COUNTRYMAN SAFETY

WHAT IS THE DIFFERENCE?

*A comparison of **P2**, **FFP2**, **KN95**, and **N95** Face Mask Respirator Types*

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Face Mask Respirator certifications can be confusing: P2, FFP2, KN95 or N95? - This quick fact sheet covers face mask standards and certifications (classes), and their filtration efficiency against non-oily particles, including biological particles and microorganisms. These are the type of respirators that can protect us from bacteria and influenza virus in daily life.

What is a P2, FFP2, KN95, N95?

P2, FFP2, KN95 or N95 are all a type of **certification** (class) given to a particular face mask based on its performance outcome in a *standardised test* - also known as a **standard.**

Which standard is applicable to me?

Due to the global nature of the market and manufacturing companies, respirators are often tested and marketed under **different standards**, meaning a range of different certifications are acceptable in the Australian market.

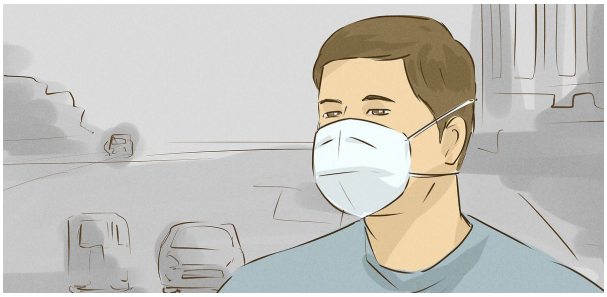
For example, the US uses the N standard **NIOSH 42 CFR 84** (e.g. N95), whereas Australia uses the standard **AS/NZS 1716:2012** (e.g. P2).

Each standard varies a little by country, however they are broadly similar.

How does a face mask get its certification?

Face mask certification types (classes) are determined by the minimum performance outcome tested against the standard for that region/country.

As mentioned earlier, this testing standard varies slightly but is vastly similar in required minimum effectiveness ***(see Table 1. – Certification Testing Requirements).***



Are N95 masks the same as P2 masks?

N95 masks are very similar to P2 masks, and feature only very slight differences. This is due to the different testing and certification practices between Australia and the US. In practice, these differences have resulted in practically nil impact on the level of protection to the wearer.

As you can see there are some minor differences in the aerosol flow rates and particle sizes that both these masks protect against.

The difference of filtering efficiency (P2 filter efficiency of 94% vs N95 filter efficiency of 95%) between the classification systems result in virtually no impact on the level of respiratory protection provided to wearers.

	P2 Masks AS/NZS 1716:2012	**N95 Masks** NIOSH 42 CFR 84
Filter efficiency	at least **94%**	at least **95%**
Testing substance	Sodium Chloride Aerosol	Sodium Chloride Aerosol
Aerosol flow rate	**95** litres/minute	**85** litres/minute
Aerosol particle size	**0.3** to **0.6** microns	**0.3** microns

Which regions are using which standard and classification?

Standards play an important role in determining the effectiveness of respiratory face masks. It is important to understand the differences between the regional testing requirements and how this affects the filtration efficiency of a respiratory face mask. There are 4 main regional standards & certifications used globally.

AUSTRALIA
AS/NZS 1716:2012

The Australian Standard specifies requirements, performance and testing criteria for the manufacture of respiratory protective devices (RPDs).

Classes:
- P1: Filters at least 80% of airborne particles
- ***P2: Filters at least 94% of airborne particles***
- P3: Filters at least 99% of airborne particles

P series: P represents "Partical Size".

EUROPE
EN 149 2001

The European Norm (EN) specifies the minimum requirements for filtering half masks used as respiratory protective devices, specifically against particles.

Classes:
- FFP1: Filters at least 80% of airborne particles
- ***FFP2: Filters at least 94% of airborne particles***
- FFP3: Filters at least 97% of airborne particles

FFP series: FFP represents "Filtering Facepiece".

UNITED STATES
NIOSH 42 CFR 84

The National Institute of Occupational Safety and Health (NIOSH) of the U.S.

Classes:
- ***N95 – Filters at least 95% of airborne particles***
- N99 – Filters at least 99% of airborne particles
- N100 – Filters at least 99.97% of airborne particles

N series: N represents "Not resistant to oil".

CHINA
GB2626-2006

Chinese National Standard for protective masks mainly refers to the U.S. standard.

Classes:
- ***KN95 – Filters at least 95% of airborne particles***
- KN99 – Filters at least 99% of airborne particles
- KN100 – Filters at least 99.97% of airborne particles

KN series: KN represents "Not resistant to oil".

Mask standards and effectiveness - The bottom line

The comparison between P2, FFP2, N95 and KN95 has shown that all of these masks objectively achieve the same level of protection against airborne particles. The differences in certification are primarily due to the slight differences in standard testing requirements, and result in practically nil impact on the level of protection to the wearer.

Therefore, it is reasonable to consider that:

- N95 (95%) = P2 or FFP2 (94%)
- N99 (99%) = FFP3 (99%)
- N100 (99.97%) = P3 (99.95%)

Table 1. - Certification testing requirements

Certification/ Class (Standard)	P2 (AS/NZ 1716:2012)	FFP2 (EN 149:2001)	N95 (NIOSH-42C FR84)	KN95 (GB2626-2006)
Filter performance – (must be ≥ X% efficient)	≥ 94%	≥ 94%	≥ 95%	≥ 95%
Test agent	NaCl	NaCl and Paraffin oil	NaCl	NaCl
Flow rate	95 L/min	95 L/min	85 L/min	85 L/min
Total inward leakage (TIL)* – tested on human subjects each performing exercises	≤ 8% leakage (individual and arithmetic mean)	≤ 8% leakage (arithmetic mean)	N/A	≤ 8% leakage (arithmetic mean)
Inhalation resistance – max pressure drop	≤ 70 Pa (at 30 L/min) ≤ 240 Pa (at 95 L/min)	≤ 70 Pa (at 30 L/min) ≤ 240 Pa (at 95 L/min) ≤ 500 Pa (clogging)	≤ 343 Pa	≤ 350 Pa
Flow rate	Varied – see above	Varied – see above	85 L/min	85 L/min
Exhalation resistance - max pressure drop	≤ 120 Pa	≤ 300 Pa	≤ 245 Pa	≤ 250 Pa
Flow rate	85 L/min	160 L/min	85 L/min	85 L/min
Exhalation valve leakage requirement	Leak rate ≤ 30 mL/min	N/A	Leak rate ≤ 30 mL/min	Depressurization to 0 Pa ≥ 20 sec
Force applied	-250 Pa	N/A	-245 Pa	-1180 Pa
CO_2 clearance requirement	≤ 1%	≤ 1%	N/A	≤ 1%

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Definitions

Filter performance: the filter is evaluated to measure the reduction in concentrations of specific aerosols in air that passes through the filter.

Test agent: the aerosol that is generated during the filter performance test.

Total inward leakage (TIL): the amount of a specific aerosol that enters the tested respirator facepiece via both filter penetration and faceseal leakage, while a wearer performs a series of exercises in a test chamber.

Inward leakage (IL): the amount of a specific aerosol that enters the tested respirator facepiece, while a wearer performs a normal breathing for 3 minutes in a test chamber. The test aerosol size (count median diameter) is about 0.5 micro meter.

Pressure drop: the resistance air is subjected to as it moves through a medium, such as a respirator filter.

Non-oily particles: Solid and non-oily liquid particles and microorganisms, such as coal dust, cement dust, acid mist and paint mist.

Oily particles: Oily fume, oil mist, asphalt fume, particles in the diesel engine exhaust, etc.

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