



THE GOOD Gear GUIDE

for Motorcycle & Scooter Riders

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No matter what you ride - from scooter to superbike - good gear is an investment too important to ignore. It could make the difference between a nasty tumble and injuries that prevent you from ever riding again.

The right gear can also improve your riding and your enjoyment by protecting you from the elements. Being too cold, too hot or soaked to the bone takes the fun out of a ride. It also affects your riding through distraction, fatigue and dehydration.

This is a guide to gear that will improve your riding comfort and could save you from preventable injuries.



TEN GOLDEN RULES



When you invest in riding gear, you want to make sure it is going to do its job. These 10 basic principles are a good place to start.

1 Cover your whole body.

2 Use impact protectors over your joints.

3 Protect your skin with abrasion-resistant material in vulnerable areas (see the injury risk zones in Figure 2).

4 Check the seams on your gear. There should be more than one line of stitching, and at least one line of concealed stitching on exposed seams.

5 Check that all fastenings are secure and protected from contact with the road or other surfaces in a crash.

6 Avoid external pockets or straps that could become tear points or snag on something in a crash.

7 Use insulated, waterproof and windproof materials to protect you from the cold.

8 Use reflective or light colours and ventilation to protect you from heat.

9 Check that all your gear fits you properly so that it will remain in place in a crash.

10 Don't carry anything in your pockets that could cause injury in a crash.

HOW CAN THE RIGHT GEAR IMPROVE YOUR RIDE?



Protection from the cold

Being cold is stressful and tiring; you become less alert and your reaction times slow. A drop in your body's core temperature can even affect your brain's function, impacting on decision-making and reactions. A cold rider can become anxious, irritable or detached from the task at hand.

Insulated and windproof gear will help maintain your core temperature and reduce cold stress. The insulation keeps a layer of warm air between your body and the outer shell of your gear. Avoid gear that is baggy or too big, as flapping and buffeting may force the warm air out. Close-fitting openings around your neck, wrists and waist, and covered zips will also reduce warm air leakage. Pay particular attention to keeping your neck, face, hands, feet and shins warm. A third of your body heat is lost from your neck and face, so a neck sock or balaclava is a good idea to stay warm.

Protection from moisture

Wet or damp clothes are uncomfortable and distracting. You will also get cold much more quickly if your clothes are wet, because water conducts heat away from your body. This is a particular safety issue for riders, as cooling is accelerated by the wind. Even in warm weather you can become chilled if your gear is damp from perspiration.

Waterproof, breathable clothing is the key to keeping comfortably dry. There is a big difference between waterproof and water-resistant clothing. While water cannot penetrate waterproof fabric, it will eventually soak through a water-resistant lining. Good waterproof gear should be breathable. This means that it lets your sweat out, while preventing rain from getting through. PVC or plasticised nylon oversuits are waterproof, and offer useful rain protection in an emergency, but are not breathable. The result will be damp clothes and rapid heat transfer.

Protection from heat

Heat is probably the most difficult comfort issue for riders to resolve. Many riders do not wear adequate protection in very hot weather. This may be one way to avoid overheating, but you risk dehydration, sunburn and windburn, in addition to substantial injuries if you crash.

Ventilation and reflection are the keys to improving riding comfort in hot weather. Good ventilation allows the wind to flow through the clothing and over your skin to evaporate sweat. Well-ventilated gear allows air to enter through vents or mesh panels (in 'zone 4' – see Figure 2). Air exit points are at the back.

The outer layer should also be designed to reflect rather than absorb heat from the sun and the road surface. Lighter colours reflect heat, while dark colours absorb it. There are a number of new materials on the market that are designed to improve comfort in hot weather.

When riding in hot weather, remember to drink lots of water to replace what you lose through sweating.



HOW CAN THE RIGHT GEAR REDUCE YOUR RISK OF INJURY?

No matter what you are wearing, your chance of surviving a direct impact with a solid object reduces as the speed of the impact increases. However, many motorcycle crashes do not involve direct impacts, nor do they occur at high speed. The right gear can prevent or reduce many of the most common rider injuries.

The outer layer, from head to foot, should:

- prevent most cuts, gravel rash and friction burns from sliding across a road
- protect you from sharp objects
- reduce the severity of contact burns from the engine and exhaust pipes
- save you from having skin and muscle stripped from your body
- avoid medical complications such as infections caused by road dirt.

In a fall or direct contact with another object, impact protectors should:

- prevent or reduce the severity of fractures
- prevent or reduce the severity of joint damage.

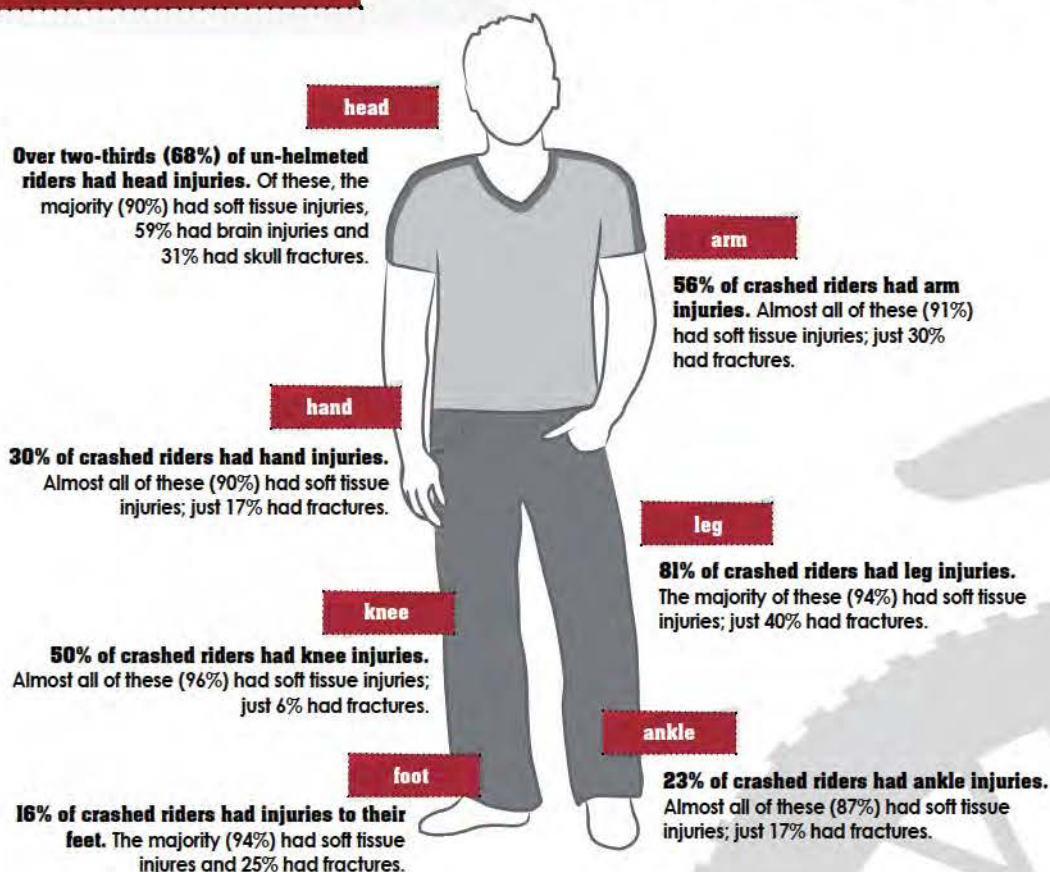
One study found that riders who wore protective clothing spent seven days less in hospital and were 40% less likely to have permanent physical injuries after a crash.

Of the riders who crash, 7 out of 10 have injuries that may have been reduced or even prevented by the right gear. Most riders wear a jacket and helmet but are less likely to protect their legs, although it is the legs that are most likely to be injured in a crash.

Protective clothing is not just about preventing injuries in crashes – it will also save you from minor harm caused by flying insects, and from stones and other debris thrown up by other vehicles.

Injury risks in a crash

Figure 1. The types of injuries sustained by riders in crashes



NOTE: This is the typical pattern of injury in motorcycle crashes before specialised motorcycle protective clothing was widely available.

HOW TO CHOOSE PROTECTIVE GEAR

Design and construction

Unless protective gear has been tested in a crash simulation, it is impossible to tell how well it will perform in a crash. There are certain important design and construction features that will help you to recognise gear that is more likely to do the job of protecting you.

Abrasion resistance

If it has not been tested, it is almost impossible to tell how well a particular garment will perform when you are sliding across a road.

- If choosing a leather garment, look for thicker leather. Generally, thicker leather will give greater abrasion resistance, although this also depends on the type of leather and how it has been treated.
- If choosing a fabric garment, make sure it is constructed with a number of different layers. Textile products can give good abrasion resistance, but not in a single layer. Multiple-layered textile products – such as those with a separate water-resistant line, abrasion-resistant liner and external shell – can provide a similar level of protection to leather.

Figure 2 shows the levels of injury risk in different parts of the body, and the type of protection a rider requires in each 'injury risk zone'.

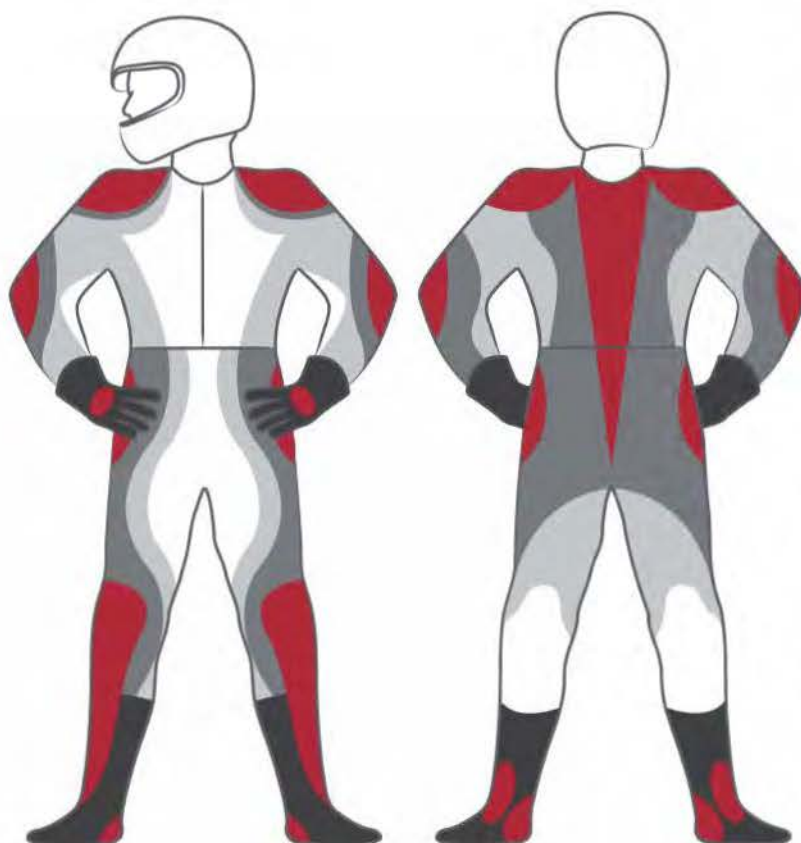


Figure 2. Injury risk zones

- Zone 1** has the highest level of injury risk. These areas need impact protectors and highly abrasion-resistant material. The European standards for jackets and pants require a minimum of 4 seconds abrasion resistance: that is, 4 seconds of sliding across the road surface before your gear wears through.
- Zone 2** also has a high injury risk and needs highly abrasion-resistant material but no impact protectors. Multiple layers are more likely to be effective than a single one.
- Zone 3** has a lower injury risk and requires only moderately abrasion-resistant material (minimum 1.8 seconds).
- Zone 4** has a relatively low injury risk. Material to provide ventilation and elasticity can be used in these areas, but they still need to provide a minimum of 1 second of abrasion resistance. Regular denim jeans have only half this resistance (0.6 seconds).



Shoulder protector

Impact protection

Impact protectors (also known as 'body armour') are shields worn inside your clothes to absorb and spread the impact of a direct blow. They reduce the risk of fractures and joint damage and should be worn over the shoulders, elbows, hips and knees (see Figure 2).

If possible, choose impact protectors that are marked CE EN 1621-1. These have been tested by dropping a 5 kilogram weight from 1 metre to simulate the impact of a fall from a motorcycle. Think of a sledgehammer dropping onto your knee: you will certainly feel it, but effective protection can minimise the damage.

- Check to ensure you cannot move impact protectors around when your jacket or suit is fully fastened. Impact protectors only work if they stay in place in a crash. Choose the type that fits your body best.
- A back protector can provide protection from direct impacts and may reduce soft tissue injuries. It will not protect you from the most serious spinal injuries, which are caused by twisting forces on other parts of the body rather than direct blows to the spine. If you do decide to buy a back protector, try to find one that is marked CE EN 1621-2.
- If you wear a kidney belt, make sure it is placed below your rib cage. Kidney belts can reduce fatigue on long trips by supporting vital organs from vibration.

Hip protector



Knee protector



HOW TO CHOOSE JACKETS, PANTS AND SUITS



Leather or textile? Riders used to prefer leather for its higher abrasion resistance, but that depends on the type and grade of leather. There are now many textiles that can also provide abrasion resistance and have the added benefits of being lightweight and providing insulation, ventilation and waterproofing.

There is no point in having the best materials if their construction fails in a crash. If the garment has been tested to the European standard, you can be confident it is well made, so look for the CE label and the number EN 13595 on jackets, pants and suits.

If you cannot find products with the CE label, the following points will help you choose the best gear you can.

Design

- **Avoid straps or external pockets.** These become tear or snag points which may catch on your motorcycle, another vehicle or objects on the road.
- **Look for garments made of large panels of fabric with few openings and joins.** Joins and seams are potential weak points; they can burst open on impact or when sliding along the road.
- **Avoid decorations and hard or sharp objects.** Metal buckles and other decorations can tear the garment and injure your body in a crash. They should not be used in impact zones, nor anywhere they might cause injury. Think about what you keep in your pockets: pens and keys can be forced into your skin, while phones and larger objects pressed against your body can damage nerves or break bones.
- **Make sure the lining is not attached to the outer shell in zones 1, 2 or 3 (see Figure 2).** Lining should be made of slippery material and able to move freely. This allows your body to slide within the external shell and reduces the risk of your skin being cut or penetrated by sharp objects.



Seams and construction

- **Look for two or three rows of stitching with at least one row concealed for seams in zones 1, 2 and 3.** Seams that split or burst are the most common reason for motorcycle gear failing the European standards tests. Concealed stitching is protected from the road surface in a slide.

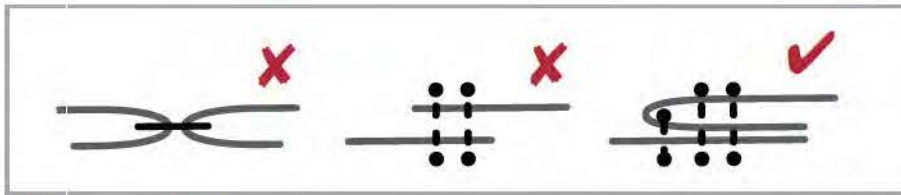


Figure 3. Concealed stitching

- **Extra layers must be stitched on top of the main protective layer – not inserted as a separate double section.** Check inside and feel through the material to ensure there is no gap in the main protective layer. Additional layers should be double-stitched. See Figure 4.

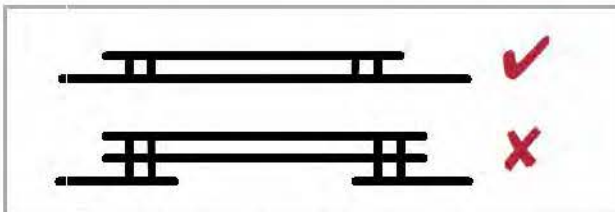


Figure 4. Construction of extra layers



- **Check the number of stitches in the seams.** As a rule, there should be 11–14 stitches for each 5 centimetres of leather. There should be 13–16 stitches for each 5 centimetres of fabric. Too few stitches means a weak seam; too many may weaken the material and cause it to tear.
- **Check that the stitching is regular and continuous.** Dropped or broken stitches may weaken the seam.

Fasteners

- **Avoid garments that have zips in injury risk zones 1 or 2.** Zips should not be used in these areas (see Figure 2).
- **Make sure that zips in zones 3 and 4 are below the outer surface of the garment.** They should also be covered with flaps on both sides to prevent contact with the road or the skin.
- **Check for good-quality zips.** They should be heavy-duty and securely stitched to the garment.
- **Make sure all fasteners are protected to prevent them being ripped open on contact with the road or a vehicle.**
- **Ensure that there are fasteners for the wrists and ankles.** These are essential to prevent garments riding up in a crash, and should be on the inside of the wrist or ankle to avoid being torn away in a crash.
- **Always secure fasteners before riding.** Fasteners are a necessary but weak point in the construction of a garment, so it is crucial to ensure they are done up tightly.



Comfort and fit

- **Try your gear on as realistically as possible.** Put it on over the sort of clothing you normally wear while riding.
- **Make sure it fits snugly and comfortably while you're in the riding position.** Clothes that are too tight will become uncomfortable and can restrict blood flow when you are riding. Clothes that are too loose can billow and flap, which can be distracting and fatiguing.
- **Avoid hipsters or pants that are loose-fitting around your waist.** Pants that ride low on your hips may be dragged down or off in a crash.
- **Make sure that any stretch and mesh panels are used only in zone 4.** Stretch panels for comfort and mesh panels for ventilation should not be in any other zones.
- **Check that you can walk, bend over, climb stairs and crouch in the gear.** Try picking up a small object, such as your keys, from the floor. Check for fabric bunching behind the knees and in your elbows, as this will cause pressure and discomfort when riding.
- **Check that you can move freely to get on and ride your motorcycle.** Can you use all controls, and turn to look behind you while wearing your helmet and holding both handlebars?

Fit is a particular problem for women riders and pillioners because most gear is designed for men. Jackets are often too wide in the shoulders, while pants are too narrow in the hips. Adjustable fasteners can help, and are particularly useful to hold impact protectors in place.

Use the internet to research brands designed for women, and their suppliers, or ring around a few stores before setting out on a shopping trip.



HOW TO CHOOSE BOOTS



Choosing the right motorcycle footwear can be a challenge, particularly if you want to be able to continue to wear it once you reach your destination. However, there are many good products available, including some that bear the CE symbol. Look for the CE mark and the number EN 13634.

If you cannot find CE-marked boots, here are some things to consider when choosing footwear.

Coverage

- **Look for boots that fully enclose the foot, ankle and lower shin.** Impact protection is recommended for the shins, instep (the top of your foot), ankles and heels. Beware of steel-capped boots which can cause friction burns or may cut into your toes in a crash.

Design

- **Check that leather boots are at least 2.5 millimetres thick.** Most motorcycle boots are made from leather, but there are also synthetic materials, such as Lorica, which are more lightweight and flexible while still being water-repellent and abrasion-resistant.
- **Check that the soles are fairly rigid and at least 4 millimetres thick.** One of the critical tests is the rigidity of the sole to protect your foot from being crushed sideways.
- **Look at how the sole is attached to the upper.** Stitched soles are stronger than glued or bonded soles, which may be torn off if your foot is dragged along the road.
- **Check that the boot uppers don't overhang the edge of the soles.**

Fastening

- **Choose boots that fasten on the inside of your leg.**
- **Avoid lace-up boots unless the laces are fully protected.** Laces can be worn away and the boots torn off when dragged against the road. The laces can also catch on footpegs, levers and even parts of another vehicle in a crash.
- **Try to pull the boots off your feet when they are properly fastened.** If they can be pulled off or unfastened accidentally, don't buy them – they could come off in a crash.

Comfort and fit

- **Choose boots with oil-resistant, waterproof, non-slip soles.** Wet feet quickly become cold feet, which can then become numb – this is dangerous.
- **Ensure that you can walk normally, climb stairs, bend over and crouch in the boots.** Try bending down to pick up your keys.
- **Make sure you can get on and ride your motorcycle while wearing your boots.**
- **Check that you can operate the gear lever and brake properly.** Do the boots let you feel what you are doing?

HOW TO CHOOSE GLOVES



Choosing the right motorcycle gloves can be a difficult decision, but it is an important one. Gloves need to protect your hands and wrists without reducing your ability to operate the controls. Those that have been tested against the European standard will be marked CE with the number EN 13594, but these may be difficult to find.

If you don't find any CE-marked gloves, here are a few features to consider when choosing them.

Abrasion protection

- **Check that leather is at least 0.9 mm thick.** This is the minimum to provide sufficient abrasion protection. Under the European standard, gloves must provide a minimum of 2.5 seconds of abrasion resistance.
- **Look for webbing between the little finger and the ring finger.** This may prevent the little finger from being twisted under your weight as it is often the first point of contact with the road in a fall.
- **Choose gloves with multiple layers over the base of your palm, and impact protection for knuckles and wrists.** These are very vulnerable areas, so extra padding is important.

Coverage

- **Check that gloves cover the whole hand and wrist.** They should extend at least 5 centimetres above the wrist joint.

Fastening

- **Make sure the gloves are easy to put on and take off.**
- **Try to pull the gloves off when they are properly fastened.** If they can be pulled off, don't buy them – they could come off in a crash.
- **Check that fasteners are on the inside of the wrists, where they are less likely to be worn off or torn open in a crash.**

Construction and seams

- **Look for seams with multiple rows of stitching.** At least one row of stitching should be concealed and protected.
- **Avoid gloves with hard seams or sharp edges.** Studs, staples or buckles can penetrate the protective layer of the glove and injure your hands.

Comfort and fit

- **Make sure the gloves fit snugly.** They should be neither too tight nor too loose.
- **Make a fist while wearing the gloves.** Material should not bunch against your palm or fingers when your hand is curved around the handlebar. There should be just enough room for the material to pinch together at the end of each finger while gripping the handlebar.
- **Can you feel and operate your motorcycle controls – throttle, clutch, brake levers and switches?** Can you adjust your visor while wearing the gloves?

Colour fastness

- **Check for the international standards number ISO 11642.** This ensures that the dye will not run and stain your hand when the gloves get wet, which is, unfortunately, a common failing in motorcycle gloves.

HOW TO CHOOSE A HELMET



By law, when riding in Australia, you must wear a motorcycle helmet that complies with the standard AS/NZS 1698 and is securely fastened. Helmets that also comply with other standards are not necessarily better, as they are often heavier and stiffer than those made to a single standard and may not perform as well in a crash.

Don't spend your whole safety budget on an expensive helmet. A helmet that complies with a recognised standard, fits well and is securely fastened should provide as much protection as you can expect in a crash. Cost is not always an indicator of better crash protection; the additional value may be in comfort, features, appearance and the quality of the finish. Comfort and fit are very important.

The decision to wear a full-face or an open-face helmet is a personal choice, but it is important to consider all the issues. The following points will help you choose the right helmet for you.

Design

- **Most crash impacts are to the front or sides of a helmet, with some 16% to the chin area.** A full-face helmet is the preferred option for safety. It will provide more comprehensive protection to the face and chin in a crash than an open-face helmet. It will also protect your face from flying stones and insects, and keep you warmer and drier in bad weather.
- **Consider the weight of the helmet.** Some riders fear that a full-face helmet may increase the risk of fractures to the base of the skull. However, recent studies have found that this type of injury is more likely to be related to the weight of the helmet (greater than 1.5 kilograms) than its design.
- **Consider the materials used in the helmet.** Composite helmets that include advanced materials such as Kevlar and carbon fibre are generally lighter and may absorb impacts better than polycarbonate or 100% fibreglass helmets.
- **Consider a flip-front helmet.** You might find this to be a good compromise between the convenience of an open-face and the protection and comfort of a full-face helmet. However, keep in mind that the hinge will add weight and may compromise the impact strength of the chin bar.
- **Make sure you have a visor or goggles.** Whichever style you choose, it is essential to protect your eyes with a visor or motorcycle goggles that comply with the standard AS 1609 - 1981.

Fit

- **Check that the helmet covers your forehead and brow.** Looking up, you should just be able to see the edge of the helmet. The helmet shouldn't move around on your head or put pressure on your forehead. Keep it on for 5 or 10 minutes to check that it is comfortable – correct fit is the most important factor in choosing your helmet.
- **Get someone to grip the helmet at the back of your neck and try to pull it up and forward.** If it comes off or slips over your eyes, adjust the position, tighten the straps and try again. If it still moves or comes off, you need a different helmet.
- **If you choose an open-face helmet, it is even more important to ensure that it fits correctly.** Crash studies have found that open-face helmets are more likely to be pulled off in a crash.
- **Correct fit is more important than the brand.** Shell and lining shapes vary between brands just as head shapes vary between riders, so try a range of different brands until you find a helmet that fits the shape of your head. Whilst it's important to buy a good quality helmet, it is more important that it fits correctly.

Vision

- **Check your peripheral vision.** Is the eye-port wide enough?
- **Turn your head.** How far behind you can you see?
- **If you wear glasses or sunglasses, check they don't cause pressure points.** Can you take them off while still wearing the helmet?
- **Make sure that replacement visors carry the AS 1609 - 1981 label.** Those that don't may distort or affect your vision.
- **If you are wearing a tinted visor, always carry a clear visor with you.** Never use a darkened visor in low light or at night; always carry the clear one as well, just in case you are caught out.

Comfort

- **Consider a vented helmet.** A lot of your body heat is released from your head, which can become very uncomfortable, particularly in hot weather. Vented helmets can substantially reduce the discomfort of a hot and sweaty head.
- **Look for fog shields and chin vents.** These help prevent your visor from misting.
- **Choose a helmet with removable comfort padding.** Padding that can be washed or replaced will preserve the condition of your helmet and help it last longer.
- **To protect your hearing, use earplugs.** Helmet noise is affected by the way air flows around the helmet, vents and visor, and by how close the padding is to your ears. Product reviews and other riders will help you compare noise levels. Helmet design is not the only factor with noise. The style of bike and wind movement around features like fairings and windscreens can also affect noise levels.¹¹ A helmet that is quiet on one bike may be noisy on another. Earplugs can substantially reduce noise levels. Take care not to block all sound, though, because you need to be alert to what is happening around you.



Age and condition

- **Do not buy or wear an old or second-hand helmet.** Comfort padding disintegrates after about seven years, and researchers do not know for certain how long the protective capabilities of a helmet will last. If you are returning to riding after many years, buy a new helmet.
- **Once you have consigned a helmet to history, cut off the straps to prevent anyone else using it.**
- **Never use a helmet that has been in a crash.** You might not be able to see any damage, but once a helmet has been in a crash it loses much of its ability to protect you. You can never be sure whether someone else's helmet has been in a crash, which is another reason not to buy second-hand.
- **Don't give a pillion passenger a poorly fitting or damaged helmet.** Remember, if it moves around on their head, it won't provide adequate protection in a crash.
- **If you drop your helmet and have dented or cracked the outer shell, definitely get a new one.** Remember that it is the energy-absorbing inner lining that protects you. If the outer shell shows any damage, that is a very good indicator that the inner lining will also be damaged.

If it drops a short distance, such as off your motorcycle when stationary, there would be only a small chance of damaging the outer or inner shell. But no one can ever guarantee that a helmet has not sustained any damage in a drop. A series of little drops may weaken the helmet's protective capacity as much as one bigger fall. Use common sense. Imagine how you would feel if it was your head that was dropped. If the 'drop' would have damaged your head, then it could well have damaged your helmet.

Looking after your helmet

- When you put your helmet on the ground, rest it on your gloves.
- Use the helmet hooks under the seat – these are provided on most motorcycles. This will secure it from falling as well as from theft. Don't sit it on the mirror because this may dent and damage the energy-absorbing lining, and don't rest it on the motorcycle seat where it can fall off.
- Invest in a helmet bag made of protective material (e.g. wetsuit material).
- Keep your visor clean and scratch-free. Protect it from scratches by keeping it in a soft cloth bag. Replace it if it is scratched.
- Clean your helmet and visor with dishwashing liquid and water and rinse well. Use only your hands when cleaning your helmet as even soft brushes can scratch the visor.
- Never wipe your visor with anything when it is dry – you will scratch the surface.
- Painting or adding decoration to your helmet is not a good idea. The strength of the helmet shell can be weakened by the solvents in paints and in some glues (e.g. stickers).

Standards

In Europe, there are standards for motorcycle jackets, pants, gloves and boots which are based on tests of their performance under crash conditions. There are no comparable standards for protective clothing in Australia nor anywhere else in the world.

Gear that has been independently tested and conforms to the European standards is CE marked. It should display the letters 'CE' (Conformité Européenne) with the number of the standard and this symbol of a rider:



There are different European Standards for each type of motorcycle clothing. The numbers are:

- impact protectors for limbs: EN 1621-1
- impact protectors for the back: EN 1621-2
- jackets, pants or suits: EN 13595
- boots: EN 13634
- gloves: EN 13594.

In Australia, there are standards only for helmets and visors/goggles:

- AS/NZS 1698:2006: Protective helmets for vehicle users
- AS 1609 - 1981: Eye protection for motorcyclists and racing car drivers.

Currently there is little CE-marked motorcycle gear available anywhere in the world, although the number of products is increasing. While CE certification is currently the best indicator of injury protection this does not mean that that non-CE marked products are no good – you just have to know what to look for.

Product evaluations

Some European motorcycle magazines conduct regular product evaluations using the tests specified under the European standards. It is interesting to note that neither price nor brand name is a reliable indicator of performance. Some of the best known and expensive brands perform very poorly in these tests, while some cheaper products do very well. (For example, see the product tests undertaken by *RiDE* magazine: www.ride.co.uk)



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