

How to Make SCA Equestrian Games Equipment from PVC

By Mistress Marguerite du Royon

If you would like to make the EQ Games equipment like I have, this is what you will need. **Note that most of this 'how to' article is just that – a guideline and NOT a hard and fast requirement!** This is just one of many ways of making inexpensive, modular equipment that looks nice once its painted.

How to Make A Boffer Sword:

Note: For IKEqC, a 36 inch long sword is the maximum allowed (for the ASXL year competition) i.e. 3 ft. long from hilt to tip (2 ft. blade, 1 ft handle). For Reeds, only swords are allowed, no maces. (For heads you may use maces, but it is not scored this year for the championship). Possible [Wooden swords](#) /[fake scimitar](#) or wasters may be used, or boffer swords.

Supplies needed for a boffer sword:

- ½ inch PVC, comes in 10 ft. sections for ~\$2 each; need 1 of the 10 ft. sections for several boffers
- ½ inch PVC pipe cap (if desired)
- closed cell foam or pipe insulation to pad the boffer sword – I used 7/8 inch opening by ¾ inch thick (less than \$2 at the hardware store)
- duct tape to wrap the closed cell foam (available in colors at OSH)
- electrical tape to indicate the boffer sword edge (available in colors at OSH)
- athletic tape (recommended) for handle/grip

Directions:

- Cut the PVC into a 36 inch long piece. Cut your foam/pipe insulation into a 2 to 2.5 ft. long piece and wrap it around the sword (varies depending on the length of your preferred grip).
- Cap the PVC, then cut out enough closed cell foam rounds to pad the top of the sword with - 1 inch thick padding is required for the tip (approximately three circles of foam are needed). Place the padding of the top of the sword, then wrap the 'blade' and tip with duct tape to secure them in place.
- Add an 'edge' to your sword using electrical tape if desired, and wrap the handle in athletic tape for a better grip if desired.

How to Make a Ring-Tilt Lance:

Note that lances used for IKEqC must follow their requirements for that year. The guidelines below comply with Year XL requirements.

Supplies needed for ring tilt lance:

Power Tools:

- power drill
- hand sander/grinder or belt sander (and safety goggles)

- 1 to 1.25 inch diameter wooden dowel, 7-9 feet in length. One-inch dowels are available in 8 ft. lengths from OSH for about \$10.
- 1 bolt, 1 lug nut, & 2 washers to counterweight the end of the lance (optional, but recommended). Size/weight of the nut, bolt, and washers will be determined by your lance diameter and length. Ideally the lance balance on one finger (like a see-saw) at a point 5 ft. from the tip, so experiment with what fits your dowel and balances your lance at the hardware store.
- Materials (such as riveted leather or plastic) that form a *graper/vamplate/arret de la lance* “ring stop” are required in the West Kingdom (due to the dangers of the rings sliding down the lance and covering your hand, preventing the lance from being discarded in an emergency). Sport Mart & Big 5 Sports have small cone shaped (neon) athletic field markers in the soccer section that work great for a vamplate when duct taped to the lance (pack of 20 for \$20, or Marguerite has them for \$1 each). The more period leather option is described below. Patterning paper, tape, leather, and rivets or lacing will be needed).

Directions:

- Mark the dowel at 12 inches from the tip, and at 5 ft. from the tip. The 12 inches from the tip is where the lance will taper down to 3/8 of an inch (this is the standard for Year XL IKEqC starting May 1, 2005). So, mark a 3/8 inch diameter circle centered on the tip end of the dowel.
- Using the grinder, SLOWLY shave down the tip until the end is 3/8 inch diameter, with a gentle taper in the last 12 inches to the full dowel diameter.
- Vamplate patterning: Make a paper vamplate pattern that fits your lance. First, cut a circle out of stiff paper about 12 inch diameter. Then cut a 1-1.25 diameter hole in the middle (depending on your lance diameter). Next cut a straight line out from the center hole to the outer edge. Insert the lance through the middle of this pattern, and curl the paper around until the circular pattern is slightly cone shaped and slants back slightly. Tape the cone in this position, and be certain that it will prevent a 6 inch diameter ring from sliding down the lance. Cut a straight line from the center hole to the outer edge, and flatten out your pattern.
- Leather Vamplate: Select a leather that is sturdy enough to stand out 3 inches on either side of the lance, and support the weight of several rings (not to mention being discarded in an emergency). Cut out the vamplate out of leather based on the paper pattern, and lace it onto the lance (or if using rivets, add some extra “seam” allowance to your paper pattern for overlapping the leather, then rivet the vamplate together into the slight cone shape). Attach to the lance at the 5 ft. from the tip mark, using friction (if rivets/lacing are tight enough) or by building up the hand grip under the vamplate so that it cannot slide backwards, or a combination of these – hose clamps (or duct tape) could also be used..
- Optional counterweight: Pre-drill a small hole in the back of the lance to prevent the wood from splitting. Then screw the bolt into the predrilled hole over the lug nut and washers to counterweight the back end of the lance.

How to Make PVC Heads Equipment:

Supplies needed for heads equipment:

Power Tools/Hand tools:

- hand sander/grinder or belt sander (and safety goggles)
- small blow torch which can be mounted on Coleman lamp-sized propane bottle (and gloves)
- drill
- hacksaw
- PVC glue or industrial strength glue
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- 6 traffic delineators, with 12 bases/weights on the bottom (4 to hold the heads/rings, 2 to mark your start and ending poles, and you need an extra weight on the bottom of the 4 heads holders). I work in construction so I can help with these - let me know!
- 1.25 inch PVC, comes in 10 ft. sections for ~\$2 each. We used 5 ft. height to make the heads uprights, meaning you need TWO 10 ft. sections (Note: The IKEqC rules do not specify a height at this time).
- 4 rubber toilet plunger tops to hold the heads (these fit nicely inside the 1.25 inch PVC pipe ends with no gluing required) OR 4 1.25-inch PVC end caps ('cups') and 4 6-inch end caps to make a "cup" to hold the head
- 4 "Nerf" style foam balls for heads or styrofoam mannequin heads (the Nerf balls are actually surprisingly hard to find these days! I finally found a multi sport pack at a Target near me, so the set of 4 heads would cost \$20. Let me know if you want me to pick these up!)
- tent stake to heat up in the blow torch and poke holes through the foam ball "heads"
- ½ inch to ¾ inch thick rope to attach the foam heads to the uprights (burn ends to seal them)

Directions:

- Cut the 2 pieces of 10 ft. PVC into four 5 ft. tall pieces – these are now heads "uprights." Paint as desired.
- Using a hacksaw, cut the top ball handles off of the traffic delineators (not too low or too high – you need a 1.25 inch opening, with 4 small plastic "tabs" protruding over the hole, which should make a very tight fit for the uprights).
- Heat the tent stake with the blowtorch, and poke it completely through each Nerf ball. Run the rope through the Nerf balls, and tie a knot in the end of the rope. (Paint the balls if desired by hanging them from the rope).
- IF you're using 6 inch PVC end cap & cups: Bolt the PVC cup and end cap together securely in the center of each. PVC glue or industrial strength glue the cups onto your uprights. Drill a hole in the 6-inch cup slightly bigger than the size of your rope. Paint as desired.
- Put the cups on the uprights & glue if desired. Run your rope through the cup and out the hole. Tie a not in both ends to keep the head on the upright.
- IF you're using plungers: Drill a hole in the uprights and plungers (middle bottom) slightly bigger than the size of your rope. Run your rope through the plunger and out the hole in the upright. Tie a not in both ends to keep the head on the upright. Do NOT paint these (it will just flake off) - try taping instead.

How to make PVC Rings Equipment:

Note: Ring tilt standards must hold the rings at 6.5'-7' from the ground (measured from the bottom of the upright to the ground).

Supplies needed for rings:

Power Tools:

- drill and a clamp to hold things straight
- dremel
- hand sander/grinder or belt sander (and safety goggles)
- small blow torch, which can be mounted on Coleman lamp-sized propane bottle (and gloves)

- 3 traffic delineators, can be same ones as the heads if you want (but you will really need 3 weights on the bottom for windy days). I work in construction so I can help with these - let me know!
- 1.25 inch PVC, comes in 10 ft. sections for ~\$2 each. We used 6+ ft. height to make the ring uprights/standards, and 4 ft. for the ring "T" cross braces (two 2 ft. long sections), meaning you need FIVE ten foot sections of PVC to make equipment.
- Three 1.25 inch PVC "T" connectors for the rings cross bar (\$1-\$2 each)
- 2 sets of magnetic rings in sizes 1in. to 6in, for a total of 12 rings, plus ribbon to attach to the rings so they don't get lost on the ground. We used gold-tone metal macramé hoops available for ~\$0.70 each at Beverly's crafts in San Jose. (Michaels only has plastic ones.) I bought some extras of these, and they are available from me at cost.
- 24 Rare earth magnets, available from Radio Shack for \$2 a two pack (limited quantities per store! Hit a few of them to get a whole set, or I have tons of these so if you want you can buy them from me at cost). Other ceramic magnets just don't compare to these for strength, and are too bulky by comparison.
- Six 1.25 inch PVC pipe "ends" – to seal the ends of the rings crossbars, optional
- PVC glue or industrial strength glue for crossbars, if desired

Directions:

- Using a hacksaw, cut the top ball handles off of the traffic delineators (not too low or too high – you need a 1.25 inch opening, with 4 small plastic "tabs" protruding over the hole, which should make a very tight fit for the uprights).
- Cut the 3 pieces of 10 ft. PVC into three pieces of desired height – these are now the central posts of the T shaped rings uprights. Cut the arms of the T-Posts to desired length, then glue the arms into the "T" connector. Paint entire T-post as desired.
- Using the dremel, make little hollows in the arms of the T-post near the central post and near the ends of the arms to suspend rings from your magnets (so hollows/depressions should be the same size & depth as 2 rare earth magnets side by side). Glue 2 rare earth magnets into the indentations.
- Purchase or make rings to the exact size required – 1 inch through 6 inch. Remember, the measurements are for the INNER diameter of the rings.

How to make PVC/Bamboo Reeds:

Note: The bamboo PVC materials described here are acceptable for IKEqC. Reeds for IKEqC can be made from [dowels](#) or [tubing](#) mounted with magnets or velcro or weighted cords on 5' size standards/uprights. Standards shall be supported by any the following items: T-posts, [electrical metal rods](#), portable holes, or jump standards. The supports must be able to fold to the ground, but not easily fall over when hitting the reed off. Other materials may be acceptable--- check with the [IKEQC Administrator](#) before using something other than those listed above.

Supplies needed for reeds:

Tools:

- PVC Cutter or Hacksaw
- Industrial strength glue (E6000, Amazing Goop, etc.)

- 10 traffic delineators, can be same ones as the heads if you want (but you will need 2 weights on the bottom for windy days). I work in construction so I can help with these - let me know!
- 1.25 inch PVC, comes in 10 ft. sections for ~\$2 each. We needed FIVE sections of ten foot PVC to make them.
- ¾ inch PVC, comes in 10 ft. sections for ~\$2 each; need 5 of the 10 ft. sections to place over tent stakes, then the 1.25 inch PVC will slide over that to stabilize the reed upright
- 1 inch diameter dried bamboo reeds that come in 6-8 ft. long sections at OSH. I used 2 6 ft. bamboo stalks to make my set of reeds - watch out and buy pieces that don't have any vertical splits. (Note: Rattan would work fine too, but bamboo is light & makes a nice hollow "clock!" sound when you hit it vs. hitting the upright, so it helps us keep track of good shots when its hard otherwise to say from the ground.)
- Ten 1.25inch diameter washers with the smallest hole possible (1/4 inch I think) in them
- String to make lanyards for the reeds
- Ten strong magnets that can be glued to the bottom of the reeds (rare earth magnets should work, or I used larger ½ to ¾ inch ceramic ones)
- Ten tent stakes to erect reeds uprights

Directions:

- Using a hacksaw, cut the top ball handles off of the traffic delineators (not too low or too high – you need a 1.25 inch opening, with 4 small plastic “tabs” protruding over the hole, which should make a very tight fit for the uprights).
- Cut the PVC into ten 5 ft. uprights.
- Cut the bamboo into 2, 4, 6, 8, & 10 inch pieces - always keeping a "node" at the bottom. Put big daub of industrial strength glue into each 'node' area, and then stick a magnet into the glue to dry - so that the bottom is (reasonably) flush but with a magnet to sit on.
- Glue the 1.25" diameter washers on to the top of PVC uprights, and glue and tie a string between the upright and bamboo reed as a lanyard.

For Mounted Boffer-Crest Combat, you will need:

- A Helm (fencing helms are acceptable, available for \$49 from The Fencing Post at <http://www.thefencingpost.com/Uniforms.htm>)
- a boffer sword, (see above section). Preferably this sword should be **longer** than the boffer sword used for heads to make it easier to reach your opponent without having the horses right against one another. **The West Kingdom recommend length is 4 ft. long from hilt to tip (3 ft. blade, 1 ft handle), the same length as a period 'hand-and-a half' or 'bastard' sword.**

For Styrofoam jousting, you will need:

Armor (some off the shelf/some purchase options are below):

- Basic helms: \$125.00. (The 18-gauge steel 'decorative' one that I have to pad out was \$100). Leather helms are available from: <http://www.animalhospitalonmidway.com/helms.html>.
- Simple profile crests are \$25.00 (same source)
- Body Protector/padded jumping vest (Flexrider, www.statelinetack.com): \$94.99 ladies, \$104.99 mens, sizes S, M, L, XL (requires a surcoat to cover the mundane body armor)
- Gorget (throat protection): I got a stainless one ready to wear for \$45 from GAA armories <http://www.hammeredsteel.com/gaa/armour/gaa/N-001.htm>! Both Anshelm Arms and Mandrake Armory have brigandine ones (black leather covered/riveted on) for \$65. (<http://www.mandrakearmory.com>, <http://www.anshelmarms.com/>)

Power Tools:

- Belt sander
- Power drill
- PVC cutter

Supplies for jousting lance:

- Home Depot Table leg with rounded ball at the end and taper prior to the ball in the largest/longest size they have (28", I think)
- 2 ½ x ½ inch galvanized steel water reducer (to counterweight the back of the jousting lance) available from Home Depot (and OSH, different looking but still fits)
- 6 inch lag screw to attach counterweight to wooden table leg
- Two ½" washers that the lag screw will fit through to secure lag screw to counterweight
- 5 ft. long, 2 inch diameter cardboard tube from a fabric store – lightest/thinnest weight available (1/8 inch thickness, not ¼ inch – best to get them from a silk/lightweight roll)
- 2 ft. long, 2 inch diameter styrofoam tips available from at cost Marguerite for ~\$0.52 each, source: U.S. Foam, (408) 988-6700, 630 Martin Ave., San Jose CA (exit De Anza from 101, near airport) Contact: Michael

Directions: See separate article for how to make the jousting lance.