

# What is IP54? A detailed explanation of its dust and water resistance capabilities.

What is IP54? Learn about the meaning of the IP54 rating and its actual dust and water resistance limits. Check it out now to choose the right technology device for your needs.

IP54 is an international standard (IEC 60529) for equipment protection, meaning it offers a moderate level of dust resistance (dust may enter but does not affect operation) and can withstand water splashes/sprays from all directions. Let's learn more about the IP54 standard with GearVN in the following article.

## Key points

1. The IP54 rating provides level 5 dust resistance and level 4 water resistance, suitable for everyday use in normal environments.
2. IP54 rated devices are suitable for light rain, sweat, or light splashes of water, but they cannot withstand submersion in water or strong water pressure.
3. IP54 surpasses IP53, equivalent to IPX4 in water resistance, but is inferior to IP67 and IP68 because it does not fully support submersion in water or dust.
4. Dust and water resistance decreases over time, so use within limits to avoid damage and void the warranty.

## 1. What is the IP standard? An overview of the Ingress Protection system.

The IP (Ingress Protection) standard is a system for evaluating the level of protection of electronic equipment enclosures. This standard is defined by the International Electrotechnical Commission through the document IEC 60529.

The IP rating system helps users know exactly what environmental factors a device can withstand, instead of relying on general advertisements. The structure of the ingress protection standard always begins with the letters IP followed by two digits.

1. **The first digit (0 to 6):** Indicates the level of protection the device offers against solid objects and dirt.
2. **The second digit (0 to 8 or 9):** Indicates the level of protection the device offers against liquid ingress, specifically water.



*IP standard structure with two ratings: dustproof and waterproof.*

## **2. What is the IP54 standard? Decoding the meaning of each number.**

### **2.1. The meaning of the number 5 in the IP54 standard**

A dust resistance rating of 5 means the case is designed to prevent most dust from entering. While not completely sealed like a level 6 case, the amount of dust particles that penetrate is minimal. This rating ensures that internal components and circuit boards will not short circuit or malfunction under normal usage conditions.

### **2.2. The meaning of the number 4 in the IP54 standard**

Water resistance level 4 indicates that the device is capable of safely protecting against water jets from all directions. The device can pass wide-angle water spray tests without liquid seeping in and damaging components. However, the water pressure in these tests is only at a low level.



*Water resistance level 4 protects the device against water jets from all directions.*

## **3. Practical limits of IP54 protection rating**

### 3.1. Safety situations

1. Use the device when exercising and sweating profusely.
2. Making phone calls or wearing headphones in light rain or drizzle.
3. I accidentally splashed a few drops of water from the sink onto the appliance's surface.
4. Do not place your keyboard , mouse , or phone on your desk in an office environment with normal humidity levels.

### 3.2. Risky situations to avoid

1. Do not immerse the device directly in a glass of water, a basin of water, or a bathtub.
2. Do not bring the device while swimming, diving, or playing water sports.
3. Do not rinse the device with a high-pressure water hose or a strong shower.
4. Do not use the machine in harsh environments such as construction sites with dense fine dust or metal shavings.



*Avoid immersion in water or exposure to high-pressure water.*

## 4. Compare the IP54 standard with IPX4, IP53, IP67, and IP68.

1. **Comparing IP54 with IPX4:** Both can withstand splashes of water from all directions. However, IPX4 does not have a dust rating (indicated by an X), while IP54 is certified as a safer level 5 dustproof rating.
2. **Comparing IP54 to IP53:** IP54 is superior in terms of water resistance. IP53 only withstands water splashed from a 60-degree angle, while IP54 protects the device from water spray from any direction.
3. **The difference between IP54 and IP67/IP68:** IP67 and IP68 are higher levels of water resistance, allowing for complete submersion in water and complete dust resistance (level 6). However, IP54 has lower manufacturing costs, significantly reducing product prices.

## 6. Some related questions

### 6.1. Can IP54-rated phones be used for swimming?

No, the water pressure in the swimming pool is very high, exceeding the water resistance standard of level 4. Taking a phone with an IP54 rating to the pool while swimming will cause water to seep in and damage the circuit board immediately.

## 6.2. Is an IP54 rated device covered under warranty if it falls into water?

Most technology companies today refuse to provide warranty coverage for water damage, even if the device has a high IP rating. IP rating is for preventative purposes only and should not be abused.

## 6.3. Does the IP54 dust and water resistance rating decrease over time?

Yes. The ability to protect against ingress will gradually decrease due to physical wear and tear during use. The adhesives and waterproof rubber seals inside the device will age due to temperature and environmental factors.



*Water and dust resistance decreases over time with use. An IP54 rating provides basic and practical protection, keeping your device safe from dust, dirt, and sudden rain showers at a reasonable cost.*

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