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Leading quality made in Japan

There is no other form of transport that gives you a sense of speed and cornering like the motorcycle does. But this means the motorcycle rider must always prepare for unforeseeable situations. Protection is therefore essential, most importantly the helmet.

At Shoei highly specialized employees develop and produce helmets using latest technology. To a large part the manufacturing is done by a highly skilled workforce. Thanks to decades of experience, millions of passionate motorcycle riders place their trust in Shoei products.

Shoei belongs to the leading brands in helmet making. With its company headquarters in Japan and further locations in Europe and the US, Shoei reaches its customers in almost 40 countries around the globe.







Philosophy

Three core criteria –

A first class helmet

The main function of a helmet is to protect the head of the rider in the event of an accident. However, we specified a more comprehensive set of requirements for our Shoei helmets. Our product philosophy is based on 3 core criteria: safety achieved by impact protection, maximum degree of comfort in any situation, and passion for motorcycling. These core criteria have driven the development of all Shoei helmets since 1959.









SHOEL



The Shoei helmet shell

The helmet shell absorbs the impact energy in the event of an accident and spreads it over the largest possible area.

The shock-absorbing inner shell (EPS-Liner)

The energy that is passed on by the helmet shell is taken up by the shock-absorbing EPS-liner. The helmets inner shell consists of light polystyrene which in the event of an impact is compressed and absorbs the energy shock.

The comfortable inner padding

The inner padding consists of high-quality polyurethane foam of different densities. It is covered with padding materials for a perfect hold and a pleasant tactile feeling.

The chin strap

The chin strap holds the helmet firmly on the head, it is attached to the helmet shell by metal rivets.

The visor

The visor protects the rider against wind, dirt, insects, and UV radiation. It must guarantee clear vision without any optical distortion.

The high performance ventilation

The ventilation system directs air into the helmet and guides warm and damp air out. The perfect location and shape of the inlets, outlets, and channels is one of our most important innovations.

2.1 The Outer Shell

The helmet shell is always a balance between conflicting factors. It must be as light as possible to take the forces off the riders neck, and at the same time, it must prevent the head from fatal injuries in the event of a crash. It should be as small as possible to have good aerodynamics, but the space inside must be large enough to contain the shock absorbing EPS-liner.

In 50 years of experience we have built up a good understanding of the right balance between all these factors. Shoei
AIM helmet
shells —

Advanced Integrated Matrix'

A Shoei helmet outer shell is a 3D structure of multiple layers of fibreglass and organic fibres – our Advanced Integrated Matrix. The organic fibres reinforce the glass fibres and optimize the ratio of weight to characteristics.

The structure is held together by an unsaturated polyester resin, a so-called heat-setting plastic. This resin acquires the desired properties during its heat hardening process: elasticity, resilience, and extreme corrosion resistance.

These technologies put together produce a helmet outer shell that shows high strength at a very low weight.



6	Ply	/ AIM+	Specific	Weigh
1	-	Glas Fibres		2.6
2	-	Organic Fibres		1.3
3	-	3D Organic Fibres		1.3
4	-	High Performance	Fibres	0.9
5	-	Organic Fibres		1.3
6	-	Glass Fibres		2.6

Our technologies produce outer shells that provide ideal damping of impact, good elasticity, light weight, and enormously high strength.





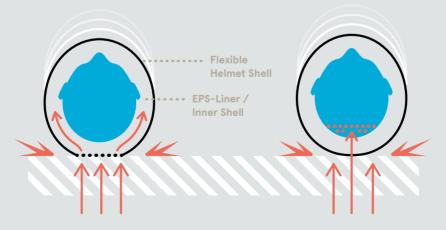
The advantage of our purpose-built AIM outer shell

The AIM outer shell has been designed to absorb the forces of an impact and spread them over the entire shell. The outer shell and the inner shell may show damage from deformation after an impact, but the head of the rider is given the maximum amount of protection.

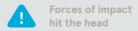
Heavy, hard helmet shells do not have this ability and direct the energy of an impact without any reduction to the inside of the helmet. The shell may be undamaged but the rider suffers from head injuries. This applies in particular to helmets that were designed to prevent penetration of sharp objects.

Shock absorbing AIM Shell.

Hard Shell.







Reduced weight.

Two factors are crucial for the weight of a helmet: the actual weight of the helmet the rider feels, and the dynamic weight, that is produced by wind resistance and inertia.

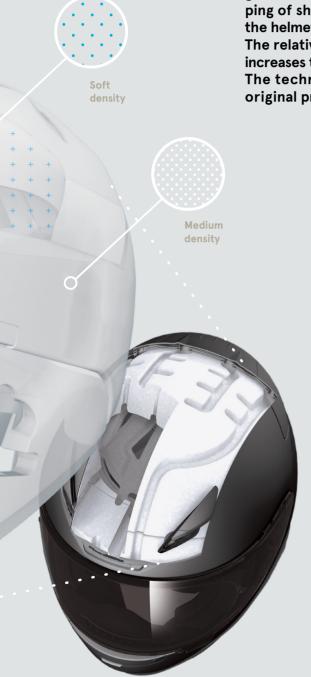
In the event of an accident, the actual weight is a direct factor of the acceleration forces and stresses, which act on the neck muscles.

The heaviest part of a helmet is the helmet shell. Since the shell is also the part of the helmet that gets most stressed in an impact, the requirements of a light helmet shell are complex. Through its extensive experience in the processing of fibre compound materials, Shoei has succeeded in developing the extremely resistant and light AIM and AIM+ helmet shells.

Due to the multi-layer construction, Shoei is able to route the air-channels of the ventilation system through the liner. This system manages to cool down the entire inner structure.

2.2 The Inner Shell





Each Shoei helmet that is offered for sale in Europe has a bespoke inner shell to fit the European head-shape. The combination of the various grades of expanded EPS provides an effective damping of shocks and impacts. The upper part of the helmet's inner shell is softer than the outer part. The relatively hard outer part of the inner shell increases the damping effect in the event of a crash. The technology has been patented and is an original property of Shoei.

★ We strongly recommend to change the helmet after an accident.

2.3 The In side

The material and shape of the inner padding plays a decisive role in both comfort and fit. In the past, the thicker and softer the padding was the more comfortable it felt, but soft padding compromised a snug fit and the helmet lost its ability to hold well, especially at high speeds when forces accumulate. So, comfort and fit often worked against each other.

Shoei rethought the structure and function of the inner padding and developed a new concept. The ESP-liner inside the helmet sits closer to the head allowing the padding to be thinner still.

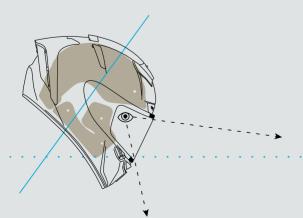
An intricate manufacturing process produces it from multiple layers of polyurethane foam in different hardnesses or from a three-dimensional cut out of a block. The result ensures optimum hold and high wearing comfort.

Optimised cover materials

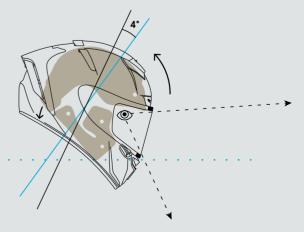
New high-performance fabrics allow the padding to take up sweat. Think "summer covering". This is used mainly in motocross and road racing sport where perspiration is intense.



Improved view by adjustable Interior



The interior position is adjustable by 4°. This enables the rider to adjust the exact position of the helmet and to choose the optimal visual field for every sitting posture on the bike. The result is a better view in sportive driving posture.

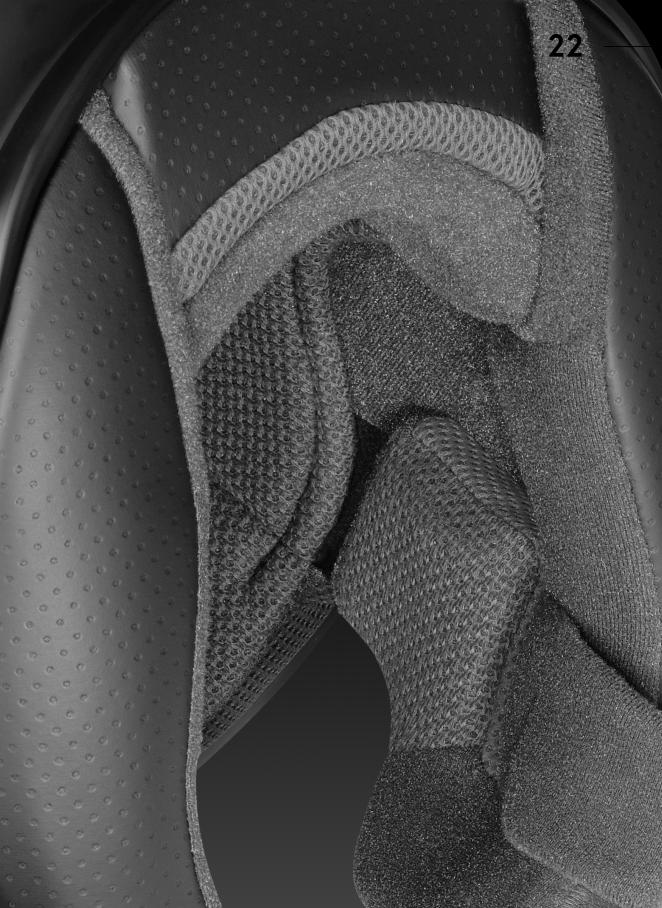






Modular padding

Shoei padding is modular. You can choose the right size of every individual part and combine them to fit perfectly.



2.4 The Locking Systems

Right now Shoei is offering two different locking mechanisms for the chinstrap.

The Double-D system is used on most of our "sporty" helmets. This system is obligatory for racing helmets. It has the highest strength in keeping the chinstrap closed in the event of an accident.

For our more comfort oriented customers, we provide many of our "touring" orientated helmets with our micro ratchet system. Unsatisfied with the micro ratchet systems on the market we developed our own system, where all locking parts are made entirely of Japanese stainless steel. So we can guarantee the best possible performance with a maximum of comfort.





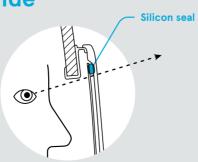
2.5 The Shoei Visor system

All Shoei visors are made of polycarbonate. Most of them are produced by the so-called injection moulding process. This guarantees clear and distortion-free vision. The visor protects against small stones and absorbs 99% of the UV radiation. Its coating prevents scratches and lets water roll off more easily.

All recent visors are provided with Shoei's own Q.R.B.P. system which allows the visor to be changed quickly and easily without any tools. The smooth surface of a Shoei visor comes without an external visor cover and prevents wind noise.

Extended vision, safer ride

To achieve an uncompromised vision in all driving positions the silicon seal of the Pinlock® lens is moved outside the visual field. Now the rider has a clear view up to the edge of the visor.





Our visors are equipped with the <u>Pinlock</u>® mist retardant system that ensures a clear shield under most weather conditions. The double-shield technology has an insulating effect and prevents fogging of the visor to a very high extend.

Although, the Pinlock® system is the most advanced mist retardant system on the market, there are weather conditions where the system is stressed beyond its limits. In this case it is important to open the ventilation to let air flow into the helmet.





Transitions® adaptive visor technology seamlessly adapts the shading of the visor to the amount of light falling in.

When a Transitions® visor is exposed to UV light, trillions of photochromatic molecules change their structure. This reaction tints the visor. The molecules continuously calibrate, allowing the optimal amount of light to pass through to the eye at any given moment. Our visor blocks 100% of UV light, it is shockproof and it meets all international standards.



Shoei Touring helmets are equipped with an integrated QSV-1 sun visor that is scratch-proof, prevents fogging, and is even DIN EN 1836 approved.

This norm ensures that the rider can discern traffic lights under any lighting condition. It is not a customary standard but a Shoei specific feature to enhance safety.

Most Shoei helmets feature a spring loaded visor mechanism. The visor does not just rotate around one axis, but moves in an ellipse to guarantee the best contact between the visor and the beading of the helmet.

This prevents the intrusion of rainwater and wind.

The spring loaded visor mechanism



Develop—ment

3.1 The Blueprint



All Shoei helmets are developed based on our three core criteria: safety, comfort, and passion. A fourth criterion is of course looks. Our product development team always incorporates customer requests and new market trends into their designs. Although safety and functionality is key, the aspect of design is never neglected. Motorcycle riders worldwide know and appreciate this combination of perfect functionality and unique design.

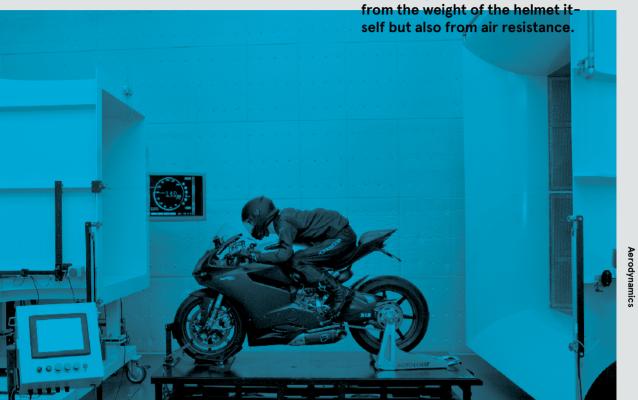
More than 20 years ago Shoei was the first manufacturer to recognize the importance of aerodynamics around a helmet.

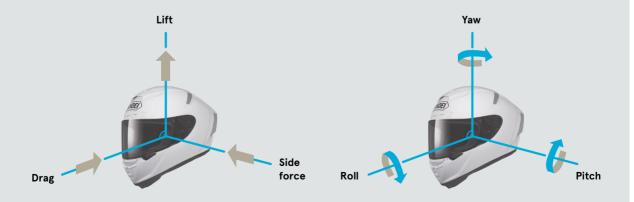
3.2 Aerodynamics

Today, Shoei has its own wind tunnel capable of testing wind speeds of up to 240 km/h on a complete bike. The wind tunnel has become an indispensable part of our product development. The effects of air resistance and the various forces on the helmet during riding can be exactly measured in a controlled environment.



Improving the aerodynamics is an important factor in preventing fatigue. The stress applied to the neck muscles when riding a motorcycle comes not only







Controlled airflow — stable ride

With special test heads it is also possible to measure the volume of air passing the ventilation system, or the noise inside the helmet. Both are very important factors to evaluate the performance of a helmet.

Thanks to our robotic helpers, it is possible to repeat a test for a particular movement in literally thousands of test-cycles.

Noise reduction

There are two ways to reduce noise in the helmet: by optimising aerodynamics and by suitable design of the helmet shell and the padding. Reducing the noise at the expense of safety and comfort is not an option for Shoei.

Highly sophisticated aerodynamic system

- (1A) Integrated spoiler (1B) Vortex generators (1C) Lower Air Spoiler Reduction of drag and lift
- Exchangeable rear flaps
 Two sizes of flaps available
 Reduced shaking





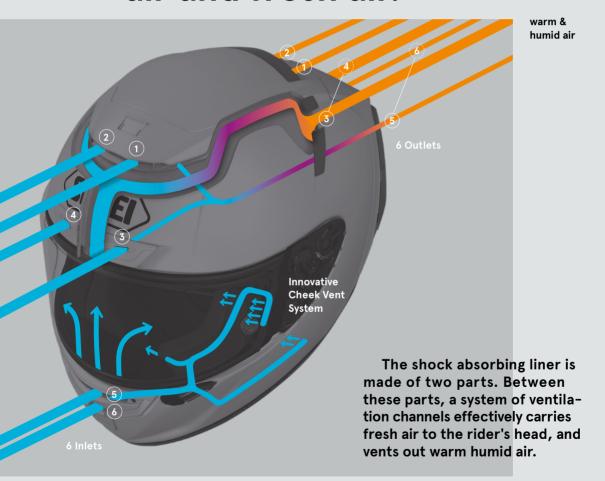
Back in the early 1980s
Shoei developed a ventilation system that funnels
air through holes in the shell
without affecting the
stability of the outer shell.
Air flow is a complex problem. Our wind tunnel
allows us to carry out extensive studies for effective
and high-performance
ventilation systems.



3.3 High Performance Ventilation

fresh air

Shoei has developed a dual EPS liner (inner shell) whose <u>air system</u> provides optimum exchange of used air and fresh air.



Most of our models come with LoPAM (Low Pressure Air Management System). The position of the rear outlets create a negative pressure area by using the wind stream. Warm air from the rider's head is actively drawn out of the helmet.

3.4 Riding Test



Our Shoei test team is passionately testing against all riding conditions around the world.

Having passed the laboratory testing, the last and final approval of a new helmet is done with extensive riding tests out on the roads and on the track.

For our racing helmets, we rely on the experience and knowledge of our sponsored riders in the top international racing series. Racing is a tremendous source of information we can loop back to our development and pass on to our customers.



Production

4

Shoei R&D invests a great amount of effort, of care, and of passion in developing a new helmet. Once the prototyping of a helmet is complete Shoei makes sure that the mass-produced helmet meets the exact specs of the prototype.



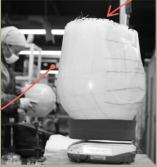




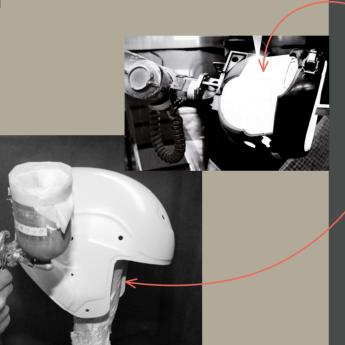




4.1 Production Steps







Production of the helmet shell

Shoei exclusively uses fibre-reinforced plastics that offer the best properties for the production of a helmet shell. Each helmet shell is marked personally by the employee who is responsible for it.

Laser cutting

Here the helmet is given its final shape. All the protrusions that are created during manufacturing are cut off. The openings for the visor and ventilation are burnt into the helmet shell with a laser. Finally the helmet's correct material thickness and weight are verified.

Painting

Even though many production steps have avoid hand work in some areas. Shoei combines hand work and automation in the production to ensure maximum quality. For further details, please see next page.

Final assembly

The ventilation sliders, visor seals, inner shell, and padding are assembled with great care. The helmet only ships after a detailed final inspection. Strict compliance with the production process definitions and tight quality control guarantee the high quality levels of Shoei.

Painting

The priming

After the helmet is given its priming, it is sanded, polished, and quality checked by hand to get a flawless surface, before it moves on to the next painting step. Working on the various helmet shells with their individual details requires a high degree of experience.

The quality of a paintwork depends on the quality of its individual layers. It is almost impossible to apply a high-quality coat of paint by machines even with the very latest polyurethane paints. For that reason only specially qualified employees do this work. This production step is again completed with a close inspection for drips, inclusions and unevenness.

Applying the design

Extremely detailed, and elaborate graphics, make the spectacular brand image of a Shoei helmet. In an intricate work step the designs are applied by the hands of specially trained staff.

4 Protective varnish

Next up, a clear varnish is applied onto the shell to protect the decoration and to give the helmet its beautiful brilliance.

5 The final inspection

Before the helmet is passed on to final assembly, the finished paintwork of the helmet must pass a final and meticulous inspection. Perfection, even in areas that are hardly recognizable with the naked eye.

4.2 Manufactured Perfection





Hand work is an irreplaceable part of Shoei helmet production. The painting process is a great example.







5.3 Quality Control





Each helmet that ships from our factories in Ibaraki and Iwate has passed <u>extensive</u> <u>quality control</u>



- during production

At Shoei rigoros quality controls are an integral part in all phases of production, from manufacturing the outer shell up to final assembly. In addition to that, to ensure perfect safety of our products, we regularly take samples from normal production and test them at our test facilities. Every year more than 3,000 helmets are thus being extracted from the production output, tested, and destroyed.

- during product development

Country-specific safety standards play a major role during the development of a helmet. The helmet shell and the shock-absorbing inner shell are continuously tested for hardness and elasticity and modified as required. The resulting helmet meets the strict standards imposed and still incorporates the advantages of the original design.

5.1 The Shoei Safety Con cept

Basic safety properties ensure protection in the event of an impact. In an outstanding helmet the safety concept doesn't stop there. A Shoei helmet also provides the comfort necessary for a safe ride. It reliefs the load on the riders neck so that the rider can concentrate more easily — this property is an important part of the Shoei safety concept.

At Shoei we make it our top priority to comply with the various standards worldwide for passive safety. Our strict quality controls ensure that this applies in every single Shoei helmet. But our products have also made a number of contributions to active safety: aerodynamics, the comfortable padding, and the efficient ventilation of our helmets all help the rider to concentrate on the one important thing: driving safely.

The performance of a helmet with regard to passive safety is measured against various international safety standards. Thanks to our many years standing know-how and our commitment to quality assurance, the performance properties of all Shoei helmets clearly exceed the requirements of these standards.

— Active Safety

Active safety signifies all properties of a helmet that help the rider avoid accidents: improved inner padding for optimum seating of the helmet, the lowest possible weight to reduce stress on the neck muscles, an effective ventilation system for temperature regulation and a reduction of wind noises primarily serve the safety of the rider. Active safety drives the progress in Shoei comfort technology.



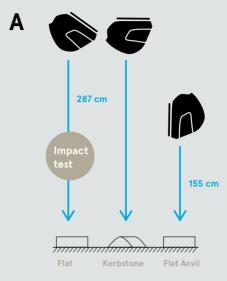
Around the globe, a whole array of safety standards exist today, which differ markedly from one another in their specific requirements and test scenarios. The ECE R22/05 directive applies in all the countries of the ECE (Economic Commission for Europe) and further countries following this standard.

The ECE R22/05 standard tests impact damping, chin strap, rolloff behavior, structure, and resistance of a helmet among other things. The impact damping test comprises two criteria. The permissible value of the maximum acceleration measured in g (Peak G) and the HIC (Head Injury Criterion), or risk of injury to the riders head. The HIC represents the total amount of energy that acts on the head and is calculated from the impact speed and the length of time that the force acts. The maximum permitted values of 275 g and a HIC of 2400 are handled very strictly in ECE countries. The rigoros quality controls at Shoei ensure that Shoei helmets meet these standards without exception.

5.2 ECE R22/05

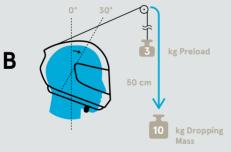
Shoei Guide Safety Testing & Homologa tion





The Test Methods

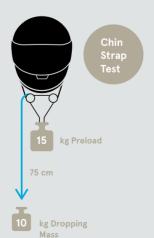




Peak G and HIC



C



A The impact resistance test

- 1. The helmet is placed on a dummy head that is equipped with the corresponding sensors and then drops onto a steel block from a height of 287 cm with an impact speed of approx. 27 km/h. The steel block simulates both the flat road surface and the kerbstone. Four points on the helmet are each tested once in this way.
- 2. Integral helmets go through additional chin protection tests. The helmet falls from a height of 155 cm onto a flat steel block.
- The impact speed and impact duration are measured by sensors in the dummy head.
 The analysis is fully computerized.
- The results of the analysis are converted to indices and shown graphically for evaluation.

The approval criteria of directive ECE R22/05

- 1. The acceleration of the dummy head may not be more than 275 g.
- 2. The HIC value may not exceed 2,400.

B The roll-off test

- The helmet is placed on a dummy head and the chin strap is done up. A frame to position and drop a static 3 kg weight is attached at the middle level to the back of the helmet.
- 2. A further dynamic weight of 10 kg then drops from a height of 50 cm.

Approval criterion

The helmet may not incline forwards by more than 30°.

C The chin strap test

- 1. A weight of 15 kg is suspended from the closed chin strap.
- The dynamic test is done by releasing 10 kg of these 15 kg causing the chin strap to recoil.

Approval criteria

- 1. The dynamic stress may not stretch the chin strap by more than 35 mm.
- 2. The static stress of 15 kg may not stretch the chin strap by more than 25 mm.

Handling

Helmets are subjected to an ageing process. The way that a helmet is maintained has a share in how long it lasts. Helmets can lose their ability to provide safety after a crash or due to ageing and then they need to be replaced.

Choosing

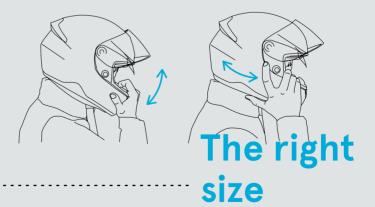
the right
Different helmets specialise in he mifferent use cases. Full face helmets offer the greatest level of safety and are ideally suited for sports-type riding and road racing sport. Off-road helmets, as the name implies, have advantages when used off road. Each helmet should be selected with regard to the type of riding it will be used for.

Using both hands, the helmet is pulled apart at the chin strap and put on over the head with a rolling motion from front to back. The helmet is removed following same principle in reverse fashion.

Each model of helmet has small differences in its shape that affects the fit. For that reason it is essential to test the helmet fore buying.

Put on the helmet and move your head to the left and the right and up and down while holding the helmet firmly with both hands. If your head can move too freely within the helmet, we recommend that you try a smaller size. If you feel local pressure points, then choose a helmet that is one size larger or else adapt the helmet by pulling in the inner padding.





Cleaning

All Shoei helmets are made of compound fibre materials. Therefore use plastic cleaner or wax to clean the helmet shell—but not on the ventilation slider and other plastic parts. Do not use polishes on helmets with matt finish paintwork.

All plastic parts (such as the visor, ventilation, etc.) are very sensitive to solvents. We recommend using only the mildest possible cleaning agents. The visor and any other removable parts should be removed for cleaning. If the visor is equipped with a Pinlock system, this can also be cleaned with neutral soapy water. The visor and the Pinlock shield must be absolutely dry before the Pinlock system is reassembled.

Washing the inner padding

All the parts of the removable inner padding should be washed by hand or in a washing machine inside a washing bag at 30°. Antibacterial detergents have proven useful in removing smells. The inner shell can likewise be wiped down with a mild cleaner. Make sure that everything is absolutely dry before putting the padding back in.

When should a helmet be replaced?

The life of a helmet depends on how it is used. A helmet should be replaced if one or more of the following points apply:

- 1. There was a fall that resulted in an impact on the helmet.
- 2. The helmet is worn as a result of very frequent use and has become wider.
- 3. The inner shell has come away from the helmet shell.
- The styrofoam (expanded polystyrene) inner shell shows signs of wear and is beginning to break up.

Mair han

Service

If required, Shoei will replace the inner padding, ventilation slider and inner shells as long as the helmet has not been subjected to an impact.

Heritage



History

The history of Shoei begins in Tokyo in 1959. From the start Shoei took on the challenge to always be the leader in safety, function, and innovation worldwide. Its introduction of cutting edge technologies and its continuous improvement of safety has earned Shoei the status of a recognised premium manufacturer. Shoei enjoys extremely high regard among motorcycle riders all around the world.

1959	Founding of the Shoei Kako Co., Ltd. Start of production of multi-purpose safety helmets in Tokyo.	Time
1960	Start of production of Shoei motorcycle helmets.	
1962	Shoei helmets are awarded with the JIS (Japanese Industrial Standard) certification.	line
1963	Introduction of the SR-1, the first racing helmet from Shoei.	
1967	Start of production of the Shoei SR-Z, the first full face helmet.	SR-1
1968	Founding of Shoei Safety Helmet Corporation in California, USA.	
1976	Introduction of the world's first carbon fibre helmet, the Shoei GR-Z.	
1978	Founding of Shoei Europe in Belgium.	
1983	Appearance of the Shoei Z-100 with innovative developments like injection moulded visor and built-in chin spoiler.	Z-100
1984	For the first time in the history of motorcycle helmets, ventilation is implemented into a helmet with the Shoei RF-102V and the TJ-201V.	
1987	Wayne Gardner wins the 500cc class title with Shoei.	
1988	Eddie Lawson wins the 500cc world championship with Shoei.	*
1990	Shoei introduces its X-8, the first helmet with internal visor mechanism. No covers are needed.	
1991	Introduction of the VF-X off-road helmet.	
1992	Wayne Rainey wins the 500cc world championship for the 3rd time in a row with Shoei. Shoei riders have won all 500cc world cham-	×-H>

pionships since 1987.

nary two-part EPS liner.

Shoei introduces the X-8SP with a revolutio-

1993







1994	Founding of Shoei Europe in Düsseldorf.
1999	Alex Criville wins the 500cc world champion- ship with Shoei.
2001	Founding of Shoei Distribution in Germany.
2003	Introduction of the Shoei XR-1000 helmet.
2006	The Shoei Multitec marks a new era in flipuphelmets.
2009	Introduction of the Shoei VFX-W, an icon in motocross helmets.
2011	Founding of Shoei Italia in Milano.
2011	The new Shoei wind tunnel is opened in Ibaraki, Japan.

2011 The Shoei Noetec takes the flip-up market by storm.2012 Introduction of the Shoei GT-Air. The most

advanced touring helmet.

2013 Marc Marquez wins the MotoGP champion-

Marc Marquez wins the MotoGP championship with Shoei.

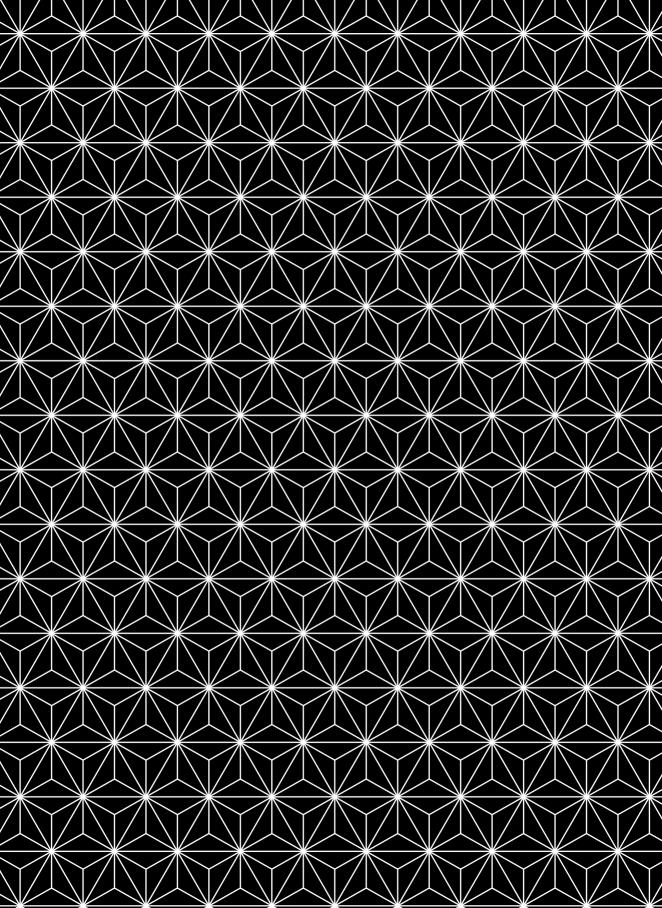
2013 Shoei introduces the NXR. The street helmet for passionate motorcycle riders.

2014 Marc Marquez again wins the MotoGP championship with his trusty Shoei helmet.

Shoei introduces the X-Spirit 3, the most advanced racing helmet, and the J·O, the most beautiful open face helmet.

2016 Marc Marquez again wins the MotoGP championship with his trusty Shoei helmet.

2017 Introduction of the RYD.



Photos: Klaus Dyba, Nico Schneider, David Marvier, Christoph Leib, Illadam 36111/Daiquiri/Shutterstock.com, SHOEI

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