

Specifications for Sweeping Devices



Background and Statement of Principles

Curling is the only sport in the world where an athlete propels an object (the curling stone) towards a target (the skip's broom) and on its way to the intended destination, the trajectory can be influenced by impacting the field of play (sweeping), rather than by touching the object itself.

Because of this unique aspect, special attention must be given to the only piece of competition equipment specifically designed to impact the field of play: the curling broom or brush.

To ensure the integrity of athletic performance is maintained, the curling broom must not be capable of providing excessive influence, causing undesirable deterioration of playing conditions, creating residual effects on the ice to the disadvantage of fellow competitors or diminishing the importance of a well-executed delivery.

In 2015, athletes and sport experts began to observe unusual reactions when curling stones were swept with particular types of curling brooms using previously unseen techniques.

The WCF convened a Sweeping Summit in Kemptville Canada in May 2016 to better understand what was occurring and to determine if specifications for curling brushes or amendments to the rules for sweeping, or both were necessary.

Prior to the Sweeping Summit, the WCF consulted with its Members Associations and surveyed elite athletes and the general curling community.

The consultation and Survey confirmed that the skill of a proficient curling delivery is the most important performance element of curling.

The Survey also confirmed sweeping is integral to the broad public appeal and enjoyment of the sport, but the overwhelming opinion of athletes and curling enthusiasts is that sweeping is secondary in importance relative to the delivery.

Throughout the history of curling, participants have accepted there are two legitimate reasons for sweeping a curling stone, both of which were confirmed by the results of the consultation and Survey:

- To reduce the rate of deceleration of a stone (causing it to go further)
- To delay the curling action of a stone in the direction in which the “turn” was applied (causing it to go straighter)

Consultation and surveying further determined unacceptable effects of sweeping are:

- To increase the rate of deceleration of a stone (causing it to slow down)
- To cause a stone to move in the opposite direction in which the turn was applied (causing it to fall back)
- To deposit debris in the path of the stone (dumping)

An important question which consultation and surveying did not ask was: “How much further should sweeping be able to cause a stone to travel?”

There are many variables and environmental conditions which can impact the distance added by sweeping a stone and just as many assumptions which can be applied to those variables, making survey responses difficult to analyze and compare.

The impact on distance produced by the brush heads constructed using the materials and constructions recommended by the athletes who participated at the WCF Sweeping Summit was unanimously determined by those athletes to be within acceptable limits. That assessment has been accepted by the WCF.

To reduce the possibility of sweeping equipment detrimental to the competitive and performance integrity of the game, the WCF has established specifications for

sweeping equipment, along with principles and references against which those specifications should be considered.

The initial specifications are established based on the results of testing at the WCF Sweeping Summit held in May 2016, the analysis of the testing results by the National Research Council of Canada, the unanimous recommendations of the elite athletes who participated in the Sweeping Summit and following consultation with curling equipment manufacturers.

Typically, the most effective sweepers have been those athletes who have a high level of fitness, utilize a sound technique and are consistently able to exert a great amount of force, combined with a high stroke rate, to the brush head.

This athletic aspect is fundamental to curling being accepted as an elite sporting endeavour and one which athletes and sport leaders have worked hard to achieve.

To ensure athleticism continues to be an important element of sweeping, the specifications also take into account the desire to reduce significant variations in effectiveness between acceptable sweeping devices.

The references in each section of the specifications to “design elements and characteristics” are included to provide context, guidance and a greater understanding of the basis for the specifications.

These references should be considered equally important as the specifications themselves.

When carefully applied in concert with the specifications, these principles and references serve to guide equipment developers, manufacturers and athletes as they strive to innovate and produce new and improved equipment, while remaining respectful of the competitive values and traditions of curling.

Curling Brush Specifications

1) Base/Faceplate/Bracket:

a) Design elements and characteristics:

- i) Incorporates a flat, level design on the side of the brush head in contact with the ice, is covered only by foam and fabric and distributes the force applied by the sweeper evenly across the area of the brush head in contact with the ice
- ii) Prevents significant deflection of base/faceplate/bracket, which would otherwise allow excessive force to be focused immediately beneath the handle connection
- iii) Design does not allow force applied by the sweeper to be focused on a significantly small area of the brush head, such as the side or the edge of the brush head

b) Dimensions:

- | | |
|-------------------------------------|--|
| i) Length (see note): | Minimum: 7" (17.78cm)
Maximum: 9" (22.86cm) |
| ii) Width (see note): | Minimum: 2.5" (6.35cm)
Maximum: 3" (7.62cm) |
| iii) Length/Width Ratio (see note): | Minimum: 2.5/1
Maximum: 3.5/1 |
| iv) Thickness: | Minimum: no current specification
Maximum: no current specification
Sufficient to prevent significant deflection of base/faceplate, which could otherwise allow the force applied by the sweeper to be focused on a small area of the brush head |

v) Notes:

(1) designs which incorporate fabric wrapped over foam and stapled or fastened to the top of the base/faceplate, so long as the uncovered base/faceplate is within the dimensions shown above, a tolerance of +.25" (.635cm) is permitted to allow the foam to sufficiently cover the edges or corners of the base/faceplate.

(2) To allow for variations in designs which do not incorporate fabric wrapped over foam and stapled or fastened to the top of the base/faceplate, the minimum and maximum dimensions refer to the area in contact with the ice.

c) Material:

- i) Hard Plastic which does not significantly deflect while sweeping.
- ii) May be constructed from recycled materials but bases/faceplates which incorporate fabric attached by stapling may not be reused.

2) Foam:

a) Design elements and characteristics:

- i) Cushions the force applied by the sweeper
- ii) Does not allow force applied by the sweeper to be concentrated on the top of the pebble
- iii) Foam nearest the ice is flat, with a general uniform density and thickness.
- iv) For brush head and pad designs which incorporate fabric wrapped over foam and stapled to the top of the base/faceplate, the foam must extend beyond the edges/corners of the base/faceplate to ensure the corners or the edges of the base/faceplate are covered by foam.
- v) When fully compressed, does not allow any part of the base or faceplate other than the fabric to be in contact with the ice surface

b) Dimensions/Specifications:

i) Thickness of Foam

(1) Minimum of 1/2" (1.27cm)

(2) Sufficient to ensure that when compressed by 95% of its original thickness, the foam is at least 0.5mm higher than the base/faceplate or lip of the brush head

ii) Compression Threshold

(1) Foam does not compress more than 95% of its original thickness when 175lbs (79.4kg) of force is applied.

iii) Compression Modulus

(1) The compression modulus is defined by the ratio of the pressure required to compress the sample 65% vs the pressure required to compress the sample 25% (Stress @65%/Stress @25%)

(2) The range of acceptable compression modulus is 2.0 – 4.0

iv) Durometer Readings

(1) The assembled brush head is within a range of 60-80 duros (+/- 2) when measured on a Shore 00 durometer with a 1kg weight

(a) Brush head must be dry

(b) Assembled brush head must rest with the fabric on the ice for a minimum of 10 seconds immediately prior to taking durometer measurements

c) Material:

i) Foam which meets WCF specifications may be manufactured from recycled materials but foam which has previously been used in a brush head which incorporates fabric wrapped over foam and stapled or fastened to the top of the base/faceplate may not be reused.

3) **Fabric:**

a) Design elements and characteristics:

- i) Is woven in such a way to avoid any scratching effect on the ice which could serve to provide a directional influence on a swept stone
- ii) No Polyurethane (PU), Polyvinyl Chloride (PVC) or similar coatings applied to the side of the fabric in contact with the ice
- iii) No treatments or processes applied to the side of the fabric in contact with the ice, which could serve to provide a directional influence on a swept stone
- iv) No stencil, logo, marking, embroidery or any other feature is permitted on the fabric in contact with the ice while sweeping

b) Specifications:

- i) Description: Oxford 55 Sport Yellow
- ii) Backing Content: 100% Polyurethane
- iii) Construction: 0420 Denier
- iv) Content: 100% Nylon
- v) Description: High Density Nylon, Piece Dyed, PU Coated
- vi) Hydrostatic Resistance: AATCC 127 (Suter) – Average 800 mm.
- vii) Protective Finish: DWR Durable Water Repellant

c) Orientation:

- i) Fabric must be cut and oriented on base/faceplate/cover in accordance with Schedule A – Fabric Cutting Diagram.
- ii) Fabric must be attached to the base/faceplate/cover with the uncoated (darker) side exposed to the ice and the Polyurethane coated side (lighter) in contact with the foam – see Schedule B – Fabric Attachment Photos

d) Approved Fabric Supplier(s):

- i) J Ennis Fabrics – Canada (contact information available to prospective manufacturers from WCF Office)

- e) Fabric Specification and Quality Control Verification:
 - i) The Approved Fabric Supplier verifies each production run of approved fabric meets its specifications, within established tolerances.
 - ii) Once a production run of fabric has been verified to conform to the established specification, the fabric may be supplied to curling equipment manufacturers for use on curling brushes.
 - iii) The Approved Fabric Supplier maintains records of the Lot Number and Piece Number for fabric supplied to each curling equipment manufacturer.
 - iv) Upon receipt of approved fabric, manufacturers are responsible for inspecting a sample of each Lot Number to ensure there is no evidence of “bleed-through” of Polyurethane coating on the side of the fabric exposed to the ice. If evidence of “bleed-through” is discovered, the fabric should be rejected and not used for the construction of curling brush heads, pads or covers.

4) Handle:

- a) Design elements and characteristics :
 - i) The design of the handle is a straight shaft, recognizing the strength required to hold a curling broom while applying maximum force and frequency is a point of performance differential between athletes
 - ii) The design of connection between the handle and the base/faceplate ensures the brush head or pad remains flat against the ice when sweeping
 - iii) The connection between the handle and the base/faceplate does not allow the brush head or pad to be pivoted in such a way so as to allow the sweeper to focus excessive force on a small area below the handle or on the edge or side of the brush head

- b) Dimensions:
 - i) Straight shaft
 - ii) No current specification

- c) Material:
 - i) No current specification
 - ii) Must not be capable of violating Rule R.10.A (“No player shall cause damage to the ice surface by means of equipment, hand prints or body prints”) if handle comes in contact with the ice

5) Markings and Statements

- a) WCF Member Association and Team Markings:
 - i) Size and Placement as per equipment used at WCF Championships and events up to and including the 2015-16 curling season.
 - ii) Further specifications TBD in consultation with WCF Athlete Commission and WCF Member Associations

- b) Commercial Markings:
 - i) Size and Placement as per equipment available for purchase up to and including the 2015-16 curling season.
 - ii) Further specifications TBD in consultation with Curling Equipment Manufacturers

- c) Manufacturers statements, labeling or packaging for conforming Brush Heads, Pads or Covers
 - i) The WCF is responsible for ensuring submitted designs and constructions meet WCF specifications, and when these products are found to conform, for assigning a WCF Product Code to the manufacturer.
 - ii) Because the WCF does not inspect and approve each brush head, pad or cover, the WCF does not authorize the use of any term or statement which may leave an impression with the consumer that a WCF inspection of each piece of equipment has occurred.

- iii) The responsibility for ensuring each brush head, pad or cover displaying a WCF Product Code meets WCF specifications rests with the manufacturer. Therefore, manufacturers may use the following terms for advertising or Point of Purchase material for brush heads, pads or covers which have been assigned a WCF Product Code:
 - (1) “WCF Approved Design”
 - (2) “Certified to meet WCF Specifications”
 - (3) “Conforms to WCF Specifications”
 - (4) “Certified for use in WCF Championships and Events”
 - (5) Other – subject to prior written approval of the WCF

6) Conforming Brush Heads, Pads and Covers

- a) For brush heads, pads and covers to be conforming, the following conditions must be met:
 - i) Design and construction submitted for approval to WCF and found to conform to WCF Specifications for Curling Brushes
 - ii) Displays a valid WCF Product Code listed on the WCF Website
 - iii) If inspected before, during or after use at a WCF Championship or event, must be found to conform to WCF Specifications for Sweeping Devices

7) Non-Conforming Brush Heads, Pads and Covers

- a) Brush heads, pads and covers are considered non-conforming if any of the following conditions exist:
 - i) Any modification to the design, materials or construction of a conforming brush head, pad or cover.
 - ii) If a brush head, pad or cover displaying a valid WCF Product Code appears to have been modified other than through normal wear, it will be deemed to be “non-conforming” and will not be permitted for use at WCF Championships or Events.

- (1) Indication that modification may have occurred include empty staple holes, unusual foam firmness or evidence of foreign substances on the fabric.
- b) An assigned WCF Product Code may be invalidated if brush heads, pads or covers do not conform to WCF specifications or vary from the information provided to the WCF by the manufacturer when the device was presented for inspection and a WCF Product Code was assigned.
 - c) If a WCF Product Code becomes unreadable or cannot be located, the brush head, pad or cover is deemed to be “non-conforming” and will not be permitted for use at WCF Championships or Events. Care should be taken to ensure that the WCF Product Code is affixed to brush heads in such a manner that it is durable and not easily removed.
 - d) A conforming brush head, pad or cover may become “non-conforming” through normal use if it’s found the brush head, pad or cover no longer conforms to WCF specifications.
 - i) Examples of conditions which would make brush heads, pads or covers “non-conforming” are if the foam becomes compressed beyond durometer specifications or the fabric has become dirty or damaged and deemed to be capable of producing scratches in the ice.
 - e) If particular models of brush heads, pads or covers are consistently found to be “non-conforming” or if a manufacturer is found to consistently produce “non-conforming” products, the WCF, at its sole discretion, may withdraw applicable WCF Product Codes from the list of conforming products.

8) Important Notes:

- a) Purchase of approved fabric from an Approved Supplier does not guarantee sweeping devices produced using this fabric will be approved for use at WCF Championships and events. Other requirements such as meeting specifications, being determined an “Effective Manufacturer” and meeting all conditions of the WCF Equipment Approval process are required.

- b) Unless meeting the requirements of the specifications contained in this document, no other fabric, material or construction is approved for use on sweeping devices for use in WCF Competitions or Events.
- c) Other materials previously allowed for use such as corn straw, hair, fabric which have external Polyurethane, Polyvinylchloride (PVC) or similar coatings or textured fabric are no longer permitted for use on equipment used for sweeping at WCF Championships or Events.

9) Definitions:

a) Sweeping Device:

A sweeping device is a curling broom or brush which is used by athletes to sweep a curling stone. The sweeping device is comprised of a handle affixed to a brush head or pad.

b) Brush Head or Pad:

The brush head or pad is the part of the sweeping device which is in contact with the ice while sweeping.

c) Cover

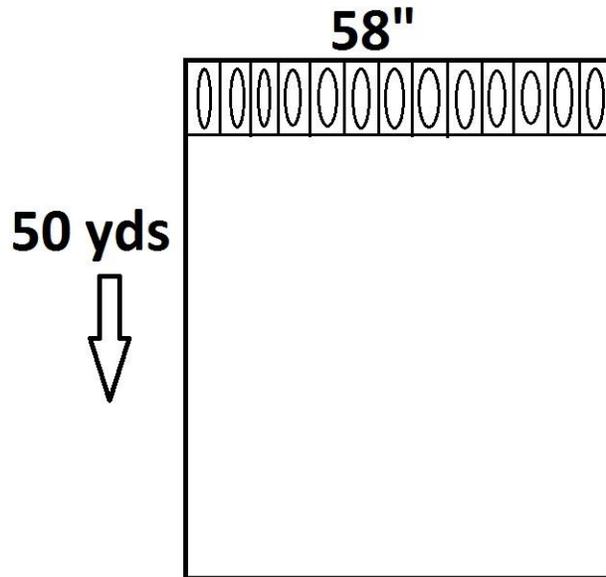
For brush heads which don't incorporate fabric fastened to the base, faceplate or bracket, the cover is the fabric portion which slips over the base, faceplate or bracket.

d) Handle

The handle is a straight shaft which attaches to the base, faceplate or bracket.

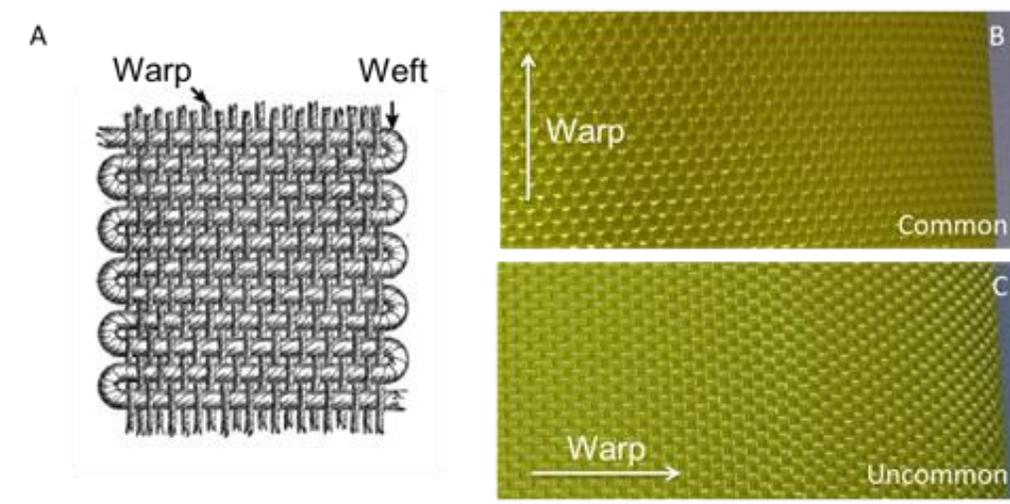
Schedule "A"

Fabric Cutting Diagram (Image A)



Orientation of Warp and Weft (Image B)

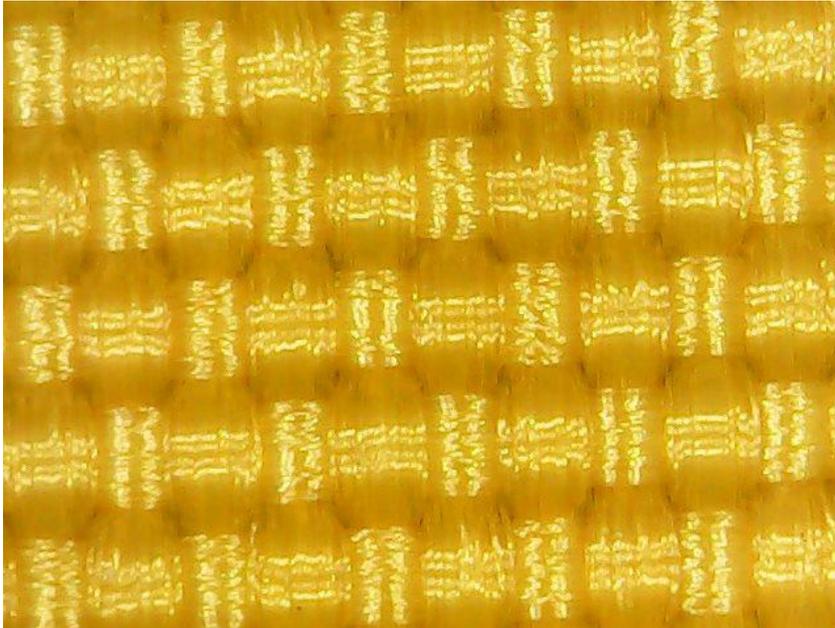
<http://commons.wikimedia.org/wiki/User:Ryj>



Schedule "B"

Fabric Attachment Photos

Ice Side – Darker Side - Uncoated (Image A)



Foam Side – Lighter Side - Coated (Image B)

