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## 1. Introduction

1.1 These Regulations apply to balls and hoops to be used in all WCF Licensed events. They are intended to ensure that Event Hosts provide appropriate balls and hoops for a WCF event and to guide equipment manufacturers and suppliers.

1.2 Balls and hoops that have Championship Approval are listed in Appendix 1. The WCF Sports Regulations require Event Hosts to provide balls with current Championship Approval whereas any hoops that meet the specifications in Appendix 4 may be used in WCF events.

1.3 The WCF Equipment Specification and Approval system is based upon the testing system endorsed and operated by the (English) Croquet Association. The equipment tests are carried out by the WCF Equipment Officer (see Appendix 2).

## 2. Seeking approval

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

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

## 3. The approval process

### 3.1 Balls

3.1.1 A manufacturer who wishes to obtain or renew Championship Approval for balls is required to deliver at its expense a non-returnable set of balls to the Equipment Laboratory at the address given in Appendix 2 accompanied by an examination fee of £50 GBP payable to the Croquet Association. This fee is subject to change without notice.

3.1.2 Balls that meet the specification set out in Appendix 3 will be awarded Championship Approval for a period of three years.

3.1.3 A Test Report will be sent promptly to the manufacturer and, if the balls receive Championship Approval, a copy will be forwarded to the WCF for publication.

3.1.4 Sets of primary colours (Blue, Red, Black, Yellow) and secondary colours (Green, Pink, Brown, White) must be submitted for separate Championship Approval because some colours can perform differently from others. Sets of tertiary colours are also in use but are not used in WCF events. Such sets do not need Championship Approval but may be submitted for examination if the manufacturer wishes.

3.1.5 In the event of the balls failing to meet the required specification, £20 GBP will be returned to the manufacturer.



## 3.2 Hoops

3.2.1 A manufacturer who wishes to obtain Championship Approval for a hoop is required to deliver at its expense a non-returnable hoop to the Equipment Laboratory at the address given in Appendix 2. There is no examination fee payable in respect of hoops.

3.2.2 In addition, at least one set of six hoops must also be manufactured in order for an adequate Field Test to be conducted (see Appendix 4 paragraph 7.2).

3.2.3 The manufacturer must provide a written assurance that the manufacturing process is reproducible.

3.2.4 A Test Report will be sent promptly to the manufacturer and, if the hoop receives Championship Approval, a copy will be forwarded to the WCF for publication.

## 4. Duration of approval

### 4.1 Balls

4.1.1 A set of balls purchased during the Championship Approval period set out in Appendix 1 paragraph 1 (i.e. not later than the expiry date and on or after the date three years earlier) will remain approved indefinitely unless the required specification is changed or the balls deteriorate and cease to meet the specifications set out in Appendix 3.

4.1.2 Balls are not required to be replaced if the Championship Approval for such balls lapses.

4.1.3 Individual sets of balls are not required to be re-tested during their lifetime.

### 4.2 Hoops

A hoop purchased after the Championship Approval date set out in Appendix 1 paragraph 3 will remain approved indefinitely unless the required specification is changed.

## 5. Guidance on seeking approval for balls

5.1 Experience of the efforts of ball manufacturers to date leads the WCF to caution those seeking Championship Approval about the difficulty and length of time required to develop a ball of the appropriate standard. The WCF suggests that the effort may not be cost-effective unless a manufacturer expects to have a market for balls that extends internationally.

5.2 The critical ball parameters of diameter, weight and resilience are not independent. Adjustment of the manufacturing process to improve the achievement of one parameter 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 to the manufacturer with as little delay as possible. The



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manufacturer may then be able to decide whether to proceed further. There is no examination fee for this service. In the customs declaration the ball should be stated to be for testing only and to have no commercial value.

## 6. Ball purchasers

6.1 It is suggested that purchasers may wish to safeguard their position by ordering only balls that comply with the specification set out in Appendix 3. Lists of the balls that have current Championship Approval and the names and contact details of their manufacturers are set out in Appendix 1 paragraph 1.

6.2 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 always recommended. Modern plastic balls are generally produced from moulds comprising two hemispheres. It is a simple matter to check that the two hemispheres have been correctly aligned because any significant step across the joint line is capable of adversely affecting the reliability of ball to ball contact and will be unacceptable in play.

### End of WCF Equipment Regulations

#### Revisions

Version 1 10 August 2005	Original
Version 2 1 January 2006	Update on ball and hoop approval dates.
Version 3 6 November 2011.06	Contents page added. Clarification of commencement and expiry approval dates for balls and hoops.
Version 4 13 November 2007	Update on ball approval dates.
Version 5 6 April 2009	Amendment to hoop specifications following 2008 amendments to AC Laws 6 <sup>th</sup> edition and ancillary matters
Version 6 1 January 2012	Updated in the light of practical experience and latest approvals. Comments received from Alan Pidcock and Ian Plummer
Version 6.1 6 February 2012	V6 ratified by Council but suggested editorial reorganisation with current Approved Balls & Hoops removed to Appendix 2.
Version 6.2 21 July 2015	General update of text and addition of Atkins Quadway hoops to list of approved hoops.
Version 6.3 26 December 2015	Minor amendments to improve clarity and consistency and to allow use of Atkins Quadway hoops at their narrowest setting.



## Appendix 1 – Approved balls and hoops

### 1. Approved balls and manufacturers

#### 1.1 Balls that have current Championship Approval

- 1.1.1 Dawson 2000 International Mk II 1<sup>st</sup> Colours: approved to 30 April 2017
- 1.1.2 Dawson 2000 International Mk II 2<sup>nd</sup> Colours: approved to 30 April 2017
- 1.1.3 Sunshiny (CB16) 1<sup>st</sup> Colours: approved to 30 April 2016
- 1.1.4 Willhoite Xtreme 1<sup>st</sup> Colours: approved to 31 October 2017

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

- 1.1.5 Sunshiny (CB16) 2<sup>nd</sup> Colours: approved to 30 April 2014, retest pending
- 1.1.6 Barlow GT Mark II 1<sup>st</sup> Colours: approved to 31 July 2006, manufacture ceased
- 1.1.7 Barlow GT Mark II 2<sup>nd</sup> Colours: approved to 31 July 2006, manufacture ceased

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

#### 1.2 Ball manufacturers

- 1.2.1 Dawson: Brian Dawson [auscroquetco@picknowl.com.au](mailto:auscroquetco@picknowl.com.au)
- 1.2.2 Sunshiny: Richard Wu (Taiwan) [sunshinyco@hotmail.com](mailto:sunshinyco@hotmail.com)
- 1.2.3 Willhoite: Willhoite Tool Co. Inc., PO Box 1342, 157 Industry Rd, Georgetown, KY40324-1342, U.S.A. [WILLTOOL@aol.com](mailto:WILLTOOL@aol.com)

### 2. Approved hoops and manufacturers

#### 2.1 Hoops that have current Championship Approval

- 2.1.1 Omega Adjustable Hoop (Steel; Standard and Championship): approved from 1 December 2000.
- 2.1.2 Jaques Championship Hoop (Cast Iron; Standard and Championship): approved from 1 July 2005.
- 2.1.3 George Wood Championship Hoop (Steel; Standard and Championship): approved from 1 December 2011.
- 2.1.4 Hopewell cast-iron hoops: approved from 1 July 2010.
- 2.1.5 Atkins Quadway stainless steel hoops: approved from 1 July 2014.

Note: All hoops manufactured after the relevant Approval Date shown above are suitable for continued use beyond that date.

#### 2.2. Hoop manufacturers and suppliers

Hoop type	Manufacturer/supplier	E-mail or URL
2.2.1 Jaques	Jaques London	<a href="http://www.jaqueslondon.co.uk">www.jaqueslondon.co.uk</a>
2.2.2 George Wood	Wood Mallets Ltd	<a href="http://www.woodmallets.com">www.woodmallets.com</a>
2.2.3 Hopewell	Croquet Association	<a href="http://www.croquet.org.uk">www.croquet.org.uk</a>
2.2.4 Atkins	Ray Atkins	<a href="mailto:atkins.quadway@gmail.com">atkins.quadway@gmail.com</a>



## Appendix 2 – WCF Equipment Officer

WCF Equipment Officer: Dr Alan Pidcock

Address:

Dr. A. Pidcock  
WCF Equipment Officer  
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1 Barn Croft  
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United Kingdom

Email: [pidcock@manorh.plus.com](mailto:pidcock@manorh.plus.com)



## Appendix 3 – Championship ball specifications

### 1. Introduction

Imperial measurements are currently definitive and metric equivalents are provided for convenience.

### 2. Diameter

2.1 The minimum diameter of a ball must not be less than  $3 \frac{38}{64}$  inches (91.3 mm) and the maximum diameter must not exceed  $3 \frac{42}{64}$  inches (92.9 mm).

2.2 The maximum and minimum diameters of a ball must not differ by more than  $\frac{2}{64}$  inch (0.8 mm).

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

### 3. Resilience

3.1 When dropped from a height of 60 inches (1,524 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).

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

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

### 4. Milling

4.1 All balls must have a milled surface with an identical pattern.

4.2 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.

4.3 With moulded balls, milling is created as part of the moulding process.

### 5. Weight

The weight of balls must be within the range  $15 \frac{3}{4}$  ounces (446.5 g) to  $16 \frac{1}{4}$  ounces (460.7 g).

### 6. Bias

The mass distribution in a ball should be essentially spherically symmetric so that noticeable bias is not present when the ball is rolling slowly on a flat surface. When



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using a brine flotation test, the weight applied to the unadjusted high point required to cause it to become the adjusted low point should not exceed 0.5g.

### **7. Colour**

Guidance can be provided by the WCF Equipment Officer on the preferred colours for 1<sup>st</sup> and 2<sup>nd</sup> 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.





## Appendix 4 – Championship hoop specifications

### 1. Introduction

1.1 Imperial measurements are currently definitive and metric equivalents are provided for convenience.

1.2 The hoop specifications are derived from the requirement that the hoop/ball clearances specified in the WCF Sports Regulations be achievable with any ball meeting the WCF Championship Approval standard for diameter (i.e.  $3 \frac{38}{64}$  to  $3 \frac{42}{64}$  inches (91.3 to 92.9 mm)) at half-ball height when the hoop is set in the ground.

### 2. Construction

2.1 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.

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

2.3 A hoop may be cast in one piece or consist of separate uprights and a crown which are bolted together.

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

### 3. 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.

### 4. Diameter of an upright

4.1 The minimum diameter of an upright must not be less than  $\frac{38}{64}$  inch (15.1 mm) and the maximum diameter must not exceed  $\frac{48}{64}$  inch (19.1 mm) but minor deviations at the top and bottom are permitted.

4.2 Hoops with uprights formed from well-made  $\frac{48}{64}$  inch bar will be deemed to fulfil these requirements.

4.3 Three measurements are to be made for each upright and all diameters must lie within the permitted range at each measurement point:

High:  $1 \frac{52}{64}$  inches (46 mm) from the underside of the crown.

Middle: 6 inches (152.4 mm) above the base of the upright.

Low:  $1 \frac{52}{64}$  inches (46 mm) above the base of the upright.

The high and low measurement points avoid minor deviations at the top and bottom of the uprights and are approximately equal to a ball radius below the underside of the crown and above ground level respectively.



## 5. Separation of the uprights

5.1 The inner surfaces of the uprights must be approximately parallel and display a separation of between  $3 \frac{42}{64}$  inches (92.9 mm) and  $3 \frac{48}{64}$  inches (95.3 mm).

5.2 Three measurements of the separation between the inner surfaces of the uprights of an unstressed hoop (i.e. out of the ground) are to be made at the high, low and mid length points specified in paragraph 4.3 above. All three measurements must be within the range specified in paragraph 5.1 above and the difference between the largest and smallest measurement must not exceed  $\frac{2}{64}$  inch (0.8 mm).

5.3 For a set of six hoops, the difference between the largest and smallest of the 18 measurements made under paragraph 5.2 above must not exceed  $\frac{4}{64}$  inch (1.6 mm).

5.4 The uprights of a hoop between the high and low points specified in paragraph 4.3 above will also 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  $\frac{4}{64}$  inch (1.6 mm).

## 6. Crown

6.1 The crown must be straight, at right angles to the uprights, and have a diameter between  $\frac{38}{64}$  inch (15.1 mm) and  $\frac{48}{64}$  inch (19.1 mm).

6.2 Any logo on the crown must comply with these limits.

## 7. Field Test

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

7.2 Evidence of satisfactory performance in setting, durability and play with Championship Approved balls must be provided by the manufacturer. In practice, this means that the manufacturer should supply a set of hoops for use by experienced players using such balls in order that they can supply testimonials that the hoops perform satisfactorily in practice.