



ClassroomCare™ Touch Displays for Education

Guide to Germ-Resistant BenQ Interactive Displays

Introduction to BenQ germ-resistant displays

The confluence of evolving technology and growing public health awareness has prompted notable developments in the field of educational interactive devices. BenQ ClassroomCare™ displays provide all the established benefits of interactive displays with high fidelity touch screens, and fold into the equation strong measures that safeguard student, teacher, and overall user health.

Additionally, the rise of more diverse modalities in the global education scene translates into increased demand for blended learning and a focus on smart, interactive technology rather than the traditional model of a class-facing teacher. This so-called flipped class, where teachers and students discuss work that was carried out at home, tends to require a great deal of interactivity. Classes now often revolve around a digital, interactive screen and not a traditional classroom board.

While very amenable to idea sharing and learning in general, smart and interactive touch screens do present focal points for possible infection vectors. Compared to previous teaching methods that centered on whiteboards, blackboards, or maybe a projector; touch screens offer more flexibility but are also literally more hands on. As such, potentially harmful pathogens such as bacteria, viruses, and fungi may transmit between students and teachers and then outside the classroom to families and the community at large.

For every opportunity to share knowledge and insights, touch screens and interactive devices also offer a possibility to catch an unwanted germ. For that reason, and anticipating growing demand for healthier platforms, BenQ has continuously improved ClassroomCare interactive displays. Current models employ thoroughly-tested layers of ionized nanosilver imbued into screens. Nanosilver has been known to be a disinfectant and anti-microbial agent. As this document explains, BenQ ClassroomCare products offer anti-germ protection that lasts up to several years, or the life of the product. In that way, ClassroomCare touch displays protect productive learning while at the same time ensuring schools and other establishments get good return on their investment as an incentive to acquire equipment that is more conducive to communal wellbeing.



Use of anti-microbial coatings to control the spread of germs

Nanosilver application on touch displays helps minimize the health risks associated with numerous users sharing the same surface. Already growing in awareness over recent years, the need for professional-grade, long-lasting, and easy to maintain germ resistance for interactive boards has burst onto the global consciousness due to COVID-19 concerns.

With nanosilver coating embedded in touch screens, interactive displays help protect users against germs. That umbrella term covers essentially bacteria, viruses, and fungi. These microbes pervade in any environment and cannot be entirely avoided in a school setting. However, their impact on educators, learners, and support staff can indeed be nearly nullified through proper, carefully-tested germ resistance technology.

What exactly are germs?



Viruses
30 – 150 nm

They require a living host to grow and reproduce. Most viruses cannot survive very long outside of a host.



Bacteria
300 – 50,000 nm

They can reproduce inside and outside of a host's body and cause infections.



Fungi
>2,000 nm

Multi-celled organisms that can only get their nutrition from a host.

Source: Ryan J. B, What are germs? Kids Health. Nemours Children's Hospital. July, 2018

Serious illness may arise from exposure to any type of germ in susceptible individuals. Additionally, commonly found germs have a high likelihood of bringing about colds and flus even among healthy persons. Therefore, good germ resistance technology helps keep the focus on learning by greatly reducing the risk of localized outbreaks or wider epidemics as a result of a group of people using the same touch screen.

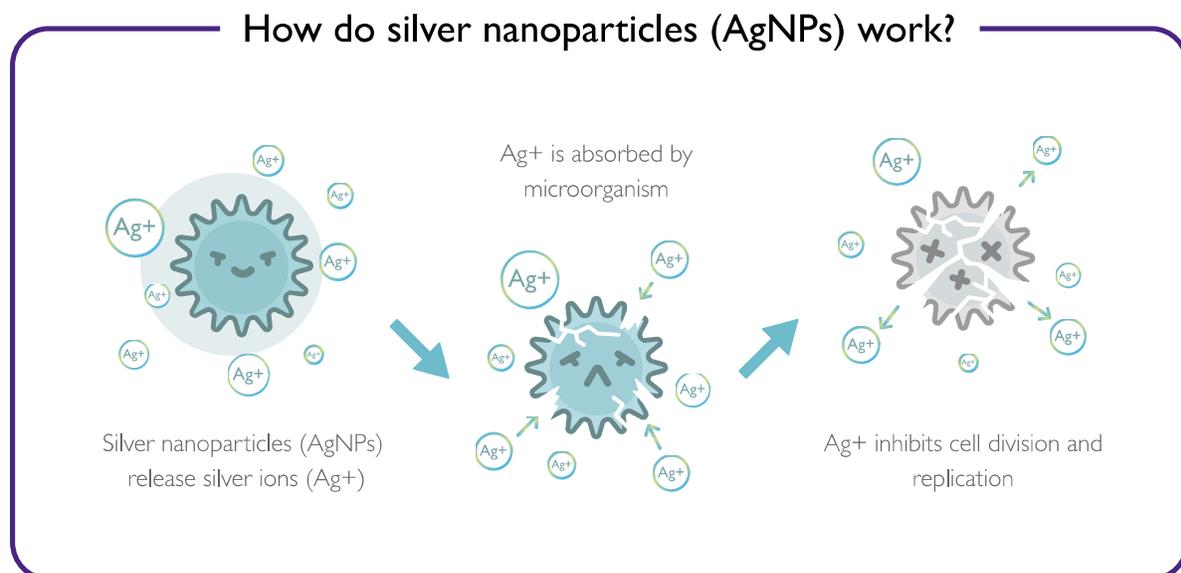
Ionized silver nanoparticles are known to bring anti-microbial action to educational touch screens and interactive displays which neutralize bacteria, viruses, and fungal spores, thus covering a full range of potential health hazards. While not a substitute for best practices such as good personal and classroom hygiene, nanosilver-imbued BenQ boards certainly help reduce a major infection route (including *Staphylococcus aureus*, *Klebsiella pneumonia*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Salmonella*) that has been a thorny issue for schools since time immemorial.



Disrupting germ replication and reproduction with nanosilver

Silver has been known for its anti-microbial properties for centuries. Harking back to traditional knowledge, silver has an extensive history of being used to sanitize and cleanse different materials, substances, and surfaces. Historical records offer countless examples of silver applied in an effort to prevent illness, for instance the practice of placing a coin made of pure silver in a flask of water to make sure the contents were drinkable. Based on experience from different industries such as healthcare and food

packaging, nanosilver has established itself as one of the most effective anti-microbial agents. Germs naturally intake silver nanoparticle (AgNP) ions (Ag⁺). Once within bacterial, viral, and fungal structures, nanosilver disrupts microbial replication and reproduction. For one, this stops germ populations from increasing. Secondly, existing microbes quickly die out and the touch display is effectively sanitized, as micro organisms can't replicate and sustain themselves on the screen surface.



Source: W. Sim et al, *Antimicrobial Silver in Medicinal and Consumer Applications: A Patent Review of the Past Decade*. *Antibiotics* 2018, 7, 93

With little germs present on BenQ boards, the odds of users spreading pathogens are reduced or outright negated by germ-resistant technology.

It's important to note that silver ions, also referred to simply as nanosilver in the context of germ resistance applications, work to stop the spread of gram negative and positive bacteria, including variants known as resistant to antibiotics^[1]. The direct and aggressive mechanism of action of nanosilver makes

for an excellent defense against even fungal spores^[2].

As mentioned above, nanosilver has been at work for quite some time in a variety of industries that depend on hygiene and the ability to control microbial populations. From food packaging to medical supplies such as masks, gloves, and bandages, to biomedical devices, water filters, and exercise equipment, nanosilver plays a pivotal role as a safeguard against infectious pathogens.

Categories of products that use AgNP

BenQ is one of the few electronics manufacturers that incorporate germ-resistant **AgNPs** to their products.

AgNP used in everyday products



Surgical masks



Bandages



Food containers



Medical devices



Water filters

Source: W. Sim et al, Antimicrobial Silver in Medicinal and Consumer Applications: A Patent Review of the Past Decade. Antibiotics 2018, 7, 93

BenQ and a handful of other electronics manufacturers employ nanosilver in products. It is quite evident that BenQ boards with germ

resistance based on the use of nanosilver are ahead of the curve and offer better protection than virtually any other product range on the market.

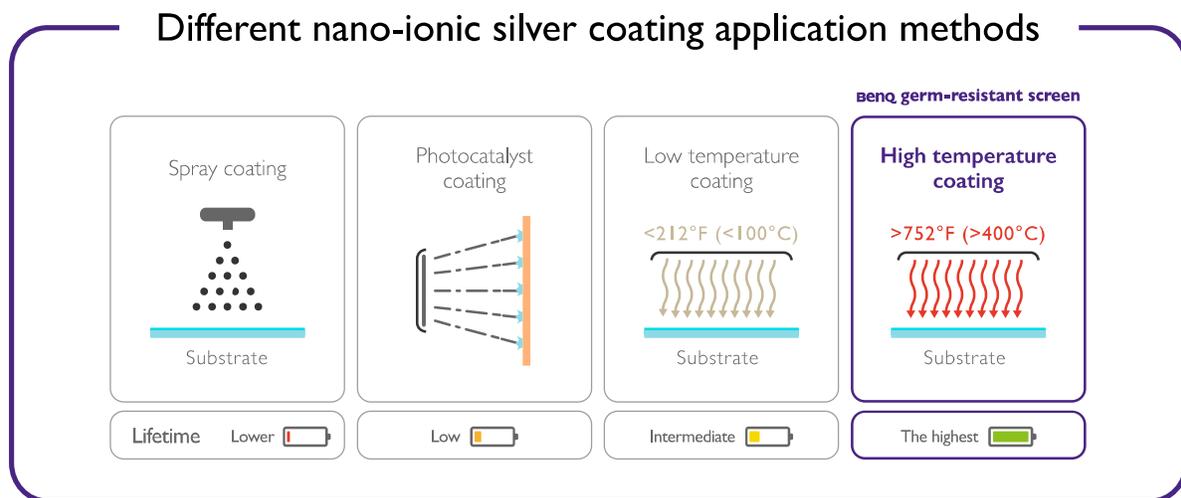
[1] "Ag+ are effective against a broad spectrum of Gram-negative and Gram-positive bacteria including some antibiotic-resistant strains" - Wright, J.B et al

[2] "Studies have shown Ag+ are effective and fast-acting agents that destroy different types of fungi" - Jolanta Pulit-Prociak & Marcin Banach

How we make germ resistance last as long as possible

BenQ was the first company to implement nanosilver in large touch displays back in 2017, by that instantly upgrading the germ resistance capabilities of interactive displays. In the over three years since, BenQ has improved the application methods used to add nanosilver to screen layers, while other manufacturers have also taken up nanosilver. However, not all application methods offer equally viable or impressive results.

Depending on how committed a product's design is to germ resistance, nano ionic silver may be introduced to materials in various ways, leading to variable durability. From just one month to the life of the product, nanosilver application differs considerably as a result of decisions made by the designers and marketers of any given product.



High heat bonding involves the most complex application sequence, and BenQ uses this approach as the company employs glass in touch displays for educational boards. Glass handles the needed 752 degrees Fahrenheit (400 degrees Celsius) well, allowing for a consistent substrate of anti-microbial

material that works for years. During that time, germ resistance doesn't degrade, and action such as cleaning the screen may be undertaken with no risk of wiping away or otherwise damaging the anti-microbial protective layer.

BenQ commitment to the best application methodology available

To further elaborate on the high heat bonding method, we need to highlight that not all glass works equally well in this scenario. BenQ has made a clear choice to go all in on nanosilver application. And considering the large size of BenQ boards with their touch displays, the specific formulation of glass screens involves intricate engineering and chemical factors. A dedicated production process has been established, as BenQ doesn't use off-the-shelf solutions.

ClassroomCare touch displays feature extremely durable tempered glass that can handle the high heat curing process required for the best nanosilver

substrate embedding. That degree of durability also makes the glass used in BenQ touch displays highly shatter, shock, and scratch resistant, creating products that work very well in active environments with multiple users, including young children.

All of this necessitates a prolonged production cycle, extensive quality assurance, and expensive equipment, not to mention third party certification to verify efficiency. This may provide a clue as to why BenQ is nearly alone in the touch display landscape when it comes to offering germ resistance on this scale.



Premium, industry leading processes for visible advantages

The premium glass curing process used in BenQ ClassroomCare products serves several needs. In addition to germ resistance and high durability, it imbues touch displays with anti-glare properties for better viewing and less eye strain.

As for germ resistance, the methods and materials used in BenQ products offer protection without any health risks to humans, which is verified repeatedly by external and impartial parties. BenQ uses the

most effective and safe-proven concentration of nanosilver in the industry, providing protection that lasts the life of the touch display. As of this writing, BenQ is the only manufacturer that cures tempered glass for interactive displays at over 752 degrees Fahrenheit (400 degrees Celsius). The complexity and cost involved in successfully completing this manufacturing process demands a level of commitment other manufacturers haven't been willing to accept as of yet.

BenQ's proprietary germ-resistant screen

BenQ incorporates **AgNP** to the **anti-glare** coating of its interactive display screens. They are cured **at more than 752°F (400°C)** to ensure longer germ-resistant efficacy and screen durability.



Advantages

- World 1st germ-resistant large interactive display
- Double-certified by TÜV and SIAA*
- Cured at >752°F (400°C)
- Verified safe for humans
- Increased AgNP concentration
- Abrasion & corrosion resistant

**On models manufactured from 2020*

TÜV & SIAA certified and verified efficacy

Multiple international organizations and government agencies recognize silver ions or nanosilver as a highly effective defense against germs. Uniquely, BenQ ClassroomCare models undergo complete and thorough evaluation by Germany-based TÜV Rheinland, one of the world's premier test labs. TÜV certification has become standard in multiple industries worldwide. BenQ is the only touch display manufacturer with products that have been approved by TÜV as effective against specific pathogens.

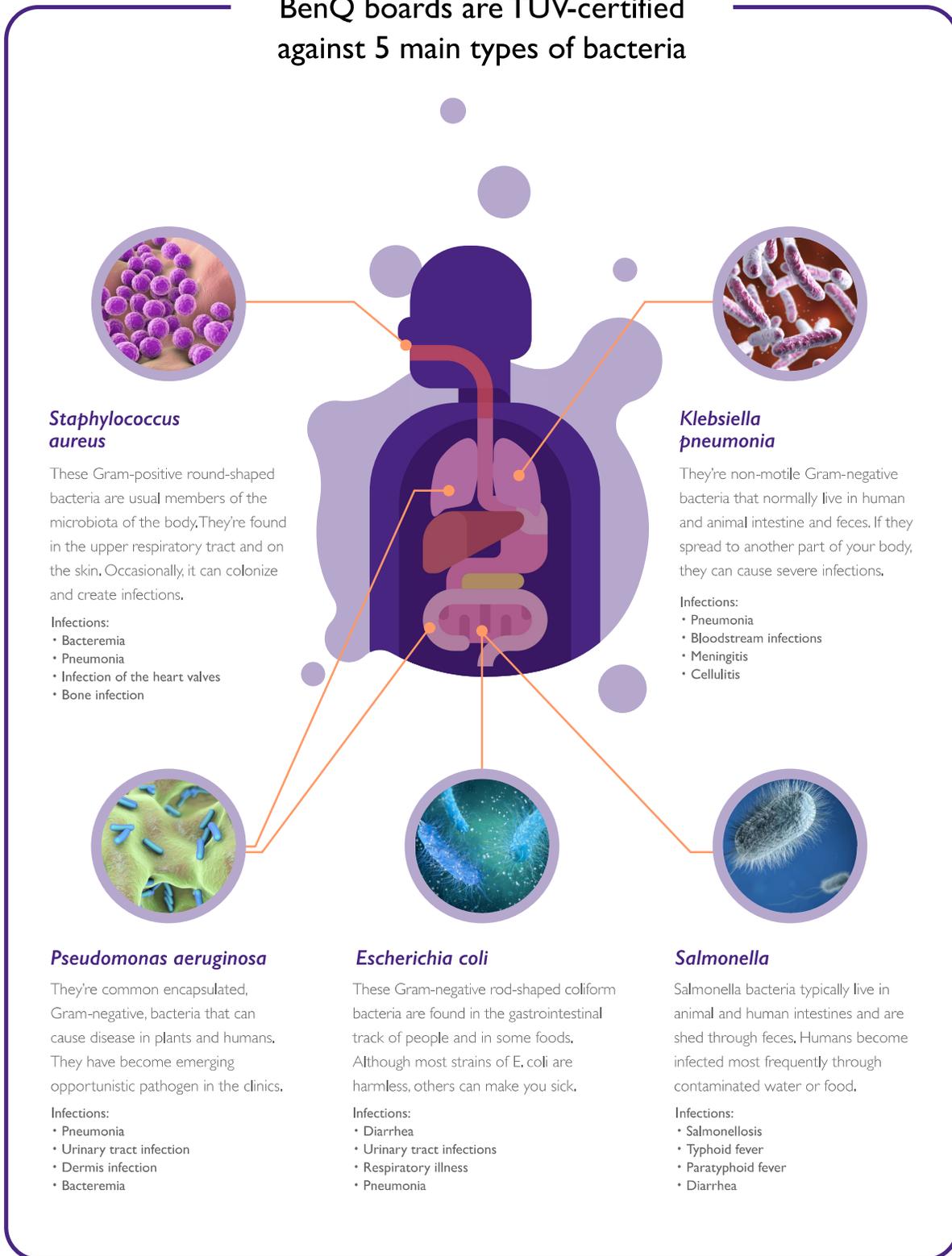
Notably, TÜV has verified BenQ touch displays with germ resistance as clearly effective against *Escherichia coli*, the notorious *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia* and *Salmonella*. No other manufacturer has such certifications to offer; and while BenQ interactive displays with germ resistance work against microbial pathogens, having official validation for five of the most common illness-inducing variants is testament to the value of BenQ design. *E. coli* and *S. aureus*

have long been known as the bane of classrooms, inflicting much suffering on students and teachers as they spread very easily and quite readily cause illness in many individuals. With TÜV-certified resistance against these two specific pathogens, a major burden is quite literally lifted from teachers and school administrators.

Japan-based SIAA, or Strategic Insurance Agency Alliance, also validates and certifies BenQ ClassroomCare models. SIAA observes both anti-pathogen efficacy and user safety. Experts at SIAA put products to tests that evaluate anti-microbial defense while looking for potentially harmful side effects. After all, many very effective anti-microbial agents are almost equally dangerous to humans and therefore cannot be used in classrooms or outside highly controlled laboratory conditions. SIAA validates BenQ interactive displays as both germ-resistant and completely safe for human use.



BenQ boards are TÜV-certified against 5 main types of bacteria



Staphylococcus aureus

These Gram-positive round-shaped bacteria are usual members of the microbiota of the body. They're found in the upper respiratory tract and on the skin. Occasionally, it can colonize and create infections.

Infections:

- Bacteremia
- Pneumonia
- Infection of the heart valves
- Bone infection

Klebsiella pneumoniae

They're non-motile Gram-negative bacteria that normally live in human and animal intestine and feces. If they spread to another part of your body, they can cause severe infections.

Infections:

- Pneumonia
- Bloodstream infections
- Meningitis
- Cellulitis

Pseudomonas aeruginosa

They're common encapsulated, Gram-negative, bacteria that can cause disease in plants and humans. They have become emerging opportunistic pathogen in the clinics.

Infections:

- Pneumonia
- Urinary tract infection
- Dermis infection
- Bacteremia

Escherichia coli

These Gram-negative rod-shaped coliform bacteria are found in the gastrointestinal track of people and in some foods. Although most strains of E. coli are harmless, others can make you sick.

Infections:

- Diarrhea
- Urinary tract infections
- Respiratory illness
- Pneumonia

Salmonella

Salmonella bacteria typically live in animal and human intestines and are shed through feces. Humans become infected most frequently through contaminated water or food.

Infections:

- Salmonellosis
- Typhoid fever
- Paratyphoid fever
- Diarrhea

Long term reliability and simple maintenance

Classrooms and other venues where touch displays work often present harsh operating conditions. Multiple users, different habits, perhaps even a touch of accidental carelessness. BenQ boards therefore have to be robust and durable, while providing excellent viewing, responsive touch, and of course protection against germs.

The BenQ manufacturing and testing process ensures all of the above. Panels pass several rigorous abrasion tests to make sure they don't degrade due to abrasive, rubbing influence. Knowing that schools and organizations routinely wipe screens with a variety of cleaning products, BenQ engineers and researchers then submit touch displays to a battery of chemical exposure trials. These include acid, alkaline, and alcohol proofing. Because BenQ ClassroomCare touch displays do not degrade when exposed to all commonly used cleaning agents, there's no risk from regularly wiping them. Maintenance involves a simple wipe down with a cloth moistened with water or any regular household cleaner; and nothing more. The anti-microbial and anti-glare properties of the screen

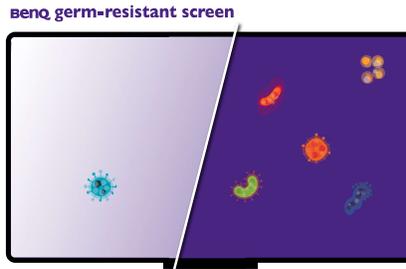
do not degrade with repeated cleaning over the course of the product's lifespan.

The anti-microbial layer must remain fully intact and active after all of these abrasion and chemical contact tests. We validate BenQ interactive displays can resist above average abrasion and chemical stress.

To simulate pressure from pens and other stylus-like implements, BenQ puts touch display screens to a very demanding scratch-free test. The trial simulates contact on the panel that equals several years of use in a typical classroom setting, and gauges the screen's ability to resist scratches while retaining full anti-microbial resistance.

Schools and other organizations also have an interest in the sheer strength of touch displays, often expressing concerns about shattering and cracking, which also double as a potential hazard for students and faculty. BenQ ClassroomCare products must pass a steel ball impact test to indicate a high degree of resistance to external pressures such as shocks, drops, and impacts from fast moving or thrown objects.

How to properly clean and protect your BenQ interactive display



Coated with **AgNP**, BenQ's germ-resistant interactive display screens reduce the spread of bacterial infections, even after heavy use and frequent cleaning. Follow these steps for regular careful cleaning of your screen to ensure optimum germ-resistance.

You will need



Disposable gloves



Two pieces of lint-free microfiber cloths



Isopropyl alcohol 70%

Step by step



1 Power off the display



2 Put on gloves



3 Wipe the screen with a dry piece of cloth



4 Spray alcohol on the 2nd piece of cloth



5 Wipe the screen and accessories



6 Discard the used gloves and cloths

Never



Use paper towels or anything that could leave streaks or lint on the screen



Fully soak the microfiber cloths in liquid



Spray liquids directly onto the screen



Use hazardous chemicals or ammonia-based cleaners

Educational Interactive Displays

RP Series

BenQ RP series reshapes teaching and learning environments, offering the complete ClassroomCare 2.0 solution. Educators and students benefit from a precision motion sensor, an air quality sensor, convenient front-facing ports and instant-pair NFC technology. Helpful cloud features include a digital whiteboard to help with class preparation and promote participatory collaboration across platforms and locations. As a wellness-conscious smart product, the RP series packs a germ-resistant screen and eye-care technologies. It supports learning in a healthier manner and offers an interactive display that connects entire classes through consistently fun and rewarding educational experiences.

RP01 65" 75" 86"



- Cloud Whiteboard
- Air Quality Sensor and Advanced Motion Sensor
- Germ-Resistant Screen
- Eye-Care technology
- Fine IR Touch Interface
- 4K UHD Touch Screen
- Friendly, Hassle-Free Account and Display Management

RP02 65" 75" 86"



- Cloud Whiteboard
- Upgraded Air Quality Sensor: CO₂, PM2.5, Temperature, and Humidity
- Germ-Resistant Screen
- Eye-Care Technology
- Zero Bonding Technology with Fine IR⁺ Touch Interface
- Advanced Presence Detection
- 4K UHD Touch Screen
- Friendly, Hassle-Free Account and Display Management



Want to get expert info about BenQ boards?

Sometimes it can be difficult to get answers to your questions when trying to find the right interactive classroom panel for your installation and usage needs. We're here to help.



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