



WCF Equipment Regulations

Effective Date:
6th February 2012
Version: 6.1

1. Introduction

The World Croquet Federation Equipment Specification and Approval system is based, by joint agreement, upon the testing system endorsed and operated by The Croquet Association (England).

The equipment tests are carried out at The Croquet Association Laboratory in England, under the directorship of the WCF Equipment Officer (see Appendix 1).

These Regulations apply to all WCF Licensed events but not necessarily to those that have just been Sanctioned.

This document is intended to help hosts determine the appropriate equipment for a WCF event, and to guide equipment manufacturers and suppliers.

Currently Approved Balls and Hoops are listed in Appendix 2. Note that current WCF Sports Regulations require WCF events to use only Approved balls, whereas any hoops that meet the specifications in Section 10 are permitted.

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2. Seeking Approval

It is WCF policy to encourage the development of consistent, high quality croquet equipment for championship play.

All manufacturers of croquet balls and hoops seeking Approval for their equipment are encouraged to make early contact with the WCF Equipment Officer (see Appendix 1) to discuss the testing process and the specifications required. WCF wishes to be as helpful as reasonably possible in any application for Approval of equipment.

3. Costs

Balls: Manufacturers who wish to obtain or renew Championship Approval for balls are required to submit a set (non-returnable) to the Equipment Laboratory at the address given in Appendix 1, accompanied by a fee of £50 GBP (payable to The Croquet Association). In the event of the balls failing to meet the required specification, £20 GBP will be returned. Balls that meet the specification will be awarded Championship Approval valid for a period of three years. Test Reports will be sent promptly to the Manufacturer and those for Approved balls will be forwarded to the WCF.

Note that each colour set of balls is Approved separately – in the past, some colours have been found to perform differently, hence this requirement.

Hoops: No charge is made for the tests but a single example must be provided to the Equipment Laboratory - transportation costs borne by the submitter. Any Approved hoop will be retained. In addition, a set of six hoops must also be provided at a mutually-agreed location for the duration of the Field Test; once this Field Test is complete, the submitter may recover them.

Note: These fees are subject to change without prior warning.

4. Duration of Approval

The Approval period applies to the manufacture and supply of new hoops and balls – a set of hoops or balls purchased when Approval is valid, will remain “Approved” for their life unless:

- the required specification is changed, or
- the equipment deteriorates and becomes out of specification.

It is not required that equipment is replaced should the maker’s Approval lapse, nor are individual sets of balls required to be re-tested during their lifetime.



BALLS

5. Guidance on seeking Ball Approval

Experience of the efforts of ball manufacturers to date leads WCF to caution those seeking Approval about the difficulty and length of time required to develop a ball of the appropriate standard. WCF suggests that the effort may not be cost-effective unless a manufacturer expects to have a market for balls that extends internationally. It is essential to understand that the critical ball parameters: diameter, weight and resilience are not independent, so that adjustment of the manufacturing process to better fit one criterion will normally affect the other parameters too. If a manufacturer has a prototype ball already in production, it is strongly suggested that it is sent for testing by airmail so that it can be tested using the approved laboratory equipment and the results reported back. A manufacturer may then be able to decide whether to proceed further. There would be no charge for this service. In the customs declaration it is advised that the ball is stated to be for testing only and that it has no commercial value.

6. Purchasers

It is suggested that purchasers may wish to safeguard their rights by ordering balls that comply with the current Championship Specification – see also Appendix 2 for current Approved Balls. Makers produce balls in batches and the Croquet Association, on behalf of the WCF, is not able to test each batch, so close inspection of new purchases is recommended. Modern plastic balls appear to be produced from moulds comprising two hemispheres: it is a simple matter to check that the two hemispheres have been correctly aligned - any significant step across the joint line causes out of line rebounds and is unacceptable in play.

7. Championship Ball Specification

(Imperial measurements are definitive; metric equivalents are given for convenience.)

(a) Diameter

The maximum diameter of a ball must not exceed $3 \frac{21}{32}$ inches (92.9 mm) and the minimum diameter must not be less than $3 \frac{19}{32}$ inches (91.3 mm).

The maximum and minimum diameters of a ball must not differ by more than $\frac{1}{32}$ inch (0.8 mm).

The maximum and minimum diameters of balls in a set must not differ by more than $\frac{3}{64}$ inch (1.2 mm).

(b) Resilience

When dropped from a height of 60 inches (1524 mm) from the bottom of the ball onto a steel plate 1 inch (25.4 mm) thick and set rigidly in concrete, a ball must rebound to a height from the bottom of the ball of not less than 31 inches (787 mm) and not more than 37 inches (940 mm).



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The rebound height is the average of eighteen measurements: each ball is dropped three times onto each of the two poles and four nodes in the milling pattern.

The rebound heights of a set of balls to be used together must not differ by more than 2 inches (50.8 mm).

(c) Milling

All balls must have a 'milled surface' with an identical pattern. (In practice, the ball is usually molded to reproduce the appearance of milling.)

The pattern must consist of two orthogonal sets of grooves and the width of the grooves must be less than the width of the upstands left after grooving.

(d) Weight

The weight of balls must be within the range $15 \frac{3}{4}$ ounces (446.5g) to $16 \frac{1}{4}$ ounces (460.7g). The mass distribution in a ball should be essentially spherically symmetric and not require more than a 0.5g weight applied to the ball's surface to cancel discrepancies.

(e) Colour

Guidance can be provided by the WCF Equipment Officer on the preferred colours for 1st and 2nd colour sets. Comment may be added to the Approval Statement for colours outside the preferred ranges.

8. Ageing of Balls

The WCF is not aware of any definitive assessment of the effects of ageing and use on the rebound characteristics of Championship Approved balls. Ideally, sets of balls should be tested when new and at annual intervals thereafter, but in clubs with several similar sets of balls it is likely to be difficult to keep track of a particular set.

HOOPS

9. Guidance on seeking Hoop Approval

Manufacturers seeking Championship Approval are required to submit one (non-returnable) fully finished hoop for testing, to arrange a Field Test at a mutually-agreed venue and for an agreed period, and to provide written assurance that the manufacturing processes are adequately reproducible. The WCF Testing Laboratory will be responsible for preparing a report of performance in relation to the stated criteria. The report will include a general description of the hoop system. The report will be made available to the Manufacturer - and for an Approved hoop, will be published by the WCF.



10. Championship Hoop Specification

(Imperial measurements are definitive; metric equivalents are given for convenience.)

The specifications for Approval are derived from the requirement for a hoop/ ball clearance of $\frac{1}{32}$ inch with any ball meeting the WCF Championship Approval standard – i.e. diameter $3\frac{19}{32}$ - $3\frac{21}{32}$ inches.

By stressing the hoops in the ground it is expected that most designs will produce the required $\frac{1}{32}$ inch to $\frac{3}{64}$ inch settings at half-ball height.

The requirements were revised in 2009 to allow hoops of greater upright and crown diameters than $\frac{5}{8}$ " – a maximum of $\frac{3}{4}$ " now permissible.

(a) Construction

A hoop comprises two vertical uprights joined at the top by a horizontal crown and must be provided with a means of anchorage at the base of the uprights.

The uprights and crown should be straight and the anchorage system must not hinder free passage of the ball.

The uprights and crown must be constructed of solid metal of adequate hardness and the hoop must be rigid.

(b) Height

The hoop must be capable of a setting in which the top of the crown is between 11.5 and 12.5 inches (292 and 317 mm) from the ground surface.

(c) Upright diameter

The diameter of each upright should be no less than $\frac{19}{32}$ and no greater than $\frac{3}{4}$ inches (15.1 and 19.1 mm); minor deviations at the top and bottom are permitted. Hoops with uprights formed from well-made $\frac{3}{4}$ inch bar will be deemed to fulfil the requirements for Approval.

Three measurements are to be made for each upright: high, low and mid length: all diameters must lie within the allowed range. Here and subsequently, high = approx. $1\frac{3}{4}$ inches from underside of crown; low = approx. $1\frac{3}{4}$ inches above base of upright.

The high and low points avoid minor deviations at the top and bottom of the uprights and approximate respectively to a ball radius from the underside of the crown or the ground ($1\frac{3}{4}$ inches = ideal ball radius minus $\frac{1}{16}$ inch).



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(d) Uprights parallel

The inner surfaces of the uprights must be approximately parallel and of separation between $3\frac{1}{16}$ and $3\frac{3}{4}$ inches (93.7 and 95.25 mm). For a set of hoops the separations must not differ by more than $\frac{1}{16}$ inch (1.6 mm).

Three measurements of the separation between the inner surfaces of the uprights of an unstressed hoop are to be made at high, low and mid length: all three measurements must be within the allowed range and the difference between the largest and smallest measurement shall not exceed $\frac{1}{32}$ inch; for a set of hoops the difference between the largest and smallest of the 18 measurements should not exceed $\frac{1}{16}$ inch.

The uprights between the high and low positions will be tested for co-planarity: when one upright is in contact with a plane surface, no point of the relevant length of the other upright may depart from the plane by more than $\frac{1}{16}$ inch.

(e) Crown

The crown must be straight, at right angles to the uprights, and have a diameter between $\frac{19}{32}$ and $\frac{3}{4}$ inches (15.1 and 19.1 mm).

Any logo must comply with these limits.

(f) Field Test

The hoop must be capable of being set firmly in suitable ground.

Evidence of satisfactory performance in setting, durability, and play with Championship Approved balls must be available.

A check list has been prepared and is available from the WCF Equipment Officer, to ensure that the Field Test has appropriate scope.

End of WCF Equipment Regulations



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Revisions

Effective 10.8.05 Version 1	Original Version
Effective 01.10.06 Version 2	Update on ball and hoop approval dates.
Effective 06.11.06 Version 3	Contents page added. Clarification of commencement and expiry approval dates for balls and hoops.
Effective 13.11.07 Version 4	Update on ball approval dates.
Effective 06.04.09 Version 5	Amendment to hoop specifications following 2008 amendments to AC Laws 6 th edition and ancillary matters
Effective 01.01.12 Version 6	Updated in the light of practical experience and latest approvals. Comments received from Alan Pidcock and Ian Plummer
Effective 06.02.12 Version 6.1	V6 ratified by Council but suggested editorial reorganisation with current Approved Balls & Hoops removed to Appendix 2

Appendix 1 – WCF Equipment Approval

WCF Equipment Officer: Dr Alan Pidcock

Laboratory Address:

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WCF Equipment Officer
The Manor House
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Appendix 2 – Current Approved Balls & Hoops

1. Approved Balls

Balls that have current WCF Championship Approval are as follows:

Dawson 2000 International 1st Colours (Approved to April 2014)

Dawson 2000 International 2nd Colours (Approved to April 2014)

Sunshiny (CQ-16) 1st Colours (Approved to April 2014)

Sunshiny (CQ-16) 2nd Colours (Approved to April 2014)

Previously-approved balls that are still suitable for use, but which do not have a current approval for new supply:

Barlow GT Mark II 1st Colours (Approved to July 2006, manufacture ceased)

Barlow GT Mark II 2nd Colours (Approved to July 2006, manufacture ceased)

Willhoite Xtreme 1st Colours (Approved to October 2009)*

**Blue ball very pale: unsuitable for use alongside white of a second colour set.*

Note: All balls manufactured up to and including the Approved Date shown above, are suitable for continued use beyond that date.

2. Ball Manufacturers

Dawson: auscroquetco@picknowl.com.au

Sunshiny: Richard Wu (Taiwan) sunshinyco@hotmail.com;

Willhoite: Willhoite Tool Co Inc, PO Box 1342, 157 Industry Rd, Georgetown, KY40324-1342, U.S.A. WILLTOOL@aol.com



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3. Approved Hoops

Hoops that have current Championship Approval are as follows:

Hopewell cast-iron hoops (Approved from July 2010)

George Wood steel hoops (Approved from December 2011)

Note: All hoops manufactured from the Approved Date shown above are suitable for continued use until further notice.

4. Hoop Manufacturers

Hopewell hoops have been developed by Nottingham Croquet Club in England and are manufactured in a British foundry, and supplied only through the CA Shop www.croquet.org.uk/shop/.

George Wood steel Championship Hoops are available from Wood Mallets Ltd of New Zealand <http://www.woodmallets.com/croquet/accessories.htm>.