



## Standard Test Method for Measurement of Backpack Capacity<sup>1</sup>

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### 1. Scope

1.1 This test method determines and standardizes an unextended and extended capacity for backpacks and related bags. Related bags include lumbar packs, soft rucksacks, internal and external frame packs, duffel bags, and travel packs.

1.2 This test method is designed to provide a means whereby manufacturers and consumers may have a consistent means to compare pack volumes.

1.3 This test method does not take into consideration areas of the backpack that are not completely enclosed by fabric such as mesh pockets, water bottle holders, and compressor pockets.

1.4 For practical purposes this test method cannot be used to measure capacities less than 4 L.

### 2. Terminology

#### 2.1 Definitions:

2.1.1 *backpack*—any carrying device constructed of fabric that utilizes a single or double shoulder strap as the means for the wearer to carry the bag on the users back.

2.1.2 *backpack back*—the part of the backpack that is against the user's back.

2.1.3 *backpack front*—the part of the backpack that is away from the user's back.

2.1.4 *extended capacity*—the maximum achievable volume of a backpack including all compartments and extensions maximized to their largest usable volume.

*full for panel loaded:* Zipped shut and all expansion panels open.

*full for top loader:* 4-in. diameter opening of extension collar drawcord, with pack body draw cord completely open. Top pocket must cover the extension collar opening.

*roll top:* In accordance with the manufacturer's design with all extension panels open.

2.1.5 *extension skirt*—a fabric extension which is attached to the top of the pack body and extends over and above the actual pack body.

2.1.6 *external frame pack*—a backpack that uses a rigid or semirigid frame on the outside of the pack bag.

2.1.7 *frame sheet*—a sheet generally constructed of foam or polyethylene, which forms the support in the back of the backpack.

2.1.8 *internal frame pack*—a backpack that uses one or more supports, or stays, made from a rigid or semirigid material, and incorporated into the inside of the backpack (usually made of aluminum, graphite, or carbon-fiber).

2.1.9 *lumbar pack*—a backpack that is designed to fit in the small of the back. Many lumbar packs do not have shoulder straps.

2.1.10 *soft rucksack*—a backpack that does not have a rigid frame and is generally of smaller size. This backpack may have a back constructed of foam, or a light frame sheet.

2.1.11 *unextended backpack capacity*—the maximum achievable volume of a backpack including all compartments maximized to their largest usable volume. All extensions closed.

*full for panel loaded:* Zipped shut.

*full for top loader:* 4-in. diameter opening of pack body drawcord.

*roll top:* In accordance with the manufacturer's design.

### 3. Summary of Test Method

3.1 *Determining Backpack Capacity*—All compartments (including main pack body, top pocket, exterior pockets) are filled with 20-mm plastic balls to their extended capacity. Balls are removed to bring the pack down to its unextended capacity. The removed balls are temporarily stored. The rest of the pack is emptied and the capacity measured in the graduated cylinder as the unextended capacity. The balls removed in the first step are then added to the cylinder to measure the extended capacity.

### 4. Significance and Use

4.1 Many consumers use the capacity measurement as a key specification to determine the backpack size suitable for their requirements.

### 5. Apparatus

5.1 *Spheres (see Fig. 1)*—15 to 20-mm hollow polypropylene, polyethylene, or other functionally incompressible plastic, measurement units with net density between 6 and 14

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilities and is the direct responsibility of Subcommittee F08.22 on Camping Softgoods.

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