thousandths (0.7939) in vacuum at 60 degrees Fahrenheit referred to water at 60 degrees Fahrenheit as unity.

Spirits, spirituous liquor, or distilled spirits. That substance known as ethyl alcohol, ethanol, or spirits of wine in any form, including all dilutions and mixtures thereof, from whatever source or by whatever process produced, but not denatured spirits unless specifically stated. For the sole purpose of gauging wine and alcoholic flavoring materials on the bonded premises of a distilled spirits plant, such alcoholic ingredients shall have the same meaning described herein to spirits, spirituous liquor, or distilled spirits.

This chapter. Title 27, Code of Federal Regulations, Chapter I (27 CFR Chapter I).

U.S.C. The United States Code.

[T.D. ATF–198, 50 FR 8535, Mar. 1, 1985, as amended by T.D. ATF–438, 66 FR 5481, Jan. 19, 2001; T.D. TTB–44, 71 FR 16947, Apr. 4, 2006]

Subpart C—Gauging Instruments

§ 30.21 Requirements.

(a) *General.* The proof of distilled spirits shall be determined by the use of gauging instruments as prescribed in this part.

(b) *Proprietors.* Proprietors shall use only accurate hydrometers and thermometers that show subdivisions or graduations of proof and temperature which are at least as delimitated as the instruments described in § 30.22.

(c) *Appropriate TTB officers.* Appropriate TTB officers shall use only hydrometers and thermometers furnished by the Government. However, where this part requires the use of a specific gravity hydrometer, TTB officers shall use precision grade specific gravity hydrometers conforming to the provisions of § 30.24, furnished by the proprietor. However, the appropriate TTB officer may authorize the use of other instruments approved by the appropriate TTB officer as being equally satisfactory for determination of specific gravity and for gauging. From time to time appropriate TTB officers shall verify the accuracy of hydrometers and thermometers used by proprietors.

(Sec. 201, Pub. L. 85–859, 72 Stat. 1358, as amended (26 U.S.C. 5204))

[T.D. ATF–198, 50 FR 8535, Mar. 1, 1985, as amended by T.D. ATF–438, 66 FR 5481, Jan. 19, 2001]

§ 30.22 Hydrometers and thermometers.

The hydrometers used are graduated to read the proof of aqueous alcoholic solutions at 60 degrees Fahrenheit; thus, they read, 0 for water, 100 for proof spirits, and 200 for absolute alcohol. Because of temperature-density relationships and the selection of 60 degrees Fahrenheit for reporting proof, the hydrometer readings will be less than the true percent of proof at temperatures below 60 degrees Fahrenheit and greater than the true percent of proof at temperatures above 60 degrees Fahrenheit. Hence, corrections are necessary for hydrometer readings at temperatures other than 60 degrees Fahrenheit. Precision hydrometers shall be used for gauging spirits. Hydrometers and thermometers shall be used and the true percent of proof shall be determined in accordance with § 30.31. Hydrometers are designated by letter according to range of proof and are provided in ranges and subdivisions of stems as follows:

Precision	Range	Subdivision
F	0 to 20	0.2°
G	20 to 40	0.2°
H	40 to 60	0.2°
I	60 to 80	0.2°
K	75 to 95	0.2°
L	90 to 110	0.2°
M	105 to 125	0.2°
N	125 to 145	0.2°
P	145 to 165	0.2°
Q	165 to 185	0.2°
R	185 to 206	0.2°

Thermometers are designated by type according to range of degrees Fahrenheit and are provided in ranges and subdivisions of degrees as follows:

Type	Range	Subdivision
Pencil type	10° to 100°	1°
V-back	10° to 100°	1°
Glass shell (earlier model)	40° to 100°	½°
Glass shell (later model)	40° to 100°	¼°

(Sec. 201, Pub. L. 85–859, 72 Stat. 1358, as amended (26 U.S.C. 5204))

[T.D. ATF–198, 50 FR 8535, Mar. 1, 1985, as amended by T.D. ATF–381, 61 FR 37003, July 16, 1996]

§ 30.23 Use of precision hydrometers and thermometers.

Care should be exercised to obtain accurate hydrometer and thermometer readings. In order to accomplish this result, the following precautions should be observed. Bulk spirits should be thoroughly agitated so that the test samples will be representative of the entire quantity. The hydrometers should be kept clean and free of any oily substance. Immediately before readings are taken, the glass cylinder containing the thermometer should be rinsed several times with the spirits which are to be gauged so as to bring both the cylinder and the thermometer to the temperature of the spirits (if time permits, it is desirable to bring both the spirits and the instruments to room temperature). If the outer surface of the cylinder becomes wet, it should be wiped dry to avoid the cooling effect of rapid evaporation. During the readings the cylinder should be protected from drafts or other conditions which might affect its temperature or that of the spirits which it contains. The hands should not be placed on the cylinder in such a manner as to warm the liquid contained therein. The hydrometer should be inserted in the liquid and the hydrometer bulb raised and lowered from top to bottom 5 or 6 times to obtain an even temperature distribution over its surface, and, while the hydrometer bulb remains in the liquid, the stem should be dried and the hydrometer allowed to come to rest without wetting more than a few tenths degrees of the exposed stem. Special care should be taken to ascertain the exact point at which the level of the surface liquid intersects the scale of proof in the stem of the hydrometer. The hydrometer and thermometer should be immediately read, as nearly simultaneously as possible. In reading the hydrometer, a sighting should be made slightly below the plane of the surface of the liquid and the line of sight should then be raised slowly, being kept perpendicular to the hydrometer stem, until the appearance of the surface changes from an ellipse to a straight line. The point where this line intersects the hydrometer scale is the correct reading of the hydrometer. When the correct readings of the hydrometer and the thermometer have been determined, the true percent of proof shall be ascertained from Table 1. Another sample of the spirits should then be taken and be tested in the same manner so as to verify the proof originally ascertained. Hydrometer readings should be made to the nearest 0.05 degree and thermometer readings should be made to the nearest 0.1 degree, and instrument correction factors, if any, should be applied. It is necessary to interpolate in Table 1 for fractional hydrometer and thermometer readings.

Example. A hydrometer reads 192.85° at 72.10 °F. The correction factors for the hydrometer and the thermometer, respectively are minus0.03° and plus0.05°. The corrected reading, then, is 192.82° at 72.15 °F.

From Table 1:		
193.0° at 72.0 °F.	=	190.2°
192.0° at 72.0 °F.	=	189.1°
Difference	=	1.1°
192.0° at 72.0 °F.	=	189.1°
192.0° at 73.0 °F.	=	188.9°
Difference	=	0.2°

The hydrometer difference (1.1°) multiplied by the fractional degree of the hydrometer reading (0.82°)=0.902.

The temperature difference (0.2°) multiplied by the fractional degree of the temperature reading (0.15°)=0.03°.

Proof at 60 °F.=189.1+0.902–0.03=189.972°=190.0°.

As shown, the final proof is rounded to the nearest tenth of a degree of proof. In such cases, if the hundredths decimal is less than five, it will be dropped; if it is five or over, a unit will be added.

(Sec. 201, Pub. L. 85–859, 72 Stat. 1358, as amended (26 U.S.C. 5204))

[T.D. ATF–198, 50 FR 8535, Mar. 1, 1985, as amended by T.D. ATF–381, 61 FR 37004, July 16, 1996]

§ 30.24 Specific gravity hydrometers.

(a) The specific gravity hydrometers furnished by proprietors to appropriate TTB officers shall conform to the standard specifications of the American Society for Testing and Materials (ASTM) for such instruments. Such specific gravity hydrometers shall be