Creating a Technical Description: Golf Balls

When professional communication fails, the problem is often that the writer did not recognize the readers' needs. These needs are determined not only by what the readers want to do with the text, but also their ability to construct meaningful knowledge from the information presented. Research shows that writers must consider how the readers will use the text and what they already know about the subject.[1]

In addition, a document's format leads readers to expect certain types of information. A memo format suggests something different from a newspaper column. Your task as a workplace professional is to meet the reader's expectations by presenting information that readers need in an appropriate format.

This document contains the description of a golf ball, written by a student who is an avid golfer. You'll edit and format this description (or selected portions of it) for a specific audience.

[1] Blyler, Nancy Roundy. "The Effect of Purpose on Professional Communication." *Technical Communication* 41.1 (1994): 81-88.

Getting Started

Prior to working on this exercise, read Chapter 15 ("Creating Technical Descriptions"). Pay particular attention to the section on the organization of technical descriptions.

Read the text about golf balls included in this document. Identify an audience who would be interested in the information and consider the purpose that the audience might have for the description. Here are a few suggestions:

- a sidebar in a golf magazine
- a manufacturer's information sheet to be provided to potential suppliers
- a brochure for customers in a golf shop
- an instructional sheet for students taking golf as their physical education requirement
- a lab sheet for students in mechanical engineering or materials engineering courses

Creating and revising a technical definition

Create a new document using information in the description about golf balls. Make sure to save the new document with a unique name.

Select appropriate details for your description based on the purpose of your document and the needs of your audience.

Select a format appropriate for presenting the information. After you have selected a format, begin thinking about how you will edit the text—what information you will omit and what you will include—based on your audience's needs and expectations. Also decide what visual cues you need in the document to assist readers (headings, text emphasis, use of white space, color, tables, boxes, etc.).

Decide whether you need an illustration (included with text) in your description. If you use an illustration, make sure to place, caption, and label it so that it enhances your description.

Evaluating the definition

Make sure to review, revise, and edit your description.

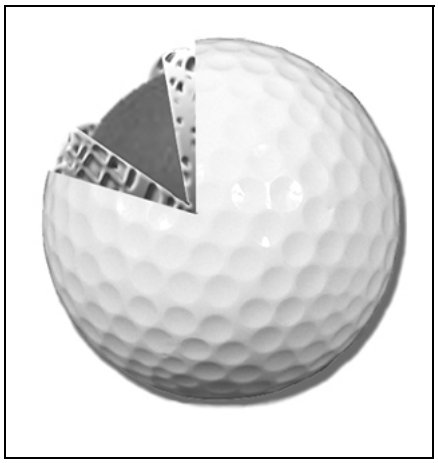
Effective technical descriptions include the following elements:

- accessible answers to the questions your readers are most likely to have about golf balls
- identification of the structural and/or functional parts of a golf ball based on your purpose and audience's needs.
- a logical pattern of organization; transitions from one idea to the next that guide readers through the material and aid comprehension
- formatting that assists readers to use the information in your document
- unified paragraphs that make effective use of forecasting
- language and tone adapted to the subject, purpose, and audience
- few problems with conventions (grammar, spelling, etc.)

Golf Balls

In their effort to create golf balls that fly farther with maximum control, manufacturers have made significant advancements in the design and construction of golf balls by understanding what happens to the ball at impact and its effect on trajectory. Manufacturers must keep the ball within USGA specifications, while trying to balance the amount of spin on the ball (not too much to decrease the distance and not too little to minimize control). In this paper I will state the USGA requirements manufacturers must follow, and give an explanation of the core construction, cover materials, and their effect on the aerodynamics and performance of the ball.

All golf balls must meet the four requirements listed by the USGA. These specifications (shown below) are tested in controlled conditions using a True Temper hitting machine set to generate a clubhead speed of 160 ft/sec and 10 degree launch angle. **Requirements**: weight: should not surpass 1.62 ounces; size: no larger than 1.68 inches in diameter; initial velocity: not faster than 250 ft/sec, with a tolerance of +2%; distance: not farther than 280 yards, with a tolerance of 6%



There are basically two kinds of golf balls—wound (or three-piece) and two-piece—each with a different core construction. Wound balls consist of the core, rubber thread (or some similar material or compound) windings, and a cover. The cores for these balls contain either a solid or hollow-filled center. The type of center depends on what type of cover is used. For a balata-covered ball, which will be explained later, the core consists of a rubber compound molded to the company's specifications and filled with a liquid or pasty material. For a hard-covered ball, the center is a solid rubber compound. The solid center increases the spin of the ball to make up for the lower spin rate caused by the harder cover. A two-piece ball consists of just a solid core and a hard cover. The core is also some type of rubber compound and, because there are no rubber threads, is larger than the core of a wound ball. This increase in core size creates a larger potential for stored energy and translates into more distance. All balls are manufactured to a certain degree of precision in their weight, size, velocity, and compression.

Just as there are basically two types of golf balls, there are also two types of cover materials, balata and hard-covers. Balata covers are used by players who want or need maximum control. These covers are much softer and thinner than hard covers and give a player more control by delivering the highest spin. Hard-covered balls, or ionomer-covered, are the most widely manufactured. The cover is thicker and harder than a balata cover and therefore offers a more cut-proof, durable cover. Most ionomers are Surlyn, which was developed by DuPont. These also have undergone advancements in their design. For instance, lithium-based Surlyn gives a more durable cover than older designs that are zinc-based. While this cover is most common, some companies use covers of their own design; for instance, Top Flite uses a Zylin cover, an ionomer that they developed. There are two different methods of molding the cover onto the golf ball. The first, called injection molding, is done by holding the core within a mold by pins. The molten ionomer is then injected into the cavity. As the ionomer cools and hardens, the pins are retracted and eventually ejected from the mold. Top Flite balls use this method of molding. The other type of molding is called compression molding and is the most common. In this type of molding, the ionomer is formed into two pieces and compressed around the core. Both methods are roughly equal in cost and give almost the same consistency and precision.

The dimple pattern of a golf ball is what directly determines its trajectory or flight path. A common myth about golf balls is that the more dimples there are, the farther the ball will travel. In fact, the number of dimples is the least important factor in determining dimple design. The dimple arrangement and the amount of surface area covered by the dimples are what most directly affect the aerodynamics of a ball. Manufacturers try to minimize the drag forces and maximize the lift forces on a golf ball by using various dimple designs and taking into account other factors like the type of core and cover, how tightly the rubber threads are wound, and so on. A diagram is given below illustrating the air flow around a golf ball and the direction of the forces acting on it.

The addition of dimples to a golf ball allows the air flow to follow the surface of the ball. This reduces the drag forces acting on the ball and creates more spin for better control and a more consistent flight path. Because of the many different factors affecting the ball, there is no one dimple design that maximizes the performance for each ball on the market. Different constructions, degree of feel, and the ball's trajectory must all be taken into account in determining a ball's dimple pattern.

A golf ball's performance is determined by three factors: launch angle, spin rate, and feel. Launch angle is the angle at which the ball leaves the face of the club with respect to the ground. Launch angles differ depending on the type of ball construction; for instance, wound balls typically have a lower launch angle than two-piece balls. This is because at contact with the clubhead, a golf ball begins to slide up the face of the club until a large enough area of the ball is in contact with the clubface. Because of the greater compression in wound balls, they stop sliding up the face of the club sooner than a two-piece, resulting in a lower launch angle than a two-piece. Spin rate is what affects how workable a ball is. The more spin generated, the more a ball will react to the different forces acting on it. This spin rate is determined by the hardness of the cover relative to the core. A soft cover (wound balls) generates more spin than balls with harder covers. As mentioned above, wound balls store energy sooner than two-piece balls. This creates, at maximum compression of the ball, more stored energy and results in more backspin and better control. Feel is one of the most important factors in a golf ball and, like the trajectory, launch angle, and spin rate, depends on the construction of the ball. Feel is determined by the compression of the ball; the lower the compression the softer the feel is. Golf balls are usually designed in three different compressions—80, 90, and 100—however, they can also come in others. For example, Bullet manufactures balls that come in compressions of 85 and 95. Compression is adjusted by either changing the rubber compound in the core or changing the tension in the rubber threads. Unfortunately, there is no compression that is right for a certain type of golfer. He or she must simply try each one out and pick whichever feels and suits his or her style of play best.

Today, because of the variety of swing characteristics and styles of golfers, golf balls come in a variety of performance benefits; however, no golf ball maximizes the performances in every category. A golfer must choose a ball that would best suit his or her game, while taking into account factors like course and weather conditions, and realizing that to receive one benefit, another must be given up; for instance, using a wound ball to obtain better control even though it gives less distance than a two-piece ball.

Source: Robert Dueker, "A Golf Ball's Construction and Its Effect on Performance." Iowa State University, English 314: Technical Communication. Reproduced with permission.