

Coffee Standards



The Specialty Coffee Association (SCA) is a membership-based association built on foundations of openness, inclusivity, and the power of shared knowledge. From coffee farmers to baristas and roasters, our membership spans the globe, encompassing every element of the coffee value chain. SCA acts as a unifying force within the specialty coffee industry and works to make coffee better by raising standards worldwide through a collaborative and progressive approach. Dedicated to building an industry that is fair, sustainable, and nurturing for all, SCA draws on years of insights and inspiration from the specialty coffee community.

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What is a Coffee Standard?

Standards can be great tools for the coffee industry as they are trusted reference instruments established by knowledgeable subject-matter experts. An SCA standard is a high-quality recommendation by the Standards Committee. It is a quantifiable and qualifiable measure, based upon scientific testing, which set values and/or ranges of values for coffee. Currently, the SCA has standards for water, green coffee, and cupping coffee.

Green Coffee Standards

2.1 Allowable Defects for Specialty Grade Coffee

To be considered specialty grade, green coffee shall have zero category one (1) defects and five or less category two (2) defects. See the SCA green grading handbook for more information on these defects.

2.2 Green Grading Sample Size

A 350 gram sample of coffee is necessary to grade green coffee.

2.3 Lighting for Green Grading

When grading green coffee, the light level on the tabletop and grading mat shall be full spectrum and at least 4000 Kelvin (K) /1200 Lux (lx) /120 foot-candles (fc).

2.4 Surface for Grading

Green grading shall be done on a table at least two (2) feet long and two (2) feet wide (0.6096 meters by 0.6096 meters), on a black grading mat of at least the same size.

2.5 Water Activity Standard

Specialty grade green coffee beans shall have a water activity (aw) measurement lower than 0.70aw.

Green Coffee Standards cont.

2.6 Water Activity Standard: Background Information

Specialty grade green coffee beans shall have a water activity measurement lower than 0.70aw.

Standard: Specialty grade green coffee beans shall have a water activity measurement lower than 0.70aw.

Aim: To control wholesomeness and sensory quality of coffee raw material by minimizing the possibility of microorganism infection.

Background: Compared to moisture content, water activity (aw) is considered a better parameter for quantifying the degree of binding of all water present in food, both free and bound and, therefore, its availability to act as a solvent and participate in chemical, biochemical and microbiological transformations (Fellows, 2006), becoming the main indicator of food deterioration.

Presence of water in coffee may be seen as undesirable for several reasons:

- As a foreign material present in raw coffee, water content is part of the weight at time of purchase and therefore affects coffee price;
- As a spoilage factor of raw coffee at field and transport, water enhances mold attack opportunities, eventually leading to lot rejection;
- As a spoilage factor of raw coffee during final storage, water leads to enzymatic reactions that in the long term produce off-tastes;
- As a roasting/quenching/package technological aid, water is part of the weight of the coffee in the finished product and therefore affects final wholesale and retail price.

Water activity (a_w) is a measurement of the availability of water for survival and growth of microorganisms on nutritious substrates, including green coffee.

It differs from moisture content inasmuch as water can be bound in different ways to food substrate, making it unavailable for microorganisms' growth and production of metabolites, e.g. undesirable contaminants like flavor taints or toxins. Only the fraction of water that can go in equilibrium with vapor phase (i.e. evaporate) can be profited by microorganisms like bacteria, yeasts and – more importantly – molds for germination, survival and growth. Such fraction can be accurately inferred by measurement of a_w .

Mycotoxins are toxic secondary metabolites produced by fungi. Toxigenic fungi can grow both in the field during harvesting and storage, due to several factors inherent in the substrate and factors inherent in conditions involving the substrate (Scussel, 1998).

The most common mycotoxin related to coffee is ochratoxin A: there are three major ochratoxin A-producing fungi that are associated with coffee: *Aspergillus carbonarius*, *Aspergillus ochraceus* and, rarely, *Aspergillus niger* (Silva et al., 2008).

The fungus *Aspergillus ochraceus* is the leading producer of ochratoxin A in coffee. It develops in environments with temperatures between 8°C and 37°C, with the optimum temperature between 24 and 31°C. The minimum water activity for its development is 0.76 at 25°C, with the optimum a_w ranging from 0.95 to 0.99 and pH between 3 and 10 (Hocking and Pitt, 1997). Although *Aspergillus ochraceus* develops from a water activity of 0.76, the toxin is produced in coffee beans from 0.85, and 0.97 is the optimal a_w (Moss, 1996).

Implementation: Water activity is defined as the ratio of the vapor pressure of water in a given material to the vapor pressure of pure water at the same temperature. When vapor and temperature equilibrium are obtained in a sealed measurement chamber, the water activity of the sample is equal to the relative humidity of air surrounding it.

Relative humidity measurement is a straightforward albeit delicate analysis, best performed in dedicated apparatus commercially available.

Green Coffee Standards cont.

2.6 Water Activity Standard: Background Information

Guidelines: Follow the calibration and operations instructions given by the water activity testing equipment manufacture, placing the appropriate quantity of coffee beans into the device.

Caveat 1: Any analytical determination is at most as good as the sampling step that precedes it.

Caveat 2: Water Activity (aw) determinations cannot assure that previous infection and spoilage did not occur on the green coffee in the past. Monitoring plans for extant presence of mycotoxins should always be in place throughout the farm-to-roaster supply chain.

Cupping Standards

3.1 Coffee to Water Ratio for Cupping

When cupping, the ratio of 8.25 grams (whole bean) coffee (± 0.25 grams), to 5.07 fluid ounces (150 ml) water shall be used. When adjusting due to vessel size, a ratio of 1.63 grams (whole bean) coffee per 1 fluid ounce of water (or 0.055 g coffee per 1 ml water) shall be used.

3.2 Cupping Vessel

Cupping vessels shall be of tempered glass or ceramic material. They shall be between 7 and 9 fluid ounces (207 ml to 266 ml), with a top diameter of between 3 and 3.5 inches (76 - 89 mm). All cups used shall be of identical volume, dimensions and material of manufacture, and have lids.

3.3 Cupping Water Temperature

Cupping water temperature shall be $200^{\circ}\text{F} \pm 2^{\circ}\text{F}$ ($92.2 - 94.4^{\circ}\text{C}$) when poured on grounds.

3.4 Cupping Water

Cupping Water shall meet all the requirements listed in the SCA Standard 'Water for Brewing Specialty Coffee', which can be found on the SCA Resources web page.

3.5 Grind for Cupping

The coffee used for cupping shall be ground so that 70-75 percent of the grinds pass through the 20 mesh sieve.

Cupping Standards

3.6 Roast for Cupping

The roasting of coffee for cupping shall take between 8 and 12 minutes, and shall be used for cupping between 8 and 24 hours after roasting.

3.7 Roast Level for Cupping

The roast level for cupping shall be measured between 30 minutes and 4 hours after roasting using coffee ground to the SCA Standard Grind for Cupping and be measured on coffee at room temperature. The coffee shall meet the following measurements with a tolerance of ± 1.0 units:

- Agtron "Gourmet": 63.0
- Agtron "Commercial": 48.0
- Colortrack: 62.0
- Probat Colorette 3b: 96.0
- Javalitics: same as Agtron measurement using either "Gourmet" or "Commercial" scales
- Lightells: same as Agtron measurements using "Gourmet" scale
- RoastRite: same as Agtron measurements using "Gourmet" scale

3.8 Cupping Room Size

Cupping room minimum dimensions (for exactly one cupping table) shall be no smaller than 110 square feet (10.22 m²). The cupping room shall be sufficient size to accommodate all students for cupping at the same time. Each cupping table shall have 36-inch space surrounding the table for cuppers. No other furniture or fixtures shall be closer than 36-inches from the cupping table. If two or more tables are in the cupping room, a 60-inch radius shall be required between tables.

3.9 Cupping Spoons

Cupping spoons shall hold 0.135 – 0.169 fluid ounces (4-5 ml) of coffee sample and should be of non-reactive metal.

3.9.1 Cupping Tables

Cupping tables (for 6 people) shall have a surface area of at least 10 square feet (0.93 m²). Cupping tables shall be a comfortable height for all student sizes, abilities, and disabilities. (Cupping table shall be stationary and the students shall move around the table. Spinning table are inefficient and do not allow each student to direct their own cupping experience and should only be used in extreme situations when the student has no mobility.)

Water Standards

4.1 Water For Brewing Standards

The Statistics & Standards Committee of the Specialty Coffee Association has determined the following standards for the water used to brew specialty coffee. For a superior quality extraction of coffee solids, the brewing water should have these characteristics:

Characteristic	Target	Acceptable Range
Oder 1	Clean Fresh/Oder	
Oder 2	Free	
Total Chlorine	Clear color	
TDS 3	0 mg/L	75 - 250 mg/L
TDS 3	150 mg/L	75 - 250 mg/L
Calcium	150 mg/L	1-5 grains or 17 mg/L - 85
Hardness	4 grains or 68 mg/L	mg/L
Total Alkility	40 mg/L	At or near 40 mg/L
pH	7.0	6.5 - 7.5
Sodium	10 mg/L	At or near 10 mg/L

1. Odor is based on sensory olfactory determination.
2. Color is based on sensory visual determination.
3. TDS measured based on 4-4-2 conversion.

The Target is the most desirable point in the Acceptable Range, although falling within the range is considered meeting the standard. These variances are in place to take into consideration real world circumstances, and the target gives the optimum measurement of each characteristic to strive for.

For details of testing equipment & protocols, please see the SCA Water Quality Handbook.

Brewing Standards

5.1 Golden Cup Standard

Coffee shall exhibit a brew strength, measured in Total Dissolved Solids, of 11.5 to 13.5 grams per liter, corresponding to 1.15 to 1.35 "percent" on the SCA Brewing Control Chart, resulting from a solubles extraction yield of 18 to 22 percent*.



**Specialty
Coffee
Association**

**Oak Lodge Farm, Leighams Road,
Bicknacre, Chelmsford,
Essex, CM3 4HF
United Kingdom**

**117 West 4th St., Suite 300
Santa Ana, California, 92701
United States**

sca.coffee