

Chapter 4: How Footballs Are Made

You can throw a football far across a field, kick it up in the air, or bounce it in the dirt. The first official rules for the game of football, printed in 1894, said only that the ball should be made of leather and hold air. Some balls were short and stubby, while others were long and skinny. To make the game more fair, all official footballs are now the same size and shape. *<image: kid throwing football>*

1. Footballs are made from thick leather that has been softened in a process called tanning, so that it won't crack when it bends. It has also been treated with chemicals so it won't soak up water, because water could also make the leather crack. In a factory, cutters use a stamp like a cookie cutter to cut almond-shaped pieces from the leather. *<image: cutter>*

2. It takes four flat pieces to make one round football with pointed ends. The ball's shape is called a prolate spheroid. The flat football pieces are called panels. Usually at least one of the panels gets stamped with a design telling the name of the factory where the football is made. *<image: stamper>*

3. Next, a stitcher sews a lining that is three layers thick onto each panel for extra strength. Then, stitchers sew the panels together, inside out, with the seams showing. They leave a small opening in the middle with two rows of lacing holes that will be used later to close the football. *<image: stitcher>*

4. Turning the football right side out is no easy job. A turner has to bunch all the leather through one small hole. *<image: turner>*

5. In another part of the factory, a smaller shape has been made from black polyurethane. This part of the football is called the bladder, or the rubber. The bladder is pushed in through the opening in the lace-up area. It has a valve so it can be blown up like a balloon inside the leather. *<image: stuffing>*

6. Before the final lacing, the football is pre-molded, which is the first try at shaping the ball. The bladder is blown up like a bicycle tire, by inserting a hose with compressed air. This stretches the leather and the rubber and helps straighten the seams. If the seams are crooked or the rubber is thin, someone will notice in pre-molding. *<image: pre-molding>*

7. Then the ball is deflated just a bit, so it isn't being stretched. Now it is ready for its final lacing. The lacers must have strong hands. They lace the ball with strong cord as tightly as they can. Unlike most shoelaces, the cord survives rough play in water and mud without tearing. *<image: lacer>*

8. A football factory can make more than one-and-a-half million footballs in a year. Every single ball must be the exact same weight, shape, and lacing strength. Otherwise it just might be thrown out of the game. *<image: pile of footballs>*

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