



Risk Management Seminar – Helmets

Dr Peter Whitehead

Background

- The FEI Medical Committee was asked to review helmet use and International Standards by the FEI Board to produce a definition for “Protective Headgear” in General Regulations
- The Eventing Department also asked for a review of standards as defined in Eventing Rules 538.1.1

Safe Protective Headgear at FEI Events

- “Protective Headgear” now defined in the GRs as:
“Appropriate helmet or Headgear that is in compliance with the applicable international testing standards (please refer to the list of the applicable international testing standards published on the FEI website)”.
- This will ensure that athletes only use quality products to protect their heads

Applicable International Testing Standards

Published on FEI website

Result of meetings with manufacturers and members of standards committees

Constantly under review



**List of the applicable international testing standards for
Protective Headgear**

This document is subject to regular reviews. Last update: 26 July 2019

"Protective headgear" as defined in the FEI General Regulations must comply with at least one of the international testing standards listed below. In addition, the product must have passed quality testing (quality testing monitors the ongoing quality of the product according to the original standard).

Products complying with the above are marked and labelled accordingly.

• **Accepted international testing standards:**

- British standard PAS 015 (1998 and any subsequent updates).
- Protective headgear carrying a CE mark, **including** products referencing the VG1 performance specification but **excluding** products referring exclusively to the EN1384:2012 unless it is shown in conjunction with another accepted standard from the present list.
- Australian standard AS/NZ 3838 (2006 and any subsequent updates).
- Australian standard ARB HS 2012.
- American ASTM F1163: 2004a and any subsequent updates.
- American Snell E2001 and E20016 (Please note: Snell combines a standard with subsequent quality testing, therefore no additional quality testing mark is required).

• **Quality testing labels include, but are not limited to:**



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ASTM INTERNATIONAL

Important:

- Although protective headgear can help to keep a rider/driver as safe as possible, no headgear can prevent serious injury under certain circumstances.
- Perfect fit and the correct adjustment of the retention harness are essential to the performance of protective headgear. Please always try on the product and ideally have it fitted by someone that is qualified to do so. Avoid buying online, even if you bought the same model before, as individual differences may exist.

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General Regulations from January 2021

Article 140 - Protection of Athletes and Participating Support Personnel

1. While riding anywhere on the show grounds, and for Driving Athletes and Grooms in the Marathon phase, on the show grounds the use of a properly fastened Protective Headgear ~~will is be~~ mandatory. ~~In the Competition arena venue and adjacent warm up areas, as well as riding from one to the other and from the stables for the purposes of competing, the Protective Headgear requirements are governed by the applicable Sport Rules. The applicable Sports Rules may provide for an exception to this rule by permitting Athletes to remove their Protective Headgear while accepting prizes, during the playing of the National Anthem and any other ceremonial protocol.~~ Failure to wear such Protective Headgear where and when required ~~(either as per the requirement(s) of these General Regulations or as per the requirement(s) of the relevant Sport Rules) after being notified to do so by an Official,~~ shall result in a Yellow Warning Card, being issued to the Athlete or Participating Support Personnel (as applicable) unless exceptional circumstances apply. The use of cameras on Athletes or Participating Support Personnel (as applicable) or equipment (such as on Protective Headgear, head covering or carriage) shall not be permitted, unless otherwise specifically agreed by the FEI. An Athlete's decision to wear a camera while competing shall always be voluntary and at their own risk.

Current Eventing Rules – 538.1.1 Protective Headgear

- While riding on the show grounds, the use of a properly fastened Protective Headgear will be mandatory. Protective headgear must comply with any of the European (EN), British (PAS), North American (ASTM), Australian/New Zealand tested standards applicable at the time of the competition.
- Failure to wear such Protective Headgear where and when required after being notified to do so by an Official, shall result in a Yellow Warning Card, being issued to the Athlete unless exceptional circumstances apply.
- As an exception, Senior Athletes may be allowed to remove their Headgear while accepting prizes or during the national anthem. It is recommended that Athletes not remove their Headgear during the lap of honour.



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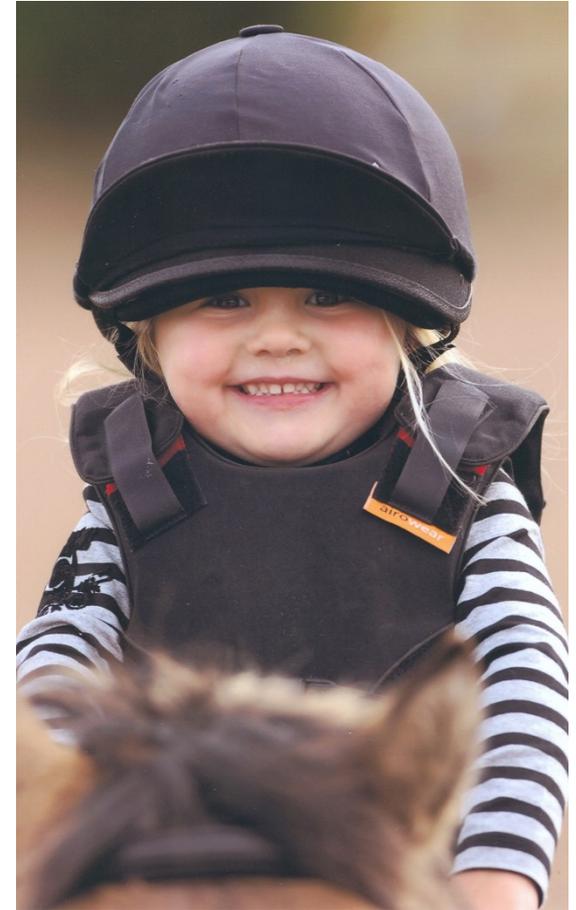
International Hat Standards

**Claire Williams
British Equestrian Trade
Association**

FEI Eventing Risk Management Seminar



- What is a Standard
- Current standards and their differences
- Standard making process
- Progress of EN1384



What is a Standard?



- Document that sets out performance requirements to defined tests with consistent methodology
- Each standard represents a different type of accident.
- Therefore, a helmet with multiple standards will protect in a wider range of situations



• Current Standards & Specs



- EN1384:2017
- PAS 015 98/2011 - UK
- VG1 (2014) - EU
- ASTM F1163 2004a/2015 - USA
- Snell 2001 & 2016 - USA
- AS/NZ 3838 (03 & 06) - Australasia
- UTAC/CRITT (2015) - France



WHAT'S THE DIFFERENCE?



Standard Name	Country of Origin	Flat anvil drop height mm <i>Note ii</i>	V anvil drop height mm <i>Note i</i>	Lateral Rigidity	Strength retention system	Penetration	Effectiveness Of retention system Roll off Test	Stability	Impact Max g allowed <i>Note iii</i>	Temp °C	Presumption of conformity for CE Marking
EN1384:2012	EU	1500 velocity stated 5.94m/s	none	No	10kg x 250mm Dynamic	500 mm drop, 3 sites	10kg x 175mm	none	250g – uncertainty	-20 +50	No longer
AS/NZ 3838 2006	Australia and New Zealand	1500mm	1300mm	No	725N (74kg)for 150 seconds static	None	10kg x 175mm	50N Approx 5kg	300g	?	No
ASTM F1163 2013	USA	1800 velocity stated	1300 velocity stated	No	4kg x 600mm Dynamic	None	4kg x 600mm	None	300g	-20	No other tests.
PAS015:2011	UK	1800 velocity stated	1300 velocity stated	800N	10kg x 300mm Dynamic	750mm x 3 sites	5kg x 500mm	5kg	250max 225ave flat	-20 +50	Yes
VG1	EU	1800 velocity stated	None	630N	10kg x 250mm Dynamic	500 mm drop, 3 sites	5kg x 175mm	5kg	250g	-20 +50	Yes
Snell	USA/Canada	2000	Horse shoe 1400	1000N	38kg dropped onto 23kg anvil x 70mm Dynamic	1000mm	4kg x 600mm	None	300g	-20 +50	No needs other tests.
EN1384:2017	Europe	1800 5.94+0.15/-0)m/s	None	630N	250mm x 10kg Dynamic	500mm, 4 sites	10kg x 175mm	None	250g, 2 not 3 impacts over more helmets	-20 +50	Yes
CE++ (UTAC Critt	France	1600 5.6m/s	none	430N	10kg x 250mm	600mm, 3 sites	10kg x 175mm	None	250g	-20 +50	In France??

WHAT'S THE DIFFERENCE?



Standard Name	Flat anvil drop height mm	Mechanical Strength	Pull off Test Strength retention system	Penetration	Effectiveness Of retention system	Impact Max g allowed Note iii	Temp	V Anvil
PAS 015 2011	1800 velocity stated	800N	10kg x 250mm	750 mm drop, 3 sites	800mm	250g –	-20	Yes
VG1	1800 velocity stated	630N	10kg x 175mm	500 mm drop, 3 sites	5kg	250g	-20	No
EN1384 2017	1800 5.94+0.15/-0)m/s	630N	250mm x 10kg	500mm, 4 sites	240 mm drop	250g, 2 not 3 impacts over more helmets	-20	No

Standard Making Process



- Commercial test houses vs National Standards
- CEN/CENELEC
- Technical Committees
- Working Groups
- CEN Consultants
- Voting and Commission approval
- Harmonisation



European Standard



- EN1384:2017
- Voted on throughout EU
- Positive vote
- Published 2017
- Commission rejected
- Revision and revoting



IN SUMMARY



- Range of hat standards all reflecting slightly different sets of tests and requirements
- FEI now specify need for quality marks adding another level of safety
- European standard stalled
- Regardless of standard if not fitted correctly and replaced after a fall a hat cannot do the job it is expected to do.





**FEI Eventing Risk Management (NSO)
Seminar and Forum**

24th January 2020

Our mission

As CEO of Kep Italia, an Italian company located in Northern Italy, I have to say that our brand is a firm believer of the Made in Italy label as we can have 100% of the control of the raw materials and all the components of the helmets and that we are fully concentrated on the value of safety.

Safety, comfort, lightness and technical performances have always been our main objectives because we think that every Company that works with Safety products needs to look at these aspects for getting a product safe and wearable by everyone in any moment of its equestrian activity to avoid certain kind of injuries.

Research and development must be two major objectives of the manufacturers to improve safety, continuously studying new materials and cutting edge work processes, fully sharing the philosophy of creating superior quality helmets earning the customers' trust and loyalty to become partners in the choice of protective equipment for horse riding.

The materials



Internal Polystyrene and outside shell

Today most of the helmets are composed by an internal part made in **Polystyrene** and an outside shell that can be either in **ABS, Polycarbonate, Carbon fiber, Glass fiber** or other.

All these materials have different reactions when facing Certification tests.

A helmet must pass the test required by the Standard Authority in order to enter the market.

Actually, there is no awareness about safety test results, because they are not published.

That's why the final consumer can't compare different products to choose the safest one.

Safety features

When a new helmet has to comply the different Safety Standards, a manufacturer has to consider different things:

- The requested cover of the head
- The different points of the attachment of the chinstrap
- The visor that needs to be flexible
- The retention system and the right use of the chinstrap that has to respect many details in order to be really safe.

Once checked the rules imposed by the standard, the manufacturer starts to design the helmet following its creativity to get it complying the Standards but also stylish.

This is a very challenging process, requiring a lot of investments, time, changing of directions and reviews.



5 different points of the attachment of the chinstrap



Flexible visor

Safety and comfort

KAP[®]
ITALIA



MORE SAFETY LESS WEIGHT

A[®]
LIGHT

It is important to guarantee to the rider the safest helmet combined with comfort and lightness.

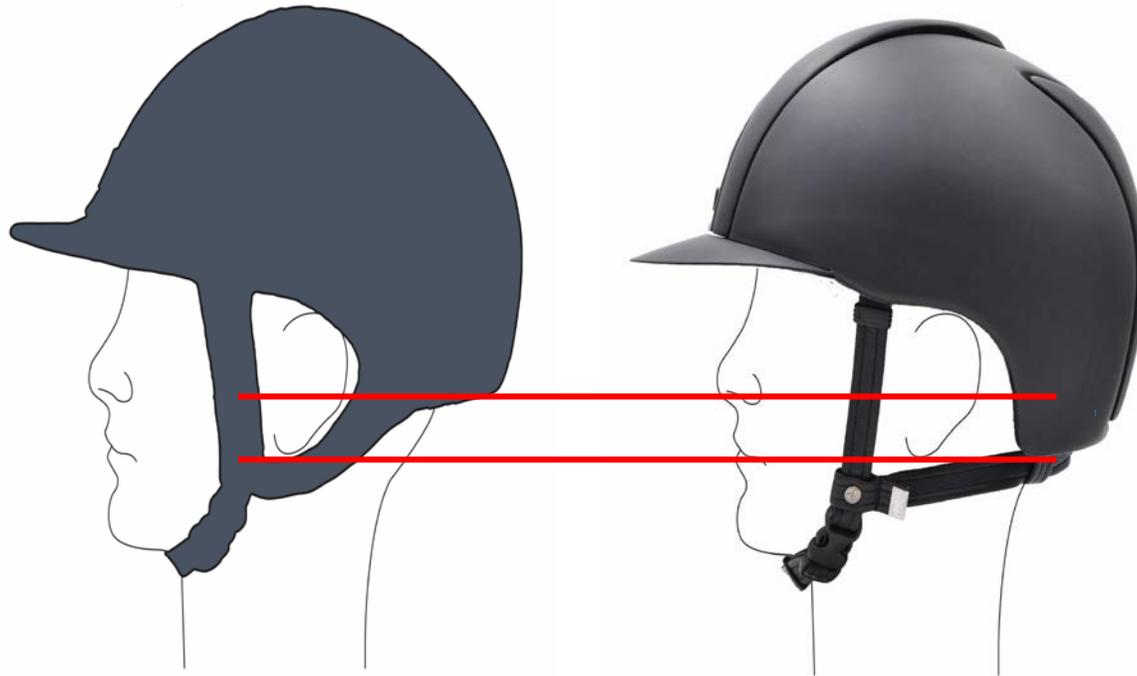
The user can wear the helmet most easily and keep it all the time during its activity with the horse, even if it is not riding.

Accidents could happen in different situation where the rider is close to the horse that's why it's important to always wear the helmet.

Imagine to wear an uncomfortable and heavy helmet, the first thing you do, is to remove it once you finish riding.

For this reason, we are focused on all these aspects in order to get people used to wear the helmet in any moment: before, during and after riding.

Safety and comfort



Another relevant issue is to increase head protection through the cover, helping people to avoid additional injuries in case of a fall. This is the reason why we extended the rear part of the helmet to protect the nape of the neck. This means that more of the neck is protected and less vulnerable to knocks and fractures of first vertebrae.

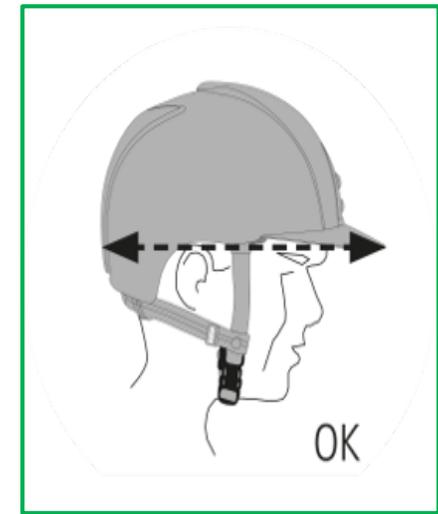
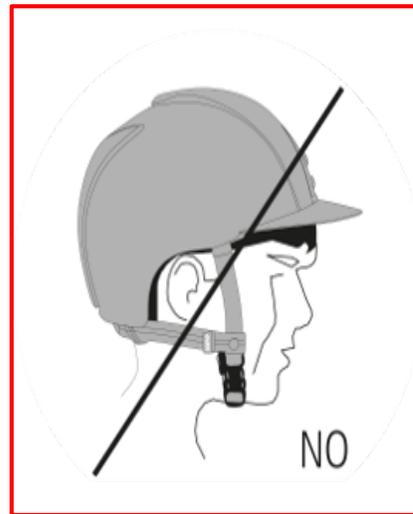
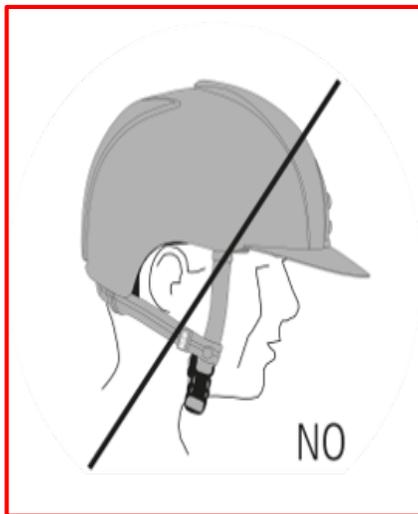
How to wear the helmet

It's very important to wear the helmet in the right way.

When fitted correctly it should not be possible to rotate or displace the helmet to reduce the level of protection and/or field of vision.

Unfortunately, there are still many riders who wear the helmet incorrectly (e.g. the chinstrap is not fastened enough, the size is either too large or too narrow, etc.) with higher damage risk in the event of an accident (e.g. the helmet can move during the fall leaving part of head uncovered).

KEP Italia is engaged in communication and information campaign to aware riders to wear the helmet correctly from their first ride.



Carbon fiber



It is important to invest more in searching performative materials that could be more expensive but safer, because their consistency is higher during the impacts.

For example, the **carbon fiber** is something that can really be more resistant, only if worked in the right way.

Actually, the use of handmade carbon molded in autoclave is something providing high performance in terms of protection, precision, quality and surface finish.



Autoclave technique involves layering sheets of a composite in to an inflatable bladder that is the male portion of a male-female mold. The composite sheets may be "prepreg" sheets having an impregnated resin or they may be composite sheets that become treated with a resin in a wet lay-up on the inflatable bladder. The inflatable bladder with the composite sheets is placed into a female mold, and the mold is closed forming a seal. Heat is introduced into the mold to activate the resin, and the bladder is inflated with sufficient pressure to force the composite sheet material into the shape of the mold, which corresponds to the shape of the outer shell.

In view of the foregoing, there is a substantial need for improved helmets that are stronger and safer, lighter, cooler and more comfortable to use and KEP Italia is always developing and researching new materials and composites to reach this goal taking always into account the safety aspect.

Removable visor

Talking about Eventing, we have worked on the possibility to have the detachable visor made in special material, always flexible but that allows the final consumer to remove it during the cross-country competition and to replace it on the same helmet during the jumping and dressage use.



Conclusion

That brings us to the end of the presentation.

I'd like to summarize by saying that it is not easy for a manufacturer to develop a safety helmet taking into account all the standards requested by the various countries in horse riding activities. The investment is really important for a self-respecting manufacturer.

KEP ITALIA appreciates the efforts FEI is doing for Safety in equestrian sports and its aim to reduce dangerous riding.

I'd like to thank you for your time and attention today and sincerely appreciate that I've had this opportunity to present to you.



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