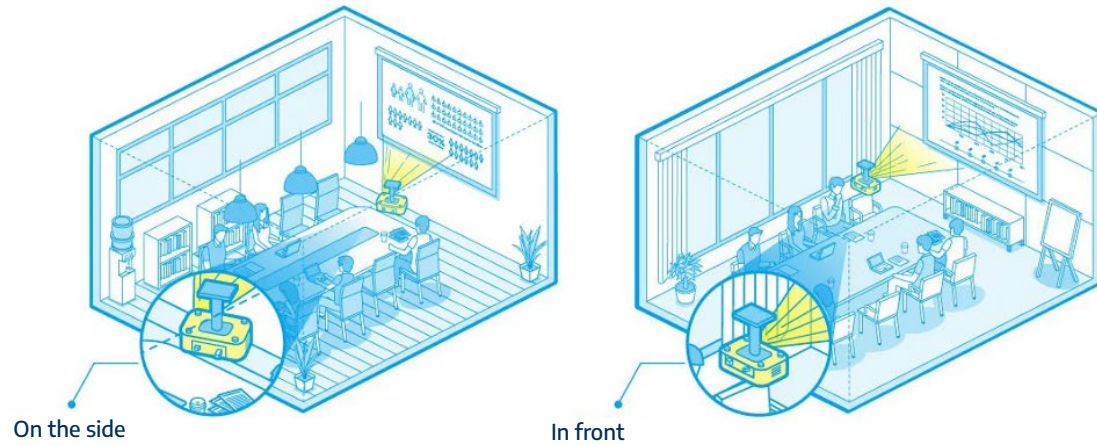
#### Step One: Select a Projector Based on Conference Room Size and Projection Brightness

An important consideration in choosing a projector for business information is projection brightness. For typical small conference rooms of about 10 people, we recommend a projector with 3,000–3,499 lumens of brightness to balance energy savings and projection clarity. For medium meeting rooms for about 20 participants, the projector should produce 3,500–5,000 lumens to accommodate more people and larger projection dimensions. An ultra-bright projector with more than 5,000 lumens is ideal in larger conference rooms for over 40 attendees. This provides increased brightness and image clarity. In addition—to support business presentations held in rooms where the lights are on—we recommend raising the brightness requirement by 1,000 lumens.



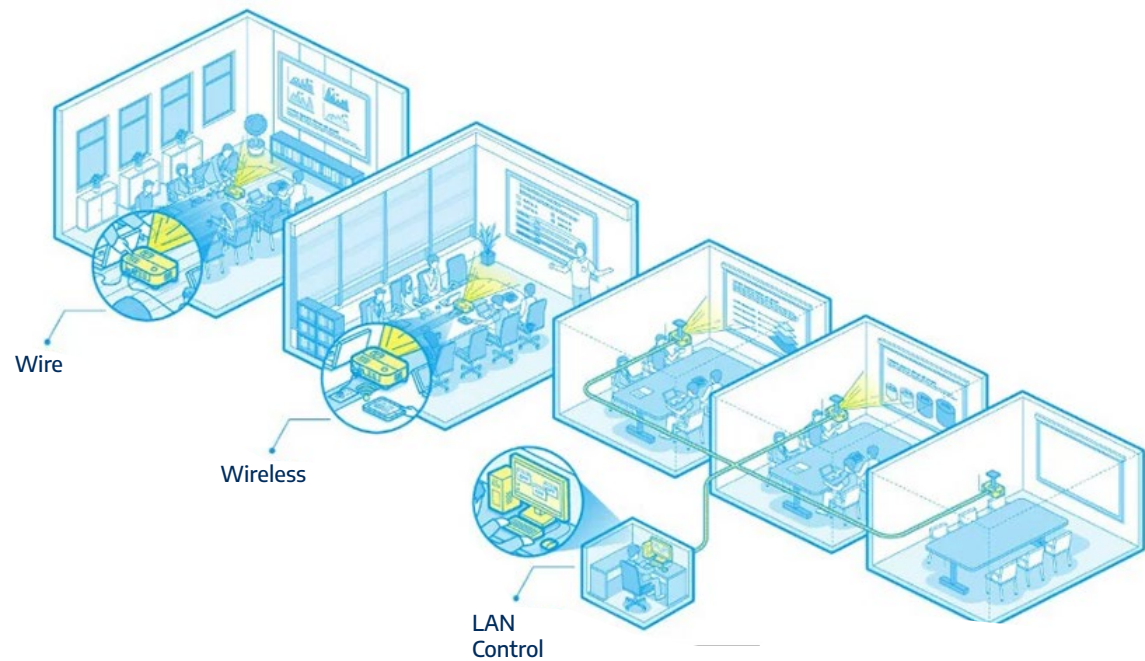
#### Step Two: Choose a Projector Based on Installation Requirements

In business, a projector may need to be moved into different conference rooms—or even carried to client meetings. It is critical to choose the right projector according to the specific needs of the business. In conference rooms where the projector can be placed directly in front of the screen, a projector with vertical keystone correction facilitates optimal image alignment. If a small meeting room's space constraints make it difficult to position the projector in front of the screen, a projector model with both horizontal and vertical keystone correction and side projection capability can ensure the correct image aspect ratio from either the left or right side of the screen.



### Step Three: Choose a Projector to Meet Business Requirements

Today, a wide variety of projectors are available to meet the diverse needs of modern businesses. Considering the needs for different business meetings, wired connection models can satisfy the majority of projection requirements used in a single space. If the projector often connects to smart devices for projection sources, look for wireless transmission capability. For large businesses with dedicated projectors in multiple conference rooms, business projector models with LAN connectivity and remote management capabilities can facilitate efficient management of multiple projectors.



### Meet Your Diverse Business Needs with BenQ Projectors

Home offices, small businesses, and corporate conference spaces all must meet customer needs for presentations of product information and marketing plans. A business projector with the performance and features to meet usage requirements can boost productivity and create additional opportunities. BenQ business projectors deliver both hardware specs and smart functionality designed for a variety of presentation scenarios to become your best partner for brilliant business projection.

## Buying Guide by Specifications

### Knowing the Specs to Choose the Ideal Business Projector

Choosing the right projector can help your business and its employees get more done with less effort. On the flip side, using the wrong projector will not only frustrate its user but also slow down the progress of a meeting by dragging down efficiency and decreasing productivity. Because of all this, the task of choosing the right projector for your business is especially important. This article will explain the terminology that is most commonly used in projector specifications to ensure that your decision-making process goes smoothly.

### Explaining the Terms

#### Projection Systems (Technology)

##### DLP

DLP projectors are projectors where the light produced by the light source travels through a focus lens, passes through a spinning color wheel that separates the color, and is then beamed onto a DMD (Digital Micromirror Device) chip. Each microscopic mirror on the DMD chip then adjusts its angle based on the digitized video signal stored in the chip's memory so that the light that is reflected off it produces the image that is projected. The color produced by DLP projectors tends to be more accurate and doesn't easily fade.

##### 3LCD

3LCD projectors utilize LCD panels to modify the color of the light from the light source based on the video signal, generating the image that is projected onto the screen. The benefits of using 3LCD projectors are that their colors are vivid and more saturated, while their disadvantages are that they usually have weaker contrast levels, and their colors tend to fade.

#### Light Source

##### Laser

The advantages of using a laser light source include:

- Very high brightness
- Longer lifetime resulting in lower repair/maintenance costs
- Quick power on/off time
- Lower light/lumen depreciation so the color and brightness levels stay well preserved over time

The disadvantage of using a laser light source is that the initial cost is higher than lamp light source.

##### Lamp

The advantages of using a mercury lamp as a light source include:

- Low cost
- Strong color performance

The disadvantages of using a mercury lamp as a light source include:



- Shorter light source life span: approximately 2,000 hours for an entry-level model, and 4,000–6,000 hours for a high-end model
- The image will gradually become darker and more yellow as the brightness, color saturation, and contrast levels deteriorate
- Higher maintenance costs

## Brightness

### Lumen

Lumens are the units used to measure the total light output produced by a light source in a given amount of time. The amount of light in an average conference room is about 250 lux (lumen per square meter). Based on testing the amount of light needed from a projector is about five times that of its surrounding, or in the case of a normal conference room, 1,250 lux. The table below lists the recommended brightness in lumens for a projector installed in a 250-lux ambient light setting based on screen size.

Illuminance on the screen (Ambient light ~ 250lux)	
Screen Size (inch)	Recommendation for Projector Brightness (AL)
78	2100 AL
92	2900 AL
100	3500 AL
120	5000 AL
135	6300 AL
150	7700 AL
160	8800 AL
180	10000 AL

## Image Quality

### Contrast Ratio

The simplest way of measuring contrast is to measure the ratio between the brightness of the light reflected from a solid white image to that of a solid black image. This means that for a projector with a 5000:1 contrast ratio the solid white image is 5000 times brighter than the solid black image. The higher the contrast ratio, the more detailed the image is—no matter if you are talking about numbers, text, graphics, pictures, or videos. Contrast allows us to notice subtle

differences in color and shadows, thus a higher contrast ratio makes it easier for the viewer to see a greater number of details.

### Aspect Ratio

Aspect ratio is the ratio between the width and height of the projected image. For example, the aspect ratio for a Full HD image is 16:9. Traditional TV shows broadcast at an aspect ratio of 4:3. This is roughly equivalent to a square, but the vast majority of televisions currently transmit at the 16:9 aspect ratio of FHD. Projectors commonly use the following aspect ratios: 4:3 (XGA), 16:9 (FHD/4K), 16:10 (WXGA/WUXGA).

### Resolution (4K / FHD / WUXGA / WXGA / XGA)

A projector's resolution is defined as the number of horizontal pixels multiplied by the number of vertical pixels. For example, the resolution for Full HD video is 1920x1080. The larger the number of pixels an image has the clearer the image becomes. The following are resolutions for various display standards:

- **XGA:** 1024x768
- **WXGA:** 1280x800
- **WUXGA:** 1920x1200
- **FHD:** 1920x1080
- **4K:** 3840 x 2160

### Projection Distance

The principle behind projection distance is that the shorter the projection distance, the greater the number of lenses needed; the higher the complexity of the projector design, the lower the yield—all resulting in a higher price for the projector. Below is a list of projector types, in terms of projection distance, and their suitable settings:

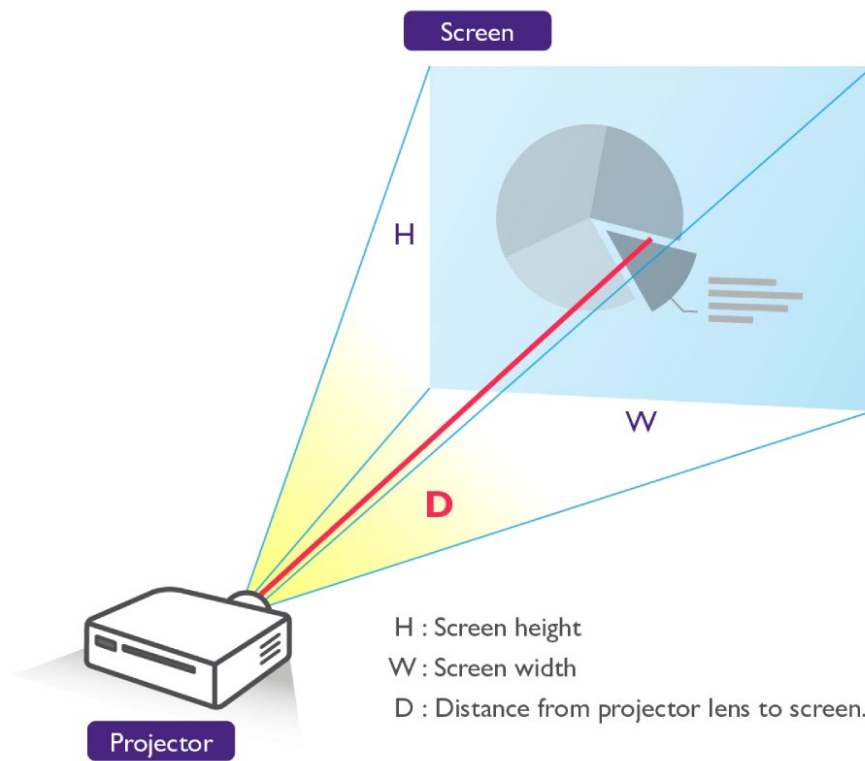
- **Normal:** Conference rooms and classrooms
- **Short Throw:** Exhibition spaces, simulation space, small classrooms, and small conference rooms
- **Ultra Short Throw:** Interactive projection spaces and interactive classrooms

## Optical

The sections below will help describe throw ratio, zoom ratio, lens shift, and their differences.

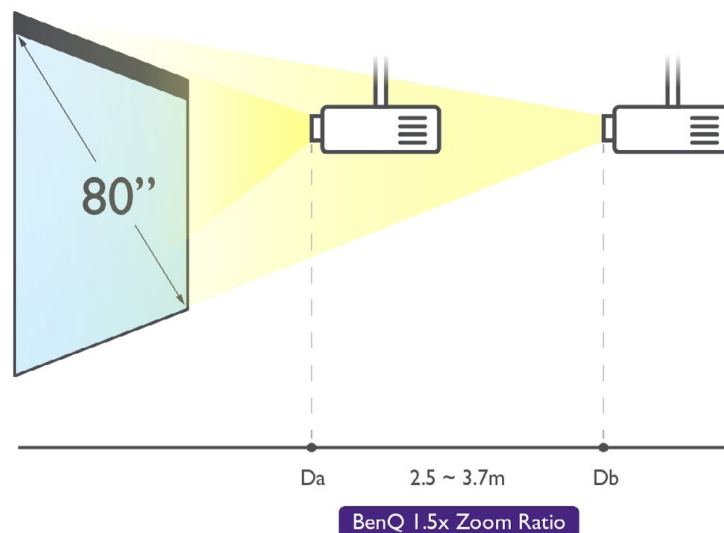
### Throw Ratio

Throw ratio is the distance from the projector lens to the screen divided by the screen width. For a fixed screen width, the shorter the projection distance, the smaller the throw ratio. This is the case for short throw and ultra short throw projectors—and vice versa for long-distance projectors.



### Zoom Ratio

If a projector is designed with a built-in zoom lens, it will be able to adjust the size of its projected image from a fixed position without having to move the projector. Zoom ratio is then defined as the ratio between the width/length of the largest image the lens can produce from a given position and the width/length of the smallest image the lens can produce from the same position. This means that given a fixed image/screen size, the larger the zoom ratio, the larger the range of distance the projector can be placed from the screen. Thus, the larger the zoom ratio the more flexibility you will have in terms of installation options. In this scenario, as seen in the image below, the zoom ratio is equal to the  $D_a$  divided by  $D_b$  (where  $D$  is the distance between the projector and the screen).

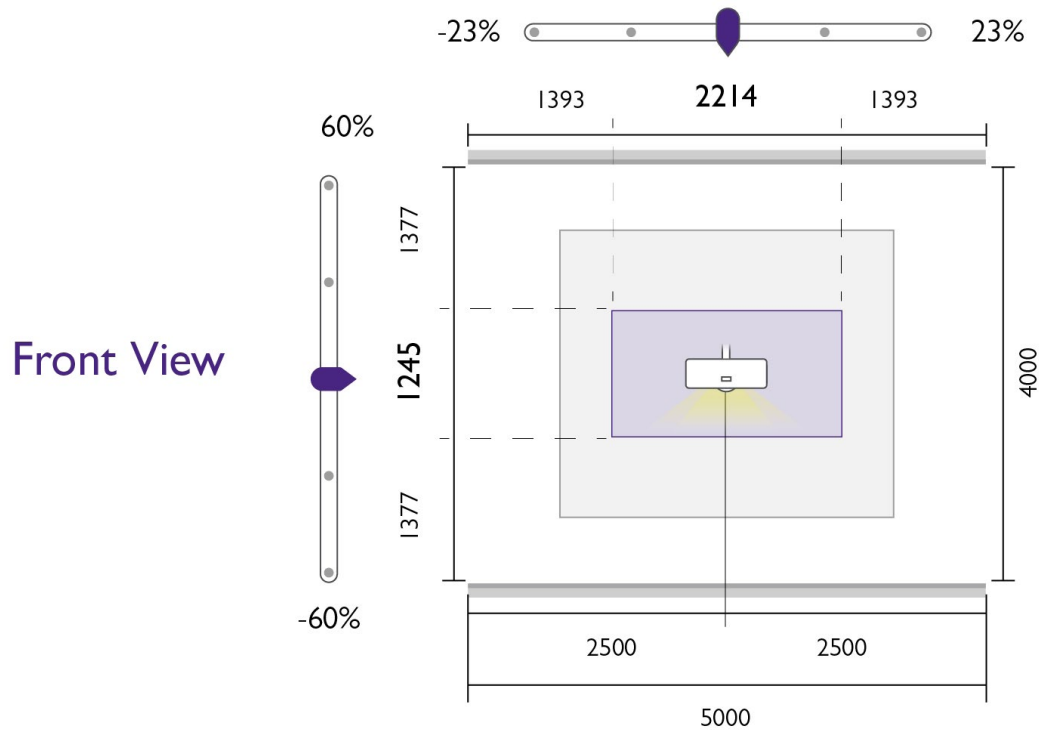


### Lens Shift

For most users it's quite difficult to get the projected image to be perfectly centered on the screen during the installation process. A lot of the time the projected image will fall either above or to the side of the screen, while trying to perfectly center the image on the screen solely by means of moving or adjusting the projector itself hardly ever works. Because of all this, lens shift is a must-have feature for projectors. Its vertical shift allows the projector's lens to shift in order

to move the image up or down, while its horizontal shift allows the lens to move the image left or right. Most projectors feature hardware controls on the projector itself that allow users to perform the lens shift function, while some high-end projectors allow you to use the lens shift function via electronic controls or the remote control.

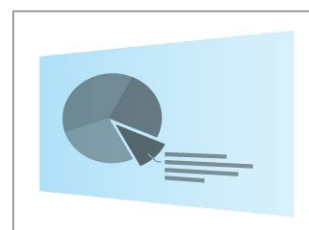
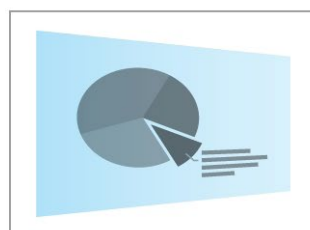
For example—if using the BenQ LK953ST projecting a 100-inch image—a vertical shift has a range of 60% (60% of the height of the image), while the horizontal shift has a range of 23% (23% of the image width).



**Keystone (Vertical Keystone, 2D Keystone, Auto Keystone)**

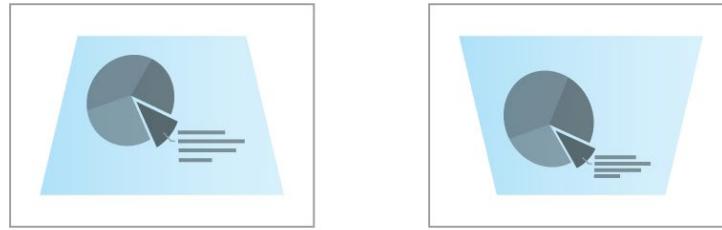
When a projector is installed in a location/orientation that prevents it from being properly aligned to the center of the screen the projected image will be distorted into a trapezoid. This is called the keystone effect. For instance, if the projector is installed above the screen and is tilted down when projecting, the image will have a keystone effect along its vertical axis. If the projector is even with the screen—but is off-center horizontally—the image will have a keystone effect along the horizontal axis. The reason why this happens is because the projected image is not properly projecting onto the plane of the screen at the required 90-degree angle.

Need **HORIZONTAL** Keystone Correction





## Need **VERTICAL** Keystone Correction



To achieve a **SQUARE** image



The following are descriptions of the different type of keystone corrections available on projectors:

- **Vertical Keystone:** The most basic keystone correction. Currently 4K projectors only support vertical keystone because of limitations in their circuitry.
- **2D Keystone:** Supports both vertical and horizontal keystone correction.
- **Auto Keystone:** High-end projectors feature auto keystone correction where a G-sensor is embedded into the projector allowing the projector to automatically correct for the keystone effect via a hard key or the projector's OSD menu.

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