Tycos Tables

General Data

Concerning and for use with Temperature Indicating, Recording, and Controlling Instruments; Hydrometers and Meteorological Instruments

Price $1.00

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Foreword

The tables and data here published are applicable to the operation of and the results obtained with instruments for the indicating, recording and controlling of temperatures, density tests of liquids, and pressure, velocity and humidity of air.

We have collected these tables with a view to giving the users of our instruments all the general information possible that will assist them in properly operating the instruments and to use in connection with the results obtained.

We are desirous of having these tables as complete as possible and will therefore be pleased to receive criticisms or suggestions which would add greater value to future editions.

In compiling these tables we took our data from the most authoritative sources possible. We wish to acknowledge the courtesy of the following in allowing us to copy from their publications and for assistance rendered

Bureau of Standards,
American Chemical Society,
American Society for Testing Materials,
University of Illinois,
Smithsonian Institute,
Weather Bureau,
Landolt Bornstein Physical & Chemical Tables,
Exporters Encyclopedia, thirteenth edition,
Wheeler Condenser & Engineering Company,
Practical Engineer,
City of Philadelphia—Bureau of Health,
O. S. Hunziker,
The Department of Agriculture, Bureau of Animal Industry.

Taylor Instrument Companies

September, 1918.

CORRECTION FOR EMERGENT STEM ON ENGRAVED THERMOMETERS

In general, all corrections are determined for total immersion conditions, i. e., for the condition where both the bulb and the stem of the thermometer are at the same temperature. If, however, the stem is emergent into space, either hotter or colder than the temperature of the bulb, a stem correction must be applied to the observed reading in addition to any actual correction given for the thermometer on a certificate.

This so-called stem correction is very large if the number of degrees emergent and the difference of the temperature between the bath and the space above it are large. It may amount to more than 20° C. (36° F.) for measurements made with an engraved mercury in glass thermometer at 400° C. (750° F.)

For the glass of which practically all thermometers up to 450° C. (850° F.) are made, the stem correction can be very closely computed from the following formula:

$$\text{Stem Correction} = .00016^\circ \text{ C. } (.000089^\circ \text{ F.}) \times N\ (T^\circ - t^\circ).$$

N = number of degrees emergent from bath.

T = temperature of the bath.

t = average temperature of the emergent stem.

The average temperature of the emergent stem, t, may be approximately measured by means of a small auxiliary thermometer suspended near the emergent stem, either near the middle or at several points, as the bottom, middle and top, and the average of these readings taken.

If the thermometer is used in conditions such that it has only a small stem correction, the reading of the thermometer corrected by the actual corrections as shown on a certificate, may be taken as the temperature of the bath, since a difference in the temperature of the bath makes a much smaller difference in the value of the stem correction.

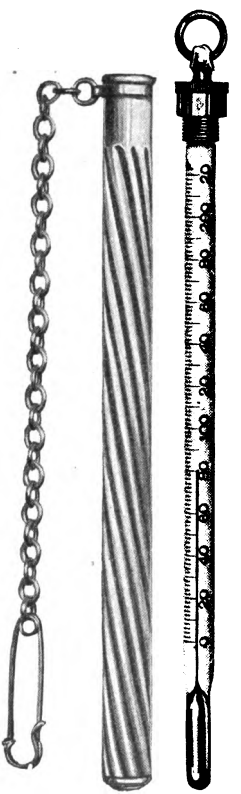
Example: The observed temperature is 50° C., at which point the certificate shows there is a correction on the thermometer of +0.5° C., and the thermometer is immersed to the 0° C. mark on the scale, so that there is 50° C. of the mercury column projected out into the air and the average temperature of the emergent stem is found to be 20° C., then

$$\text{Stem Correction} = .00016 \times 50\ (50.5 - 20)$$
$$= .244$$

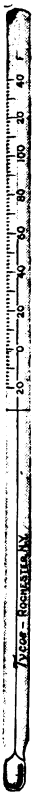
Tycos Engraved Thermometers

1410

1441



1485



1785

X 1633

Ask for Section 1400

Correction for Emergent Stem on Engraved Thermometers (Continued)

As the stem is at a lower temperature than the bulb, the observed reading is too low and this correction must be added to it to find the reading corresponding to the total immersion, i. e., 50° + .244° = 50.244°. From the certificate there is found to be a further correction of + .5°, making the correct temperature 50.744° C.

If, however, the number of degrees emergent and the difference of temperature between the bath and the space above it are large, it is necessary to determine the stem correction approximately and apply this correction to the corrected reading of the thermometer in order to get the approximate temperature of the bath. This may be done by using the observed reading, corrected from the certificate, as the temperature of the bath and substituting it in the formula given above. This will determine the approximate stem correction and by applying this to the observed reading, the approximate temperature of the bath to a very small degree of error. Then using this corrected value of the temperature of the bath, the true stem correction can be obtained as closely as required.

Example: The observed temperature is 600° F., at which point the certificate indicates there is no correction and the thermometer is immersed to the 100° F. mark on the scale, so that there is 500° F. of the mercury column projected out into the air and the average temperature of the emergent stem is found to be 200° F., then

$$\text{The approximate stem correction} = .000089 \times 500\ (600 - 200)$$
$$= 17.8$$

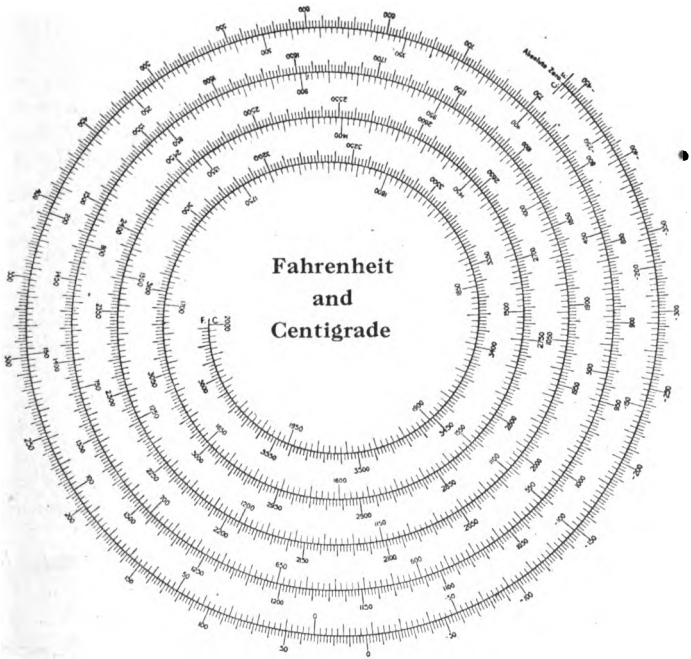
The approximate temperature of the bath is therefore 617.8° F. Therefore, a closer approximation to the true stem correction value will be

$$\text{Stem Correction} = .000089 \times 500\ (617.8 - 200)$$
$$= 18.6$$

As the stem is at a lower temperature than the bulb, the observed reading is too low and this correction must be added to it to find the reading corresponding to total immersion, i. e., 600° + 18.6 = 618.6° F.

As there is no correction shown at this point, on the certificate the corrected temperature is 618.6° F.

Temperature Conversion Table



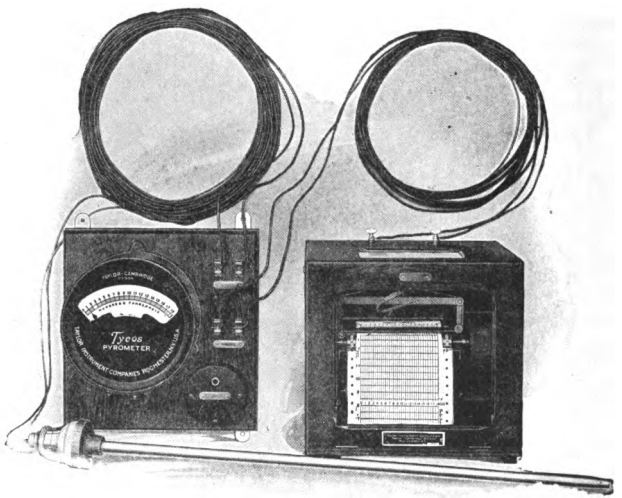
Conversion Formulae

°F. to °C. $°C = \frac{5}{9}(°F - 32)$

°C. to °F. $°F = \frac{9}{5}°C. + 32$

Tycos

Pyrometers



Standard *Tycos* Combined Indicating and Recording Pyrometer Outfit

Indicator can be located at one station, the recorder at another, at any distance apart.

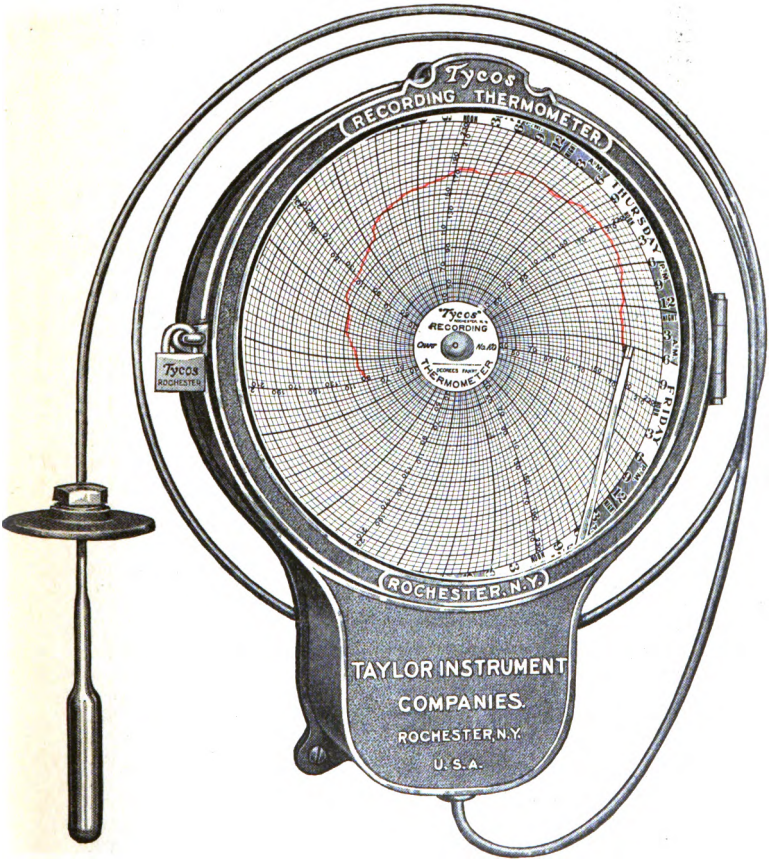
Ask for Book 4014

Equivalent Temperature Readings for Fahrenheit and Centigrade Scales

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
—459.4	—273.	— 29.20	— 34.	1.	— 17.22
—436.	—270.	— 29.	— 33.89	1.40	— 17.
—418.	—260.	— 28.	— 33.33	2.	— 16.67
—400.	—240.	— 27.40	— 33.	3.	— 16.11
—382.	—230.	— 27.	— 32.78	3.20	— 16.
—364.	—220.	— 26.	— 32.22	4.	— 15.56
—346.	—210.	— 25.60	— 32.	5.	— 15.
—328.	—200.	— 25.	— 31.67	6.	— 14.44
—310.	—190.	— 24.	— 31.11	6.80	— 14.
—292.	—180.	— 23.80	— 31.	7.	— 13.89
—274.	—170.	— 23.	— 30.56	8.	— 13.33
—256.	—160.	— 22.	— 30.	8.60	— 13.
—238.	—150.	— 21.	— 29.44	9.	— 12.78
—220.	—140.	— 20.20	— 29.	10.	— 12.22
—202.	—130.	— 20.	— 28.89	10.40	— 12.
—184.	—120.	— 19.	— 28.33	11.	— 11.67
—166.	—110.	— 18.40	— 28.	12.	— 11.11
—148.	—100.	— 18.	— 27.78	12.20	— 11.
—139.	— 95.	— 17.	— 27.22	13.	— 10.56
—130.	— 90.	— 16.60	— 27.	14.	— 10.
—121.	— 85.	— 16.	— 26.67	15.	— 9.44
—112.	— 80.	— 15.	— 26.11	15.80	— 9.
—103.	— 75.	— 14.80	— 26.	16.	— 8.89
— 94.	— 70.	— 14.	— 25.56	17.	— 8.33
— 85.	— 65.	— 13.	— 25.	17.60	— 8.
— 76.	— 60.	— 12.	— 24.44	18.	— 7.78
— 67.	— 55.	— 11.20	— 24.	19.	— 7.22
— 58.	— 50.	— 11.	— 23.89	19.40	— 7.
— 49.	— 45.	— 10.	— 23.33	20.	— 6.67
— 40.	— 40.	— 9.40	— 23.	21.	— 6.11
— 39.	— 39.44	— 9.	— 22.78	21.20	— 6.
— 38.20	— 39.	— 8.	— 22.22	22.	— 5.56
— 38.	— 38.89	— 7.60	— 22.	23.	— 5.
— 37.	— 38.33	— 7.	— 21.67	24.	— 4.44
— 36.40	— 38.	— 6.	— 21.11	24.80	— 4.
— 36.	— 37.78	— 5.80	— 21.	25.	— 3.89
— 35.	— 37.22	— 5.	— 20.56	26.	— 3.33
— 34.60	— 37.	— 4.	— 20.	26.60	— 3.
— 34.	— 36.67	— 3.	— 19.44	27.	— 2.78
— 33.	— 36.11	— 2.20	— 19.	28.	— 2.22
— 32.80	— 36.	— 2.	— 18.89	28.40	— 2.
— 32.	— 35.56	— 1.	— 18.33	29.	— 1.67
— 31.	— 35.	— 0.40	— 18.	30.	— 1.11
— 30.	— 34.44	0.	— 17.78	30.20	—

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
31.	— 0.56	62.	16.67	92.	33.33
32.	0.	62.60	17.	93.	33.89
33.	0.56	63.	17.22	93.20	34.
33.80	1.	64.	17.78	94.	34.44
34.	1.11	64.40	18.	95.	35.
35.	1.67	65.	18.33	96.	35.56
35.60	2.	66.	18.89	96.80	36.
36.	2.22	66.20	19.	97.	36.11
37.	2.78	67.	19.44	98.	36.67
37.40	3.	68.	20.	98.60	37.
38.	3.33	69.	20.56	99.	37.22
39.	3.89	69.80	21.	100.	37.78
39.20	4.	70.	21.11	100.40	38.
40.	4.44	71.	21.67	101.	38.33
41.	5.	71.60	22.	102.	38.89
42.	5.56	72.	22.22	102.20	39.
42.80	6.	73.	22.78	103.	39.44
43.	6.11	73.40	23.	104.	40.
44.	6.67	74.	23.33	105.	40.56
44.60	7.	75.	23.89	105.80	41.
45.	7.22	75.20	24.	106.	41.11
46.	7.78	76.	24.44	107.	41.67
46.40	8.	77.	25.	107.60	42.
47.	8.33	78.	25.56	108.	42.22
48.	8.89	78.80	26.	109.	42.78
48.20	9.	79.	26.11	109.40	43.
49.	9.44	80.	26.67	110.	43.33
50.	10.	80.60	27.	111.	43.89
51.	10.56	81.	27.22	111.20	44.
51.80	11.	82.	27.78	112.	44.44
52.	11.11	82.40	28.	113.	45.
53.	11.67	83.	28.33	114.	45.56
53.60	12.	84.	28.89	114.80	46.
54.	12.22	84.20	29.	115.	46.11
55.	12.78	85.	29.44	116.	46.67
55.40	13.	86.	30.	116.60	47.
56.	13.33	87.	30.56	117.	47.22
57.	13.89	87.80	31.	118.	47.78
57.20	14.	88.	31.11	118.40	48.
58.	14.44	89.	31.67	119.	48.33
59.	15.	89.60	32.	120.	48.89
60.	15.56	90.	32.22	120.20	49.
60.80	16.	91.	32.78	121.	49.44
61.	16.11	91.40	33.	122.	50.

Tycos Mercury Recording Thermometer
Dial Type



Records temperature within limits of —40°to +1000° Fahr.
Various forms of bulbs and connections for all industrial processes.

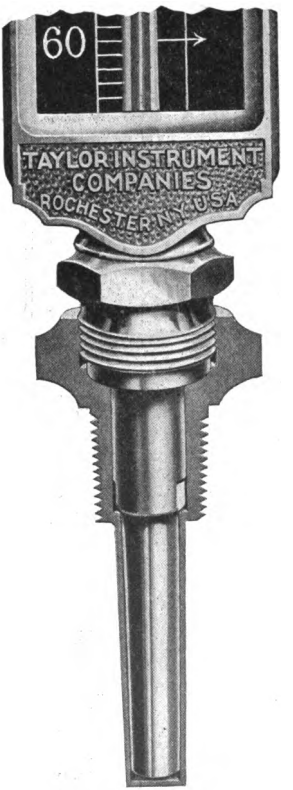
Ask for Catalog 3000-9000

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
123.	50.56	153.	67.22	183.20	84.
123.80	51.	154.	67.78	184.	84.44
124.	51.11	154.40	68.	185.	85.
125.	51.67	155.	68.33	186.	85.56
125.60	52.	156.	68.89	186.80	86.
126.	52.22	156.20	69.	187.	86.11
127.	52.78	157.	69.44	188.	86.67
127.40	53.	158.	70.	188.60	87.
128.	53.33	159.	70.56	189.	87.22
129.	53.89	159.80	71.	190.	87.78
129.20	54.	160.	71.11	190.40	88.
130.	54.44	161.	71.67	191.	88.33
131.	55.	161.60	72.	192.	88.89
132.	55.56	162.	72.22	192.20	89.
132.80	56.	163.	72.78	193.	89.44
133.	56.11	163.40	73.	194.	90.
134.	56.67	164.	73.33	195.	90.56
134.60	57.	165.	73.89	195.80	91.
135.	57.22	165.20	74.	196.	91.11
136.	57.78	166.	74.44	197.	91.67
136.40	58.	167.	75.	197.60	92.
137.	58.33	168.	75.56	198.	92.22
138.	58.89	168.80	76.	199.	92.78
138.20	59.	169.	76.11	199.40	93.
139.	59.44	170.	76.67	200.	93.33
140.	60.	170.60	77.	201.	93.89
141.	60.56	171.	77.22	201.20	94.
141.80	61.	172.	77.78	202.	94.44
142.	61.11	172.40	78.	203.	95.
143.	61.67	173.	78.33	204.	95.56
143.60	62.	174.	78.89	204.80	96.
144.	62.22	174.20	79.	205.	96.11
145.	62.78	175.	79.44	206.	96.67
145.40	63.	176.	80.	206.60	97.
146.	63.33	177.	80.56	207.	97.22
147.	63.89	177.80	81.	208.	97.78
147.20	64.	178.	81.11	208.40	98.
148.	64.44	179.	81.67	209.	98.33
149.	65.	179.60	82.	210.	98.89
150.	65.56	180.	82.22	210.20	99.
150.80	66.	181.	82.78	211.	99.44
151.	66.11	181.40	83.	212.	100.
152.	66.67	182.	83.33	213.	100.56
152.60	67.	183.	83.89	213.80	101.

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
214.	101.11	244.40	118.	275.	135.
215.	101.67	245.	118.33	276.	135.56
215.60	102.	246.	118.89	276.80	136.
216.	102.22	246.20	119.	277.	136.11
217.	102.78	247.	119.44	278.	136.67
217.40	103.	248.	120.	278.60	137.
218.	103.33	249.	120.56	279.	137.22
219.	103.89	249.80	121.	280.	137.78
219.20	104.	250.	121.11	280.40	138.
220.	104.44	251.	121.67	281.	138.33
221.	105.	251.60	122.	282.	138.89
222.	105.56	252.	122.22	282.20	139.
222.80	106.	253.	122.78	283.	139.44
223.	106.11	253.40	123.	284.	140.
224.	106.67	254.	123.33	285.	140.56
224.60	107.	255.	123.89	285.80	141.
225.	107.22	255.20	124.	286.	141.11
226.	107.78	256.	124.44	287.	141.67
226.40	108.	257.	125.	287.60	142.
227.	108.33	258.	125.56	288.	142.22
228.	108.89	258.80	126.	289.	142.78
228.20	109.	259.	126.11	289.40	143.
229.	109.44	260.	126.67	290.	143.33
230.	110.	260.60	127.	291.	143.89
231.	110.56	261.	127.22	291.20	144.
231.80	111.	262.	127.78	292.	144.44
232.	111.11	262.40	128.	293.	145.
233.	111.67	263.	128.33	294.	145.56
233.60	112.	264.	128.89	294.80	146.
234.	112.22	264.20	129.	295.	146.11
235.	112.78	265.	129.44	296.	146.67
235.40	113.	266.	130.	296.60	147.
236.	113.33	267.	130.56	297.	147.22
237.	113.89	267.80	131.	298.	147.78
237.20	114.	268.	131.11	298.40	148.
238.	114.44	269.	131.67	299.	148.33
239.	115.	269.60	132.	300.	148.89
240.	115.56	270.	132.22	300.20	149.
240.80	116.	271.	132.78	301.	149.44
241.	116.11	271.40	133.	302.	150.
242.	116.67	272.	133.33	303.	150.56
242.60	117.	273.	133.89	303.80	151.
243.	117.22	273.20	134.	304.	151.11
244.	117.78	274.	134.44	305.	151.67

Tycos Industrial Thermometers

Separable Socket Connection



Separable Socket Connection Thermometer showing lower portion of scale case, separable socket in cross section and taper fit, giving perfect contact between socket and bulb.

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
305.60	**152.**	**336.**	168.89	366.80	**186.**
306.	152.22	336.20	**169.**	**367.**	186.11
307.	152.78	**337.**	169.44	**368.**	186.67
307.40	**153.**	**338.**	**170.**	368.60	**187.**
308.	153.33	**339.**	170.56	**369.**	187.22
309.	153.89	339.80	**171.**	**370.**	187.78
309.20	**154.**	**340.**	171.11	370.40	**188.**
310.	154.44	**341.**	171.67	**371.**	188.33
311.	**155.**	341.60	**172.**	**372.**	188.89
312.	155.56	**342.**	172.22	372.20	**189.**
312.80	**156.**	**343.**	172.78	**373.**	189.44
313.	156.11	343.40	**173.**	**374.**	**190.**
314.	156.67	**344.**	173.33	**375.**	190.56
314.60	**157.**	**345.**	173.89	375.80	**191.**
315.	157.22	345.20	**174.**	**376.**	191.11
316.	157.78	**346.**	174.44	**377.**	191.67
316.40	**158.**	**347.**	**175.**	377.60	**192.**
317.	158.33	**348.**	175.56	**378.**	192.22
318.	158.89	348.80	**176.**	**379.**	192.78
318.20	**159.**	**349.**	176.11	379.40	**193.**
319.	159.44	**350.**	176.67	**380.**	193.33
320.	**160.**	350.60	**177.**	**381.**	193.89
321.	160.56	**351.**	177.22	381.20	**194.**
321.80	**161.**	**352.**	177.78	**382.**	194.44
322.	161.11	352.40	**178.**	**383.**	**195.**
323.	161.67	**353.**	178.33	**384.**	195.56
323.60	**162.**	**354.**	178.89	384.80	**196.**
324.	162.22	354.20	**179.**	**385.**	196.11
325.	162.78	**355.**	179.44	**386.**	196.67
325.40	**163.**	**356.**	**180.**	386.60	**197.**
326.	163.33	**357.**	180.56	**387.**	197.22
327.	163.89	357.80	**181.**	**388.**	197.78
327.20	**164.**	**358.**	181.11	388.40	**198.**
328.	164.44	**359.**	181.67	**389.**	198.33
329.	**165.**	359.60	**182.**	**390.**	198.89
330.	165.56	**360.**	182.22	390.20	**199.**
330.80	**166.**	**361.**	182.78	**391.**	199.44
331.	166.11	361.40	**183.**	**392.**	**200.**
332.	166.67	**362.**	183.33	**393.**	200.56
332.60	**167.**	**363.**	183.89	393.80	**201.**
333.	167.22	363.20	**184.**	**394.**	201.11
334.	167.78	**364.**	184.44	**395.**	201.67
334.40	**168.**	**365.**	**185.**	395.60	**202.**
335.	168.33	**366.**	185.56	**396.**	202.22

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
397.	202.78	427.	219.44	458.	236.67
397.40	203.	428.	220.	458.60	237.
398.	203.33	429.	220.56	459.	237.22
399.	203.89	429.80	221.	460.	237.78
399.20	204.	430.	221.11	460.40	238.
400.	204.44	431.	221.67	461.	238.33
401.	205.	431.60	222.	462.	238.89
402.	205.56	432.	222.22	462.20	239.
402.80	206.	433.	222.78	463.	239.44
403.	206.11	433.40	223.	464.	240.
404.	206.67	434.	223.33	465.	240.56
404.60	207.	435.	223.89	465.80	241.
405.	207.22	435.20	224.	466.	241.11
406.	207.78	436.	224.44	467.	241.67
406.40	208.	437.	225.	467.60	242.
407.	208.33	438.	225.56	468.	242.22
408.	208.89	438.80	226.	469.	242.78
408.20	209.	439.	226.11	469.40	243.
409.	209.44	440.	226.67	470.	243.33
410.	210.	440.60	227.	471.	243.89
411.	210.56	441.	227.22	471.20	244.
411.80	211.	442.	227.78	472.	244.44
412.	211.11	442.40	228.	473.	245.
413.	211.67	443.	228.33	474.	245.56
413.60	212.	444.	228.89	474.80	246.
414.	212.22	444.20	229.	475.	246.11
415.	212.78	445.	229.44	476.	246.67
415.40	213.	446.	230.	476.60	247.
416.	213.33	447.	230.56	477.	247.22
417.	213.89	447.80	231.	478.	247.78
417.20	214.	448.	231.11	478.40	248.
418.	214.44	449.	231.67	479.	248.33
419.	215.	449.60	232.	480.	248.89
420.	215.56	450.	232.22	480.20	249.
420.80	216.	451.	232.78	481.	249.44
421.	216.11	451.40	233.	482.	250.
422.	216.67	452.	233.33	483.	250.56
422.60	217.	453.	233.89	483.80	251.
423.	217.22	453.20	234.	484.	251.11
424.	217.78	454.	234.44	485.	251.67
424.40	218.	455.	235.	485.60	252.
425.	218.33	456.	235.56	486.	252.22
426.	218.89	456.80	236.	487.	252.78
426.20	219.	457.	236.11	487.40	253.

Tycos Mercury Index Thermometer

Full-Circle Type

Indicates temperature within limits of —40° to +1000° Fahr. Various forms of bulbs and connections for all industrial processes.

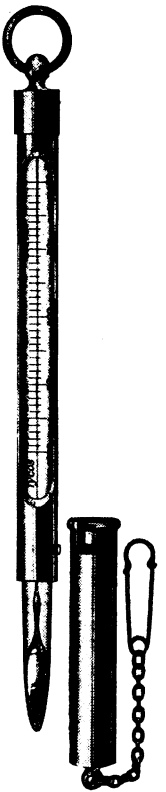
Ask for Catalog Part 8000-9000

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
488.	253.33	519.	270.56	549.	287.22
489.	253.89	519.80	271.	550.	287.78
489.20	254.	520.	271.11	550.40	288.
490.	254.44	521.	271.67	551.	288.33
491.	255.	521.60	272.	552.	288.89
492.	255.56	522.	272.22	552.20	289.
492.80	256.	523.	272.78	553.	289.44
493.	256.11	523.40	273.	554.	290.
494.	256.67	524.	273.33	555.	290.56
494.60	257.	525.	273.89	555.80	291.
495.	257.22	525.20	274.	556.	291.11
496.	257.78	526.	274.44	557.	291.67
496.40	258.	527.	275.	557.60	292.
497.	258.33	528.	275.56	558.	292.22
498.	258.89	528.80	276.	559.	292.78
498.20	259.	529.	276.11	559.40	293.
499.	259.44	530.	276.67	560.	293.33
500.	260.	530.60	277.	561.	293.89
501.	260.56	531.	277.22	561.20	294.
501.80	261.	532.	277.78	562.	294.44
502.	261.11	532.40	278.	563.	295.
503.	261.67	533.	278.33	564.	295.56
503.60	262.	534.	278.89	564.80	296.
504.	262.22	534.20	279.	565.	296.11
505.	262.78	535.	279.44	566.	296.67
505.40	263.	536.	280.	566.60	297.
506.	263.33	537.	280.56	567.	297.22
507.	263.89	537.80	281.	568.	297.78
507.20	264.	538.	281.11	568.40	298.
508.	264.44	539.	281.67	569.	298.33
509.	265.	539.60	282.	570.	298.89
510.	265.56	540.	282.22	570.20	299.
510.80	266.	541.	282.78	571.	299.44
511.	266.11	541.40	283.	572.	300.
512.	266.67	542.	283.33	573.	300.56
512.60	267.	543.	283.89	573.80	301.
513.	267.22	543.20	284.	574.	301.11
514.	267.78	544.	284.44	575.	301.67
514.40	268.	545.	285.	575.60	302.
515.	268.33	546.	285.56	576.	302.22
516.	268.89	546.80	286.	577.	302.78
516.20	269.	547.	286.11	577.40	303.
517.	269.44	548.	286.67	578.	303.33
518.	270.	548.60	287.	579.	303.89

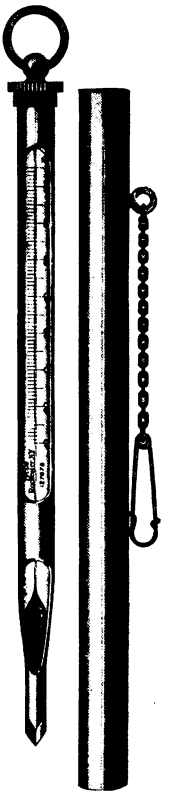
Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
579.20	304.	610.	321.11	640.40	338.
580.	304.44	611.	321.67	641.	338.33
581.	305.	611.60	322.	642.	338.89
582.	305.56	612.	322.22	642.20	339.
582.80	306.	613.	322.70	643.	339.44
583.	306.11	613.40	323.	644.	340.
584.	306.67	614.	323.33	645.	340.56
584.60	307.	615.	323.89	645.80	341.
585.	307.22	615.20	324.	646.	341.11
586.	307.78	616.	324.44	647.	341.67
586.40	308.	617.	325.	647.60	342.
587.	308.33	618.	325.56	648.	342.22
588.	308.89	618.80	326.	649.	342.78
588.20	309.	619.	326.11	649.40	343.
589.	309.44	620.	326.67	650.	343.33
590.	310.	620.60	327.	651.	343.89
591.	310.56	621.	327.22	651.20	344.
591.80	311.	622.	327.78	652.	344.44
592.	311.11	622.40	328.	653.	345.
593.	311.67	623.	328.33	654.	345.56
593.60	312.	624.	328.89	654.80	346.
594.	312.22	624.20	329.	655.	346.11
595.	312.78	625.	329.44	656.	346.67
595.40	313.	626.	330.	656.60	347.
596.	313.33	627.	330.56	657.	347.22
597.	313.89	627.80	331.	658.	347.78
597.20	314.	628.	331.11	658.40	348.
598.	314.44	629.	331.67	659.	348.33
599.	315.	629.60	332.	660.	348.89
600.	315.56	630.	332.22	660.20	349.
600.80	316.	631.	332.78	661.	349.44
601.	316.11	631.40	333.	662.	350.
602.	316.67	632.	333.33	663.	350.56
602.60	317.	633.	333.89	663.80	351.
603.	317.22	633.20	334.	664.	351.11
604.	317.78	634.	334.44	665.	351.67
604.40	318.	635.	335.	665.60	352.
605.	318.33	636.	335.56	666.	352.22
606.	318.89	636.80	336.	667.	352.78
606.20	319.	637.	336.11	667.40	353.
607.	319.44	638.	336.67	668.	353.33
608.	320.	638.60	337.	669.	353.89
609.	320.56	639.	337.22	669.20	354.
609.80	321.	640.	337.78	670.	354.44

Tycos Engraved Thermometers

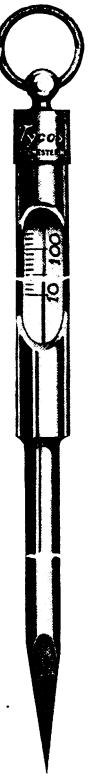
1784



1102



Z 3770



1120

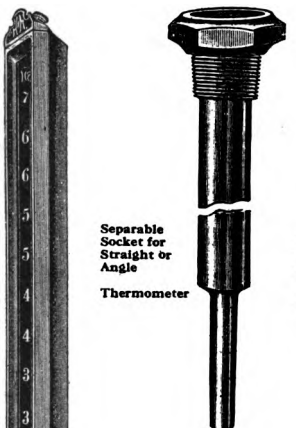
X 1150

Ask for Section 1400

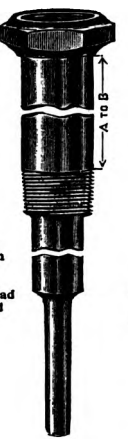
Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
671.	355.	701.60	372.	732.	388.89
672.	355.56	702.	372.22	732.20	389.
672.80	356.	703.	372.78	733.	389.44
673.	356.11	703.40	373.	734.	390.
674.	356.67	704.	373.33	735.	390.56
674.60	357.	705.	373.89	735.80	391.
675.	357.22	705.20	374.	736.	391.11
676.	357.78	706.	374.44	737.	391.67
676.40	358.	707.	375.	737.60	392.
677.	358.33	708.	375.56	738.	392.22
678.	358.89	708.80	376.	739.	392.78
678.20	359.	709.	376.11	739.40	393.
679.	359.44	710.	376.67	740.	393.33
680.	360.	710.60	377.	741.	393.89
681.	360.56	711.	377.22	741.20	394.
681.80	361.	712.	377.78	742.	394.44
682.	361.11	712.40	378.	743.	395.
683.	361.67	713.	378.33	744.	395.56
683.60	362.	714.	378.89	744.80	396.
684.	362.22	714.20	379.	745.	396.11
685.	362.78	715.	379.44	746.	396.67
685.40	363.	716.	380.	746.60	397.
686.	363.33	717.	380.56	747.	397.22
687.	363.89	717.80	381.	748.	397.78
687.20	364.	718.	381.11	748.40	398.
688.	364.44	719.	381.67	749.	398.33
689.	365.	719.60	382.	750.	398.89
690.	365.56	720.	382.22	750.20	399.
690.80	366.	721.	382.78	751.	399.44
691.	366.11	721.40	383.	752.	400.
692.	366.67	722.	383.33	753.	400.56
692.60	367.	723.	383.89	753.80	401.
693.	367.22	723.20	384.	754.	401.11
694.	367.78	724.	384.44	755.	401.67
694.40	368.	725.	385.	755.60	402.
695.	368.33	726.	385.56	756.	402.22
696.	368.89	726.80	386.	757.	402.78
696.20	369.	727.	386.11	757.40	403.
697.	369.44	728.	386.67	758.	403.33
698.	370.	728.60	387.	759.	403.89
699.	370.56	729.	387.22	759.20	404.
699.80	371.	730.	387.78	760.	404.44
700.	371.11	730.40	388.	761.	405.
701.	371.67	731.	388.33	762.	405.56

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
762.80	**406.**	**793.**	422.78	**823.**	439.44
763.	406.11	793.40	**423.**	**824.**	**440.**
764.	406.67	**794.**	423.33	**825.**	440.56
764.60	**407.**	**795.**	423.89	825.80	**441.**
765.	407.22	795.20	**424.**	**826.**	441.11
766.	407.78	**796.**	424.44	**827.**	441.67
766.40	**408.**	**797.**	**425.**	827.60	**442.**
767.	408.33	**798.**	425.56	**828.**	442.22
768.	408.89	798.80	**426.**	**829.**	442.78
768.20	**409.**	**799.**	426.11	829.40	**443.**
769.	409.44	**800.**	426.67	**830.**	443.33
770.	**410.**	800.60	**427.**	**831.**	443.89
771.	410.56	**801.**	427.22	831.20	**444.**
771.80	**411.**	**802.**	427.78	**832.**	444.44
772.	411.11	802.40	**428.**	**833.**	**445.**
773.	411.67	**803.**	428.33	**834.**	445.56
773.60	**412.**	**804.**	428.89	834.80	**446.**
774.	412.22	804.20	**429.**	**835.**	446.11
775.	412.78	**805.**	429.44	**836.**	446.67
775.40	**413.**	**806.**	**430.**	836.60	**447.**
776.	413.33	**807.**	430.56	**837.**	447.22
777.	413.89	807.80	**431.**	**838.**	447.78
777.20	**414.**	**808.**	431.11	838.40	**448.**
778.	414.44	**809.**	431.67	**839.**	448.33
779.	**415.**	809.60	**432.**	**840.**	448.89
780.	415.56	**810.**	432.22	840.20	**449.**
780.80	**416.**	**811.**	432.78	**841.**	449.44
781.	416.11	811.40	**433.**	**842.**	**450.**
782.	416.67	**812.**	433.33	**843.**	450.56
782.60	**417.**	**813.**	433.89	843.80	**451.**
783.	417.22	813.20	**434.**	**844.**	451.11
784.	417.78	**814.**	434.44	**845.**	451.67
784.40	**418.**	**815.**	**435.**	845.60	**452.**
785.	418.33	**816.**	435.56	**846.**	452.22
786.	418.89	816.80	**436.**	**847.**	452.78
786.20	**419.**	**817.**	436.11	847.40	**453.**
787.	419.44	**818.**	436.67	**848.**	453.33
788.	**420.**	818.60	**437.**	**849.**	453.89
789.	420.56	**819.**	437.22	849.20	**454.**
789.80	**421.**	**820.**	437.78	**850.**	454.44
790.	421.11	820.40	**438.**	**851.**	**455.**
791.	421.67	**821.**	438.33	**852.**	455.56
791.60	**422.**	**822.**	438.89	852.80	**456.**
792.	422.22	822.20	**439.**	**853.**	456.11

Tycos Industrial Thermometers
Long Stem
Separable Socket



Separable Socket for Straight or Angle Thermometer



Separable Socket with Extension between Wrench-head and Thread

Straight Thermometer

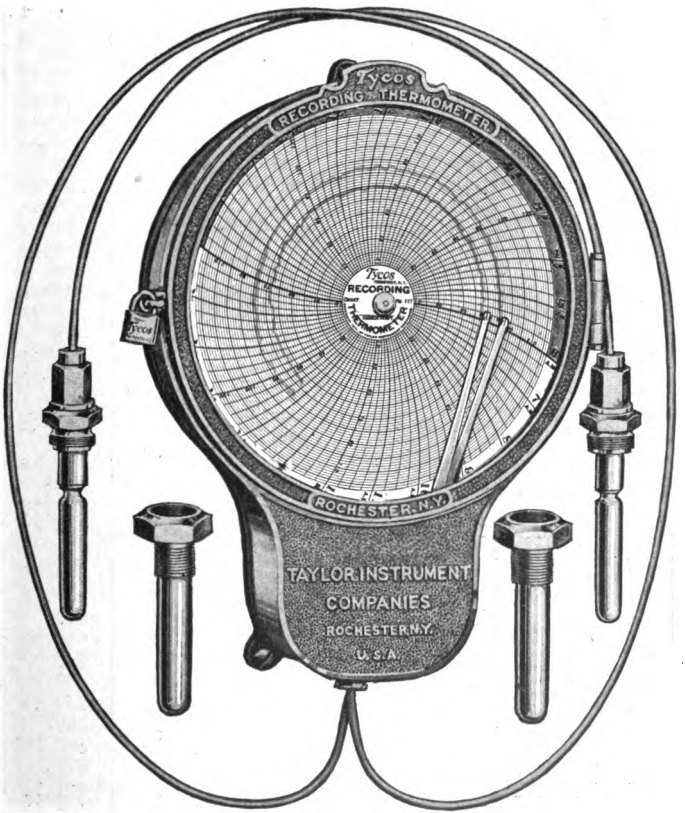
Angle Thermometer showing Swivel-nut of Union for connecting to Socket. Also Tapering Bulb-stem to form *perfect contact*

Ask for Bulletin 700-B

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
854.	456.67	**884.**	473.33	**915.**	490.56
854.60	**457.**	**885.**	473.89	915.80	**491.**
855.	457.22	885.20	**474.**	**916.**	491.11
856.	457.78	**886.**	474.44	**917.**	491.67
856.40	**458.**	**887.**	**475.**	917.60	**492.**
857.	458.33	**888.**	475.56	**918.**	**492.22**
858.	458.89	888.80	**476.**	**919.**	492.78
858.20	**459.**	**889.**	476.11	919.40	**493.**
859.	459.44	**890.**	476.67	**920.**	**493.33**
860.	**460.**	890.60	**477.**	**921.**	**493.89**
861.	460.56	**891.**	477.22	921.20	**494.**
861.80	**461.**	**892.**	477.78	**922.**	**494.44**
862.	461.11	892.40	**478.**	**923.**	**495.**
863.	461.67	**893.**	478.33	**924.**	495.56
863.60	**462.**	**894.**	478.89	924.80	**496.**
864.	462.22	894.20	**479.**	**925.**	496.11
865.	462.78	**895.**	479.44	**926.**	496.67
865.40	**463.**	**896.**	**480.**	926.60	**497.**
866.	463.33	**897.**	480.56	**927.**	497.22
867.	463.89	897.80	**481.**	**928.**	497.78
867.20	**464.**	**898.**	481.11	928.40	**498.**
868.	464.44	**899.**	481.67	**929.**	**498.33**
869.	**465.**	899.60	**482.**	**930.**	498.89
870.	465.56	**900.**	482.22	930.20	**499.**
870.80	**466.**	**901.**	482.78	**931.**	**499.44**
871.	466.11	901.40	**483.**	**932.**	**500.**
872.	466.67	**902.**	483.33	**933.**	500.56
872.60	**467.**	**903.**	483.89	933.80	**501.**
873.	467.22	903.20	**484.**	**934.**	501.11
874.	467.78	**904.**	484.44	**935.**	501.67
874.40	**468.**	**905.**	**485.**	935.60	**502.**
875.	468.33	**906.**	485.56	**936.**	**502.22**
876.	468.89	906.80	**486.**	**937.**	502.78
876.20	**469.**	**907.**	486.11	937.40	**503.**
877.	469.44	**908.**	486.67	**938.**	**503.33**
878.	**470.**	908.60	**487.**	**939.**	503.89
879.	470.56	**909.**	487.22	939.20	**504.**
879.80	**471.**	**910.**	487.78	**940.**	504.44
880.	471.11	910.40	**488.**	**941.**	**505.**
881.	471.67	**911.**	488.33	**942.**	505.56
881.60	**472.**	**912.**	488.89	942.80	**506.**
882.	472.22	912.20	**489.**	**943.**	506.11
883.	472.78	**913.**	489.44	**944.**	506.67
883.40	**473.**	**914.**	**490.**	944.60	**507.**

Tycos Mercury Bi-Record Recording Thermometer

Dial Type



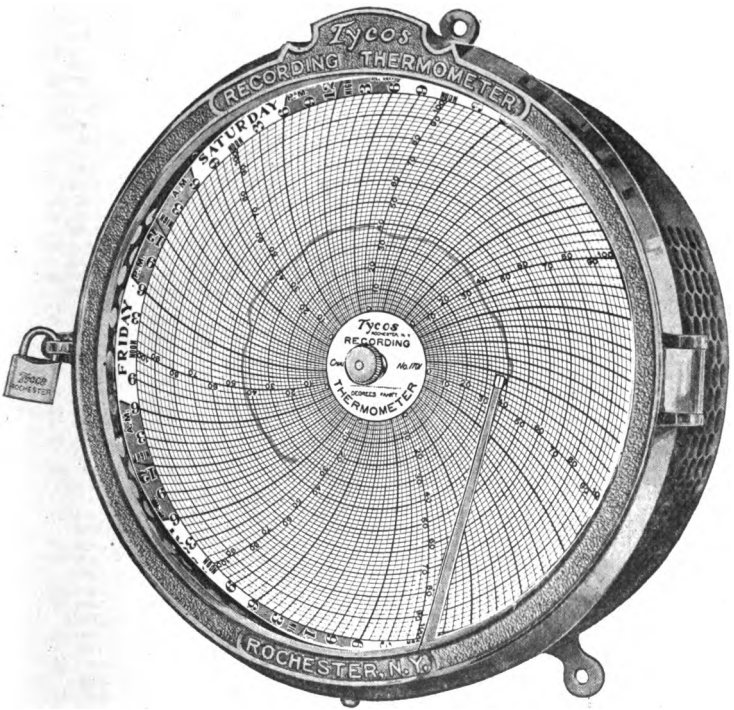
Recommended for condensers, hot water and brine circulating systems, etc.

Ask for Catalog Parts 8000-9000 and 11000

Fahren-heit Degs.	Centi-grade Degs.	Fahren-heit Degs.	Centi-grade Degs.	Fahren-heit Degs.	Centi-grade Degs.
945.	507.22	971.60	522.	1000.	537.78
946.	507.78	972.	522.22	1004.	540.
946.40	508.	973.	522.78	1010.	543.33
947.	508.33	973.40	523.	1020.	548.89
948.	508.89	974.	523.33	1022.	550.
948.20	509.	975.	523.78	1030.	554.44
949.	509.44	975.20	524.	1040.	560.
950.	510.	976.	524.44	1050.	565.56
951.	510.56	977.	525.	1058.	570.
951.80	511.	978.	525.56	1060.	571.11
952.	511.11	978.80	526.	1070.	576.67
953.	511.67	979.	526.11	1076.	580.
953.60	512.	980.	526.67	1080.	582.22
954.	512.22	980.60	527.	1090.	587.78
955.	512.78	981.	527.22	1094.	590.
955.40	513.	982.	527.78	1100.	593.33
956.	513.33	982.40	528.	1110.	598.89
957.	513.89	983.	528.33	1112.	600.
957.20	514.	984.	528.98	1120.	604.44
958.	514.44	984.20	529.	1130.	610.
959.	515.	985.	529.44	1140.	615.56
960.	515.56	986.	530.	1148.	620.
960.80	516.	989.60	532.	1150.	621.11
961.	516.11	990.	532.22	1160.	626.67
962.	516.67	991.	532.78	1166.	630.
962.60	517.	991.60	533.	1170.	632.22
963.	517.22	992.	533.33	1180.	637.78
964.	517.78	993.	533.89	1184.	640.
964.40	518.	993.40	534.	1190.	643.33
965.	518.33	994.	534.44	1200.	648.89
966.	518.89	995.	535.	1202.	650.
966.20	519.	995.20	535.56	1210.	654.44
967.	519.44	996.	536.	1220.	660.
968.	520.	997.	536.11	1230.	665.56
969.	520.56	998.	536.67	1238.	670.
969.80	521.	998.80	537.	1240.	671.11
970.	521.11	999.	537.22	1250.	676.67
971.	521.67				

Tycos Recording Thermometer

Dial Type, Self-Contained Form



Records atmospheric temperatures within limits of zero to +150° Fahr.

Ask for Catalog 8000-9000

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
1256.	680.	1640.	893.33	2030.	1110.	2420.	1326.67
1260.	682.22	1650.	898.89	2040.	1115.56	2426.	1330.
1270.	687.78	1652.	900.	2048.	1120.	2430.	1332.22
1274.	690.	1660.	904.44	2050.	1121.11	2440.	1337.78
1280.	693.33	1670.	910.	2060.	1126.67	2444.	1340.
1290.	698.89	1688.	915.56	2066.	1130.	2450.	1343.33
1292.	700.	1688.	920.	2070.	1132.22	2460.	1348.89
1300.	704.44	1690.	921.11	2080.	1137.78	2462.	1350.
1310.	710.	1700.	926.67	2084.	1140.	2470.	1354.44
1320.	715.56	1706.	930.	2090.	1143.33	2480.	1360.
1320.	720.	1710.	932.22	2100.	1148.89	2490.	1365.56
1330.	721.11	1720.	937.78	2102.	1150.	2490.	1370.
1340.	726.67	1724.	940.	2110.	1154.44	2500.	1371.11
1346.	730.	1720.	943.33	2120.	1160.	2510.	1376.67
1350.	732.22	1740.	948.89	2130.	1165.56	2516.	1380.
1360.	737.78	1742.	950.	2138.	1170.	2520.	1382.22
1364.	740.	1750.	954.44	2140.	1171.11	2530.	1387.78
1370	743.33	1760.	960.	2150.	1176.67	2534.	1390.
1380.	748.89	1770.	965.56	2156.	1180.	2540.	1393.33
1382.	750.	1778.	970.	2160.	1182.22	2550.	1398.89
1390.	754.44	1780.	971.11	2170.	1187.78	2552.	1400.
1400.	760.	1790.	976.67	2174.	1190.	2560.	1404.44
1410.	765.56	1796.	980.	2180.	1193.33	2570.	1410.
1418.	770.	1800.	982.22	2190.	1198.89	2580.	1415.56
1420.	771.11	1810.	987.78	2192.	1200.	2588.	1420.
1430.	776.67	1814.	990.	2200.	1204.44	2590.	1421.11
1436.	780.	1820.	993.33	2210.	1210.	2600.	1426.67
1440.	782.22	1830.	998.89	2220.	1215.56	2606.	1430.
1450.	787.78	1832.	1000.	2220.	1220.	2610.	1432.22
1454.	790.	1840.	1004.44	2230.	1221.11	2620.	1437.78
1460.	793.33	1850.	1010.	2240.	1226.67	2624.	1440.
1470.	798.89	1860.	1015.56	2246.	1230.	2630.	1443.33
1472.	800.	1868.	1020.	2250.	1232.22	2640.	1448.89
1480.	804.44	1870.	1021.11	2260.	1237.78	2642.	1450.
1490.	810.	1886.	1026.67	2264.	1240.	2650.	1454.44
1500.	815.56	1886.	1030.	2270.	1243.33	2660.	1460.
1508.	820.	1890.	1032.22	2280.	1248.89	2670.	1465.56
1510.	821.11	1900.	1037.78	2282.	1250.	2678.	1470.
1520.	826.67	1904.	1040.	2290.	1254.44	2680.	1471.11
1526.	830.	1910.	1043.33	2300.	1260.	2690.	1476.67
1530.	832.22	1920.	1048.89	2310.	1265.56	2696.	1480.
1540.	837.78	1922.	1050.	2318.	1270.	2700.	1482.22
1544.	840.	1930.	1054.44	2320.	1271.11	2710.	1487.78
1550.	843.33	1940.	1060.	2330.	1276.67	2714.	1490.
1560.	848.89	1940.	1065.56	2336.	1280.	2720.	1493.33
1562.	850.	1958.	1070.	2340.	1282.22	2730.	1498.89
1570.	854.44	1960.	1071.11	2350.	1287.78	2732.	1500.
1580.	860.	1970.	1076.67	2354.	1290.	2740.	1504.44
1590.	865.56	1976.	1080.	2360.	1293.33	2750.	1510.
1598.	870.	1980.	1082.22	2370.	1298.89	2760.	1515.56
1600	871.11	1990.	1087.78	2372.	1300.	2768.	1520.
1610	876.67	1994.	1090.	2380.	1304.44	2770.	1521.11
1616.	880.	2000.	1093.33	2390.	1310.	2780.	1526.67
1620.	882.22	2010.	1098.89	2400.	1315.56	2786.	1530.
1630.	887.78	2012.	1100.	2408.	1320.	2790.	1532.22
1634.	890.	2020.	1104.44	2410.	1321.11	2800.	1537.78

Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.	Fahrenheit Degs.	Centigrade Degs.
2804.	1540.	3010.	1654.44	3220.	1771.11	3430.	1887.78
2810.	1543.33	3020.	1660.	3230.	1776.67	3434.	1890.
2820.	1548.89	3030.	1665.56	3236.	1780.	3440.	1893.33
2822.	1550.	3038.	1670.	3240.	1782.22	3450.	1898.89
2830.	1554.44	3040.	1671.11	3250.	1787.78	3452.	1900.
2840.	1560.	3050.	1676.67	3254.	1790.	3460.	1904.44
2850.	1565.56	3056.	1680.	3260.	1793.33	3470.	1910.
2858.	1570.	3060.	1682.22	3270.	1798.89	3480.	1915.56
2860.	1571.11	3070.	1687.78	3272.	1800.	3488.	1920.
2870.	1576.67	3074.	1690.	3280.	1804.44	3490.	1921.11
2876.	1580.	3080.	1693.33	3290.	1810.	3500.	1926.67
2880.	1582.22	3090.	1698.89	3300.	1815.56	3506.	1930.
2890.	1587.78	3092.	1700.	3308.	1820.	3510.	1932.22
2894.	1590.	3100.	1704.44	3310.	1821.11	3520.	1937.78
2900.	1593.33	3110.	1710.	3320.	1826.67	3524.	1940.
2910.	1598.89	3120.	1715.56	3326.	1830.	3530.	1943.33
2912	1600.	3128.	1720.	3330.	1832.22	3540.	1948.89
2920.	1604.44	3130.	1721.11	3340.	1837.78	3542.	1950.
2930.	1610.	3140.	1726.67	3344.	1840.	3550.	1954.44
2940.	1615.56	3146.	1730.	3350.	1843.33	3560.	1960.
2948.	1620.	3150.	1732.22	3360.	1848.89	3570.	1965.56
2950.	1621.11	3160.	1737.78	3362.	1850.	3578	1970.
2960.	1626.67	3164.	1740.	3370.	1854.44	3580.	1971.11
2966.	1630.	3170.	1743.33	3380.	1860.	3590.	1976.67
2970.	1632.22	3180.	1748.89	3390.	1865.56	3596.	1980.
2980.	1637.78	3182.	1750.	3398.	1870.	3600.	1982.22
2984.	1640.	3190.	1754 44	3400.	1871.11	3610.	1987.78
2990.	1643.33	3200.	1760.	3410.	1876.67	3614.	1990.
3000.	1648.89	3210.	1765.56	3416.	1880.	3620.	1993.33
3002.	1650	3218.	1770.	3420.	1882.22	3630.	1998.89

STEAM

Under normal atmospheric pressure of 14.7 lbs. per square inch water boils at 212° F. or 100° C. and passes off as steam; the boiling temperature varies however, with changes in pressure.

Steam is perfectly transparent, colorless, dry and invisible. When partially condensed as in contact with the air the mist or spray makes it visible.

Dry steam contains no free moisture. It may be either saturated or superheated.

Wet steam contains free moisture in the form of mist or spray, and has the same temperature as dry saturated steam of the same pressure.

Saturated steam is steam in its normal state. Its temperature is that due to the pressure under which it is formed, that is, its temperature is the same as that of the water from which it is generated and upon which it rests.

Superheated steam is steam at a temperature above that due to its pressure after leaving the water from which it is generated, being further heated from another source.

Water in contact with saturated steam has the same temperature as the steam itself. Water introduced into superheated steam will be vaporized until the steam becomes saturated, and its temperature becomes that due its pressure. Cold water, or water at a lower temperature than that of the steam introduced into saturated steam, will condense some of it, thus lowering both the temperature and pressure of the rest until the temperature again equals that due its pressure.

One volume of water evaporated at normal atmospheric pressure and temperature of 212° F. becomes 1646 volumes of steam, i. e., 1 cu. ft. of water will become 1646 cu. ft. of steam.

One cu. ft. of steam weighs .03732 lbs., and 1 lb. of steam occupies 26.795 cu. ft., at a pressure of 14.7 lbs. per square inch. Temperature 212° F.

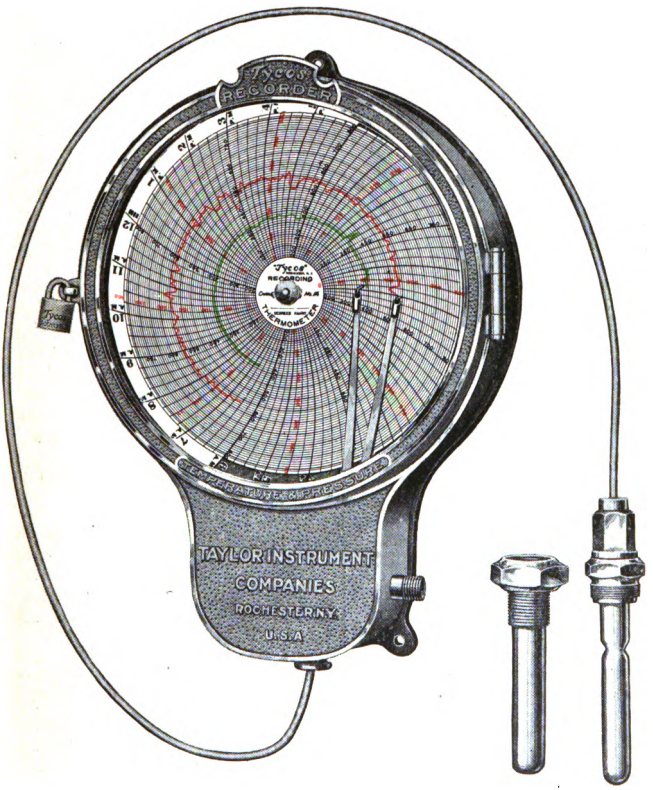
One cu. ft. of dry air weighs .08073 lbs., and 1 lb. of dry air occupies 12.387 cu. ft. at a pressure of 14.7 lbs. per square inch. Temperature 0° C.

The latent heat of evaporation of water to steam is 965.7 B. t. u.

The best designed boilers, well set, with good draft and skillful firing, will evaporate from 7 to 10 lbs. of water per pound of first class coal.

Tycos Mercury Bi-Record Recording Thermometer and Pressure Gauge

Dial Type



Specially adapted to superheated steam lines for recording steam temperature and pressure on the same chart.

Ask for Catalog 8000 D

Saturated Steam; Gauge Pressure and Temperature*

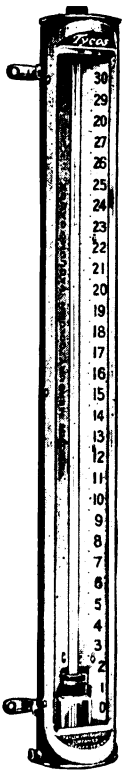
Zero Gauge Pressure is absolute pressure of 14.7 lbs. per square inch.

Pressure pounds Gauge	Temperature Deg. F.	Pressure pounds Gauge	Temperature Deg. F.	Pressure pounds Gauge	Temperature Deg. F.
0	212.	36	281.9	71	316.9
1	215.3	37	283.1	72	317.7
2	218.5	38	284.3	73	318.5
3	221.5	39	285.5	74	319.3
4	224.4	40	286.7	75	320.1
5	227.2				
6	229.8	41	287.9	76	320.9
7	232.4	42	289.0	77	321.6
8	234.8	43	290.2	78	322.4
9	237.1	44	291.3	79	323.2
10	239.4	45	292.4	80	323.9
11	241.6	46	293.5	81	324.7
12	243.7	47	294.6	82	325.4
13	245.8	48	295.6	83	326.2
14	247.8	49	296.7	84	326.9
15	249.7	50	297.7	85	327.6
16	251.6	51	298.7	86	328.4
17	253.5	52	299.7	87	329.1
18	255.3	53	300.7	88	329.8
19	257.1	54	301.7	89	330.5
20	258.8	55	302.6	90	331.2
21	260.5	56	303.6	91	331.8
22	262.1	57	304.5	92	332.5
23	263.7	58	305.5	93	333.2
24	265.3	59	306.4	94	333.9
25	266.9	60	307.3	95	334.6
26	268.3	61	308.2	96	335.2
27	269.8	62	309.1	97	335.9
28	271.3	63	310.0	98	336.6
29	272.7	64	310.9	99	337.2
30	274.1	65	311.8	100	337.9
31	275.4	66	312.6	101	338.5
32	276.8	67	313.5	102	339.2
33	278.1	68	314.4	103	339.8
34	279.4	69	315.2	104	340.4
35	280.6	70	316.0	105	341.1

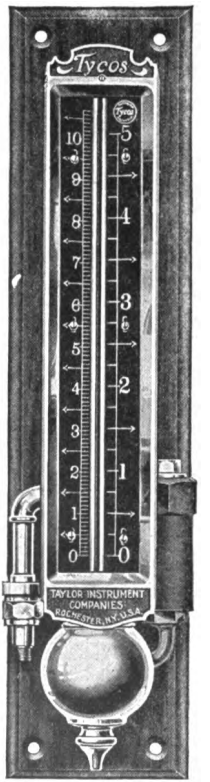
*Based on Marks & Davis Steam Tables, copied from "Steam Tables for Condenser Works," Wheeler Condenser and Engineering Co., Carteret, N. J.

Pressure pounds Gauge	Temperature Deg. F.	Pressure pounds Gauge	Temperature Deg. F.	Pressure pounds Gauge	Temperature Deg. F.	Pressure pounds Gauge	Temperature Deg. F.
106	341.7	141	361.4	176	377.9	255	408.
107	342.3	142	362.0	177	378.4	260	409.
108	343.0	143	362.5	178	378.8	265	410.
109	343.6	144	363.0	179	379.2	270	412.
110	344.2	145	363.4	180	379.7	275	414.
111	344.8	146	364.0	181	380.1	280	415.
112	345.4	147	364.5	182	380.5	285	417.
113	346.0	148	365.0	183	380.9	290	419.
114	346.6	149	365.5	184	381.3	295	420.
115	347.2	150	365.9	185	381.8	300	421.
116	347.8	151	366.4	186	382.2	305	423.
117	348.4	152	366.9	187	382.6	310	424.
118	348.9	153	367.4	188	383.0	315	426.
119	349.5	154	367.9	189	383.4	320	428.
120	350.1	155	368.4	190	383.9	325	429.
121	350.7	156	368.8	191	384.3	330	430.
122	351.2	157	369.3	192	384.7	335	432.
123	351.8	158	369.8	193	385.1	340	433.
124	352.4	159	370.3	194	385.5	345	434.
125	352.9	160	370.7	195	385.9	350	436.
126	353.5	161	371.2	196	386.3		
127	354.0	162	371.6	197	386.7		
128	354.6	163	372.2	198	387.1		
129	355.1	164	372.6	199	387.5		
130	355.7	165	373.0	200	387.9		
131	356.2	166	373.5	205	390.		
132	356.7	167	373.9	210	392.		
133	357.3	168	374.4	215	393.		
134	357.8	169	374.8	220	395.		
135	358.3	170	375.3	225	397.		
136	358.9	171	375.7	230	399.		
137	359.4	172	376.2	235	401.		
138	359.9	173	376.6	240	402.		
139	360.4	174	377.1	245	406.		
140	360.9	175	377.5	250	406.		

Tycos
Mercury Column Vacuum Gauge



Tycos
Mercury Column Absolute Pressure Gauge



Saturated Steam; Vacuum and Temperature*

From 29.8″ of mercury to atmospheric pressure. Referred to a 30″ Barometer, mercury at 58.4° F.

Vacuum in inches	Temperature Deg. F.	Vacuum in inches	Temperature Deg. F.	Vacuum in inches	Temperature Deg. F.
....	....	27.4	110.05	24.0	140.64
29.8	34.42	27.3	111.36	23.0	146.78
29.7	44.91	27.2	112.63	22.0	152.16
29.6	52.60	27.1	113.87	21.0	157.00
29.5	58.77	27.0	115.06	20.0	161.42
29.4	63.86	26.9	116.20	19.0	165.42
29.3	68.33	26.8	117.32	18.0	169.14
29.2	72.27	26.7	118.42	17.0	172.63
29.1	75.84	26.6	119.50	16.0	175.93
29.0	79.07	26.5	120.55	15.0	179.03
28.9	81.97	26.4	121.55	14.0	181.92
28.8	84.61	26.3	122.54	13.0	184.68
28.7	87.10	26.2	123.51	12.0	187.31
28.6	89.47	26.1	124.45	11.0	189.83
28.5	91.70	26.0	125.38	10.0	192.23
28.4	93.79	25.9	126.28	9.0	194.52
28.3	95.78	25.8	127.17	8.0	196.73
28.2	97.67	25.7	128.04	7.0	198.87
28.1	99.45	25.6	128.90	6.0	200.94
28.0	101.15	25.5	129.75	5.0	202.92
27.9	102.79	25.4	130.59	4.0	204.85
27.8	104.35	25.3	131.42	3.0	206.71
27.7	105.85	25.2	132.21	2.0	208.52
27.6	107.30	25.1	133.00	1.0	210.28
27.5	108.70	25.0	133.77	0.0	212

*Based on Marks & Davis Steam Tables, copied from "Steam Tables for Condenser Works," Wheeler Condenser and Engineering Co., Carteret, N. J.

Saturated Ammonia Vapor; Pressure and Corresponding Temperature

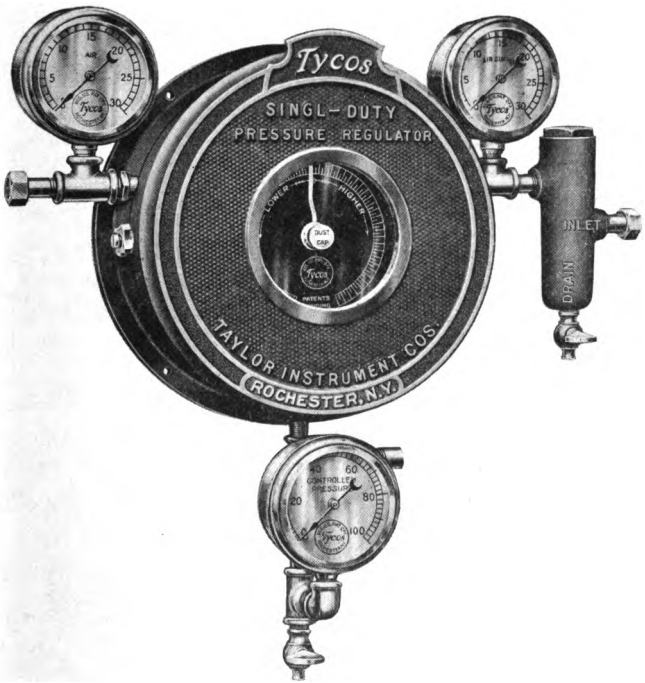
These values are figured from the tables by Goodenough and Mosher, Bulletin No. 66, University of Illinois.

The temperatures are given to the nearest .5° Fahrenheit.

Pressure Lbs. Gauge	Temperature ° F.	Pressure Lbs. Gauge	Temperature ° F.	Pressure Lbs. Gauge	Temperature ° F.
0	—27.	35	22.	70	47.5
1	—24.	36	23.	71	48.
2	—22.	37	24.	72	49.
3	—20	38	25.	73	49.5
4	—18.	39	25.5	74	50.
5	—16.	40	26.5	75	50.5
6	—14.	41	27.	76	51.
7	—12	42	28.	77	51.5
8	—10.5	43	29.	78	52.
9	— 9.	44	30.	79	53.
10	— 7.	45	30.5	80	53.5
11	— 5.5	46	31.	81	54.
12	— 4.	47	32.	82	54.5
13	— 2.5	48	33.	83	55.
14	— 1.	49	33.5	84	55.5
15	0.	50	34.	85	56.
16	+ 1.	51	35.	86	56.5
17	2.5	52	36.	87	57.
18	4.	53	36.5	88	57.5
19	5.	54	37.	89	58.
20	6.5	55	38.	90	58.5
21	7.5	56	38.5	91	59.
22	9.	57	39.	92	59.5
23	10.	58	40.	93	60.
24	11.	59	40.5	94	60.5
25	12.	60	41.	95	61.
26	13.	61	42.	96	61.5
27	14.	62	42.5	97	62.
28	15.	63	43.	98	62.5
29	16.	64	44.	99	63.
30	17.	65	44.5	100	63.5
31	18.	66	45.	102	64.5
32	19.	67	46.	104	65.5
	20.	68	46.5	106	66.5
	21.	69	47.	108	67.

Tycos

Singl-Duty Pressure Regulator



PRESSURE LIMITS

Any of the following pressure ranges can be had:

1 lb. to 30 lb.	100 lb. to 200 lb.	200 lb. to 350 lb.
5 lb. to 75 lb.	150 lb. to 250 lb.	300 lb. to 400 lb.
25 lb. to 150 lb.		

Ask for Section 1500

Pressure Lbs. Gauge	Temperature ° F.	Pressure Lbs. Gauge	Temperature ° F.	Pressure Lbs. Gauge	Temperature ° F.
110	68.	180	94.5	250	114.
112	69.	182	95.	252	114.5
114	70.	184	95.5	254	115.
116	71.	186	96.	256	115.5
118	71.5	188	96.5	258	116.
120	72.5	190	97.5	260.	116.5
122	73.5	192	98.	262	117.
124	74.	194	98.5	264	117.5
126	75.	196	99.	266	118.
128	76.	198	99.5	268	118.5
130	76.5	200	100.5	270.	119.
132	77.5	202	101.	272	119.5
134	78.	204	101.5	274	120.
136	79.	206	102.	276	120.5
138	79.5	208	102.5	278	120.5
140	80.5	210	103.	280	121.
142	81.	212	103.5	282	121.5
144	82.	214	104.5	284	122.
146	82.5	216	105.	286	122.5
148	83.5	218	105.5	288	123.
150	84.	220	106.	290	123.5
152	85.	222	106.5	292	124.
154	85.5	224	107.	294	124.5
156	86.5	226	107.5	296	124.5
158	87.	228	108.	298	125.
160	87.5	230	108.5	300	125.5
162	88.5	232	109.5		
164	89.	234	110.		
166	89.5	236	110.5		
168	90.5	238	111.		
170	91.	240	111.5		
172	91.5	242	112.		
174	92.5	244	112.5		
176	93.	246	113.		
178	93.5	248	113.5		

The Wet and Dry Bulb Thermometer

(Hygrometer or Psychrometer)

IS based on the principle that evaporation cannot take place without loss of heat, and the greater the evaporation the lower will be the temperature of the surface from which evaporation takes place. The Dry Bulb Thermometer is exposed to the temperature of the surrounding atmosphere; the Wet Bulb Thermometer has a wicking of silk or cotton, which ends in a cistern of water, or is otherwise dampened, keeping the bulb of the Thermometer constantly moist, from which evaporation takes place, proportioned in volume to the dryness of the air. The loss of heat occasioned by the evaporation of water from the wicking surrounding the bulb causes a difference in reading between the Dry and Wet Bulb Thermometers, dependent entirely upon the dryness of the air. From this difference in Thermometer readings at different temperatures of the air, tables have been prepared, by calculation and from exhaustive experiments, to determine the relation of such difference to the volume of aqueous vapor contained in the atmosphere. The amount of moisture which can exist as vapor in the atmosphere depends entirely upon temperature. The higher the temperature of the air the greater the volume of moisture it will carry without condensation, and the lower the temperature, the smaller the volume of aqueous vapor the air will contain. The varying relation of aqueous volume to percentage of saturation (Relative Humidity) at different temperatures precludes the possibility of using a universal factor for determining Relative Humidity. When the air contains all the moisture it will carry, there will be no evaporation at the Wet Bulb, and both Wet and Dry Bulb Thermometers will read alike. The temperature of the air is then at the "Dew Point," and "complete saturation" exists. This varying relation of volume of moisture which the air can sustain at different temperatures is best expressed by an example: at 32° Fahrenheit the air will hold in suspension 2 grains of water per cubic foot, while at 68° Fahrenheit it will hold in suspension 7½ grains. The air then at 32°, carrying 2 grains of water, is at the Dew Point, while at 68° it requires 7½ grains to reach the Dew Point.

How to Use the Tables

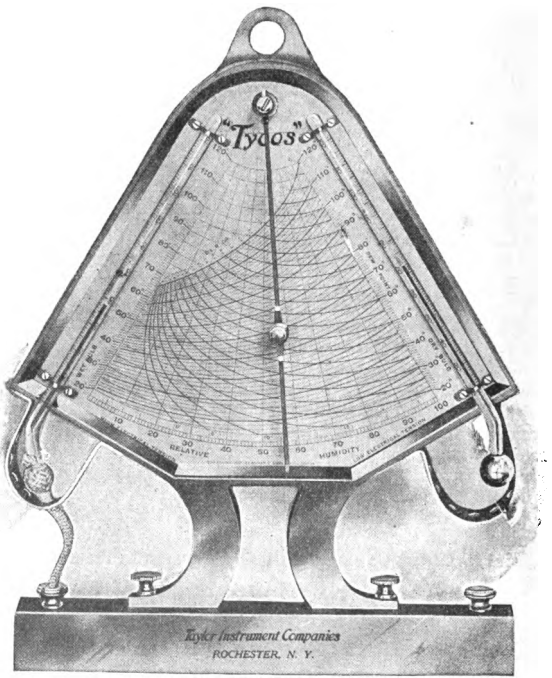
Relative Humidity Tables

To find the relative humidity for the reading of the Dry Bulb or air temperature at 70° and the Wet Bulb at 60° entering the table at page 7, with air temperature at 70° and depression of Wet Bulb Thermometer 10, we find the relative humidity 56° where the two lines intersect.

These tables are an abridged arrangement from the complete tables by C. F. Marvin, Professor of Meteorology, prepared under direction of Willis L. Moore, Chief of United States Weather Bureau. Should complete tables covering varying Barometric pressures be desired, apply to United States Department of Agriculture, Weather Bureau, Washington, D. C., for Psychrometric Tables, W. B. No. 235. Price, 10 cents

Tycos Hygrodeik

(Wet and Dry Bulb Hygrometer)



Ask for Catalog Part 1300

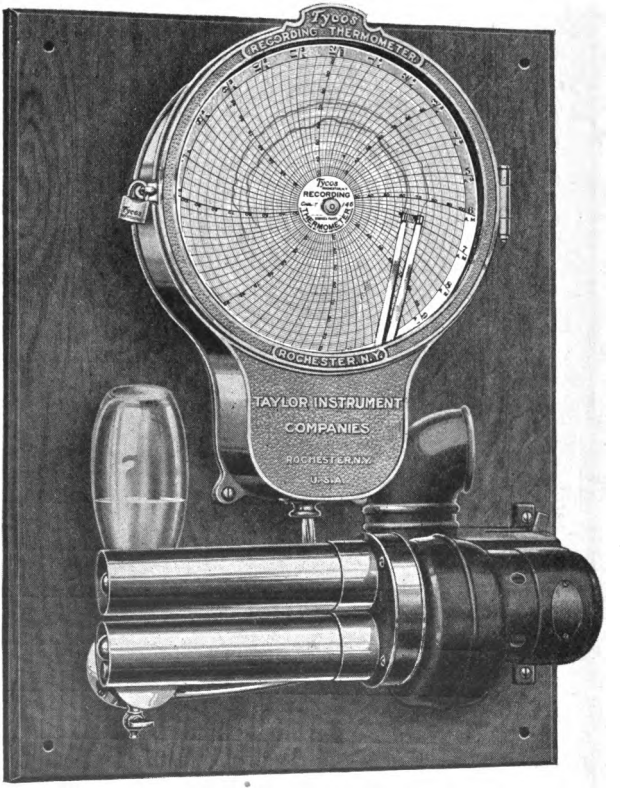
RELATIVE HUMIDITY TABLES

Temperature Readings in Degrees Fahrenheit. Relative Humidity Readings in Per Cent. Barometric Pressure 29.0 inches.

Readings of Dry Bulb Thermometer	Difference in degrees Fahrenheit between wet and dry bulb thermometers.																			
	1.	2.	3.	4.	5.	6.	7.	8	9	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
20	85	70	56	42	28	14															
21	86	71	57	44	30	17	3														
22	86	72	59	45	32	19	7														
23	87	73	60	47	34	22	10														
24	87	74	61	49	36	24	12	0													
25	87	75	63	50	38	27	15	4													
26	88	75	64	52	40	29	18	7													
27	88	76	65	53	42	31	20	9													
28	88	77	66	55	44	33	23	12	2												
29	89	78	67	56	45	35	25	15	5												
30	89	78	68	57	47	37	27	17	8												
31	89	79	69	58	49	39	29	20	10	1											
32	90	79	69	60	50	41	31	22	13	4											
33	90	80	71	61	52	42	33	24	16	7											
34	90	81	72	62	53	44	35	27	18	9	1										
35	91	82	73	64	55	46	37	29	20	12	4										
36	91	82	73	65	56	48	39	31	23	14	6										
37	91	83	74	66	58	49	41	33	25	17	9	1									
38	91	83	75	67	59	51	43	35	27	19	12	4									
39	92	84	76	68	60	52	44	37	29	21	14	7									
40	92	84	76	68	61	53	46	38	31	23	16	9	2								
41	92	84	77	69	62	54	47	40	33	26	18	11	5								
42	92	85	77	70	62	55	48	41	34	28	21	14	7	0							
43	92	85	78	70	63	56	49	43	36	29	23	16	9	3							
44	93	85	78	71	64	57	51	44	37	31	24	18	12	5							
45	93	86	79	71	65	58	52	45	39	33	26	20	14	8	2						
46	93	86	79	72	65	59	53	46	40	34	28	22	16	10	4						
47	93	86	79	73	66	60	54	47	41	35	29	23	17	12	6	1					
48	93	87	80	73	67	60	54	48	42	36	31	25	19	14	8	3					
49	93	87	80	74	67	61	55	49	43	37	32	26	21	15	10	5					

Tycos Wet and Dry Bulb Recording Thermometer

Dial Type



Furnished in both Mercury and Vapor-Tension Forms, with or without long capillary tubing for general applications

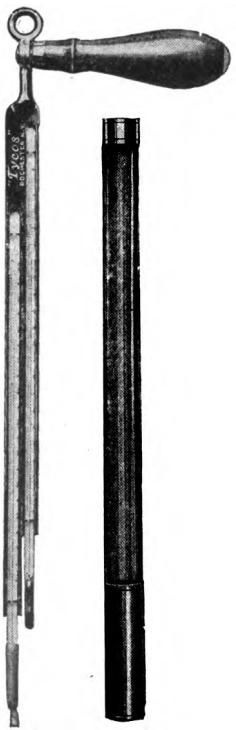
Ask for Catalog Part 8000-B

RELATIVE HUMIDITY TABLES—Continued

Temperature Readings in Degrees Fahrenheit. Relative Humidity Readings in Per Cent. Barometric Pressure 29.0 inches.

Readings of Dry Bulb Thermometer	Difference in degrees Fahrenheit between wet and dry bulb thermometers.																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14.	15.	16	17	18	19.	20.	21.
50	93	87	81	74	68	62	56	50	44	39	33	28	22	17	12	7	2				
51	94	87	81	75	69	63	57	51	45	40	35	29	24	19	14	9	4				
52	94	88	81	75	69	63	58	52	46	41	36	30	25	20	15	10	6	0			
53	94	88	82	75	70	64	58	53	47	42	37	32	27	22	17	12	7	3			
54	94	88	82	76	70	65	59	54	48	43	38	33	28	23	18	14	9	5	0		
55	94	88	82	76	71	65	60	55	49	44	39	34	29	25	20	15	11	6	2		
56	94	88	82	77	71	66	61	55	50	45	40	35	31	26	21	17	12	8	4		
57	94	88	83	77	72	66	61	56	51	46	41	36	32	27	23	18	14	10	5	1	
58	94	89	83	77	72	67	62	57	52	47	42	38	33	28	24	20	15	11	7	3	
59	94	89	83	78	73	68	63	58	53	48	43	39	34	30	25	21	17	13	9	5	1
60	94	89	84	78	73	68	63	58	53	49	44	40	35	31	27	22	18	14	10	6	2
61	94	89	84	79	74	68	64	59	54	50	45	40	36	32	28	24	20	16	12	8	4
62	94	89	84	79	74	69	64	60	55	50	46	41	37	33	29	25	21	17	13	9	6
63	95	90	84	79	74	70	65	60	56	51	47	42	38	34	30	26	22	18	14	11	7
64	95	90	85	79	75	70	66	61	56	52	48	43	39	35	31	27	23	20	16	12	9
65	95	90	85	80	75	70	66	62	57	53	48	44	40	36	32	28	25	21	17	13	10
66	95	90	85	80	76	71	66	62	58	53	49	45	41	37	33	29	26	22	18	15	11
67	95	90	85	80	76	71	67	62	58	54	50	46	42	38	34	30	27	23	20	16	13
68	95	90	85	81	76	72	67	63	59	55	51	47	43	39	35	31	28	24	21	17	14
69	95	90	86	81	77	72	68	64	59	55	51	47	44	40	36	32	29	25	22	19	15
70	95	90	86	81	77	72	68	64	60	56	52	48	44	40	37	33	30	26	23	20	17
71	95	90	86	82	77	73	69	64	60	56	53	49	45	41	38	34	31	27	24	21	18
72	95	91	86	82	78	73	69	65	61	57	53	49	46	42	39	35	32	28	25	22	19
73	95	91	86	82	78	73	69	65	61	58	54	50	46	43	40	36	33	29	26	23	20
74	95	91	86	82	78	74	70	66	62	58	54	51	47	44	40	37	34	30	27	24	21
75	96	91	87	82	78	74	70	66	63	59	55	51	48	44	41	38	34	31	28	25	22
76	96	91	87	83	78	74	70	67	63	59	55	52	48	45	42	38	35	32	29	26	23
77	96	91	87	83	79	75	71	67	63	60	56	52	49	46	42	39	36	33	30	27	24
78	96	91	87	83	79	75	71	67	64	60	57	53	50	46	43	40	37	34	31	28	25
79	96	91	87	83	79	75	71	68	64	60	57	54	50	47	44	41	37	34	31	29	26

Tycos
Sling Psychrometer



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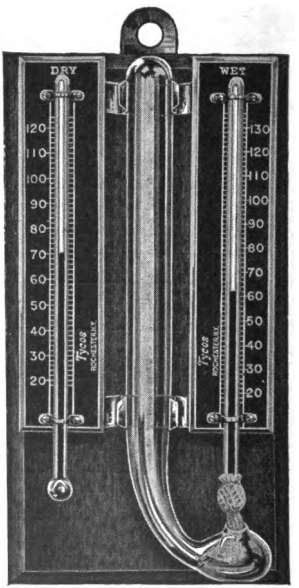
Tycos
Mason's Form Hygrometer



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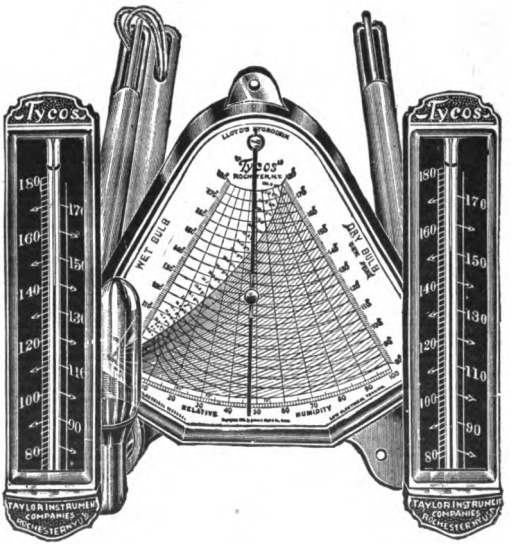
Ask for Catalog Part 1300

RELATIVE HUMIDITY TABLES—Continued

Temperature Readings in Degrees Fahrenheit. Relative Humidity Readings in Per Cent. Barometer Pressure 29.0 inches.

Readings of Dry Bulb Thermometer	Difference in degrees Fahrenheit between wet and dry bulb thermometers.																										
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
80	96	91	87	83	79	76	72	68	64	61	57	54	51	47	44	41	38	35	32	29	27	24	21	18	16	13	11	8	6	4
82	96	92	88	84	80	76	72	69	65	62	58	55	52	49	46	43	40	37	34	31	28	25	23	20	18	15	13	10	8	6
84	96	92	88	84	80	77	73	70	66	63	59	56	53	50	47	44	41	38	35	32	30	27	25	22	20	17	15	12	10	8
86	96	92	88	85	81	77	74	70	67	63	60	57	54	51	48	45	42	39	37	34	31	29	26	24	21	19	17	14	12	10
88	96	92	88	85	81	78	74	71	67	64	61	58	55	52	49	46	43	41	38	35	33	30	28	25	23	21	18	16	14	12
90	96	92	89	85	81	78	75	71	68	65	62	59	56	53	50	47	44	42	39	37	34	32	29	27	24	22	20	18	16	14
92	96	92	89	85	82	78	75	72	69	65	62	59	57	54	51	48	45	43	40	38	35	33	30	28	26	24	22	19	17	15
94	96	93	89	86	82	79	75	72	69	66	63	60	57	54	52	49	46	44	41	39	36	34	32	29	27	25	23	21	19	17
96	96	93	89	86	82	79	76	73	70	67	64	61	58	55	53	50	47	45	42	40	37	35	33	31	29	26	24	22	20	18
98	96	93	89	86	83	79	76	73	70	67	64	61	59	56	53	51	48	46	43	41	39	36	34	32	30	28	26	24	22	20
100	96	93	90	86	83	80	77	74	71	68	65	62	59	57	54	52	49	47	44	42	40	37	35	33	31	29	27	25	23	21
102	96	93	90	86	83	80	77	74	71	68	65	63	60	57	55	52	50	47	45	43	41	38	36	34	32	30	28	26	24	22
104	97	93	90	87	84	80	77	74	72	69	66	63	61	58	56	53	51	48	46	44	41	39	37	35	33	31	29	27	25	24
106	97	93	90	87	84	81	78	75	72	69	66	64	61	59	56	54	51	49	47	45	42	40	38	36	34	32	30	28	27	25
108	97	93	90	87	84	81	78	75	72	70	67	64	62	59	57	54	52	50	47	45	43	41	39	37	35	33	31	29	28	26
110	97	95	90	87	84	81	78	76	73	70	67	65	62	60	57	55	53	50	48	46	44	42	40	38	36	34	32	30	29	27
112	97	94	90	87	84	82	79	76	73	70	68	65	63	60	58	56	53	51	49	47	45	43	41	39	37	35	33	31	30	28
114	97	94	91	88	85	82	79	76	74	71	68	66	63	61	59	56	54	52	50	48	45	43	41	40	38	36	34	32	31	29
116	97	94	91	88	85	82	79	77	74	71	69	66	64	61	59	57	55	52	50	48	46	44	42	40	38	37	35	33	31	30
118	97	94	91	88	85	82	79	77	74	72	69	67	64	62	60	57	55	53	51	49	47	45	43	41	39	37	36	34	32	31
120	97	94	91	88	85	82	80	77	74	72	69	67	65	62	60	58	56	54	51	49	47	46	44	42	40	38	36	35	33	31
122	97	94	91	88	85	83	80	77	75	72	70	67	65	63	61	58	56	54	52	50	48	46	44	42	41	39	37	36	34	32
124	97	94	91	88	86	83	80	78	75	73	70	68	65	63	61	59	57	55	53	51	49	47	45	43	41	40	38	36	35	33
126	97	94	91	89	86	83	81	78	75	73	71	68	66	64	62	59	57	55	53	51	49	47	46	44	42	40	39	37	35	34
128	97	94	91	89	86	83	81	78	76	73	71	69	66	64	62	60	58	56	54	52	50	48	46	44	43	41	39	38	36	34
130	97	94	92	89	86	84	81	78	76	74	71	69	67	65	62	60	58	56	54	52	50	49	47	45	43	42	40	38	37	35
132	97	94	92	89	86	84	81	79	76	74	72	69	67	65	63	61	59	57	55	53	51	49	47	46	44	42	41	39	37	36
134	97	94	92	89	86	84	81	79	76	74	72	70	67	65	63	61	59	57	55	53	51	50	48	46	44	43	41	40	38	36
136	97	94	92	89	87	84	82	79	77	74	72	70	68	66	64	61	59	58	56	54	52	50	48	47	45	43	42	40	39	37
138	97	94	92	89	87	84	82	79	77	75	72	70	68	66	64	62	60	58	56	54	52	51	49	47	45	44	42	41	39	38
140	97	95	92	89	87	84	82	80	77	75	73	71	68	66	64	62	60	58	56	55	53	51	49	48	46	44	43	41	40	38

Tycos Hygrodeik Industrial Form with Angle Thermometers



1312

Ask for Catalog Part 1300

METHOD OF READING THE HYDROMETER*

The correct method of reading the hydrometer is illustrated in Figs. 1 and 2. The sample of liquid is placed in a clear glass jar or cylinder and the hydrometer carefully immersed in it to a point slightly below that to which it naturally sinks (not over $\frac{1}{8}$"), and is then allowed to float freely.

The reading should not be taken until the liquid and the hydrometer are free from air bubbles and are at rest.

In taking the reading in transparent liquids, the eye should be placed slightly below the plane of the surface of the liquid (Fig. 1) and then raised slowly until this surface ,seen as an ellipse, becomes a straight line (Fig. 2). The point at which this line cuts the hydrometer scale should be taken as the reading of the instrument (Fig. 2).

In case the liquid is not sufficiently clear to allow the reading to be made as above described, it will be necessary to read from above the surface, and to estimate as accurately as possible the point to which the liquid rises on the hydrometer stem. It should be remembered, however, that the instrument is calibrated to give correct indications when read at the principal surface of the liquid. It will be necessary, therefore, to correct the reading at this upper meniscus by an amount equal to the height of this point on the stem of the hydrometer, above the principal surface of the liquid. The amount of this correction may be determined with sufficient accuracy for most purposes by taking a few readings on the upper and the lower meniscus in a clear liquid and noting the differences.

In liquids lighter than water a specific gravity hydrometer will read too low and a Baumé hydrometer too high when read at the upper edge of the meniscus. The correction for meniscus height should therefore be added to a specific gravity reading and subtracted from a Baumé or per cent. alcohol reading. In liquids heavier than water, the hydrometer will always read too low, and the correction for meniscus must be added.

The magnitude of the correction will obviously depend upon the length and value of the subdivisions of the hydrometer scale, and must be determined in each case for the particular hydrometer in question.

*Bureau of Standards Circular No. 57, Second Edition.

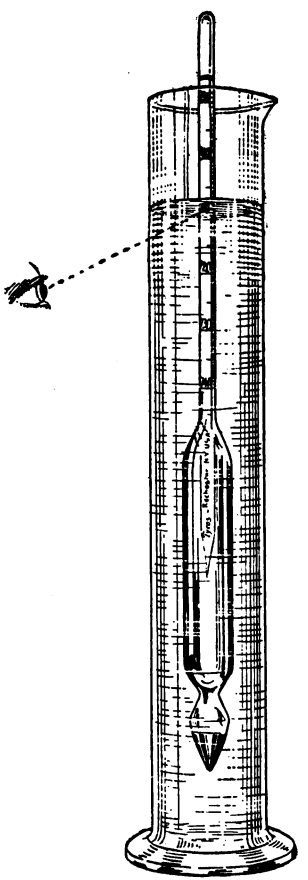


Fig. 1

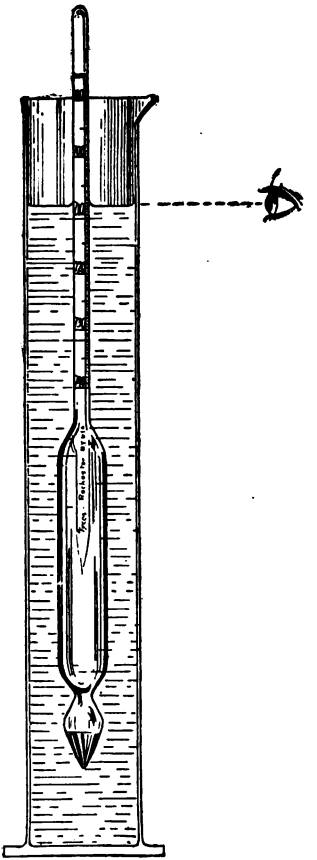


Fig. 2

The following tables depend upon standard values and fixed relations, and the rate of expansion of the liquid does not enter into their calculation. The relations involved are as follows:

(*a*) The Baumé scale, for liquids lighter than water, is based upon the following relation to specify gravity:[1]

$$\text{Degrees Baumé} = \frac{140}{\text{Sp. gr.}60°/60°\text{F.}} - 130$$

or,

$$\text{Sp. gr. } 60°/60° \text{ F.} = \frac{140}{130 + \text{Deg. B.}}$$

(*b*) The Baumé scale for liquids heavier than water, is based upon the following relation to specific gravity.

$$\text{Degree Baumé} = 145 - \frac{145}{\text{Sp. gr. } 60°/60°\text{F.}}$$

or,

$$\text{Sp. gr. } 60°/60° \text{ F.} = \frac{145}{145 - \text{Deg. B.}}$$

(*c*) Specific gravity, as used in these tables, is defined as the ratio of the weight (in vacuo) of equal volumes of a liquid and of water at 60° F.—that is, the true and not the apparent specific gravity is employed throughout the tables[2].

(*d*) The weight per gallon of the liquid is the apparent weight of a volume of 231 cubic inches of the liquid at 60° F. when weighed in air of 50 per cent. humidity, at the same temperature as the liquid and at a pressure of 760 mm. of mercury. The weighing is also assumed to be made against, brass weights of 8.4 density, or against weights reduced to that basis.

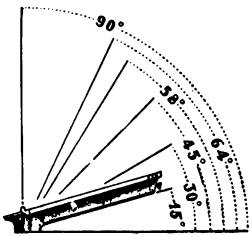
(*e*) The weight of a gallon of water at 60° F. is as follows: In air 8.32823 pounds; in vacuo, 8.33722 pounds.

On account of the way specific gravity is defined, it is necessary to apply a buoyancy correction to the product of the specific gravity of the liquid and the weight of a gallon of water, in order to obtain the apparent weigh of a gallon of the liquid in air at 60° F.

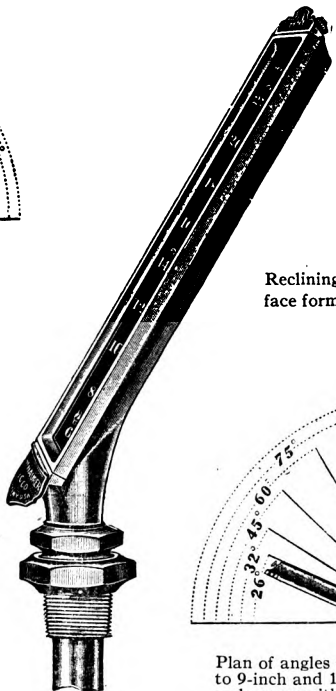
1 This relation between Baumé degrees and specific gravity has been in use by the Bureau of Standards since 1904, at which time it was found to be the one in common use in throughout the United States.

2 See True and Apparent Specific Gravity, Page 51.

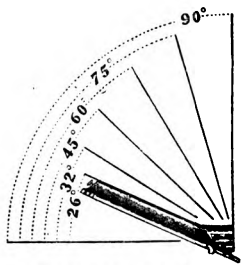
Tycos Inclined and Reclining Face Angle Industrial Thermometers



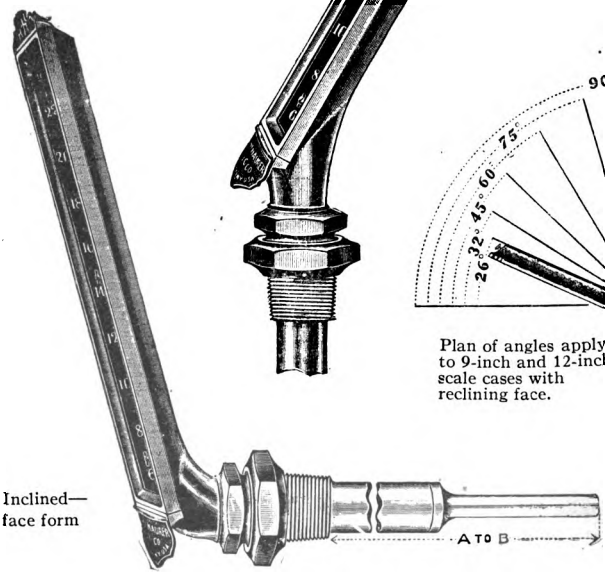
Plan of angles applying to 9-inch and 12-inch scale cases with inclined face.



Reclining—face form



Plan of angles applying to 9-inch and 12-inch scale cases with reclining face.



Inclined—face form

SPECIFIC GRAVITY

True Specific Gravity

All specific gravity values given in the tables in this book are as would be indicated by hydrometers certified by the U. S. Bureau of Standards for true specific gravity.

True specific gravity is defined as the ratio of the weight (in vacuo) of equal volumes of a liquid and of pure water at a standard temperature (usually 60° F.) made against brass weights (in vacuo.)

Apparent Specific Gravity

Specific Cravity values given by a pycnometer, or weighing bottle, are apparent specific gravities.

This is defined as the ratio of the weight in air (of 50% humidity at the standard temperature and a barometer pressure of 760 m.m. or 29.92 inches of mercury) of equal volumes of a liquid and of pure water at a standard temperature (usually 60° F.) made against brass weights of 8.4 density under the same conditions.

To convert one to the other, the following formulae will give accurate results to the fourth decimal place:

Let T. D. = true specific gravity.
A. D. = apparent specific gravity.

True specific gravity to apparent specific gravity:

$$\text{A. D.} = \text{T. D.} + .0012\,(\text{T. D.} - 1.0000)$$

Example 1. T. D. = 0.8068

$$\begin{aligned}\text{A. D.} &= 0.8068 + .0012\,(0.8068 - 1.0000)\\ &= 0.8068 + .0012\,(-.1932)\\ &= 0.8068 + (-.00023)\\ &= 0.80657\end{aligned}$$

Example 2. T. D. = 1.4044

$$\begin{aligned}\text{A. D.} &= 1.4044 + .0012\ (1.4044 - 1.0000)\\ &= 1.4044 + .0012\ (\ .4044)\\ &= 1.4044 + .00048\\ &= 1.40488\end{aligned}$$

Apparent specific gravity to true specific gravity:

$$\text{T. D.} = \text{A. D.} + .0012\,(1.0000 - \text{A. D.})$$

Example 1. A. D. = 0.80657

$$\begin{aligned}\text{T. D.} &= 0.80657 + .0012\ (1.00000 - 0.80657)\\ &= 0.80657 + .0012\ (\ .19343)\\ &= 0.80657 + .00023\\ &= 0.8068\end{aligned}$$

Example 2. A. D. = 1.4049

$$\begin{aligned}\text{T. D.} &= 1.4049 + .0012\,(1.0000 - 1.4049)\\ &= 1.4049 + .0012\,(-.4049)\\ &= 1.4049 + (-.00048)\\ &= 1.40442\end{aligned}$$

Specific Gravity Hydrometer Readings

Corrections to be added to readings of a hydrometer standardized at one temperature to convert them to values standradized at another temperature.

The first column shows Specific Gravity at temperature 60°/60° F.* The otner columns show the corrections to be applied to indications of a hydrometer standardized at 60°/60° F. to convert it to the standard temperature shown at top of each column.

To convert indications of hydrometers standardized at other than 60°/60° F., use the difference of the corrections shown. Ex.—Reading of a hydrometer standardized at 20°/4° C. is 1.550; to convert to values standardized at 20°/20° C. add .0027 equals 1.5527.

Specific Gravity 60°/60°F. or 15.56°/15.56°C.	Corrections to be Added				
	15°/4°C.	20°/4°C.	20°/20°C.	17½°/17½°C.	25°/25°C.
0.650	—0.0006	—0.0007	+0.0005	+0.0002	+0.0012
0.675	—0.0006	—0.0007	+0.0005	+0.0002	+0.0012
0.700	—0.0007	—0.0008	+0.0005	+0.0002	+0.0012
0.750	—0.0007	—0.0008	+0.0005	+0.0002	+0.0013
0.800	—0.0007	—0.0008	+0.0005	+0.0002	+0.0013
0.825	—0.0008	—0.0009	+0.0006	+0.0002	+0.0014
0.875	—0.0008	—0.0009	+0.0006	+0.0002	+0.0015
0.900	—0.0009	—0.0010	+0.0006	+0.0002	+0.0016
0.925	—0.0009	—0.0010	+0.0007	+0.0002	+0.0016
1.000	—0.0009	—0.0011	+0.0007	+0.0003	+0.0017
1.050	—0.0010	—0.0011	+0.0007	+0.0003	+0.0018
1.075	—0.0010	—0.0011	+0.0007	+0.0003	+0.0019
1.100	—0.0010	—0.0012	+0.0008	+0.0003	+0.0019
1.150	—0.0011	—0.0012	+0.0008	+0.0003	+0.0020
1.200	—0.0011	—0.0013	+0.0008	+0.0003	+0.0021
1.225	—0.0012	—0.0013	+0.0009	+0.0003	+0.0021
1.250	—0.0012	—0.0013	+0.0009	+0.0004	+0.0022
1.300	—0.0012	—0.0014	+0.0009	+0.0004	+0.0023
1.325	—0.0012	—0.0014	+0.0009	+0.0004	+0.0024
1.350	—0.0013	—0.0014	+0.0010	+0.0004	+0.0024

Specific Gravity Hydrometer Readings
(Continued)

Specific Gravity 60°/60°F. or 15.56°/15.56°C.	Corrections to be Added				
	15°/4°C.	20°/4°C.	20°/20°C.	17½°/17½°C.	25°/25°C.
1.375	—0.0013	—0.0015	+0.0010	+0.0004	+0.0024
1.400	—0.0013	—0.0015	+0.0010	+0.0004	+0.0025
1.450	—0.0014	—0.0015	+0.0010	+0.0004	+0.0025
1.475	—0.0014	—0.0016	+0.0010	+0.0004	+0.0026
1.500	—0.0014	—0.0016	+0.0011	+0.0004	+0.0026
1.550	—0.0015	—0.0016	+0.0011	+0.0004	+0.0027
1.575	—0.0015	—0.0017	+0.0011	+0.0004	+0.0027
1.600	—0.0015	—0.0017	+0.0011	+0.0004	+0.0028
1.625	—0.0015	—0.0017	+0.0011	+0.0005	+0.0028
1.650	—0.0016	—0.0017	+0.0012	+0.0005	+0.0029
1.700	—0.0016	—0.0018	+0.0012	+0.0005	+0.0030
1.725	—0.0016	—0.0018	+0.0012	+0.0005	+0.0031
1.775	—0.0017	—0.0019	+0.0012	+0.0005	+0.0031
1.800	—0.0017	—0.0019	+0.0013	+0.0005	+0.0032
1.850	—0.0017	—0.0019	+0.0013	+0.0005	+0.0032
1.900	—0.0018	—0.0020	+0.0013	+0.0005	+0.0033
1.925	—0.0018	—0.0020	+0.0014	+0.0005	+0.0033
1.950	—0.0018	—0.0021	+0.0014	+0.0006	+0.0034
2.000	—0.0019	—0.0021	+0.0014	+0.0006	+0.0035

*60°/60° F. means readings taken at 60° F. compared to water at 60°F. as 1.0000.

Tycos Hydrometers

1714 A

1715 D

1705 F

1722 A

Ask for Sections 1500-1600 and 1700

Specific Gravity Equivalents for Degrees Baumé for Liquids Heavier than Water

*Temperature 60°/60° F.

One gallon distilled water at 60° F. in air = 8.32823 lbs.

Table adopted by the U. S. Bureau of Standards from the formula:

$$°\text{Baumé} = 145 - \frac{145}{\text{Sp. Gr.}\frac{60°}{60°}\text{ F.}}$$

Degrees Baumé	Specific Gravity 60°/60° F.	Pounds per Gallon	Degrees Baumé	Specific Gravity 60°/60° F.	Pounds per Gallon
0.	1.0000	8.328	36.	1.3303	11.079
1.	1.0069	8.385	37.	1.3426	11.181
2.	1.0140	8.445	38.	1.3551	11.285
3.	1.0211	8.504	39.	1.3679	11.392
4.	1.0284	8.565	40.	1.3810	11.501
5.	1.0357	8.625	41.	1.3942	11.611
6.	1.0432	8.688	42.	1.4078	11.724
7.	1.0507	8.750	43.	1.4216	11.839
8.	1.0584	8.814	44.	1.4356	11.956
9.	1.0662	8.879	45.	1.4500	12.076
10.	1.0741	8.945	46.	1.4646	12.197
11.	1.0821	9.012	47.	1.4796	12.322
12.	1.0902	9.079	48.	1.4948	12.449
13.	1.0985	9.148	49.	1.5104	12.579
14.	1.1069	9.218	50.	1.5263	12.711
15.	1.1154	9.289	51.	1.5426	12.849
16.	1.1240	9.361	52.	1.5591	12.984
17.	1.1328	9.434	53.	1.5761	13.126
18.	1.1417	9.508	54.	1.5934	13.270
19.	1.1508	9.584	55.	1.6111	13.417
20.	1.1600	9.660	56.	1.6292	13.568
21.	1.1694	9.739	57.	1.6477	13.722
22.	1.1789	9.818	58.	1.6667	13.880
23.	1.1885	9.898	59.	1.6860	14.041
24.	1.1983	9.979	60.	1.7059	14.207
25.	1.2083	10.063	61.	1.7262	14.376
26.	1.2185	10.148	62.	1.7470	14.549
27.	1.2288	10.233	63.	1.7683	14.727
28.	1.2393	10.321	64.	1.7901	14.908
29.	1.2500	10.410	65.	1.8125	15.095
30.	1.2609	10.501	66.	1.8354	15.285
31.	1.2719	10.592	67.	1.8590	15.482
32.	1.2832	10.686	68.	1.8831	15.683
33.	1.2946	10.781	69.	1.9079	15.889
34.	1.3063	10.879	70.	1.9333	16.101
35.	1.3182	10.978			

*All densities taken at 60° F. and referred to distilled water at 60° F. as 1.0000.

Degrees Baumé with Corresponding Specific Gravity, Pounds per Gallon and Gallons per Pound for Liquids Lighter than Water*

Degrees Baumé	Specific gravity 60°/60° F	Pounds per gallon	Gallons per pound	Degrees Baumé	Specific gravity 60°/60° F	Pounds per gallon	Gallons per pound
10.0	1.0000	8.328	0.1201	55.0	0.7568	6.300	0.1587
11.0	.9929	8.269	.1209	56.0	.7527	6.266	.1596
12.0	.9859	8.211	.1218	57.0	.7487	6.233	.1604
13.0	.9790	8.153	.1227	58.0	.7447	6.199	.1613
14.0	.9722	8.096	.1235	59.0	.7407	6.166	.1622
15.0	.9655	8.041	.1244	60.0	.7368	6.134	.1630
16.0	.9589	7.986	.1252	61.0	.7330	6.102	.1639
17.0	.9524	7.931	.1261	62.0	.7292	6.070	.1647
18.0	.9459	7.877	.1270	63.0	.7254	6.038	.1656
19.0	.9396	7.825	.1278	64.0	.7216	6.007	.1665
20.0	.9333	7.772	.1287	65.0	.7179	5.976	.1673
21.0	.9272	7.721	.1295	66.0	.7143	5.946	.1682
22.0	.9211	7.670	.1304	67.0	.7107	5.916	.1690
23.0	.9150	7.620	.1313	68.0	.7071	5.886	.1699
24.0	.9091	7.570	.1321	69.0	.7035	5.856	.1708
25.0	.9032	7.522	.1330	70.0	.7000	5.827	.1716
26.0	.8974	7.473	.1338	71.0	.6965	5.798	.1725
27.0	.8917	7.425	.1347	72.0	.6931	5.769	.1733
28.0	.8861	7.378	.1355	73.0	.6897	5.741	.1742
29.0	.8805	7.332	.1364	74.0	.6863	5.712	.1751
30.0	.8750	7.286	.1373	75.0	.6829	5.685	.1759
31.0	.8696	7.241	.1381	76.0	.6796	5.657	.1768
32.0	.8642	7.196	.1390	77.0	.6763	5.629	.1776
33.0	.8589	7.152	.1398	78.0	.6731	5.602	.1785
34.0	.8537	7.108	.1407	79.0	.6699	5.576	.1793
35.0	.8485	7.065	.1415	80.0	.6667	5.549	.1802
36.0	.8434	7.022	.1424	81.0	.6635	5.522	.1811
37.0	.8383	6.980	.1433	82.0	.6604	5.497	.1819
38.0	.8333	6.939	.1441	83.0	.6573	5.471	.1828
39.0	.8284	6.898	.1450	84.0	.6542	5.445	.1837
40.0	.8235	6.857	.1459	85.0	.6512	5.420	.1845
41.0	.8187	6.817	.1467	86.0	.6482	5.395	.1854
42.0	.8140	6.777	.1476	87.0	.6452	5.370	.1862
43.0	.8092	6.738	.1484	88.0	.6422	5.345	.1871
44.0	.8046	6.699	.1493	89.0	.6393	5.320	.1880
45.0	.8000	6.661	.1501	90.0	.6364	5.296	.1888
46.0	.7955	6.623	.1510	91.0	.6335	5.272	.1897
47.0	.7910	6.586	.1518	92.0	.6306	5.248	.1905
48.0	.7865	6.548	.1527	93.0	.6278	5.225	.1914
49.0	.7821	6.511	.1536	94.0	.6250	5.201	.1923
50.0	.7778	6.475	.1544	95.0	.6222	5.178	.1931
51.0	.7735	6.440	.1553	96.0	.6195	5.155	.1940
52.0	.7692	6.404	.1562	97.0	.6167	5.132	.1949
53.0	.7650	6.369	.1570	98.0	.6140	5.110	.1957
54.0	.7609	6.334	.1579	99.0	.6114	5.088	.1966
55.0	.7568	6.300	.1587	100.0	.6087	5.066	.1974

*Bureau of Standards, Circular No. 57.

Specific Gravities with Corresponding Degrees Baumé, Pounds per Gallon and Gallons per Pound for Liquids Lighter than Water*

Specific Gravity 60°/60° F.	Degrees Baumé.	Pounds per Gallon.	Gallons per Pound.
0.600	103.33	4.993	0.2003
.610	99.51	5.076	.1970
.620	95.81	5.160	.1938
.630	92.22	5.243	.1907
.640	88.75	5.326	.1877
.650	85.38	5.410	.1848
.660	82.12	5.493	.1820
.670	78.96	5.577	.1793
.680	75.88	5.660	.1767
.690	72.90	5.743	.1741
.700	70.00	5.827	.1716
.710	67.18	5.910	.1692
.720	64.44	5.994	.1668
.730	61.78	6.077	.1646
.740	59.19	6.160	.1623
.750	56.67	6.244	.1602
.760	54.21	6.327	.1580
.770	51.82	6.410	.1560
.780	49.49	6.494	.1540
.790	47.22	6.577	.1520
.800	45.00	6.661	.1501
.810	42.84	6.744	.1483
.820	40.73	6.827	.1465
.830	38.68	6.911	.1447
.840	36.67	6.994	.1430
.850	34.71	7.078	.1413
.860	32.79	7.161	.1396
.870	30.92	7.244	.1380
.880	29.09	7.328	.1365
.890	27.30	7.411	.1349
.900	25.56	7.494	.1334
.910	23.85	7.578	.1320
.920	22.17	7.661	.1305
.930	20.54	7.745	.1291
.940	18.94	7.828	.1278
.950	17.37	7.911	.1264
.960	15.83	7.995	.1251
.970	14.33	8.078	.1238
.980	12.85	8.162	.1225
.990	11.41	8.245	.1213
1.000	10.00	8.328	.1201

*Bureau of Standards, Circular No. 57.

Tycos Hydrometers

7110

1548

1586

Ask for Section 1500-1600

Indicated Specific Gravity of Mineral Oils at Various Temperatures, Corrected to Specific Gravity at 60° F.

Example: If the hydrometer reads 0.800 Sp. Gr. in a mineral oil the temperature of which is 82° F., the true Specific Gravity at 60° F. will be 0.800 plus 0.008 or 0.808.

This table is based upon the results of experiments carried on at the Bureau of Standards, Washington, D. C., between July, 1912, and December, 1914. During that time about 100 samples of crude and refined petroleum oils from various parts of the United States were examined and their densities determined at various temperatures.

This investigation has shown that within the limits of ordinary measurements the rate of change of specific gravity with change of temperature is the same for all oils of the same specific gravity. In the calculation of the expansion table the average rate of expansion found for all oils of each designated specific gravity has been used.

A report of the experimental investigation upon which these tables are based will be found in Technologic Paper No. 77 of the Bureau of Standards, entitled "Density and Thermal Expansion of American Petroleum Oils."

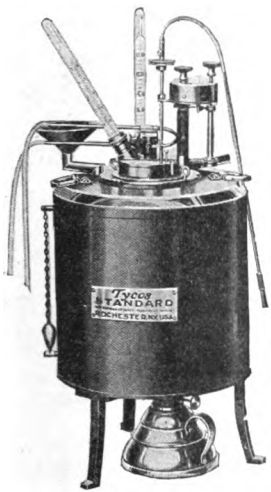
This table applies to all petroleum oils, both crude and refined, produced in the United States. Each grade of oil, gasoline, illuminating oil, lubricating and fuel oil, etc., falls into its proper place in the tables by reason of its specific gravity.[1]

Although it is generally believed that California oils have a considerably higher rate of expansion than do oils from the Central and Eastern States, this has not been found to be the case, and the slightly higher rate is not sufficient to cause an appreciable error in results carried only to the degree of accuracy here given.

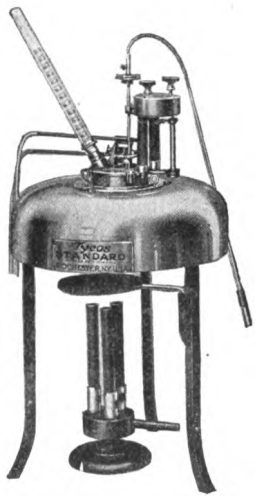
1 In the case of oils containing paraffin, or other materials that become solid at low temperatures, the expansion shown by the tables is somewhat too small at temperatures below the point of solidification.

Observed Temp. °F	Observed Degrees Baumé 15.	20.	25.	30.	35.
	Add to Observed Degrees Baumé				
10	2.8	3.0	3.1	3.5	3.8
12	2.7	2.9	3.0	3.3	3.7
14	2.6	2.8	2.9	3.1	3.6
16	2.5	2.7	2.8	3.0	3.4
18	2.4	2.6	2.7	2.9	3.2
20	2.3	2.4	2.6	2.8	3.1
22	2.2	2.3	2.5	2.6	2.9
24	2.1	2.2	2.3	2.4	2.8
26	2.0	2.0	2.2	2.3	2.6
28	1.8	1.9	2.0	2.2	2.5
30	1.6	1.7	1.9	2.0	2.3
32	1.5	1.6	1.8	1.9	2.1
34	1.4	1.5	1.7	1.8	1.9
36	1.3	1.4	1.5	1.6	1.8
38	1.1	1.3	1.4	1.5	1.6
40	1.0	1.2	1.2	1.4	1.5
42	.9	1.1	1.1	1.2	1.3
44	.8	.9	1.0	1.1	1.2
46	.7	.8	.9	.9	1.1
48	.6	.7	.8	.8	.9
50	.5	.6	.6	.7	.7
52	.4	.5	.5	.6	.6
54	.3	.3	.4	.4	.4
56	.2	.2	.3	.3	.3
58	.1	.1	.1	.1	.1
	Subtract from Observed Degrees Baumé				
60	.0	.0	.0	.0	.0
62	.1	.1	.1	.1	.1
64	.2	.2	.3	.3	.3
66	.3	.3	.4	.4	.4
68	.4	.5	.5	.6	.6
70	.5	.6	.6	.7	.8
72	.6	.7	.7	.8	.9
74	.7	.8	.9	.9	1.1
76	.8	.9	1.0	1.1	1.2
78	.9	1.0	1.1	1.2	1.4

Tycos Standard
U. S. Bureau of Mine Flash Testers



1740



1742

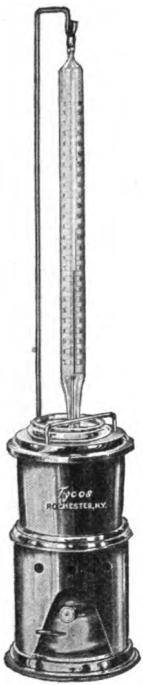
Ask for Bulletin 1700

Observed Temp. °F.	Observed Degrees Baumé				
	15.	20.	25.	30.	35.
	Subtract from Observed Degrees Baumé				
80	1.0	1.1	1.2	1.3	1.5
82	1.1	1.2	1.3	1.4	1.6
84	1.2	1.3	1.5	1.5	1.8
86	1.2	1.4	1.6	1.7	1.9
88	1.3	1.6	1.7	1.8	2.0
90	1.4	1.7	1.8	2.0	2.1
92	1.5	1.8	1.9	2.1	2.3
94	1.6	1.9	2.0	2.2	2.4
96	1.7	2.0	2.2	2.3	2.5
98	1.8	2.1	2.3	2.4	2.7
100	1.9	2.2	2.4	2.6	2.8
102	2.0	2.3	2.5	2.7	2.9
104	2.1	2.4	2.6	2.9	3.1
106	2.2	2.5	2.7	3.0	3.2
108	2.3	2.7	2.8	3.1	3.4
110	2.4	2.8	3.0	3.2	3.5
112	2.5	2.9	3.1	3.3	3.7
114	2.6	3.0	3.2	3.4	3.8
116	2.7	3.1	3.3	3.6	3.9
118	2.8	3.2	3.5	3.7	4.0
120	2.9	3.3	3.6	3.8	4.1
125	3.2	3.5	3.7	4.1	4.4
130	3.4	3.8	4.0	4.4	4.7
135	3.6	4.1	4.3	4.7	5.1
140	3.9	4.3	4.6	5.0	5.4
145	4.1	4.6	4.9	5.3	5.7
150	4.4	4.8	5.1	5.6	6.0
155	4.6	5.1	5.4	5.9	6.3
160	4.8	5.3	5.7	6.2	6.6
165	5.1	5.6	6.0	6.5	6.9
170	5.3	5.8	6.2	6.7	7.2
175	5.5	6.0	6.5	7.0	7.5
180	5.8	6.3	6.7	7.3	7.9
185	6.0	6.5	7.0	7.6	8.2
190	6.3	6.8	7.3	7.8	8.5
195	6.5	7.0	7.5	8.1	8.8
200	6.8	7.3	7.8	8.4	9.1
205	7.0	7.5	8.1	8.7	9.4
210	7.3	7.8	8.3	8.9	9.7

Observed Temp. °F.	Observed Degrees Baumé 40.	45.	50.	55.	60.
	Add to Observed Degrees Baumé				
10	4.2	4.7	5.2	5.6	6.2
12	3.9	4.5	4.9	5.4	5.9
14	3.7	4.3	4.7	5.2	5.7
16	3.6	4.1	4.5	5.0	5.4
18	3.5	3.9	4.3	4.7	5.2
20	3.4	3.8	4.1	4.5	4.9
22	3.2	3.5	3.9	4.3	4.7
24	2.9	3.3	3.7	4.1	4.4
26	2.7	3.1	3.4	3.8	4.2
28	2.6	2.9	3.2	3.6	3.9
30	2.4	2.7	3.0	3.4	3.7
32	2.3	2.5	2.8	3.2	3.4
34	2.1	2.3	2.6	2.9	3.1
36	2.0	2.2	2.4	2.7	2.9
38	1.8	2.0	2.2	2.5	2.6
40	1.6	1.8	2.0	2.2	2.4
42	1.5	1.6	1.8	2.0	2.2
44	1.3	1.4	1.6	1.8	2.0
46	1.1	1.2	1.4	1.5	1.7
48	.9	1.1	1.2	1.3	1.4
50	.8	.9	1.0	1.1	1.2
52	.7	.7	.8	.9	1.0
54	.5	.5	.6	.6	.8
56	.3	.3	.4	.4	.5
58	.1	.2	.2	.2	.3
	Subtract from Observed Degrees Baumé				
60	.0	.0	.0	.0	.0
62	.1	.1	.2	.2	.2
64	.3	.3	.4	.4	.4
66	.5	.5	.6	.6	.7
68	.6	.7	.7	.8	.9
70	.8	.9	.9	1.0	1.1
72	.9	1.0	1.1	1.2	1.3
74	1.1	1.2	1.3	1.5	1.6
76	1.3	1.4	1.5	1.7	1.8
78	1.4	1.6	1.7	1.9	2.0

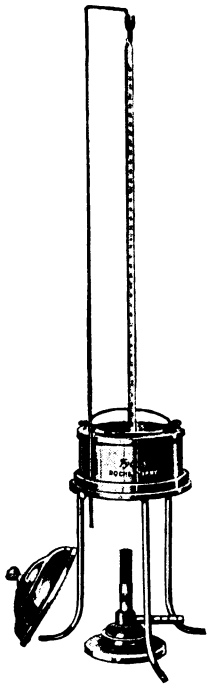
Observed Temp. °F.	Observed Degress Baumé				
	40	45	50	55	60
	Subtract from Observed Degrees Baumé				
80	1.5	1.8	1.8	2.1	2.2
82	1.7	1.9	2.0	2.3	2.5
84	1.8	2.1	2.2	2.5	2.7
86	2.0	2.2	2.4	2.7	2.9
88	2.1	2.4	2.6	2.9	3.1
90	2.3	2.5	2.7	3.1	3.3
92	2.4	2.7	2.9	3.2	3.5
94	2.6	2.8	3.1	3.4	3.8
96	2.7	3.0	3.3	3.6	4.0
98	2.9	3.2	3.4	3.8	4.2
100	3.0	3.4	3.6	4.0	4.4
102	3.2	3.5	3.8	4.2	4.6
104	3.3	3.7	4.0	4.4	4.8
106	3.5	3.8	4.2	4.6	5.0
108	3.6	4.0	4.3	4.7	5.2
110	3.7	4.1	4.4	4.9	5.4
112	3.9	4.3	4.6	5.1	5.6
114	4.0	4.4	4.7	5.3	5.8
116	4.1	4.6	4.9	5.5	6.0
118	4.3	4.7	5.1	5.8	6.2
120	4.4	4.9	5.3	5.9	6.4

Tycos Flash and Fire Testers



1742

1744



1754

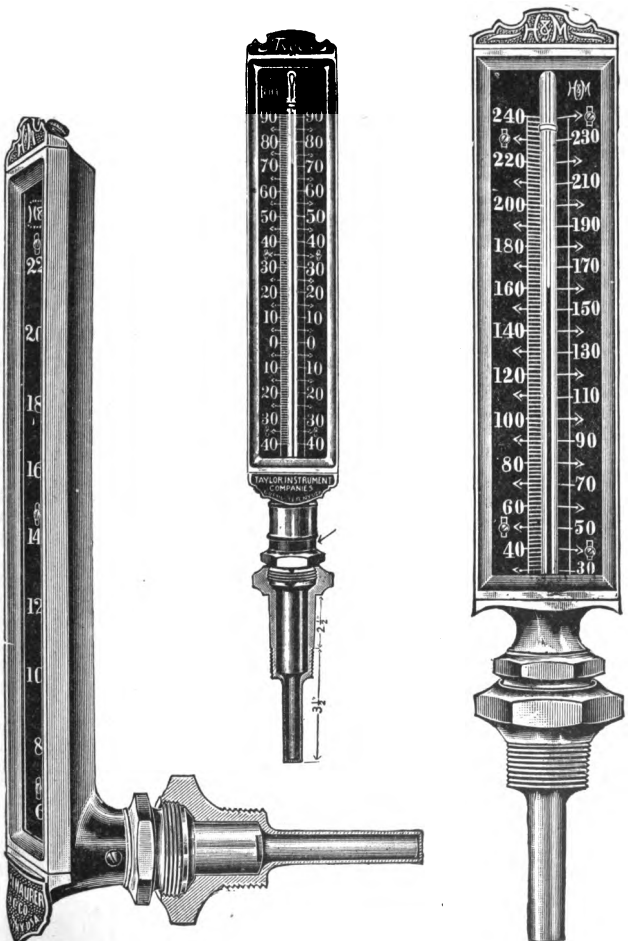
Ask for Bulletin 1700

Observed Temp. °F.	Observed Degrees Baumé 65.	70.	75.	80.	85.
	Add to Observed Degrees Baumé				
10	6.5	7.1	7.9	8.3	8.7
12	6.3	6.9	7.5	8.0	8.4
14	6.1	6.6	7.2	7.7	8.1
16	5.9	6.3	6.9	7.3	7.7
18	5.6	6.0	6.5	7.0	7.4
20	5.3	5.7	6.2	6.7	7.2
22	5.1	5.4	5.9	6.3	6.7
24	4.9	5.1	5.6	6.0	6.4
26	4.6	4.9	5.2	5.7	6.1
28	4.3	4.6	4.9	5.3	5.7
30	4.0	4.3	4.6	5.0	5.4
32	3.8	4.0	4.3	4.7	5.1
34	3.5	3.7	4.0	4.3	4.7
36	3.2	3.4	3.7	4.0	4.3
38	2.9	3.1	3.4	3.6	3.9
40	2.6	2.8	3.1	3.2	3.5
42	2.4	2.5	2.8	2.9	3.2
44	2.1	2.2	2.5	2.6	2.8
46	1.8	1.9	2.1	2.3	2.5
48	1.5	1.6	1.8	2.0	2.1
50	1.2	1.4	1.5	1.6	1.7
52	1.0	1.1	1.2	1.3	1.3
54	.8	.9	.9	1.0	1.0
56	.6	.6	.6	.6	.7
58	.3	.3	.3	.3	.3
	Subtract from Observed Degrees Baumé				
60	.0	.0	.0	.0	.0
62	.3	.3	.3	.3	.3
64	.5	.6	.6	.6	.7
66	.8	.8	.9	.9	1.0
68	1.0	1.1	1.2	1.3	1.3
70	1.2	1.4	1.5	1.6	1.7
72	1.5	1.6	1.8	1.9	2.0
74	1.8	1.8	2.1	2.2	2.3
76	2.0	2.1	2.3	2.5	2.6
78	2.2	2.4	2.6	2.8	3.0

Observed Temp.°F.	Observed Degrees Baumé				
	65	70	75	80	85
	Subtract from Observed Degrees Baumé				
80	2.4	2.6	2.9	3.1	3.3
82	2.7	2.9	3.2	3.4	3.7
84	3.0	3.2	3.5	3.7	4.0
86	3.2	3.4	3.7	4.0	4.3
88	3.5	3.7	4.0	4.2	4.6
90	3.7	3.9	4.2	4.5	4.9
92	3.9	4.2	4.5	4.8	5.2
94	4.2	4.4	4.8	5.1	5.5
96	4.4	4.6	5.1	5.4	5.8
98	4.6	4.9	5.3	5.7	6.1
100	4.8	5.1	5.6	6.0	6.5
102	5.1	5.4	5.9	6.3	6.8
104	5.3	5.7	6.2	6.6	7.1
106	5.5	5.9	6.4	6.9	7.4
108	5.7	6.2	6.6	7.2	7.7
110	5.9	6.4	6.9	7.5	8.0
112	6.1	6.7	7.2	7.7	8.3
114	6.3	6.9	7.4	7.9	8.6
116	6.6	7.1	7.6	8.2	8.9
118	6.8	7.3	7.9	8.5	9.2
120	7.0	7.5	8.2	8.8	9.5

Observed Temp. °F.	Observed Degrees Baumé 90	95	Observed Temp. °F.	Observed Degrees Baumé 90	95
	Add to Observed Degrees Baumé			Subtract from Observed, Degrees Baumé	
10	9.0	9.0	80	3.5	3.8
12	8.7	8.7	82	3.9	4.2
14	8.4	8.4	84	4.3	4.6
16	8.0	8.0	86	4.6	5.0
18	7.7	7.7	88	4.9	5.3
20	7.4	7.4	90	5.2	5.7
22	7.0	7.0	92	5.6	6.0
24	6.7	6.7	94	5.9	6.4
26	6.4	6.4	96	6.3	6.7
28	6.0	6.0	98	6.6	7.0
30	5.7	5.7	100	6.9	7.4
32	5.3	5.3	102	7.2	7.7
34	4.9	4.9	104	7.5	8.0
36	4.6	4.6	106	7.9	8.4
38	4.2	4.2	108	8.2	8.7
40	3.8	3.9	110	8.5	9.0
42	3.4	3.5	112	8.8	9.4
44	3.0	3.1	114	9.1	9.7
46	2.7	2.7	116	9.4	10.0
48	2.3	2.3	118	9.8	10.4
50	1.9	1.9	120	10.1	10.7
52	1.5	1.5			
54	1.1	1.1			
56	.7	.7			
58	.4	.4			
	Subtract from Observed Degrees Baumé				
60	.0	.0			
62	.4	.4			
64	.7	.8			
66	1.0	1.2			
68	1.4	1.6			
70	1.7	2.0			
72	2.1	2.3			
74	2.5	2.7			
76	2.8	3.0			
78	3.1	3.4			

Tycos Industrial Thermometers
for
Steam and Refrigerating Plants



Ask for Steam Bulletin 1—Refrigerating Bulletin 300

Density (in grams per milliliter) of Water at Temperatures from 0° to 102° C.*

Temp., Degrees C.	Density	Temp., Degrees C.	Density	Temp., Degrees C.	Density
0	0.99987	35	0.99406	70	0.97781
1	.99993	36	.99371	71	.97723
2	.99997	37	.99336	72	.97666
3	.99999	38	.99299	73	.97607
4	1.00000	39	.99262	74	.97548
5	.99999	40	.99224	75	.97489
6	.99997	41	.99186	76	.97428
7	.99993	42	.99147	77	.97368
8	.99988	43	.99107	78	.97307
9	.99981	44	.99066	79	.97245
10	.99973	45	.99024	80	.97183
11	.99963	46	.98982	81	.97120
12	.99952	47	.98940	82	.97057
13	.99940	48	.98896	83	.96994
14	.99927	49	.98852	84	.96930
15	.99913	50	.98807	85	.96865
16	.99897	51	.98762	86	.96800
17	.99880	52	.98715	87	.96734
18	.99862	53	.98669	88	.96668
19	.99843	54	.98621	89	.96601
20	.99823	55	.98573	90	.96534
21	.99802	56	.98524	91	.96467
22	.99780	57	.98478	92	.96399
23	.99756	58	.98425	93	.96330
24	.99732	59	.98375	94	.96261
25	.99707	60	.98324	95	.96192
26	.99681	61	.98272	96	.96122
27	.99654	62	.98220	97	.96051
28	.99626	63	.98167	98	.95981
29	.99597	64	.98113	99	.95909
30	.99567	65	.98059	100	.95838
31	.99537	66	.98005	101	.95765
32	.99505	67	.97950	102	.95693
33	.99473	68	.97894		
34	.99440	69	.97838		

*According to M. Thiesen, Wiss. Abh. der Physikalich-Technischen Riechsanstalt, 4, No. 1, 1904.

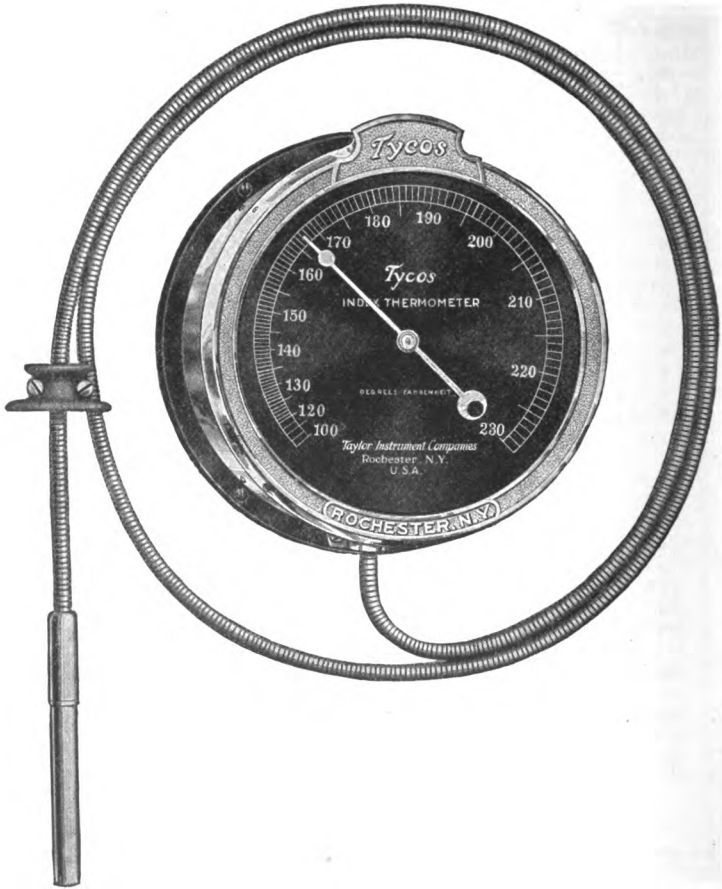
Bureau of Standards, Circular No. 19, 5th Edition.

Per Cent Sugar by Weight (Degrees Balling's or Brix) with Corresponding Specific Gravity and Degrees Baumé. Temperature 60° F.

Per Cent Sugar Balling's or Brix 60° F.-15.56° C.	Specific Gravity 60°/60° F.	Degrees Baumé 60° F.	Per Cent Sugar Balling's or Brix 60° F.-15.56° C.	Specific Gravity 60°/60° F.	Degrees Baumé 60° F.
0	1.0000	0.00	25	1.1060	13.90
1	1.0039	0.56	26	1.1107	14.45
2	1.0078	1.13	27	1.1154	15.00
3	1.0118	1.68	28	1.1201	15.54
4	1.0157	2.24	29	1.1248	16.19
5	1.0197	2.80	30	1.1296	16.63
6	1.0238	3.37	31	1.1345	17.19
7	1.0278	3.93	32	1.1393	17.73
8	1.0319	4.49	33	1.1442	18.28
9	1.0360	5.04	34	1.1491	18.81
10	1.0402	5.60	35	1.1541	19.36
11	1.0448	6.15	36	1.1591	19.90
12	1.0485	6.71	37	1.1641	20.44
13	1.0528	7.28	38	1.1692	20.98
14	1.0570	7.81	39	1.1743	21.52
15	1.0613	8.38	40	1.1794	22.06
16	1.0657	8.94	41	1.1846	22.60
17	1.0700	9.49	42	1.1898	23.13
18	1.0744	10.04	43	1.1950	23.66
19	1.0788	10.59	44	1.2003	24.20
20	1.0833	11.15	45	1.2057	24.74
21	1.0878	11.70	46	1.2110	25.26
22	1.0923	12.25	47	1.2164	25.80
23	1.0968	12.80	48	1.2218	26.32
24	1.1014	13.35	49	1.2273	26.86

Tycos Vapor Tension Index Thermometer

Full Circle Type



For installations requiring long lengths of connecting tubing.

Ask for Catalog 11000

Per Cent Sugar Balling's or Brix 60° F.- 15.56° C.	Specific Gravity 60°/60° F.	Degrees Baumé 60° F.	Per Cent Sugar Balling's or Brix 60° F.- 15.56° C.	Specific Gravity 60°/60° F	Degrees Baumé 60° F.
50	1.2328	27.38	75	1.3829	40.15
51	1.2384	27.91	76	1.3894	40.64
52	1.2439	28.43	77	1.3959	41.12
53	1.2496	28.96	78	1.4025	41.61
54	1.2552	29.48	79	1.4091	42.10
55	1.2609	30.00	80	1.4157	42.58
56	1.2667	30.53	81	1.4224	43.06
57	1.2724	31.05	82	1.4291	43.54
58	1.2782	31.56	83	1.4359	44.02
59	1.2841	32.08	84	1.4427	44.49
60	1.2900	32.60	85	1.4495	44.96
61	1.2959	33.11	86	1.4564	45.44
62	1.3019	33.63	87	1.4633	45.91
63	1.3079	34.13	88	1.4702	46.37
64	1.3139	34.64	89	1.4772	46.84
65	1.3200	35.15	90	1.4842	47.31
66	1.3261	35.66	91	1.4913	47.77
67	1.3323	36.16	92	1.4984	48.23
68	1.3384	36.67	93	1.5055	48.69
69	1.3447	37.17	94	1.5126	49.14
70	1.3509	37.66	95	1.5198	49.59
71	1.3573	38.17	96	1.5270	50.04
72	1.3636	38.66	97	1.5343	50.49
73	1.3700	39.16	98	1.5416	50.94
74	1.3764	39.65	99	1.5489	51.39
			100	1.5563	51.93

The above table is from the determinations of Dr. F. Plato, and has been adopted as standards by the United States Bureau of Standards.

Degrees Brix or Per Cent Sugar with Corresponding Specific Gravity

Temperature 17½°/17½° C.

Degree Brix or Per Cent Sugar	Specific Gravity *17½°/17½°C	Degree Brix or Per Cent Sugar	Specific Gravity *17½°/17½°C	Degree Brix or Per Cent Sugar	Specific Gravity *17½°/17½° C
0	1.00000	34	1.14871	68	1.33771
1	1.00388	35	1.15366	69	1.34394
2	1.00780	36	1.15865	70	1.35020
3	1.01173	37	1.16367	71	1.35650
4	1.01569	38	1.16872	72	1.36283
5	1.01968	39	1.17383	73	1.36921
6	1.02371	40	1.17895	74	1.37562
7	1.02775	41	1.18412	75	1.38208
8	1.03181	42	1.18931	76	1.38857
9	1.03592	43	1.19455	77	1.39510
10	1.04005	44	1.19982	78	1.40166
11	1.04422	45	1.20514	79	1.40827
12	1.04840	46	1.21048	80	1.41491
13	1.05264	47	1.21587	81	1.42159
14	1.05689	48	1.22129	82	1.42831
15	1.06118	49	1.22675	83	1.43506
16	1.06549	50	1.23225	84	1.44185
17	1.06983	51	1.23778	85	1.44867
18	1.07421	52	1.24335	86	1.45553
19	1.07863	53	1.24896	87	1.46243
20	1.08306	54	1.25461	88	1.46937
21	1.08753	55	1.26030	89	1.47634
22	1.09204	56	1.26603	90	1.48335
23	1.09658	57	1.27179	91	1.49039
24	1.10115	58	1.27758	92	1.48747
25	1.10575	59	1.28342	93	1.50459
26	1.11039	60	1.28930	94	1.51173
27	1.11506	61	1.29521	95	1.51891
28	1.11977	62	1.30117	96	1.52613
29	1.12451	63	1.30717	97	1.53338
30	1.12927	64	1.31321	98	1.54067
31	1.13408	65	1.31927	99	1.54798
32	1.13893	66	1.32538	100	1.55534
33	1.14380	67	1.33153		

*All densities taken at temperature of 17½°C and referred to water at 17½°C as 1.00000.

The above table is from the determinations of Dr. F. Plato and has been adopted as standard by the U. S. Bureau of Standards.

Per Cent Sugar by Weight (Degrees Brix) with Corresponding Specific Gravity and Degrees Baumé. Temperature 20°C

Degrees Brix or Per Cent Sugar by Weight 20° C	Specific Gravity 20°/20° C	Degrees Baumé 20° C	Degrees Brix or Per Cent Sugar by Weight 20° C	Specific Gravity 20°/20° C	Degrees Baumé 20° C
0	1.0000	0.00	25	1.1055	13.84
1	1.0039	0.56	26	1.1101	14.39
2	1.0078	1.12	27	1.1148	14 93
3	1.0117	1.68	28	1.1195	15.48
4	1.0157	2.24	29	1.1242	16.02
5	1.0197	2.79	30	1.1290	16.57
6	1.0237	3.35	31	1.1338	17.11
7	1.0277	3.91	32	1.1386	17.65
8	1.0318	4.46	33	1.1435	18.19
9	1.0359	5.02	34	1.1484	18.73
10	1.0400	5.57	35	1.1533	19.28
11	1.0441	6.13	36	1.1583	19.81
12	1.0483	6.68	37	1.1633	20.35
13	1.0525	7.24	38	1.1683	20.89
14	1.0568	7.79	39	1.1734	21.43
15	1.0610	8.34	40	1.1785	21.97
16	1.0653	8.89	41	1.1837	22.50
17	1.0697	9.45	42	1.1889	23.04
18	1.0740	10.00	43	1.1941	23.57
19	1.0784	10.55	44	1.1994	24.10
20	1.0829	11.10	45	1.2047	24.63
21	1.0873	11.65	46	1.2100	25.17
22	1.0918	12.20	47	1.2154	25.70
23	1.0964	12.74	48	1.2208	26.23
24	1.1009	13.29	49	1.2263	26.75

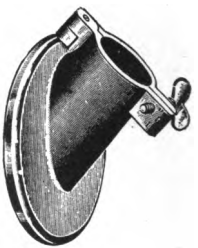
Tycos Adjustable Connections

ADJUSTABLE
CLAMP-HOOK
NO. 728

ADJUSTABLE
ROCKING-CUP
CLAMP
NO. 732

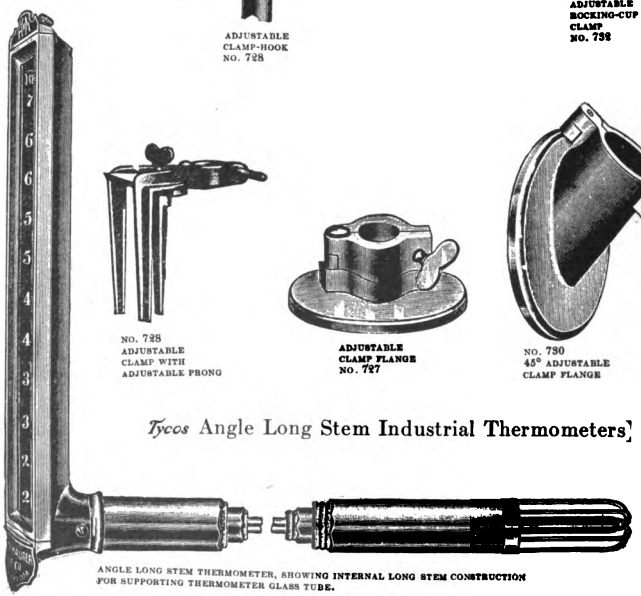
NO. 728
ADJUSTABLE
CLAMP WITH
ADJUSTABLE PRONG

ADJUSTABLE
CLAMP FLANGE
NO. 727



NO. 730
45° ADJUSTABLE
CLAMP FLANGE

Tycos Angle Long Stem Industrial Thermometers



ANGLE LONG STEM THERMOMETER, SHOWING INTERNAL LONG STEM CONSTRUCTION
FOR SUPPORTING THERMOMETER GLASS TUBE.

Degrees Brix or Per Cent Sugar by Weight 20° C	Specific Gravity 20°/20° C	Degrees Baumé 20° C	Degrees Brix or Per Cent Sugar by Weight 20° C	Specific Gravity 20°/20° C	Degrees Baumé 20° C
50	1.2317	27.28	75	1.3814	40.03
51	1.2373	27.81	76	1.3879	40.53
52	1.2428	28.33	77	1.3944	41.01
53	1.2484	28.86	78	1.4010	41.50
54	1.2541	29.38	79	1.4076	41.99
55	1.2598	29.90	80	1.4142	42.47
56	1.2655	30.42	81	1.4209	42.95
57	1.2712	30.94	82	1.4276	43.43
58	1.2770	31.46	83	1.4343	43.91
59	1.2829	31.97	84	1.4411	44.38
60	1.2887	32.49	85	1.4479	44.86
61	1.2946	33.00	86	1.4548	45.33
62	1.3006	33.51	87	1.4617	45.80
63	1.3066	34.02	88	1.4686	46.27
64	1.3126	34.53	89	1.4756	46.73
65	1.3187	35.04	90	1.4826	47.20
66	1.3248	35.55	91	1.4896	47.66
67	1.3309	36.05	92	1.4967	48.12
68	1.3371	36.55	93	1.5038	48.58
69	1.3433	37.06	94	1.5110	49.03
70	1.3496	37.56	95	1.5181	49.49
71	1.3559	38.06	96	1.5254	49.94
72	1.3622	38.55	97	1.5326	50.39
73	1.3686	39.05	98	1.5399	50.84
74	1.3750	39.54	99	1.5472	51.28
			100	1.5545	51.73

Bureau of Standards Circular No. 44

Degrees Brix or Per Cent Sugar by Weight with Corresponding Specific Gravity

Temperature 20°/4° C.

Degree Brix or Per Cent Sugar	Specific Gravity *20°/4°C	Degree Brix or Per Cent Sugar	Specific Gravity *20°/4°C	Degree Brix or Per Cent Sugar	Specific Gravity *20°/4°C
0	0.998234	35	1.151275	70	1.347174
1	1.002120	36	1.156238	71	1.353456
2	1.006015	37	1.161236	72	1.359778
3	1.009934	38	1.166269	73	1.366139
4	1.013881	39	1.171340	74	1.372536
5	1.017854	40	1.176447	75	1.378971
6	1.021855	41	1.181592	76	1.385446
7	1.025885	42	1.186773	77	1.391956
8	1.029942	43	1.191993	78	1.398505
9	1.034029	44	1.197247	79	1.405091
10	1.038143	45	1.202540	80	1.411715
11	1.042288	46	1.207870	81	1.418374
12	1.046462	47	1.213238	82	1.425072
13	1.050665	48	1.218643	83	1.431807
14	1.054900	49	1.224086	84	1.438579
15	1.059165	50	1.229567	85	1.445388
16	1.063460	51	1.235085	86	1.452232
17	1.067789	52	1.240641	87	1.459114
18	1.072147	53	1.246234	88	1.466032
19	1.076537	54	1.251866	89	1.472986
20	1.080959	55	1.257535	90	1.479976
21	1.085414	56	1.263243	91	1.487002
22	1.089900	57	1.268989	92	1.494063
23	1.094420	58	1.274774	93	1.501158
24	1.098971	59	1.280595	94	1.508289
25	1.103557	60	1.286456	95	1.515455
26	1.108175	61	1.292354	96	1.522656
27	1.112828	62	1.298291	97	1.529891
28	1.117512	63	1.304267	98	1.537161
29	1.122231	64	1.310282	99	1.544462
30	1.126984	65	1.316334	100	1.551800
31	1.131773	66	1.322425		
32	1.136596	67	1.328554		
33	1.141453	68	1.334722		
34	1.146345	69	1.340928		

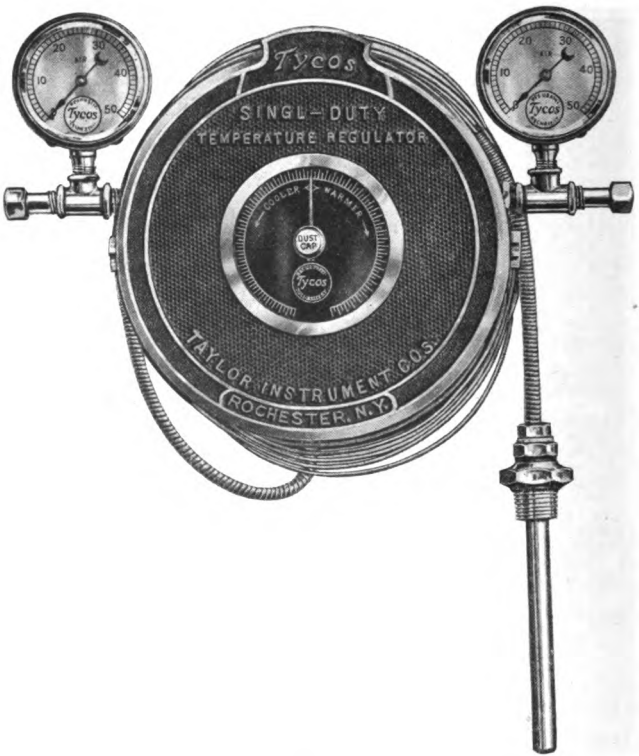
*All densities taken at temperature of 20°C and referred to water at 4°C as 1.000000.

The above table is from the determinations of Dr. Plato and is found in Bureau of Standards Circular No. 19.

Temperature Corrections to Readings of Saccharometers Standard at 20°/4° C.

Temperature in Degrees Centigrade	Observed Per Cent of Sugar						
	0	5	10	15	20	25	30
	Subtract from Observed Per cent.						
0	0.30	0.49	0.65	0.77	0.89	0.99	1.08
5	.36	.47	.56	.65	.73	.80	.86
10	.32	.38	.43	.48	.52	.57	.60
11	.31	.35	.40	.44	.48	.51	.55
12	.29	.32	.36	.40	.43	.46	.50
13	.26	.29	.32	.35	.38	.41	.44
14	.24	.26	.29	.31	.34	.36	.38
15	.20	.22	.24	.26	.28	.30	.32
16	.17	.18	.20	.22	.23	.25	.26
17	.13	.14	.15	.16	.18	.19	.20
18	.09	.10	.10	.11	.12	.13	.13
19	.05	.05	.05	.06	.06	.06	.07
17.5	.11	.12	.12	.14	.15	.16	.16
15.56 (60°F)	.18	.20	.22	.24	.26	.28	.29
	Add to Observed Per Cent						
21	0.04	0.05	0.06	0.06	0.06	0.07	0.07
22	.10	.10	.11	.12	.12	.13	.14
23	.16	.16	.17	.17	.19	.20	.21
24	.21	.22	.23	.24	.26	.27	.28
25	.27	.28	.30	.31	.32	.34	.35
26	.33	.34	.36	.37	.40	.40	.42
27	.40	.41	.42	.44	.46	.48	.50
28	.46	.47	.49	.51	.54	.56	.58
29	.54	.55	.56	.59	.61	.63	.66
30	.61	.62	.63	.66	.68	.71	.73
35	.99	1.01	1.02	1.06	1.10	1.13	1.16
40	1.42	1.45	1.47	1.51	1.54	1.57	1.60
45	1.91	1.94	1.96	2.00	2.03	2.05	2.07
50	2.46	2.48	2.50	2.53	2.56	2.57	2.58
55	3.05	3.07	3.09	3.12	3.12	3.12	3.12
60	3.69	3.72	3.73	3.73	3.72	3.70	3.67
27.5	0.43	0.44	0.46	0.48	0.50	0.52	0.54

Tycos "Singl-Duty" Temperature Regulator



15004

Ask for Section 15000

Temperature in Degrees Centigrade	Observed Per Cent of Sugar						
	35	40	45	50	55	60	70
	Subtract from Observed Per ecnt						
0	1.16	1.24	1.31	1.37	1.41	1.44	1.49
5	.91	.97	1.01	1.05	1.08	1 10	1.14
10	.64	.67	.70	.72	.74	.75	.77
11	.58	.60	.63	.65	.66	.68	.70
12	.52	.54	.56	.58	.59	.60	.62
13	.46	.48	.49	.51	.52	.53	.55
14	.40	.41	.42	.44	.45	.46	.47
15	.33	.34	.36	.36	.37	.38	.39
16	.27	.28	.28	.29	.30	.31	.32
17	.20	.21	.21	.22	.23	.23	.24
18	.14	.14	.14	.15	.15	.15	.16
19	.07	.07	.07	.08	.08	.08	.08
17.5	.17	.17	.18	.18	.19	.19	.20
15.56 (60°F)	.30	.30	.32	.33	.33	.34	.34
	Add to Observed Per Cent						
21	0.07	0.07	0.08	0.08	0.08	0.08	0.09
22	.14	.15	.15	.16	.16	.16	.16
23	.21	.22	.23	.24	.24	.24	.24
24	.29	.30	.31	.32	.32	.32	.32
25	.36	.38	.38	.39	.39	.40	.39
26	.44	.46	.47	.47	.48	.48	.48
27	.52	.54	.54	.55	.56	.56	.56
28	.60	.61	.62	.63	.64	.64	.64
29	.68	.70	.70	.71	.72	.72	.72
30	.76	.78	.78	.79	.80	.80	.81
35	1.18	1.20	1.21	1.22	1.22	1.23	1.22
40	1.62	1.64	1.65′	1.65	1.65	1.66	1.65
45	2.09	2.10	2.10	2.10	2.10	2.10	2.08
50	2.59	2.59	2.58	2.58	2.57	2.56	2.52
55	3.11	3.10	3.08	3.07	3.05	3.03	2.97
60	3 65	3.62	3.60	3.57	3.54	3.50	3.43
27.5	0.56	0.58	0.58	0.59	0.60	0.60	0.60

Bureau of Standards Circular No. 19.

Per Cent. Ethyl, (Grain) Alcohol by Volume and Corresponding Specific Gravity. Temperature 60°/60°F.

Per Cent Alcohol by Volume 60° F.	Specific Gravity 60°/60° F.	Per Cent Alcohol by Volume 60° F.	Specific Gravity 60°/60° F.	Per Cent Alcohol by Volume 60° F.	Specific Gravity 60°/60° F.
0	1.0000	34	0.9604	68	0.8949
1	0.9985	35	0.9591	69	0.8925
2	0.9970	36	0.9577	70	0.8900
3	0.9956	37	0.9563	71	0.8875
4	0.9942	38	0.9548	72	0.8850
5	0.9928	39	0.9533	73	0.8824
6	0.9915	40	0.9518	74	0.8799
7	0.9902	41	0.9502	75	0.8773
8	0.9890	42	0.9486	76	0.8747
9	0.9878	43	0.9469	77	0.8720
10	0.9866	44	0.9452	78	0.8693
11	0.9854	45	0.9435	79	0.8666
12	0.9843	46	0.9417	80	0.8638
13	0.9832	47	0.9399	81	0.8610
14	0.9821	48	0.9381	82	0.8582
15	0.9810	49	0.9362	83	0.8553
16	0.9800	50	0.9343	84	0.8524
17	0.9790	51	0.9323	85	0.8494
18	0.9779	52	0.9303	86	0.8464
19	0.9769	53	0.9283	87	0.8434
20	0.9760	54	0.9263	88	0.8403
21	0.9750	55	0.9242	89	0.8371
22	0.9740	56	0.9221	90	0.8338
23	0.9729	57	0.9200	91	0.8305
24	0.9719	58	0.9178	92	0.8271
25	0.9708	59	0.9157	93	0.8235
26	0.9698	60	0.9134	94	0.8198
27	0.9687	61	0.9112	95	0.8160
28	0.9676	62	0.9089	96	0.8121
29	0.9665	63	0.9066	97	0.8079
30	0.9653	64	0.9043	98	0.8036
31	0.9642	65	0.9020	99	0.7989
32	0.9630	66	0.8997	100	0.7939
33	0.9617	67	0.8973		

From determinations of the United States Bureau of Standards, Bureau Circular No. 19, 5th Edition. Pages 10 and 11.

Temperature Corrections to Readings of Per Cent Ethyl (grain) Alcohol by Volume Standard at 60°/60°F.

Observed Temperature in Degrees Fahrenheit	Observed Per Cent Alcohol by Volume					
	0	1	2	3	4	5
	Add to Observed Per Cent Alcohol					
50	0.37	0.38	0.39	0.40	0.42	0.45
51	.34	.35	.36	.37	.39	.41
52	.32	.32	.33	.34	.35	.38
53	.29	.30	.30	.31	.32	.34
54	.26	.26	.26	.27	.28	.29
55	.22	.22	.23	.23	.24	.25
56	.18	.18	.18	.18	.19	.20
57	.14	.14	.14	.14	.14	.15
58	.09	.10	.10	.10	.10	.10
59	.05	.05	.05	.05	.05	.05
	Subtract from Observed Per Cent Alcohol					
61		0.05	0.05	0.06	0.06	0.07
62		.10	.11	.12	.12	.13
63		.16	.17	.18	.19	.20
64		.22	.23	.24	.25	.26
65		.28	.29	.30	.32	.33
66		.34	.35	.36	.38	.40
67		.41	.42	.43	.45	.47
68		.48	.48	.50	.52	.54
69		.55	.56	.57	.59	.62
70		.62	.63	.64	.67	.70
72		.77	.78	.80	.83	.86
74		.93	.94	.96	1.00	1.03
76			1.10	1.13	1.17	1.21
78			1.28	1.31	1.35	1.40
80			1.46	1.50	1.54	1.60
82			1.64	1.69	1.74	1.80
84			1.84	1.89	1.94	2.00
86				2.09	2.15	2.22
88				2.30	2.37	2.44
90				2.52	2.59	2.66
92				2.74	2.82	2.89
94				2.97	3.04	3.12
96					3.28	3.36
98					3.52	3.60
100					3.76	3.85

Tycos

Mercury Actuated Temperature Control

Electric Contact Type

For automatically controlling the temperature of electric heated apparatus within limits of —40°+1000° Fahr.

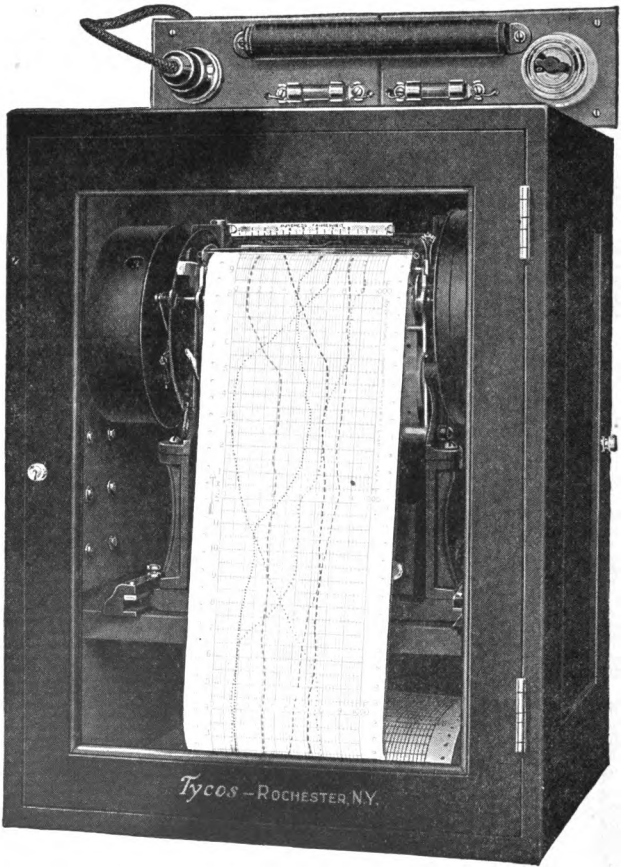
Ask for Catalog 11850

Observed Temperature in Degrees Fahrenheit	Observed Per Cent Alcohol by Volume					
	6	7	8	9	10	20
	Add to Observed Per Cen t Alcohol					
50	0.48	0.52	0.56	0.61	0.66	1.62
51	.44	.47	.51	.56	.61	1.47
52	.40	.43	.47	.51	.55	1.31
53	.36	.39	.42	.46	.49	1.15
54	.32	.34	.36	.40	.43	.99
55	.27	.29	.31	.34	.37	.83
56	.22	.24	.25	.28	.30	.67
57	.17	.18	.19	.21	.23	.51
58	.11	.12	.13	.14	.16	.34
59	.06	.06	.06	.07	.08	.17
	Subtract from Observed Per Cent Alcohol					
61	0.07	0.07	0.08	0.08	0.08	0.16
62	.14	.14	.16	.16	.17	.32
63	.20	.21	.23	.24	.25	.49
64	.27	.29	.31	.32	.34	.66
65	.34	.36	.39	.41	.43	.82
66	.42	.44	.47	.50	.52	.98
67	.50	.52	.55	.58	.61	1.15
68	.57	.60	.64	.67	.71	1.33
69	.66	.68	.73	.76	.80	1.48
70	.74	.77	.81	.85	.90	1.65
72	.90	.94	.99	1.04	1.10	2.00
74	1.09	1.13	1.18	1.25	1.32	2.32
76	1.27	1.32	1.38	1.46	1.54	2.65
78	1.46	1.52	1.59	1.67	1.76	2.98
80	1.66	1.73	1.80	1.89	1.99	3.33
82	1.87	1.94	2.02	2.12	2.22	3.66
84	2.08	2.16	2.25	2.35	2.47	4.00
86	2.30	2.39	2.49	2.60	2.72	4.33
88	2.53	2.62	2.73	2.85	2.98	4.67
90	2.76	2.86	2.98	3.11	3.24	5.01
92	3.00	3.11	3.24	3.37	3.51	5.35
94	3.24	3.36	3.50	3.63	3.78	5.69
96	3.49	3.62	3.76	3.90	4.05	6.03
98	3.74	3.88	4.03	4.17	4.32	6.38
100	4.00	4.15	4.30	4.45	4.60	6.72

Observed Temperature in Degrees Fahrenheit	Observed Per Cent Alcohol by Volume					
	30	40	45	50	55	60
	Add to Observed Per Cent Alcohol					
50	2.31	2.24	2.14	2.04	1.98	1.90
51	2.08	2.02	1.91	1.84	1.78	1.71
52	1.84	1.79	1.71	1.64	1.58	1.52
53	1.60	1.56	1.50	1.44	1.38	1.33
54	1.36	1.34	1.28	1.23	1.19	1.14
55	1.13	1.11	1.06	1.02	.99	.95
56	.90	.89	.85	.81	.79	.76
57	.67	.67	.64	.61	.59	.57
58	.44	.45	.42	.40	.39	.39
59	.22	.23	.21	.20	.20	.19
	Subtract from Observed Per Cent Alcohol					
61	0.23	0.23	0.22	0.21	0.20	0.20
62	.46	.45	.44	.42	.40	.39
63	.68	.68	.66	.62	.60	.58
64	.91	.90	.87	.84	.81	.78
65	1.12	1.12	1.09	1.05	1.01	.97
66	1.35	1.34	1.30	1.25	1.21	1.17
67	1.57	1.56	1.52	1.46	1.41	1.37
68	1.79	1.79	1.74	1.66	1.61	1.55
69	2.00	2.01	1.96	1.88	1.81	1.75
70	2.22	2.24	2.17	2.09	2.02	1.95
72	2.66	2.68	2.61	2.51	2.42	2.34
74	3.10	3.14	3.04	2.93	2.83	2.73
76	3.52	3.58	3.47	3.35	3.24	3.13
78	3.95	4.02	3.92	3.78	3.64	3.53
80	4.37	4.48	4.36	4.20	4.05	3.93
82	4.80	4.94	4.81	4.63	4.47	4.33
84	5.24	5.38	5.25	5.06	4.88	4.73
86	5.64	5.84	5.70	5.49	5.30	5.14
88	6.06	6.29	6.14	5.92	5.72	5.54
90	6.46	6.73	6.58	6.36	6.14	5.95
92	6.87	7.18	7.03	6.80	6.56	6.36
94	7.29	7.63	7.48	7.24	6.98	6.77
96	7.71	8.08	7.92	7.68	7.40	7.19
98	8.12	8.54	8.36	8.11	7.82	7.60
100	8.55	8.98	8.81	8.45	8.25	8.02

Observed Temperature in Degrees Fahrenheit	Observed Per Cent Alcohol by Volume					
	70	80	90	93	94	95
	Add to Observed Per Cent Alcohol					
50	1.78	1.63	1.39	1.27	1.22	1.17
51	1.60	1.47	1.25	1.14	1.10	1.06
52	1.42	1.30	1.12	1.02	.98	.94
53	1.25	1.15	.98	.90	.86	.83
54	1.08	.98	.84	.77	.74	.72
55	.90	.82	.70	.64	.62	.60
56	.72	.66	.56	.52	.49	.48
57	.54	.49	.42	.39	.37	.36
58	.36	.32	.28	.26	.24	.24
59	.18	.16	.14	.13	.12	.12
	Subtract from Observed Per Cent Alcohol					
61	0.18	0.17	0.15	0.13	0.13	0.12
62	.36	.34	.29	.26	.25	.24
63	.54	.50	.43	.39	.38	.36
64	.72	.68	.58	.52	.51	.49
65	.90	.84	.72	.66	.64	.61
66	1.09	1.00	.86	.79	.76	.73
67	1.27	1.17	1.00	.93	.90	.86
68	1.45	1.33	1.15	1.06	1.02	.98
69	1.63	1.50	1.30	1.20	1.16	1.10
70	1.82	1.68	1.45	1.34	1.29	1.23
72	2.18	2.02	1.74	1.61	1.55	1.49
74	2.55	2.36	2.05	1.89	1.82	1.75
76	2.93	2.70	2.35	2.17	2.09	2.01
78	3.03	3.04	2.65	2.46	2.36	2.28
80	3.68	3.38	2.96	2.74	2.64	2.56
82	4.06	3.72	3.26	3.03	2.92	2.84
84	4.44	4.08	3.57	3.32	3.21	3.10
86	4.82	4.43	3.89	3.62	3.51	3.38
88	5.20	4.78	4.20	3.91	3.80	3.66
90	5.59	5.14	4.52	4.20	4.08	3.94
92	5.98	5.50	4.84	4.50	4.38	4.23
94	6.37	5.86	5.16	4.80	4.67	4.52
96	6.76	6.23	5.49	5.11	4.97	4.82
98	7.15	6.60	5.82	5.42	5.27	5.12
100	7.54	6.96	6.15	5.74	5.58	5.42

Tycos Multi-Pyrograph



Gives individual records of temperature at six different points on one chart.

Ask for Catalog 4015

Observed Temperature in Degrees Fahrenheit	Observed Per Cent Alcohol by Volume				
	96	97	98	99	100
	Add to Observed Per Cent Alcohol				
50	1.12	1.06	0.99	0.93	....
51	1.01	.95	.89	.84	....
52	.90	.85	.79	.74	....
53	.79	.74	.70	.65	....
54	.68	.64	.60	.56	....
55	.57	.53	.50	.47	....
56	.45	.43	.40	.38	....
57	.34	.32	.30	.29	....
58	.23	.21	.20	.19	....
59	.12	.11	.10	.10	....
	Subtract from Observed Per Cent Alcohol				
61	0.12	0.11	0.10	0.10	0.09
62	.23	.22	.21	.19	.18
63	.35	.33	.31	.29	.27
64	.46	.44	.41	.39	.36
65	.58	.55	.52	.49	.46
66	.70	.67	.63	.59	.55
67	.82	.78	.74	.70	.64
68	.94	.90	.85	.80	.74
69	1.06	1.02	.96	.90	.84
70	1.19	1.14	1.07	1.00	.94
72	1.43	1.37	1.30	1.22	1.13
74	1.69	1.61	1.53	1.43	1.33
76	1.94	1.85	1.76	1.65	1.53
78	2.20	2.10	2.00	1.87	1.73
80	2.46	2.35	2.24	2.09	1.93
82	2.72	2.60	2.48	2.32	2.14
84	2.96	2.86	2.73	2.56	2.36
86	3.26	3.13	2.98	2.80	2.58
88	3.54	3.39	3.24	3.06	2.81
90	3.81	3.66	3.50	3.30	3.03
92	4.10	3.93	3.76	3.55	3.26
94	4.38	4.20	4.02	3.80	3.50
96	4.67	4.48	4.29	4.06	3.73
98	4.95	4.76	4.55	4.31	3.96
100	5.24	5.04	4.82	4.56	4.21

Degrees Twaddle with Corresponding Specific Gravity Temperature 60°/60° F.

Degrees Twaddle 60° F.	Specific Gravity 60°/60° F.	Degrees Twaddle 60° F.	Specific Gravity 60°/60° F.	Degrees Twaddle 60° F.	Specific Gravity 60°/60° F.	Degrees Twaddle 60° F.	Specific Gravity 60°/60° F.	Degrees Twaddle 60° F.	Specific Gravity 60°/60° F.
0	1.000	40	1.200	80	1.400	120	1.600	160	1.800
1	1.005	41	1.205	81	1.405	121	1.605	161	1.805
2	1.010	42	1.210	82	1.410	122	1.610	162	1.810
3	1.015	43	1.215	83	1.415	123	1.615	163	1.815
4	1.020	44	1.220	84	1.420	124	1.620	164	1.820
5	1.025	45	1.225	85	1.425	125	1.625	165	1.825
6	1.030	46	1.230	86	1.430	126	1.630	166	1.830
7	1.035	47	1.235	87	1.435	127	1.635	167	1.835
8	1.040	48	1.240	88	1.440	128	1.640	168	1.840
9	1.045	49	1.245	89	1.445	129	1.645	169	1.845
10	1.050	50	1.250	90	1.450	130	1.650	170	1.850
11	1.055	51	1.255	91	1.455	131	1.655	171	1.855
12	1.060	52	1.260	92	1.460	132	1.660	172	1.860
13	1.065	53	1.265	93	1.465	133	1.665	173	1.865
14	1.070	54	1.270	94	1.470	134	1.670	174	1.870
15	1.075	55	1.275	95	1.475	135	1.675	175	1.875
16	1.080	56	1.280	96	1.480	136	1.680	176	1.880
17	1.085	57	1.285	97	1.485	137	1.685	177	1.885
18	1.090	58	1.290	98	1.490	138	1.690	178	1.890
19	1.095	59	1.295	99	1.495	139	1.695	179	1.895
20	1.100	60	1.300	100	1.500	140	1.700	180	1.900
21	1.105	61	1.305	101	1.505	141	1.705	...	.....
22	1.110	62	1.310	102	1.510	142	1.710	...	.....
23	1.115	63	1.315	103	1.515	143	1.715	...	.....
24	1.120	64	1.320	104	1.520	144	1.720	...	.....
25	1.125	65	1.325	105	1.525	145	1.725	...	.....
26	1.130	66	1.330	106	1.530	146	1.730	...	.....
27	1.135	67	1.335	107	1.535	147	1.735	...	.....
28	1.140	68	1.340	108	1.540	148	1.740	...	.....
29	1.145	69	1.345	109	1.545	149	1.745	...	.....
30	1.150	70	1.350	110	1.550	150	1.750	...	.....
31	1.155	71	1.355	111	1.555	151	1.755	...	.....
32	1.160	72	1.360	112	1.560	152	1.760	...	.....
33	1.165	73	1.365	113	1.565	153	1.765	...	.....
34	1.170	74	1.370	114	1.570	154	1.770	...	.....
35	1.175	75	1.375	115	1.575	155	1.775	...	.....
36	1.180	76	1.380	116	1.580	156	1.780	...	.....
37	1.185	77	1.385	117	1.585	157	1.785	...	.....
38	1.190	78	1.390	118	1.590	158	1.790	...	.....
39	1.195	79	1.395	119	1.595	159	1.795	...	.....

$$\text{Degrees Twaddle} = (200 \times \text{Specific Gravity}) - 200$$

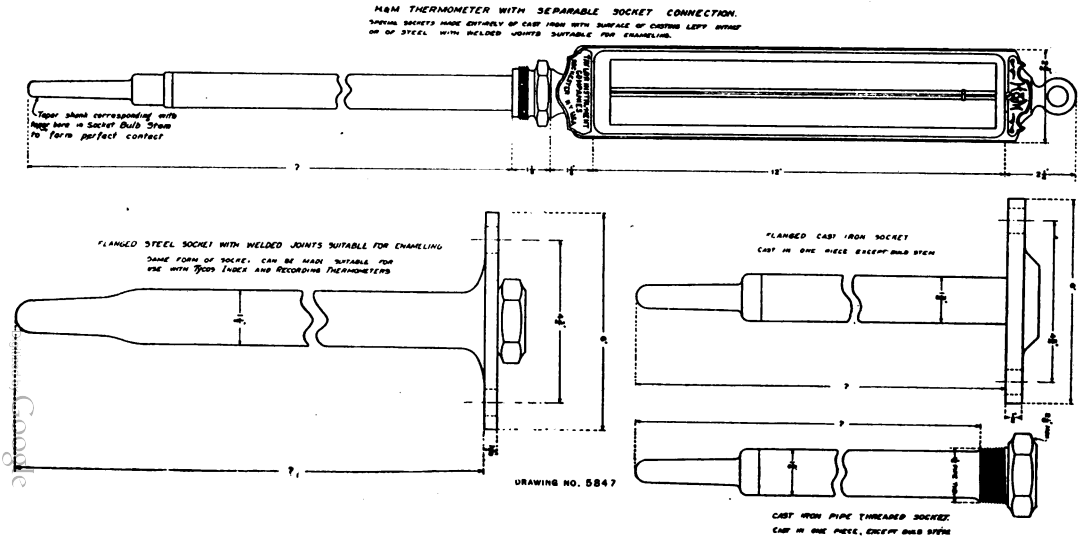
$$\text{Specific Gravity} = \frac{\text{Degrees Twaddle} + 200}{200}$$

Sulphuric Acid*

By W. C. Ferguson and H. P. Talbot

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. H_2SO_4	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. H_2SO_4
0	1.0000	0.00	30	1.2609	34.63
1	1.0069	1.02	31	1.2719	35.93
2	1.0140	2.08	32	1.2832	37.26
3	1.0211	3.13	33	1.2946	38.58
4	1.0284	4.21	34	1.3063	39.92
5	1.0357	5.28	35	1.3182	41.27
6	1.0432	6.37	36	1.3303	42.63
7	1.0507	7.45	37	1.3426	43.99
8	1.0584	8.55	38	1.3551	45.35
9	1.0662	9.66	39	1.3679	46.72
10	1.0741	10.77	40	1.3810	48.10
11	1.0821	11.89	41	1.3942	49.47
12	1.0902	13.01	42	1.4078	50.87
13	1.0985	14.13	43	1.4216	52.26
14	1.1069	15.25	44	1.4356	53.66
15	1.1154	16.38	45	1.4500	55.07
16	1.1240	17.53	46	1.4646	56.48
17	1.1328	18.71	47	1.4796	57.90
18	1.1417	19.89	48	1.4948	59.32
19	1.1508	21.07	49	1.5104	60.75
20	1.1600	22.25	50	1.5263	62.18
21	1.1694	23.43	51	1.5462	63.36
22	1.1789	24.61	52	1.5591	65.61
23	1.1885	25.81	53	1.5761	66.63
24	1.1983	27.03	54	1.5934	68.13
25	1.2083	28.28	55	1.6111	69.65
26	1.2185	29.53	56	1.6292	71.17
27	1.2288	30.79	57	1.6477	72.75
28	1.2393	32.05	58	1.6667	74.36
29	1.2500	33.33	59	1.6860	75.99

Tycos Industrial Thermometers with Special Sockets



Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. H_2SO_4	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. H_2SO_4
60	1.7059	77.67	64¼	1.7957	86.33
61	1.7262	79.43	64½	1.8012	87.04
62	1.7470	81.30	64¾	1.8068	87.81
63	1.7683	83.34	65	1.8125	88.65
64	1.7901	85.66	65¼	1.8182	89.55
			65½	1.8239	90.60
			65¾	1.8297	91.80
			66	1.8354	93.19

Sp. Gr. determinations were made at 60° F., compared with water at 60° F.

From the Sp. Grs., the corresponding degrees Baumé were calculated by the following formula: Baumé = 145—145/Sp. Gr.

Allowance for Temperatures

At 10°	Bé.	correction	of	.029°	Bé.	or	.00023	Sp.	Gr.	for every	1° F.
" 20°	"	"	"	.036°	"	"	.00034	"	"	"	1° F.
" 30°	"	"	"	.035°	"	"	.00039	"	"	"	1° F.
" 40°	"	"	"	.031°	"	"	.00041	"	"	"	1° F.
" 50°	"	"	"	.028°	"	"	.00045	"	"	"	1° F.
" 60°	"	"	"	.026°	"	"	.00053	"	"	"	1° F.
" 63°	"	"	"	.026°	"	"	.00057	"	"	"	1° F.
" 66°	"	"	"	.0235°	"	"	.00054	"	"	"	1° F.

For temperatures above 60° F., the correction is added to the observed indication; below 60° F., subtracted.

*This table was approved and adopted as a standard by the Manufacturing Chemists' Association of the United States, June 23, 1904.

Fuming Sulphuric Acid

By WINKLER

Specific Gravity 60°/60°F.	Total SO_3	100 Parts Contain		
		Free SO_3*	H_2SO_4	66° Bé Acid
1.8337	75.31	.....	92.25	99.00
1.8387	77.38	.....	94.79	90.69
1.8437	79.28	.....	97.11	83.08
1.8487	80.01	.....	98.01	80.10
1.8537	80.95	.....	99.16	76.38
1.8587	81.84	1.54	98.46	72.81
1.8637	82.12	2.66	97.34	71.71
1.8687	82.41	4.28	95.76	70.53
1.8737	82.63	5.44	94.56	69.35
1.8787	82.81	6.42	93.58	68.92
1.8837	82.97	7.29	92.71	68.27
1.8887	83.13	8.16	91.94	67.55
1.8937	83.43	9.34	90.66	66.81
1.8987	83.48	10.07	89.93	66.24
1.9036	83.57	10.56	89.44	65.68
1.9086	83.73	11.43	88.57	65.25
1.9136	84.08	13.33	86.67	63.84
1.9186	84.56	15.95	84.05	62.10
1.9236	85.06	18.67	81.33	59.90
1.9286	85.57	21.34	78.66	57.86
1.9336	86.23	25.65	74.35	55.21
1.9386	86.78	28.03	71.97	53.00
1.9436	87.13	29.94	70.06	51.60
1.9486	87.41	31.46	63.54	50.48
1.9536	87.65	32.77	67.23	49.52
1.9586	88.22	35.87	64.13	47.23
1.9636	88.92	39.68	60.32	44.42
1.9686	89.83	44.64	55.36	40.78

*Amount of SO_3 which may be distilled off.

Nitric Acid*

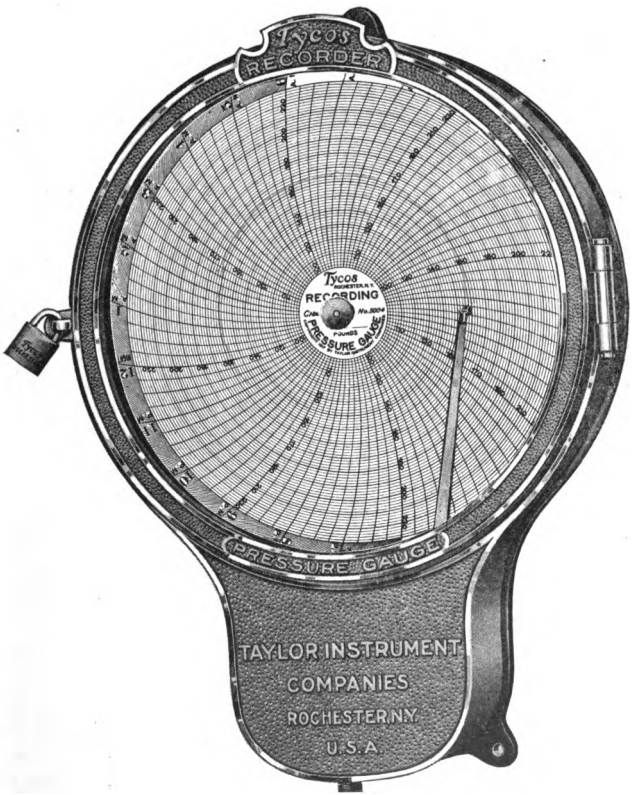
By W. C. Ferguson

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HNO_3	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HNO_3
10.00	1.0741	12.86	17.50	1.1373	22.74
10.25	1.0761	13.18	17.75	1.1395	23.08
10.50	1.0781	13.49	18.00	1.1417	23.42
10.75	1.0801	13.81	18.25	1.1440	23.77
11.00	1.0821	14.13	18.50	1.1462	24.11
11.25	1.0841	14.44	18.75	1.1485	24.47
11.50	1.0861	14.76	19.00	1.1508	24.82
11.75	1.0881	15.07	19.25	1.1531	25.18
12.00	1.0902	15.41	19.50	1.1554	25.53
12.25	1.0922	15.72	19.75	1.1577	25.88
12.50	1.0943	16.05	20.00	1.1600	26.24
12.75	1.0964	16.39	20.25	1.1624	26.61
13.00	1.0985	16.72	20.50	1.1647	26.96
13.25	1.1006	17.05	20.75	1.1671	27.33
13.50	1.1027	17.38	21.00	1.1694	27.37
13.75	1.1048	17.71	21.25	1.1718	28.02
14.00	1.1069	18.04	21.50	1.1741	28.36
14.25	1.1090	18.37	21.75	1.1665	28.72
14.50	1.1111	18.70	22.00	1.1789	29.07
14.75	1.1132	19.02	22.25	1.1813	29.43
15.00	1.1154	19.36	22.50	1.1837	29.78
15.25	1.1176	19.70	22.75	1.1861	30.14
15.50	1.1197	20.02	23.00	1.1885	30.49
15.75	1.1219	20.36	23.25	1.1910	30.86
16.00	1.1240	20.69	23.50	1.1934	31.21
16.25	1.1262	21.03	23.75	1.1959	31.58
16.50	1.1284	21.36	24.00	1.1983	31.94
16.75	1.1306	21.70	24.25	1.2008	32.31
17.00	1.1328	22.04	24.70	1.2033	32.68
17.25	1.1350	22.38	24.75	1.2058	33.05

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HNO_3	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HNO_3
25.00	1.2083	33.42	32.50	1.2889	45.68
25.25	1.2109	33.80	32.75	1.2918	46.14
25.50	1.2134	34.17	33.00	1.2846	46.58
25.75	1.2160	34.56	33.25	1.2975	47.04
26.00	1.2185	34.94	33.50	1.3004	47.49
26.25	1.2211	35.33	33.75	1.3034	47.95
26.50	1.2236	35.70	34.00	1.3063	48.42
26.75	1.2262	36.09	34.25	1.3093	48.90
27.00	1.2288	36.48	34.50	1.3122	49.35
27.25	1.2314	36.87	34.75	1.3152	49.83
27.50	1.2340	37.26	35.00	1.3182	50.32
27.75	1.2367	37.67	35.25	1.3212	50.81
28.00	1.2393	38.06	36.50	1.3242	51.30
28.25	1.2420	38.46	35.75	1.3273	51.80
28.50	1.2446	38.85	36.00	1.3303	52.30
28.75	1.2473	39.25	36.25	1.3334	52.81
29.00	1.2500	39.66	36.50	1.3364	53.32
29.25	1.2527	40.06	36.75	1.3395	53.84
29.50	1.2554	40.47	37.00	1.3426	54.36
29.75	1.2582	40.89	37.25	1.3457	54.89
30.00	1.2609	41.30	37.50	1.3488	55.43
30.25	1.2637	41.72	37.75	1.3520	55.97
30.50	1.2664	42.14	38.00	1.3551	56.52
30.75	1.2692	42.58	38.25	1.3583	57.08
31.00	1.2719	43.00	38.50	1.3615	57.65
31.25	1.2747	43.44	38.75	1.3647	58.23
31.50	1.2775	43.89	39.00	1.3679	58.82
31.75	1.2804	44.34	39.25	1.3712	59.43
32.00	1.2832	44.78	39.50	1.3744	60.06
32.25	1.2861	45.24	39.75	1.3777	60.71

Tycos Recording Gauges for Pressure and Vacuum

Dial Type



For all industrial applications.

Ask for Catalog 11900

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HNO_3	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HNO_3
40.00	1.3810	61.38	45.00	1.4500	77.17
40.25	1.3843	62.07	45.25	1.4536	78.07
40.50	1.3876	62.77	45.50	1.4573	79.03
40.75	1.3009	63.48	45.75	1.4610	80.04
41.00	1.3942	64.20	46.00	1.4646	81.08
41.25	1.3976	64.93	46.25	1.4684	82.18
41.50	1.4010	65.67	46.50	1.4721	83.33
41.75	1.4044	66.42	46.75	1.4758	84.48
42.00	1.4078	67.18	47.00	1.4796	85.70
42.25	1.4112	67.95	47.25	1.4834	86.98
42.50	1.4146	68.73	47.50	1.4872	88.32
42.75	1.4181	60.52	47.75	1.4910	89.76
43.00	1.4216	70.33	48.00	1.4948	91.35
43.25	1.4251	71.15	48.25	1.4987	93.13
43.50	1.4286	71.98	48.50	1.5026	95.11
43.75	1.4321	72.82			
44.00	1.4356	73.67			
44.25	1.4392	74.53			
44.50	1.4428	75.40			
44.75	1.4464	76.28			

Specific Gravity determinations were made at 60° F., compared with water at 60° F.

From the Specific Gravities, the corresponding degrees Baumé were calculated by the following formula:

$$\text{Baumé} = 145 - \frac{145}{\text{Sp. Gr.}}$$

ALLOWANCE FOR TEMPERATURE:

At from	10°	to	20°	Bé.	correction of	1/30°	Bé. or	.00029	Sp. Gr.	for every	1° F.
"	"	20°	"	30°	Bé.	"	1/23°	Bé. "	.00044	" "	" "	1° F.
"	"	30°	"	40°	Bé.	"	1/20°	Bé. "	.00060	" "	" "	1° F.
"	"	40°	"	48.5°	Bé.	"	1/17°	Bé. "	.00084	" "	" "	1° F.

*This table was approved and adopted as a standard by the Manufacturing Chemists' Association of the United States, June 23, 1904.

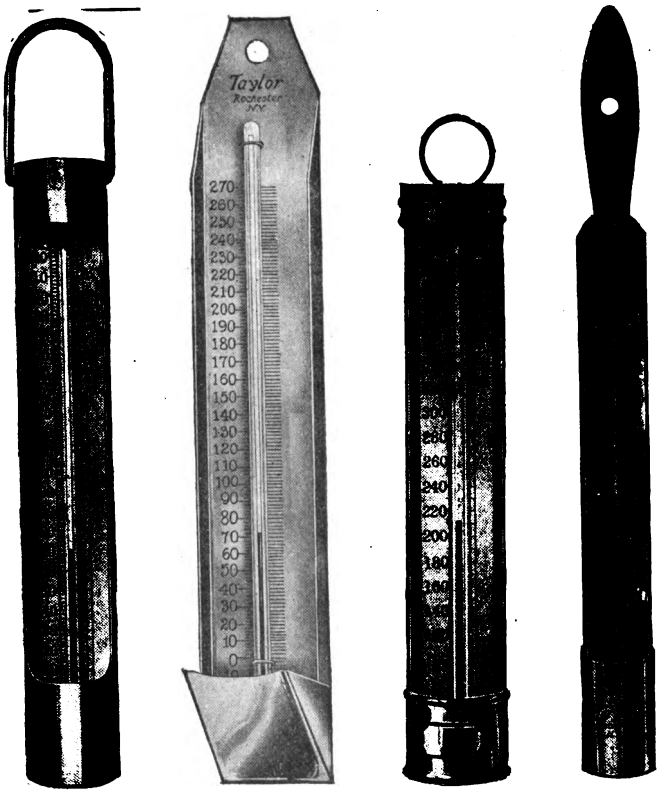
*Hydrochloric Acid

By W. C. Ferguson

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HCl.	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HCl.
1.00	1.0069	1.40	11.50	1.0861	17.21
2.00	1.0140	2.82	11.75	1.0881	17.61
3.00	1.0211	4.25	12.00	1.0902	18.01
4.00	1.0284	5.69	12.25	1.0922	18.41
5.00	1.0357	7.15	12.50	1.0943	18.82
5.25	1.0375	7.52	12.75	1.0964	19.22
5.50	1.0394	7.89	13.00	1.0985	19.63
5.75	1.0413	8.26	13.25	1.1006	20.04
6.00	1.0432	8.64	13.50	1.1027	20.45
6.25	1.0450	9.02	13.75	1.1048	20.86
6.50	1.0469	9.40	14.00	1.1069	21.27
6.75	1.0488	9.78	14.25	1.1090	21.68
7.00	1.0507	10.17	14.50	1.1111	22.09
7.25	1.0526	10.55	14.75	1.1132	22.50
7.50	1.0545	10.94	15.00	1.1154	22.92
7.75	1.0564	11.32	15.25	1.1176	23.33
8.00	1.0584	11.71	15.50	1.1197	23.75
8.25	1.0603	12.09	15.75	1.1219	24.16
8.50	1.0623	12.48	16.0	1.1240	24.57
8.75	1.0642	12.87	16.1	1.1248	24.73
9.00	1.0662	13.26	16.2	1.1256	24.90
9.25	1.0681	13.65	16.3	1.1265	25.06
9.50	1.0701	14.04	16.4	1.1274	25.23
9.75	1.0721	14.43	16.5	1.1283	25.39
10.00	1.0741	14.83	16.6	1.1292	25.56
10.25	1.0761	15.22	16.7	1.1301	25.72
10.50	1.0781	15.62	16.8	1.1310	25.89
10.75	1.0801	16.01	16.9	1.1319	26.05
11.00	1.0821	16.41	17.0	1.1328	26.22
11.25	1.0841	16.81	17.1	1.1336	26.39

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HCl.	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HCl.
17.2	1.1345	26.56	20.2	1.1619	31.82
17.3	1.1354	26.73	20.3	1.1628	32.01
17.4	1.1363	26.90	20.4	1.1637	32.19
17.5	1.1372	27.07	20.5	1.1647	32.38
17.6	1.1381	27.24	20.6	1.1656	32.56
17.7	1.1390	27.41	20.7	1.1666	32.75
17.8	1.1399	27.58	20.8	1.1675	32.93
17.9	1.1408	27.75	20.9	1.1684	33.12
18.0	1.1417	27.92	21.0	1.1694	33.31
18.1	1.1426	28.09	21.1	1.1703	33.50
18.2	1.1435	28.26	21.2	1.1713	33.69
18.3	1.1444	28.44	21.3	1.1722	33.88
18.4	1.1453	28.61	21.4	1.1732	34.07
18.5	1.1462	28.78	21.5	1.1741	34.26
18.6	1.1471	28.95	21.6	1.1751	34.45
18.7	1.1480	29.13	21.7	1.1760	34.64
18.8	1.1489	29.30	21.8	1.1770	34.83
18.9	1.1498	29.48	21.9	1.1779	35.02
19.0	1.1508	29.65	22.0	1.1789	35.21
19.1	1.1517	29.83	22.1	1.1798	35.40
19.2	1.1526	30.00	22.2	1.1808	35.59
19.3	1.1535	30.18	22.3	1.1817	35.78
19.4	1.1544	30.53	22.4	1.1827	35.97
19.5	1.1554	30.53	22.5	1.1836	36.16
19.6	1.1563	30.71	22.6	1.1846	36.35
19.7	1.1572	30.90	22.7	1.1856	36.54
19.8	1.1581	31.08	22.8	1.1866	36.73
19.9	1.1590	31.27	22.9	1.1875	36.93
20.0	1.1600	31.45	23.0	1.1885	37.14
20.1	1.1609	31.64	23.1	1.1895	37.36

Tycos Metal Scale Thermometers



Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HCl.	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent HCl.
23.2	1.1904	37.58	24.7	1.2053	41.01
23.3	1.1914	37.80	24.8	1.2063	41.24
23.4	1.1924	38.03	24.9	1.2073	41.48
23.5	1.1934	38.26	25.0	1.2083	41.72
23.6	1.1944	38.49	25.1	1.2093	41.99
23.7	1.1953	38.72	25.2	1.2103	42.30
23.8	1.1963	38.95	25.3	1.2114	42.64
23.9	1.1973	39.18	25.4	1.2124	43.01
24.0	1.1983	39.41	25.5	1.2134	43.40
24.1	1.1993	39.64			
24.2	1.2003	39.86			
24.3	1.2013	40.09			
24.4	1.2023	40.32			
24.5	1.2033	40.55			
24.6	1.2043	40.78			

Specific Gravity determinations were made at 60° F., compared with water at 60° F.

From the Specific Gravities, the corresponding degrees Baumé were calculated by the following formula:

$$\text{Baumé} = 145 - \frac{145}{\text{Sp. Gr.}}$$

ALLOWANCE FOR TEMPERATURE:

At 10° to 15° Bé. correction of 1/40° Be. or .0002 Sp. Gr. for every 1° F.
" 10° " 22° Bé. " 1/30° Bé. " .0003 " " " " 1° F.
" 22° " 25° Bé. " 1/28° Bé. " .00035 " " " " 1° F.

*This table was approved and adopted as a Standard by the Manufacturing Chemists' Association of the United States, May 14, 1903.

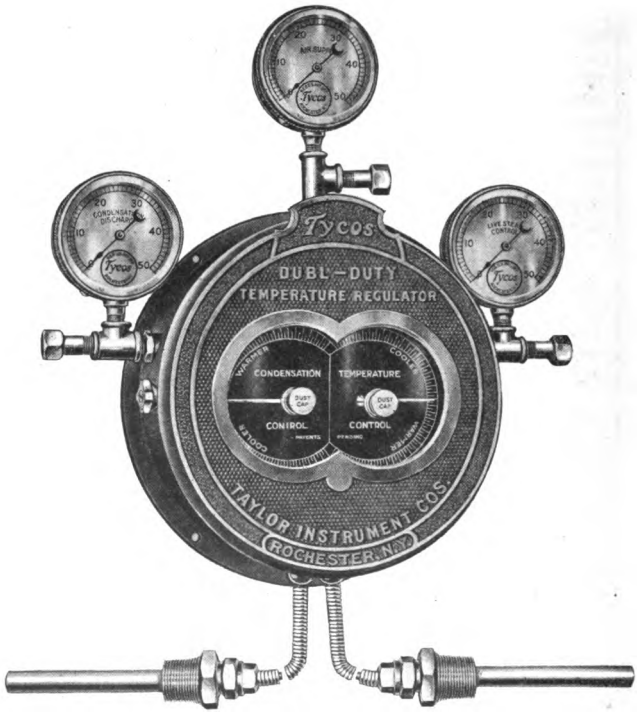
Sodium Hydroxide Solutions

(Caustic Soda)

By LUNGE

Specific Gravity 60°/60° F.	Degrees Baumé	Degrees Twaddle*	Per Cent. NaOH	Grams NaOH Per Liter
1.007	1.0	1.4	0.61	6
1.014	2.0	2.8	1.20	12
1.022	3.1	4.4	2.00	21
1.029	4.1	5.8	2.70	28
1.036	5.1	7.2	3.35	35
1.045	6.2	9.0	4.00	42
1.052	7.2	10.4	4.64	49
1.060	8.2	12.0	5.29	56
1.067	9.1	13.4	5.87	63
1.075	10.1	15.0	6.55	70
1.083	11.1	16.6	7.31	79
1.091	12.1	18.2	8.00	87
1.100	13.2	20.0	8.68	95
1.108	14.1	21.6	9.42	104
1.116	15.1	23.2	10.06	112
1.125	16.1	25.0	10.97	123
1.134	17.1	26.8	11.84	134
1.142	18.0	28.4	12.64	144
1.152	19.1	30.4	13.55	156
1.162	20.2	32.4	14.37	167
1.171	21.2	34.2	15.13	177
1.180	22.1	36.0	15.91	188
1.190	23.1	38.0	16.77	200
1.200	24.2	40.0	17.67	212
1.210	25.2	42.0	18.58	225
1.220	26.1	44.0	19.58	239
1.231	27.2	46.2	20.59	253
1.241	28.2	48.2	21.42	266
1.252	29.2	50.4	22.64	283

Tycos "Dubl-Duty" (Compound System) Temperature Regulator



15204

Ask for Section 15000

Specific Gravity 60°/60° F.	Degrees Baumé	Degrees *Twaddle	Per Cent. NaOH	Grams NaOH Per Liter
1.263	30.2	52.6	23.67	299
1.274	31.2	54.8	24.81	316
1.285	32.2	57.0	25.80	332
1.297	33.2	59.4	26.83	348
1.308	34.1	61.6	27.80	364
1.320	35.2	64.0	28.83	381
1.332	36.1	66.4	29.93	399
1.345	37.2	69.0	31.22	420
1.357	38.1	71.4	32.47	441
1.370	39.2	74.0	33.69	462
1.383	40.2	76.6	34.96	483
1.397	41.2	79.4	36.25	506
1.410	42.2	82.0	37.47	528
1.424	43.2	84.8	38.80	553
1.438	44.2	87.6	39.99	575
1.453	45.2	90.6	41.41	602
1.468	46.2	93.6	42.83	629
1.483	47.2	96.6	44.38	658
1.498	48.2	99.6	46.15	691
1.514	49.2	102.8	47.60	721
1.530	50.2	106.0	49.02	750

*Twaddle values are derived from specific gravity by the following formula.

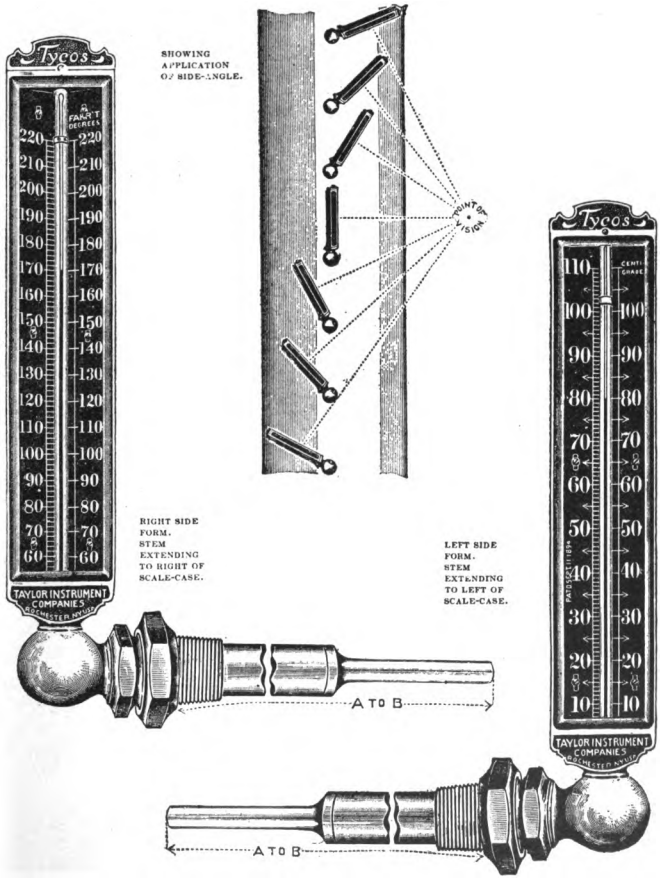
$$\text{Twaddle} = (200 \times \text{Sp. Gr.}) - 200$$

$$\text{Specific Gravity} = \frac{\text{Tw.} + 200}{200}$$

Potassium Hydroxide Solutions
(Caustic Potash)
By Lunge

Specific Gravity 60°/60° F.	Degrees Baumé	Degrees Twaddle*	Per Cent. KOH	Grams KOH Per Liter
1.007	1.0	1.4	0.9	9
1.014	2.0	2.8	1.7	17
1.022	3.1	4.4	2.6	26
1.029	4.1	5.8	3.5	36
1.037	5.2	7.4	4.5	46
1.045	6.2	9.0	5.6	58
1.052	7.2	10.4	6.4	67
1.060	8.2	12.0	7.4	78
1.067	9.1	13.4	8.2	88
1.075	10.1	15.0	9.2	99
1.083	11.1	16.6	10.1	109
1.091	12.1	18.2	10.9	119
1.100	13.2	20.0	12.0	132
1.108	14.1	21.6	12.9	143
1.116	15.1	23.2	13.8	153
1.125	16.1	25.0	14.8	167
1.134	17.1	26.8	15.7	178
1.142	18.0	28.4	16.5	183
1.152	19.1	30.4	17.6	203
1.162	20.2	32.4	18.6	216
1.171	21.2	34.2	19.5	228
1.180	22.1	36.0	20.5	242
1.190	23.1	38.0	21.4	255
1.200	24.2	40.0	22.4	269
1.210	25.2	42.0	23.3	282
1.220	26.1	44.0	24.2	295
1.231	27.2	46.2	25.1	309
1.241	28.2	48.2	26.1	324
1.252	29.2	50.4	27.0	338

Tycos Industrial Thermometers
Side Angle Forms



Specific Gravity 60°/60° F.	Degrees Baumé	Degrees Twaddle	Per Cent. KOH	Grams KOH Per Liter
1.263	30.2	52.6	28.0	353
1.274	31.2	54.8	28.9	368
1.285	32.2	57.0	29.8	385
1.297	33.2	59.4	30.7	398
1.308	34.1	61.6	31.8	416
1.320	35.2	64.0	32.7	432
1.332	36.1	66.4	33.7	449
1.345	37.2	69.0	34.9	469
1.357	38.1	71.4	35.9	487
1.370	39.2	74.0	36.9	506
1.383	40.2	76.6	37.8	522
1.397	41.2	79.4	38.9	543
1.410	42.2	82.0	39.9	563
1.424	43.2	84.8	40.9	582
1.438	44.2	87.6	42.1	605
1.453	45.2	90.6	43.4	631
1.468	46.2	93.6	44.6	655
1.483	47.2	96.6	45.8	679
1.498	48.2	99.6	47.1	706
1.514	49.2	102.8	48.3	731
1.530	50.2	106.0	49.4	756
1.546	51.2	109.2	50.6	779
1.563	52.2	112.6	51.9	811
1.580	53.2	116.0	53.2	840
1.597	54.2	119.4	54.5	870
1.615	55.2	123.0	55.9	905
1.634	56.3	126.8	57.5	940

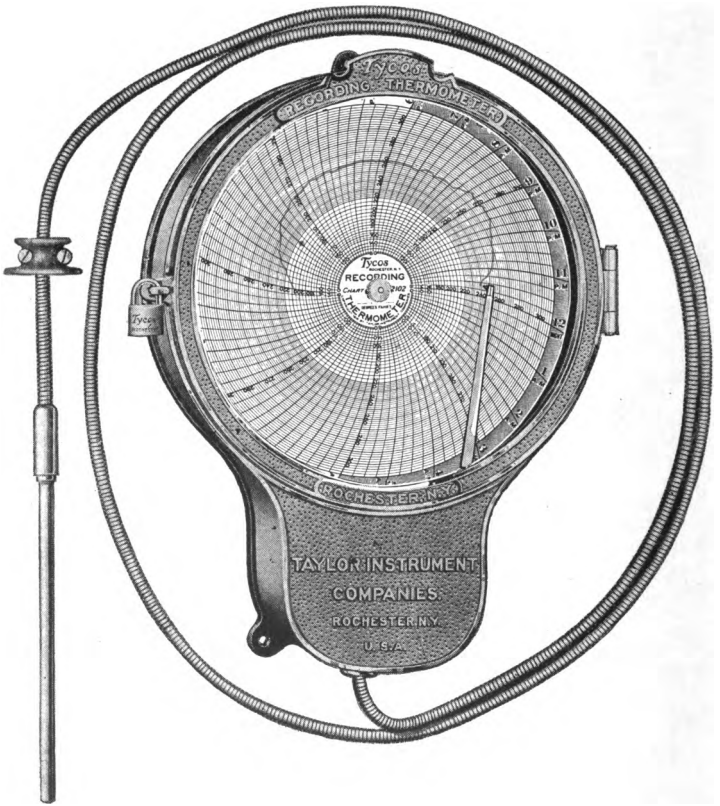
*See note at bottom of page 111.

Aqua Ammonia*

By W. C. Ferguson

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. NH_3	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. NH_3
10.00	1.0000	.00	18.75	.9412	15.37
10.25	.9982	.40	19.00	.9396	15.84
10.50	.9964	.80	19.25	.9380	16.32
10.75	.9947	1.21	19.50	.9365	16.80
11.00	.9929	1.62	19.75	.9349	17.28
11.25	.9912	2.04	20.00	.9333	17.76
11.50	.9894	2.46	20.25	.9318	18.24
11.75	.9876	2.88	20.50	.9302	18.72
12.00	.9859	3.30	20.75	.9287	19.20
12.25	.9842	3.73	21.00	.9272	19.68
12.50	.9825	4.16	21.25	.9256	20.16
12.75	.9807	4.59	21.50	.9241	20.64
13.00	.9790	5.02	21.75	.9226	21.12
13.25	.9773	5.45	22.00	.9211	21.60
13.50	.9756	5.88	22.25	.9195	22.08
13.75	.9739	6.31	22.50	.9180	22.56
14.00	.9722	6.74	22.75	.9165	23.04
14.25	.9705	7.17	23.00	.9150	23.52
14.50	.9689	7.61	23.25	.9135	24.01
14.75	.9672	8.05	23.50	.9121	24.50
15.00	.9655	8.49	23.75	.9106	24.99
15.25	.9639	8.93	24.00	.9091	25.48
15.50	.9622	9.38	24.25	.9076	25.97
15.75	.9605	9.83	24.50	.9061	26.46
16.00	.9589	10.28	24.75	.9047	26.95
16.25	.9573	10.73	25.00	.9032	27.44
16.50	.9556	11.18	25.25	.9018	27.93
16.75	.9540	11.64	25.50	.9003	28.42
17.00	.9524	12.10	25.75	.8989	28.91
17.25	.9508	12.56	26.00	.8974	29.40
17.50	.9492	13.02	26.25	.8960	29.89
17.75	.9475	13.49	26.50	.8946	30.38
18.00	.9459	13.96	26.75	.8931	30.87
18.25	.9444	14.43	27.00	.8917	31.36
18.50	.9428	14.90	27.25	.8903	31.85

Tycos
Vapor Tension Recording Thermometer
Dial Type



For installations requiring long lengths of connecting tubing and for some special applications, as for instance, dry kilns, rubber vulcanizers, etc.

Ask for Catalogs 11000-11000 A

Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. NH_3	Degrees Baumé	Specific Gravity 60°/60° F.	Per Cent. NH_3
27.50	.8889	32.34	28.50	.8833	34.30
27.75	.8875	32.83	28.75	.8819	34.79
28.00	.8861	33.32	29.00	.8805	35.28
28.25	.8847	33.81			

Specific Gravity determinations were made at 60° F., compared with water at 60° F.

From the Specific Gravities the corresponding degrees Baumé were calculated by the following formula:

$$\text{Baumé} = \frac{140}{\text{Sp. Gr.}} - 130.$$

Allowance for Temperature

The coefficient of expansion for ammonia solutions, varying with the temperature, correction must be applied according to the following table:

Degrees Baumé	Corrections to be Added for Each Degree Below 60° F.		Corrections to be Subtracted for Each Degree Above 60° F.			
	40° F.	50° F.	70° F.	80° F.	90° F.	100°F.
14° Bé.	.015° Bé.	.017° Bé.	.020° Bé.	.022° Bé.	.024° Bé.	.026°Bé.
16° "	.021° "	.023° "	.026° "	.028° "	.030° "	.032° "
18° "	.027° "	.029° "	.031° "	.033° "	.035° "	.037° "
20° "	.033° "	.036° "	.037° "	.038° "	.040° "	.042° "
22° "	.039° "	.042° "	.043° "	.045° "	.047° "	
26° "	.053° "	.057° "	.057° "	.059° "		

*This table was approved and adopted as a Standard by the Manufacturing Chemists' Association of the United States, May 14, 1903.

Sodium Chloride (NaCl)
By Gerlock

Specific Gravity 60°/60°F.	Degrees Baumé 60° F.	Degrees Salometer 60° F.	% NaCl by Weight	Lbs. NaCl per Gallon Solution	Freezing Point ° F.
1.00000	0	0	0	0	+32.0
1.00725	1.04	3.8	1	0.084	30.5
1.01450	2.07	7.6	2	0.169	29.3
1.02174	3.08	11.4	3	0.256	27.8
1.02899	4.08	15.2	4	0.344	26.6
1.03624	5.07	18.9	5	0.433	25.2
1.04366	6.07	22.7	6	0.523	23.9
1.05108	7.06	26.5	7	0.617	22.5
1.05851	8.01	30.3	8	0.708	21.2
1.06593	8.97	33.9	9	0.802	19.9
1.07335	9.90	37.5	10	0.897	18.7
1.08097	10.86	41.3	11	0.994	17.4
1.08859	11.80	45.2	12	1.092	16.0
1.09622	12.73	49.2	13	1.190	14.7
1.10384	13.64	53.0	14	1.289	13.4
1.11146	14.54	56.8	15	1.389	12.2
1.11938	15.46	60.6	16	1.495	11.0
1.12730	16.37	64.4	17	1.602	9.8
1.13523	17.27	68.2	18	1.710	8.5
1.14315	18.16	71.9	19	1.819	7.3
1.15107	19.03	75.5	20	1.928	6.1
1.15931	19.92	79.1	21	2.037	5.0
1.16755	20.80	83.0	22	2.147	3.9
1.17580	21.68	86.9	23	2.266	2.8
1.18404	22.54	90.9	24	2.376	1.7
1.19228	23.39	94.7	25	2.488	+0.5
1.20098	24.27	98.5	26	2.610	—1.1
1.20433	24.60	100.	26.395	2.661	1.6

Temperature correction 1° Salometer for every 7½° F. added to reading for temperatures above 60° F., subtracted below.

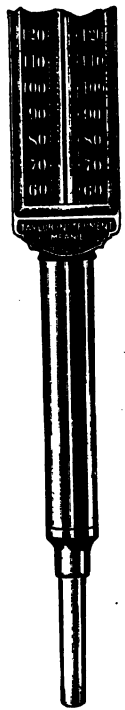
There is also a Salometer scale in use with 1° equal to ¼% NaCl. 0=1.0000 Sp. Gr. 100=1.19228 Sp. Gr., or 25% NaCl.

Tycos

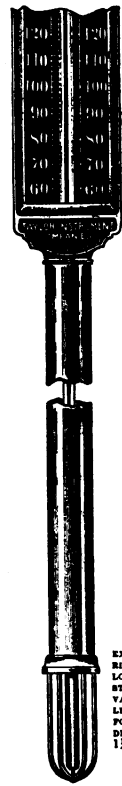
Long Stem and Handled Thermometers

REGULAR LONG STEM. VARIABLE LENGTH FORM. DIAMETER 1 INCH.

HANDLE LONG STEM. VARIABLE LENGTH FORM. DIAMETER ¾ INCH.



MOLTEN METAL LONG STEM. STANDARD LENGTH FORM. DIAMETER, 1¼ INCH. LENGTH, 18 INCHES.



EXTRA RIGID LONG STEM. VARIABLE LENGTH FORM. DIAMETER 1¼ INCH.

Calcium Chloride, $CaCl_2$

Degrees Baumé 60° F.	Specific Gravity 60°/60° F.	Degrees Salometer 60° F.	% $CaCl_2$ by Weight	Lbs. $CaCl_2$ per Gallon of Solution (Approx.)	Freezing Point ° F.
0	1.000	0	0	0	+ 32.
1.	1.007	4	1	...	31.1
2.1	1.015	8	2	...	30.4
3.4	1.024	12	3	½	29.5
4.5	1.032	16	4	...	28.6
5.7	1.041	22	5	...	27.7
6.8	1.049	26	6	1	26.6
8.	1.058	32	7	...	25.5
9.1	1.067	36	8	...	24.3
10.2	1.076	40	9	1½	22.8
11.4	1.085	44	10	...	21.3
12.5	1.094	48	11	...	19.7
13.5	1.103	52	12	2	18.1
14.6	1.112	58	13	...	16.3
15.6	1.121	62	14	...	14.3
16.8	1.131	68	15	2½	12.2
17.8	1.140	72	16	...	10.
19.	1.151	76	17	...	7.5
20.	1.160	80	18	3	4.6
21.	1.169	84	19	...	+ 1.7
22.	1.179	88	20	...	— 1.4
23.	1.188	92	21	3½	4.9
24.	1.198	96	22	...	8.6
25.	1.208	100	23	...	11.6
26.	1.218	104	24	4	17.1
27.	1.229	108	25	...	21.8
28.	1.239	112	26	...	27.
29.	1.250	116	27	4½	32.6
30.	1.261	120	28	...	39.2
31.	1.272	124	29	...	46.2
32.	1.283	128	30	5	—54.4

MILK OR RAW MILK

The Lactometer is a hydrometer with a specially arranged scale for milk inspection. The scale ranges from 0 to 130, 0 representing the unit of gravity, which is that of water, 1 or 1,000, and 130 being equal to 1.03770, specific gravity. By referring to pages 124 and 126 the equivalents in gravity to the arbitrary figures on the stem of the lactometer will be seen.

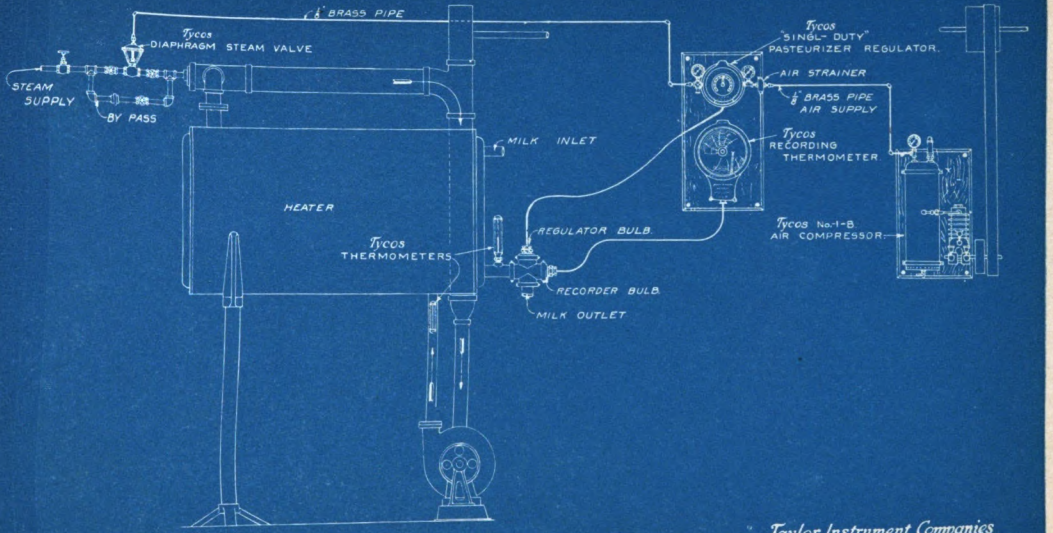
Milk being heavier than water its specific gravity varies according to the amount of solid matter it contains. These are known as total solids, and consist of caseine, milk, sugar, fat and salts or mineral matter, and in average milk should show from thirteen (13) to thirteen and one-half (13.50) per cent, and a specific gravity of 1.03190, or 110 on the lactometer stem.

An erroneous impression prevails amongst many persons who use the lactometer, that if milk shows 100 on that instrument or 1.02900 specific gravity, that it is pure and unadulterated. The falsity of this proposition is dmonstrated as follows: Suppose a sample of normal milk is of 1.03190 specific gravity or 110 on the lactometer, and ten per cent of water be added which would lower the gravity to 1.02900 or 100 lactometer reading.

It can be seen how milk of an average quality may be tampered with successfully if such standards of gravity were established. The experiments of numerous eminent chemists comprising innumerable tests range from a minimum of 1.02900 to a maximum of 1.03540 specific gravity, the average being 1.03220 or 111 on the lactometer. A low gravity milk is due to one of three causes, viz.: an excess of cream, added water, or an excess of whey or watery fluid caused by innutritious food. When, therefore, the inspector finds on examination a milk with a low gravity suspicion is at once aroused and he carefully scrutinizes the milk to determine the cause.

The practiced eye enables him instantly to discriminate between the causes above mentioned, and to condemn and sample for analysis in the event of added water or the result of bad food.

It has been urged against the reliability of the lactometer that skimmed milk "shows up" much better than whole milk. That is, it shows a higher gravity. The objectors are evidently ignorant of



INSTALLATION OF *Tycos* SINGL-DUTY PASTEURIZING REGULATOR
AND *Tycos* RECORDING THERMOMETER ON DAVIS MILK PASTEURIZER.

Taylor Instrument Companies
Rochester, N.Y.
DRAWING No-5846

the laws of physics, viz.: that the removal of cream, being the lighter constituent, raises the gravity, hence it is that skimmed milk ranges from 115 to 130 on the lactometer, according to the quantity of cream removed.

It is also alleged that milk may be skimmed and watered and yet show by the lactometer reading the gravity of normal milk. That is true so far as the reading indications, but the important fact must not be overlooked that watering or skimming converts milk from a thick viscous fluid to a comparatively thin, almost translucent liquid. There should be no difficulty therefore in discerning the adulterated article if these facts are borne in mind.

The indications on the density scale are accurate only when the instrument is used in a sample the temperature of which is 60° F. When used in samples the temperatures of which are other than 60° F., corrections should be made to the Lactometer reading for the variation of temperature. The temperature corrections should be made by adding 1 degree to the Lactometer reading for every 2½° F., and subtracting one degree from the Lactometer scale for every 2½° below 60° F.

To obtain proper results with the Lactometer, it is necessary that the milk should be well mixed before the reading is taken, but not sufficiently agitated to cause it to foam. The temperature of the sample should be uniform throughout.

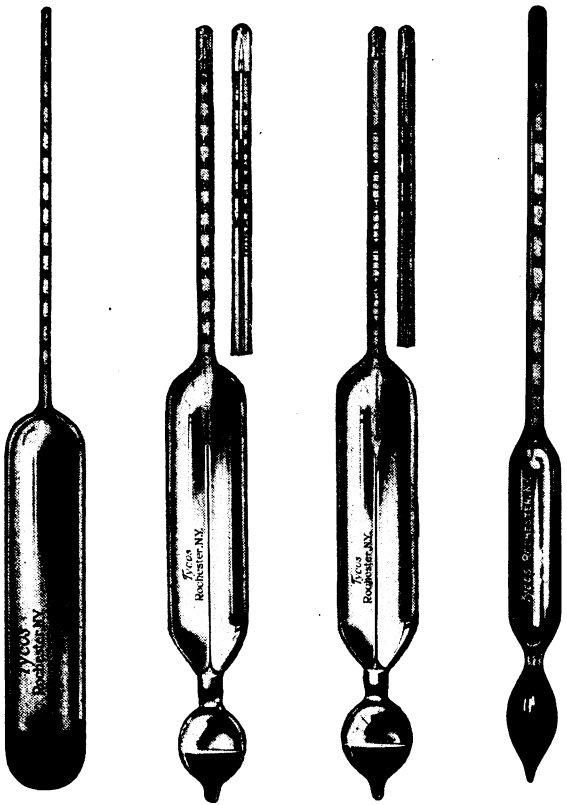
The reading of the Lactometer should be taken at the point on the stem to which the surface of the milk rises when the instrument is floating free from the sides or the bottom of the test jar.

New York State Board of Health Pattern Lactometer

Value of Lactometer Degrees in Specific Gravity

Lactometer	Gravity	Lactometer	Gravity
0	1.00000	35	1.01015
1	1.00029	36	1.01044
2	1.00058	37	1.01073
3	1.00087	38	1.01102
4	1.00116	39	1.01131
5	1.00145	40	1.01160
6	1.00174	41	1.01189
7	1.00203	42	1.01218
8	1.00232	43	1.01247
9	1.00261	44	1.01276
10	1.00290	45	1.01305
11	1.00319	46	1.01334
12	1.00348	47	1.01363
13	1.00377	48	1.01392
14	1.00406	49	1.01421
15	1.00435	50	1.01450
16	1.00464	51	1.01479
17	1.00493	52	1.01508
18	1.00522	53	1.01537
19	1.00551	54	1.01566
20	1.00580	55	1.01595
21	1.00609	56	1.01624
22	1.00638	57	1.01653
23	1.00667	58	1.01682
24	1.00696	59	1.01711
25	1.00725	60	1.01740
26	1.00754	61	1.01769
27	1.00783	62	1.01798
28	1.00812	63	1.01827
29	1.00841	64	1.01856
30	1.00870	65	1.01885
31	1.00899	66	1.01914
32	1.00928	67	1.01943
33	1.00957	68	1.01972
34	1.00986	69	1.02001

Tycos Hydhometers



1537 7164 7168 7114G

Ask for Section 500 Sub-division A

Lactometer	Gravity	Lactometer	Gravity
70	1.02030	100	1.02900
71	1.02059	101	1.02929
72	1.02088	102	1.02958
73	1.02117	103	1.02987
74	1.02146	104	1.03015
75	1.02175	105	1.03045
76	1.02204	106	1.03074
77	1.02233	107	1.03103
78	1.02262	108	1.03132
79	1.02291	109	1.03161
80	1.02320	110	1.03190
81	1.02349	111	1.03219
82	1.02378	112	1.03248
83	1.02407	113	1.03277
84	1.02436	114	1.03306
85	1.02465	115	1.03335
86	1.02494	116	1.03364
87	1.02523	117	1.03393
88	1.02552	118	1.03422
89	1.02581	119	1.03451
90	1.02610	120	1.03480
91	1.02639	121	1.03509
92	1.02668	122	1.03538
93	1.02697	123	1.03567
94	1.02726	124	1.03596
95	1.02755	125	1.03625
96	1.02784	126	1.03654
97	1.02813	127	1.03683
98	1.02842	128	1.03712
99	1.02871	129	1.03741
		130	1.03770

Quevennes Lactodensimeter

The scale of the Quevennes Lactodensimeter shows Specific Gravity indications in the white column ranging from 1.014 to 1.042 Specific Gravity. The first two figures, however, are omitted and the above is written 14 and 42. The indications on the yellow scale are for use when testing milk from which the cream *has not* been skimmed. The brackets indicate that the reading within their extremities shows the milk to contain the fractional amount of water shown opposite the bracket. Example:—Indication in unskimmed milk reading between 26 and 29 would indicate the addition of approximately one part water in ten of milk. Unskimmed pure milk would show an indication from 1.029 to 1.033. The blue scale is for use in skimmed or creamed milk and indications are read in like manner to those on yellow scale. As cream is lighter than milk, a pure milk will show heavier after the cream has been removed than before.

The indications of a Lactodensimeter are accurate when used in milk the temperature of which is 60° F. When used in samples the temperature of which are other than 60° F., corrections should be made to the Lactodensimeter reading for the variation of temperature. The temperature corrections should be made by adding 1-10th degree to the Lactodensimeter reading for every degree Fahrenheit above 60° and subtracting 1-10th degree Lactodensimeter indication for every degree Fahrenheit below 60°.

To obtain proper results with the Lactodensimeter, it is necessary that the milk should be well mixed before the reading is taken, but, not sufficiently agitated to cause it to foam. The temperature of the sample should be uniform throughout.

The reading of the Lactodensimeter should be taken at the point on the stem to which the surface of the milk rises when the instrument is floating free from the sides or bottom of the test jar.

CONDENSED AND EVAPORATED MILK

Condensed milk has a density ranging between 30° and 40° Baumé Heavy (1.260 to 1.380 Specific Gravity) at 60° F.

Interveaning ranges covering the interval of 0 to 30° Baumé or sometime corresponding density values expressed in Specific Gravity or degrees Twaddle are used in the processes of manufacture.

When Baumé hydrometers are used in sweetened condensed milk at temperatures other than 60° F. correction to the observed reading should be made as follows:

when temperature is above 60° F; + [.025 × (T—60°)]° Bé
" " " below " " — [.025 × (60°—T)]° Bé

T=temperature of sample being tested.

Evaporated milk has a density range between 5° and 15° Baumé Heavy (1.035 to 1.115 Specific Gravity) at 60° F.

Corresponding values expressed in other scales are sometimes use as are for condensed milk mentioned above.

When Baumé Heavy Hydrometers are used in testing evaporated milk at temperatures other than 60° F. corrections to the ovbserd reading should be made as follows:

when temperature is above 60° F; + [.0313 × (T—60°)]° Bé
" " " " " — [.0313 × (60°—T)]° Bé

T=temperature of sample being tested.

Tycos Vapor Tension Temperature Control
Electric Contact Type

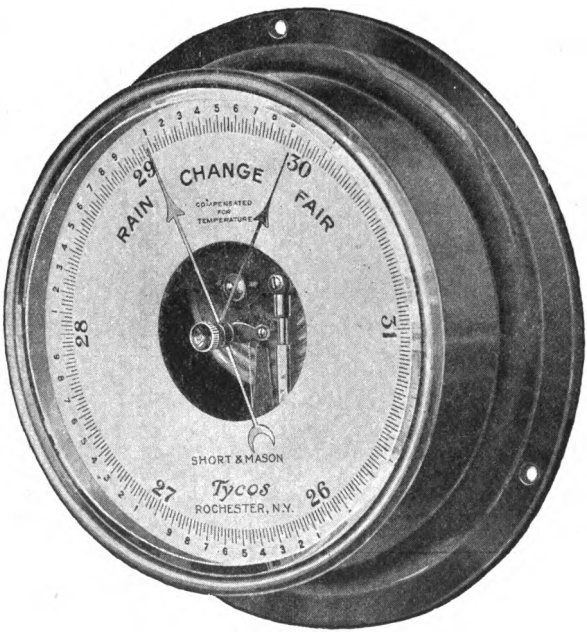
For automatically controlling the temperature of electric heated enamelling, japanning, core ovens, etc.

Ask for Catalog 11850

Barometer Readings, Boiling Points and Altitudes

Barometer Reading Inches Mercury	Barometer Reading Millimeters Mercury	Boiling Point ° F.	Boiling Point ° C.	Altitude in Feet Approximate
30.52	775.2	213.0	100.6	— 550
30.40	772.2	212.8	100.4	— 450
30.28	769.1	212.6	100.3	— 340
30.16	766.1	212.4	100.2	— 230
30.04	763.0	212.2	100.1	— 120
29.92	760.0	212.0	100.0	0
29.80	756.9	211.8	99.9	100
29.68	753.9	211.6	99.8	210
29.57	751.1	211.4	99.7	310
29.45	748.0	211.2	99.6	420
29.33	745.0	211.0	99.5	530
29.21	741.9	210.8	99.3	650
29.10	739.1	210.6	99.2	750
28.98	736.1	210.4	99.1	860
28.87	733.3	210.2	99.0	970
28.75	730.3	210.0	98.9	1080
28.63	727.2	209.8	98.8	1190
28.52	724.4	209.6	98.7	1300
28.41	721.6	209.4	98.6	1400
28.29	718.6	209.2	98.5	1520
28.18	715.8	209.0	98.3	1620
28.07	713.0	208.8	98.2	1730
27.95	709.9	208.6	98.1	1850
27.84	707.1	208.4	98.0	1960
27.73	704.3	208.2	97.9	2060
27.62	701.6	208.0	97.8	2170
27.51	698.8	207.8	97.7	2280
27.39	695.7	207.6	97.6	2400
27.28	692.9	207.4	97.4	2510
27.17	690.1	207.2	97.3	2620
27.06	687.3	207.0	97.2	2730
26.96	684.8	206.8	97.1	2830
26.85	682.0	206.6	97.0	2940
26.74	679.2	206.4	96.9	3060
26.63	676.4	206.2	96.8	3170
26.52	673.6	206.0	96.7	3280
26.41	670.8	205.8	96.6	3400
26.31	668.3	205.6	96.4	3500
26.20	665.5	205.4	96.3	3610
26.09	662.7	205.2	96.2	3720
25.99	660.2	205.0	96.1	3830

Tycos Barometer



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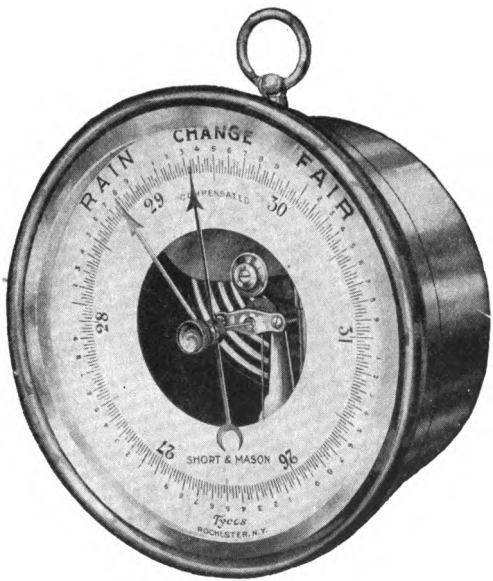
Barometer Reading Inches Mercury	Barometer Reading Millimeters Mercury	Boiling Point ° F.	Boiling Point ° C.	Altitude in Feet Approximate
25.88	657.4	204.8	96.0	3950
25.78	654.8	204.6	95.9	4050
25.67	652.0	204.4	95.8	4170
25.57	649.5	204.2	95.7	4270
25.46	646.7	204.0	95.6	4390
25.36	644.2	203.8	95.4	4500
25.26	641.6	203.6	95.3	4610
25.15	638.8	203.4	95.2	4730
25.05	636.3	203.2	95.1	4830
24.95	633.7	203.0	95.0	4950
24.85	631.2	202.8	94.9	5060
24.74	628.4	202.6	94.8	5180
24.64	625.9	202.4	94.7	5290
24.54	623.3	202.2	94.6	5400
24.44	620.8	202.0	94.4	5510
24.34	618.2	201.8	94.3	5630
24.24	615.7	201.6	94.2	5730
24.14	613.2	201.4	94.1	5850
24.04	610.6	201.2	94.0	5960
23.94	608.1	201.0	93.9	6070
23.84	605.5	200.8	93.8	6190
23.75	603.3	200.6	93.7	6290
23.65	600.7	200.4	93.6	6410
23.55	598.2	200.2	93.5	6530
23.45	595.6	200.0	93.4	6650
23.00	584.2	199.1	92.8	7170
22.50	571.5	198.0	92.2	7770
22.00	558.8	196.9	91.6	8390
21.50	546.1	195.8	91.0	9010
21.00	533.4	194.7	90.4	9660
20.50	520.7	193.6	89.8	10320
20.00	508.0	192.4	89.1	10990
19.50	495.3	191.2	88.4	11680
19.00	482.6	190.0	87.8	12390
18.50	469.9	188.8	87.1	13120
18.00	457.2	187.5	86.4	13870
17.50	444.5	186.2	85.7	14630
17.00	431.8	184.8	84.9	15430

Calculated from Smithsonian Meteorological Tables, 3d Revised Edition.

Altitudes of Various Cities in the United States

STATIONS	Feet Above Sea Level
Abilene, Texas	1718
Akron, O.	873
Albany, N. Y.	18
Astoria, Ore.	18
Atlanta, Ga.	1033
Auburn, N. Y.	677
Augusta, Ga.	100
Baltimore, Md.	98
Bangor, Me.	20
Beaumont, Texas	21
Berkeley, Cal., Weather Bureau	320
Binghamton, N. Y.	862
Bismarck, N. Dak.	1670
Boise, Idaho	2492
Boston, Mass.	—5
Brooklyn, N. Y., Weather Bureau	107
Buffalo, N. Y.	575
Burlington, Vt.	197
Cairo, Ill.	269
Cape Henry, Va.	7
Cape May, N. J.	6
Cedar Keys, Fla.	6
Charleston, S. C.	9
Charlotte, N. C.	725
Chattanooga, Tenn.	630
Chicago, Ill.	579
Cincinnati, Ohio, Weather Bureau	628
Cleveland, Ohio	594
Columbia, Mo.	737
Columbus, Ohio, Weather Bureau	824
Council Bluffs, Iowa	990
Dallas, Texas	436
Davenport, Iowa	536
Dayton, Ohio	790
Des Moines, Iowa	799
Detroit, Mich.	584
Dubuque, Iowa	643
Duluth, Minn.	601
Elkins, W. Va.	1920
Elmira, N. Y.	863
Erie, Pa.	572
Eureka, Calif.	25
Evansville, Ind.	382
Fort Worth, Texas	600
Fresno, Calif.	290
Galveston, Texas	5
Gloucester, Mass.	52
Grand Haven, Mich.	581
Green Bay, Wis.	587
Harrisburg, Pa.	317
Hartford, Ct.	38
Houston, Texas Weather Bureau	53
Indianapolis, Ind., Weather Bureau	822
Jacksonville, Fla.	7
Kansas City, Mo., Weather Bureau	963
Keokuk, Iowa	481
Knoxville, Tenn.	806
La Crosse, Wis.	678
Lansing, Mich.	827
Leavenworth, Kansas	727
Lexington, Ky.	965
Lincoln, Neb.	1147
Little Rock, Ark.	286
Los Angeles, Calif., Weather Bureau	338
Louisville, Ky.	456
Lynchburg, Va.	523
Manchester, N. H.	180
Memphis, Tenn.	271
Meridian, Miss.	341
Milwaukee, Wis.	586
Milwaukee, Wis.	586
Minneapolis, Minn.	837
Montgomery, Ala.	162
Mt. Tamalpais, Calif.	2353
Muskogee, Okla.	611
Nashville, Tenn.	434
New Bedford, Mass.	88
New Haven, Conn.	3
New London, Conn.	23
New Orleans, La.	8

Tycos Barometers



Ask for descriptive circular

Altitudes of Various Cities in the United States
(Continued)

STATIONS	Feet Above Sea Level
Newport, R. I.	13
New York, N. Y., Weather Bureau	35
Oakland, Calif., Weather Bureau	36
Oklahoma, Okla.	1195
Olympia, Wash.	17
Omaha, Neb.	1040
Oswego, N. Y.	252
Parkersburg, W. Va.	616
Philadelphia, Pa.	8
Phoenix, Ariz.	1084
Pierre, S. Dak.	1441
Pittsburgh, Pa.	697
Port Angeles, Wash.	11
Port Huron, Mich.	581
Portland, Me.	47
Portland, Ore.	8
Providence, R. I., Weather Bureau	74
Red Bluff, Calif.	306
Redlands, Calif.	1335
Richmond, Va.	164
Rochester, N. Y.	509
Sacramento, Calif.	2
St. Louis, Mo.	412
St. Paul, Minn.	693
St. Vincent, Minn.	798
San Antonio, Texas	683
San Diego, Calif.	5
Sandusky, Ohio	572
San Francisco, Cal. (City Base)	6
San Jose, Calif.	94
Sault Ste. Marie, Mich.	607
Savannah, Ga.	41
Seattle, Wash.	22
Shreveport, La.,	196
Sioux City, Iowa	1107
Southport, N. C.	14
Spokane, Wash.	1910
Springfield, Ill.	600
Springfield, Mass.	70
Springfield, Mo.	1348
Syracuse, N. Y.	398
Tacoma, Wash.	46
Tampa, Fla.	—1
Thatchers Island, Mass.	53
Toledo, Ohio Weather Bureau	628
Tucson, Ariz.	2389
Tulsa, Okla.	711
Utica, N. Y.	407
Vicksburg, Miss.	223
Washington, D. C.	91
Worcester, Mass.	475
Wichita, Kansas Weather Bureau	1358
Wilmington, Del.	78
Wilmington, N. C.	31
Youngstown, Ohio	841
Zanesville, Ohio	704

If your town is not in this list, write us for information.

Wind Velocity

The Beaufort Wind Scale

The values and terms for Wind Velocity as given in the Beaufort Wind Scale have come into general use by observers, both on land and sea, and are recognized by the International Permanent Committee on Meteorology.

In many cases, of course, Anemometers are in use, which give direct velocities, feet per second, meters per second or miles per hour.

The terms used in the Beaufort Scale are ordinary well-known words, conveying a definite meaning and well defined in any modern dictionary; thereby eliminating all danger of misunderstanding on the part of the general public.

In some instances definite values of velocity are required and if these cannot be closely enough translated from the terms of the Beaufort Scale, they can of course be obtained by using a Velocimeter, or Anemometer, and taking the exact readings the same.

In general, however, it is sufficient to know that the wind velocity would come under, as example: a moderate gale, indicating that its velocity was from 34 to 40 miles an hour.

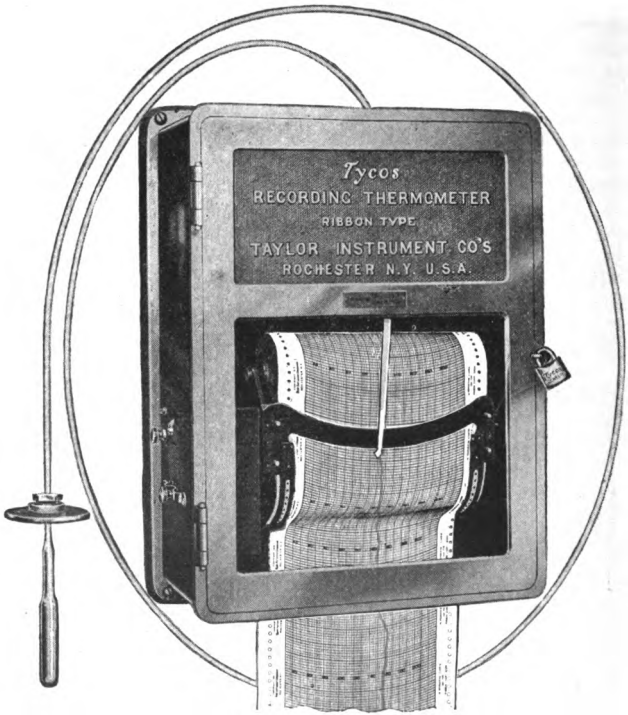
The following table gives the values for the terms of the Beaufort Wind scale, assigned to it by the U. S. Weather Bureau in 1905 and again authorized by it in 1914, and used by it at the present time, also, by Hann and Milham and the British Meteorological Office.

The latter values are also expressed in approximate feet per second, which can readily be figured to meters per second, if desired.

No.	Term	Miles Per Hour				Ft. per second
		U.S. Weather Bureau Feb. 1914	Hann	Mil-ham	British Meteoro-logical Office	
0	Calm	0 to 3	.0	0	Less than 1	Less than 2
1	Light Air	3 to 8	1.7	3	1 to 3	2 to 5
2	Light Breeze	8 to 13	3.1	13	4 to 7	6 to 11
3	Gentle Breeze	13 to 18	4.8	18	8 to 12	12 to 18
4	Moderate Breeze	18 to 23	6.7	23	13 to 18	19 to 27
5	Fresh Breeze	23 to 28	8.8	28	19 to 24	28 to 36
6	Strong Breeze	28 to 34	10.7	34	25 to 31	37 to 46
7	Moderate Gale	34 to 40	12.9	40	32 to 38	47 to 56
8	Fresh Gale	40 to 48	15.4	48	39 to 46	57 to 68
9	Strong Gale	48 to 56	18.0	56	47 to 54	69 to 80
10	Whole Gale	56 to 65	21.0	65	55 to 63	81 to 93
11	Storm	65 to 75	30.	75	64 to 75	94 to 110
12	Hurricane	75 and over	50.	90	75 and over	111 and over

Tycos Recording Thermometer

Ribbon Type



Extremely open reading scale. Chart travel can be furnished from 1 inch to 9 inches per hour.

Temperature scale 5¾ inches wide.

Write for full information

Conversion Tables for Saybolt Universal, Engler and Redwood Viscosimeters*.

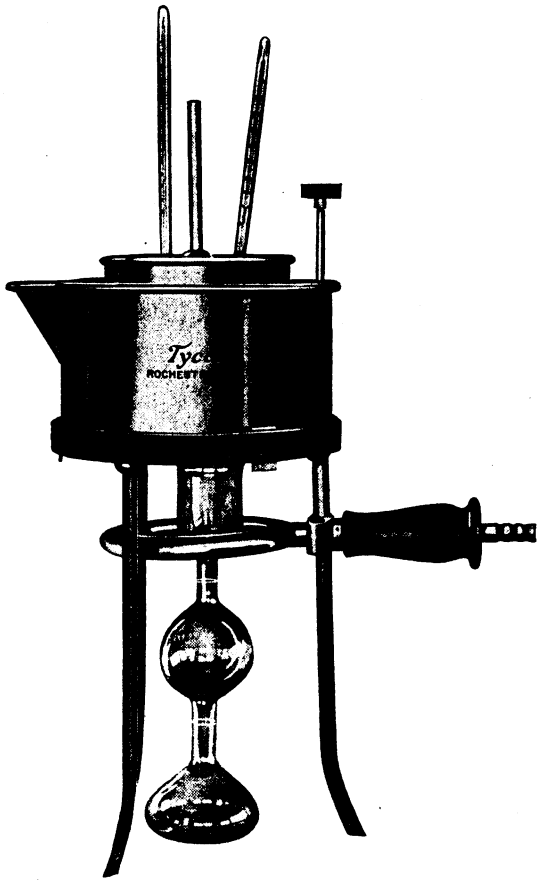
Multiplying Factors to Reduce Saybolt Times to Engler Numbers or to Redwood Times.

Viscosities taken with the Saybolt Universal Viscosimeter are expressed by the efflux time in seconds, directly, of 60 c.c. of a liquid at a given temperature.

Saybolt Time, seconds	Factor to Reduce Saybolt Time to Engler Number	Factor to Reduce Saybolt Time to Redwood Time
28	0.0357	0.95
30	0.0352	0.95
32	0.0346	0.94
34	0.0342	0.94
36	0.0337	0.94
38	0.0334	0.93
40	0.0330	0.93
42	0.0327	0.92
44	0.0323	0.92
46	0.0320	0.91
48	0.0317	0.91
50	0.0314	0.90
55	0.0308	0.90
60	0.0302	0.89
65	0.0297	0.88
70	0.0293	0.87
75	0.0289	0.86
80	0.0286	0.86
85	0.0284	0.86
90	0.0282	0.85
95	0.0280	0.85
100	0.0279	0.85
110	0.0276	0.85
120	0.0274	0.84
130	0.0272	0.84
140	0.0271	0.84
160	0 0269	0.84
180	0.0268	0.84
200	0.0267	0.84
....	.....	....
1800	0.0267	0.84

*Experiments of the Bureau of Standards, Report of Committee D-2, American Society for Testing Materials, 1915.

Tycos Engler Viscosometer



1757

Ask for Bulletin 1700

Conversion Tables for Saybolt Universal, Engler and Redwood Viscosimeters*

Multiplying Factors to Reduce Engler Numbers to Saybolt or to Redwood Times.

The values used in expressing Viscosities taken with Engler Viscosimeters are called Engler numbers.

An Engler number is the efflux time in seconds of 200 c.c. of a liquid at a given temperature divided by 51 (the standard efflux time of 200 c.c. of water at 20° C.)

Engler Number	Factor to Reduce Engler Number to Saybolt Time	Factor to Reduce Engler Number to Redwood Time
1.00	28.1	26.7
1.05	28.4	27.0
1.10	28.8	27.2
1.15	29.1	27.4
1.20	29.5	27.6
1.25	29.8	27.8
1.30	30.1	28.0
1.35	30.4	28.2
1.40	30.8	28.3
1.45	31.1	28.5
1.50	31.5	28.6
1.60	32.0	28.8
1.70	32.5	29.0
1.80	33.0	29.2
1.90	33.5	29.4
2.00	33.9	29.6
2.10	34.2	29.7
2.20	34.5	29.9
2.30	34.8	30.0
2.40	35.1	30.1
2.50	35.3	30.2
2.60	35.5	30.3
2.70	35.7	30.3
2.80	35.9	30.4
2.90	36.1	30.4
3.00	36.2	30.5
3.50	36.7	30.7
4.00	37.0	30.9
4.50	37.3	31.1
5.00	37.4	31.2
6.00	37.5	31.3
....	....	....
50.00	37.5	31.3

*Experiments of the Bureau of Standards, Report of Committee D-2, American Society for Testing Materials, 1915.

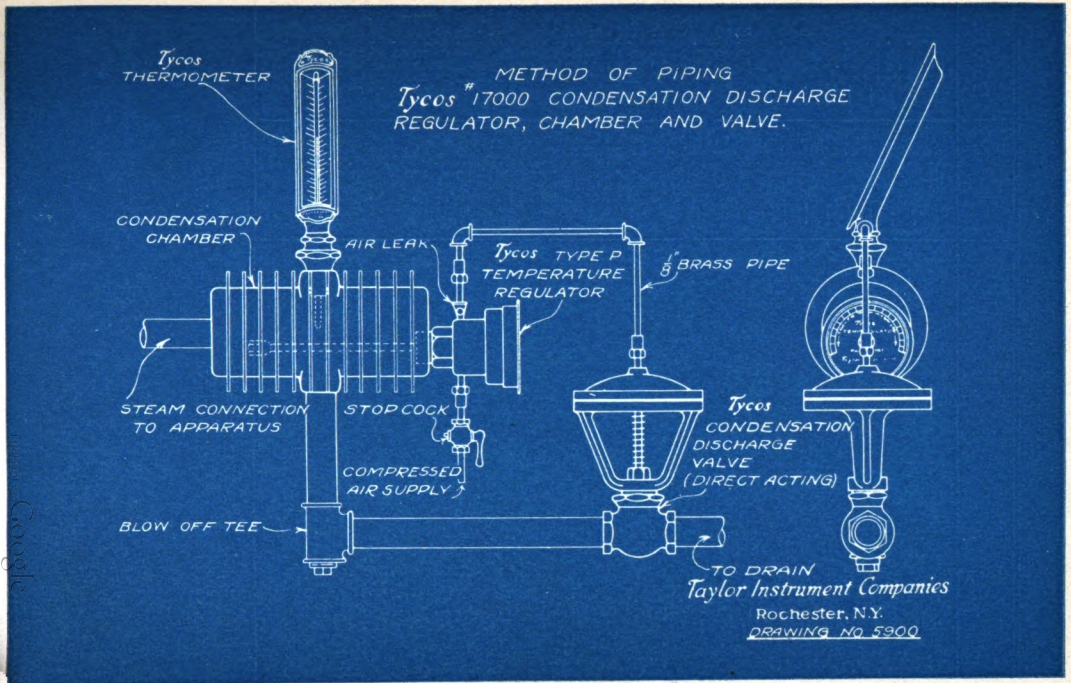
Conversion Tables for Saybolt Universal, Engler and Redwood Viscosimeters*.

Multiplying Factors to Reduce Redwood Times to Saybolt Times or to Engler Numbers.

Viscosities taken with the Redwood Viscosimeter are expressed by the efflux time in seconds, directly, of 50 c.c. of a liquid at a given temperature.

Redwood Time Seconds	Factor to Reduce Redwood Time to Saybolt Time	Factor to Reduce Redwood Time to Engler Number
26	1.05	0.0377
28	1.05	0.0372
30	1.06	0.0368
32	1.06	0.0364
34	1.07	0.0361
36	1.07	0.0358
38	1.08	0.0355
40	1:09	0.0353
42	1.10	0.0351
44	1.10	0.0349
46	1.11	0.0347
48	1.12	0.0345
50	1.13	0.0344
55	1.14	0.0340
60	1.15	0.0337
65	1.16	0.0335
70	1.16	0.0333
75	1.17	0.0331
80	1.18	0.0330
85	1.18	0.0329
90	1.18	0.0328
95	1.19	0.0327
100	1.19	0.0326
110	1.19	0.0325
120	1.20	0.0324
130	1.20	0.0322
140	1.20	0.0321
160	1.20	0.0321
180	1.20	0.0320
....	....	.....
1500	1.20	0.0320

*Experiments of the Bureau of Standards, Report of Committee D-2, American Society for Testing Materials, 1915.



Interesting Tempreatures

	Deg. F.	Deg. C.
Absolute Zero	—459.4	—273.
Hydrogen Boils	—423.	—253.
Nitrogen Boils	—321.	—196.
Liquid Air (Oxygen Boils)	—297.4	—183.
Alcohol Freezes	—179.68	—117.6
Carbon Dioxide (sublimation in inert liquid)	—109.3	— 78.5 *
Mercury Freezes	— 37.97	— 38.87*
Ammonia Boils	— 37.3	— 38.5
Water Freezes	+ 32.	0. *
Ether Boils	94.	34.6
Alcohol Boils	173.12	78.4
Water Boils	212.	100. *
Naphthalene Boils	423.73	217.96*
Tin melts	449.4	231.9 *
Glycerine Boils	554.	290.
Benzophenone Boils	582.6	305.9 *
Lead melts	621.3	327.4 *
Mercury Boils	675.05	357.25
Zinc Melts	786.9	419.4 *
Sulphur Boils	832.3	444.6 *
Antimony Melts	1166.	630. *
Aluminum Melts	1217.7	658.7 *
Salt (NaCl) Solidifies	1473.8	801. *
Silver Melts	1761.	960.5 *
Gold Melts	1945.5	1063. *
Copper Melts	1981.5	1083. *
Nickel Melts	2646.	1452. *
Iron Melts	2786.	1530. *
Platinum Melts	3191.	1755. *
Tungsten Melts	5430.	3000. *
Carbon Melts about	6500.	3600. *

Barometric Pressure 760 mm.

*Bureau of Standards Circular No. 35, Second Edition.

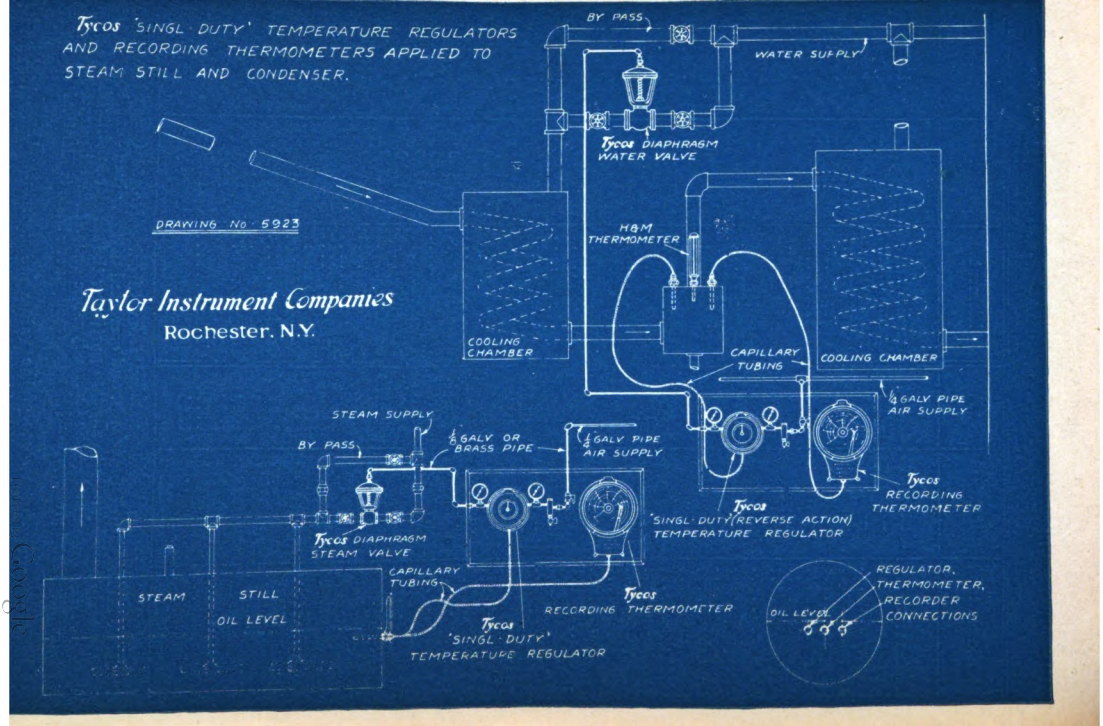
Melting Points of Chemical Elements

Element	°C.	°F.	Element	°C.	°F.
Helium	<—271	<—456	Arsenic	850?	1562
Hydrogen	—259	—434	Barium	850	1562
Neon	—253?	—423	Praseodymium	940?	1724
Fluorine	—223	—369	Germanium	958	1756
Oxygen	—218	—360	**Silver**	960.5	1761
Nitrogen	—210	—346	**Gold**	1063.0	1945.5
Argon	—188	—306	**Copper**	1083.0	1981.5
Krypton	—169	—272	Manganese	1230	2246
Xenon	—140	—220		1300–	2370–
Chlorine	—101.5	—150.7	Samarium	1400	2550
Mercury	—38.87	—37.97	Beryllium		
Bromine	— 7.3	+ 18.9	(Glucinum)	1280	2336
Caesium	+ 26	79	Scandium	?	....
Gallium	30	86	Silicon	1420	2588
Rubidium	38	100	**Nickel**	1452	2646
Phosphorus	44	111.2	Cobalt	1480	2696
Potassium	62.3	144	Yttrium	1490	2714
Sodium	97.5	207.5	Chromium	1615	2940
Iodine	113.5	236.3	**Iron**	1530	2786
	S_I 112.8	235.0	**Paladium**	1549	2820
Sulphur	S_{II} 119.2	246.6	Zirconium	1700?	3090
	S_{III} 106.8	224.2	Columbium		
Indium	155	311	(Niobium)	1700?	3090
Lithium	186	367		>1700	>3090
Selenium	217–220	422–428	Thorium	<Mo.	<Mo.
Tin	231.9	449.4	Vanadium	1720	3128
Bismuth	271	520	**Platinum**	1755	3191
Thallium	302	576	Ytterbium	?	....
Cadmium	320.9	609.6	Titanium	1800	3272
Lead	327.4	621.3	Uranium	<1850	<3362
Zinc	419.4	786.9	Rhodium	1950	3542
Tellurium	452	846	Boron	2200-2500?	4000-4500
Antimony	630.0	1166	Iridium	2350?	4262
Cerium	640	1184	Ruthenium	2450?	4442
Magnesium	651	1204	Molybdenum	2500?	4500
Aluminum	658.7	1217.7	Osmium	2700?	4900
Radium	700	1292	Tantalum	2850	5160
Calcium	810	1490	**Tungsten**	3400	6152
Lanthanum	810?	1490		>3600	>6500
Strontium	>Ca<Ba?	....	Carbon	for	for
Neodymium	840?	1544		p=1 At.	p=1 At.

The above tables are reproduced from Circular No. 35 (second edition) of the U. S. Bureau of Standards, and corrected to data given June 10, 1918.

As nearly as may be all values, in particular the standard points, have been reduced to a common scale—the thermodynamic scale. For all purposes except the most accurate investigations, the thermodynamic scale is identical with any of the gas scales.

At high temperatures some of the values are uncertain; thus, while the melting point of platinum may be considered accurately known to 5°C., that of tungsten is uncertain by 100°C. or more. Temperatures Centigrade are rounded off, and the exact Fahrenheit equivalents are usually given.


Tycos 'SINGL-DUTY' TEMPERATURE REGULATORS AND RECORDING THERMOMETERS APPLIED TO STEAM STILL AND CONDENSER.
DRAWING NO-5923
Taylor Instrument Companies
Rochester, N.Y.
BY PASS
WATER SUPPLY
Tycos DIAPHRAGM WATER VALVE
H&M THERMOMETER
COOLING CHAMBER
CAPILLARY TUBING
COOLING CHAMBER
¼ GALV PIPE AIR SUPPLY
STEAM SUPPLY
BY PASS
¼ GALV OR BRASS PIPE
¼ GALV PIPE AIR SUPPLY
Tycos RECORDING THERMOMETER
Tycos 'SINGL-DUTY' (REVERSE ACTION) TEMPERATURE REGULATOR
Tycos DIAPHRAGM STEAM VALVE
CAPILLARY TUBING
STEAM
STILL
OIL LEVEL
Tycos RECORDING THERMOMETER
Tycos 'SINGL-DUTY' TEMPERATURE REGULATOR
REGULATOR, THERMOMETER, RECORDER CONNECTIONS
OIL LEVEL

Cold Storage Temperatures

Articles	Degr. Fahr.
FRUIT	
Apples	32-36
Bananas	34
Cantaloupes	40
Cranberries	33-36
Dates, Figs, Etc.	50-55
Fruits, dried	35-40
Grapes	34-36
Lemons	33-36
Oranges	34-36
Peaches	34-36
Pears, Watermelon	34-36
MEATS	
Brined	38
Beef, fresh	33
Beef, dried	36-40
Calves	32-33
Hams, Ribs, Shoulders (not brined)	20
Hogs	20-39
Lard	38
Livers	20-30
Sheep, lambs	32
Ox-Tails	30
Sausage casings	20
Tenderloin Butts, Etc.	33
FISH	
Fresh fish	20
Dried fish	36
Oysters in shell	30-35
Oysters in tubs	25
CANNED GOODS	
Sardines	35-40
Fruits	35-40
Meats	35-40
BUTTER, EGGS	
Butter	18-20
Butterine	18-20
Cheese	34
Eggs	31

Articles	Degr. Fahr.
LIQUIDS	
Beer, Ale, Porter, Etc.	33
Cider	30
Ginger Ale	36
Wines	40-45
FLOUR AND MEAL	
Buckwheat flour	36-40
Corn meal	36-40
Oat meal	36-40
Wheat flour	36-40
VEGETABLES	
Asparagus	34-35
Cabbage	34-35
Carrots	34-35
Celery	34-35
Dried beans	32-40
Dried corn	35
Dried peas	35-40
Onions	36
Parsnips	34-35
Potatoes	36-40
Sauerkraut	35
MISCELLANEOUS	
Cigars, Tobacco	35
Furs, Woolens, Etc.	35
Honey	45
Hops	40
Maple syrup, sugar	40-45
Oils	35
Poultry, dressed, iced	28-30
Poultry, dry picked	26-28
Poultry, scalded	20
Game, to freeze	15-18
Game, after frozen	25-28
Poultry, to freeze	15-18
Poultry, after frozen	25-28
Nuts in sheels	35-40
Chestnuts	33

Heat Units

Temperature ° Fahrenheit = $\frac{9}{5}$° C. + 32°* = $\frac{9}{4}$° R. + 32°.
Temperature ° Celcius or ° Centigrade = $\frac{5}{9}$ (° F. — 32°)* = $\frac{5}{4}$° R.
Temperature ° Reaumur = $\frac{1}{5}$ ° C. = $\frac{4}{9}$ (° F.— 32°).

A British Thermal Unit (B. t. u.) is the amount of heat required to raise the temperature of 1 lb. avoir. of water 1° F. 1 B. t. u. = .252 Kilogram Calorie.

A Gram Calorie (small) is the amount of heat required to raise the temperature of 1 g. of water 1° C.

A Kilogram Calorie (large) is the amount of heat required to raise the temperature of 1 kg. of water 1° C.

One Kilogram Calorie — 1000 Gram Caloric = 3.968 B. t. u.

Power Units

A foot-pound is the power or energy required to raise a weight of 1 lb. (avoir.) a distance of 1 ft.

One Horse Power (h. p.) = 550. ft.-lbs. per second.
= 1.014 Cheval.
= 0.7457 Kilowatts.

A Kilogram-meter is the power or energy required to raise a weight of 1 kg. a distance of 1 M.

One Cheval (metric horse power) = 75 kg.-m. per second.
= 0.9863 h. p.
= 0.7355 kilowatts.

Electrical Units

The Volt is the unit of electrical pressure or electromotive force (e.m.f.)
The Ampere is the unit of electrical current or flow.
The Ohm is the unit of electrical resistance.
From Ohm's Law

$$\text{Amperes} = \frac{\text{Volts}}{\text{Ohms}}$$

$$\text{Volts} = \text{Ohms} \times \text{Amperes}.$$

$$\text{Ohms} = \frac{\text{Volts}}{\text{Amperes}}$$

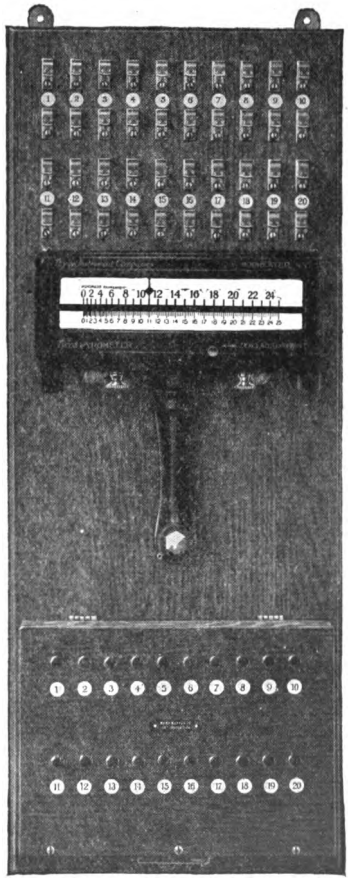
The Watt is the unit of electrical power and is produced by the flow of 1 ampere under an e.m.f. of 1 volt.

1 kilowatt = 1000 watts
= 1.341 h. p.
1 watt = 0.001341 h. p.
= 0.7376 ft.-lbs. per sec.
= 0.000239 kg.-calorie per sec.
= 0.0009486 B. t. u. per sec.

The Joule is the unit of electrical energy and is 1 watt-second or is produced by a steady current of 1 ampere passed through a resistance of 1 ohm for 1 second. 1 joule = 0.2388 gram-calorie.

*See Comparison Tables on pages 9 to 30.

Tycos Multiple Inclinating Pyrometer Push Button Switchboard



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Ask for Catalog Part 4016

Heat of Combustion

	Calories per Gram	B. T. U. per Pound
Alcohol, Ethyl	7184	12931
Benzol, Liquid	10030	18054
Carbon, Crystallized	7859	14146
Cellulose	4208	7574
Charcoal	8080	14544
Coal, Anthracite	7800–8400	14000–15200
Bituminous	7800–8750	14000–15750
Coke	7900–8040	14200–14500
Gas, Acetylene	11927	21469
Coal	4400–7370	7990–12266
Oil or Petroleum	10800	19440
Producer	773–1370	1391–2466
Water	2000–3000	4200–5400
Gasoline	11733	21120
Glycerine	4316	7769
Graphite	7901	14222
Hydrogen	34462	62032
Kerosene	11186	20135
Lignite	6000–7000	10800–12600
Magnesium	6077	10939
Napthalene	9690	17442
Oil, Cotton Seed	9500	17100
Fuel	10300–10700	18500–19300
Olive	9473	17051
Rape	9489	17081
Sperm	10000	18000
Paraffin	11140	20050
Peat	5940	10692
Petroleum, Liquid	10000–12000	18000–21600
Pitch	8400	15120
Starch	4228	7610
Sugar Cane,	3961	7130
Sulphur	2221	3998
Tallow	9500	17100
Wood, Hard	4750	8550
Soft resinous	5050	9090

1.8 × Calorics per gram = B. T. Us. per pound.
0.555 × B. T. Us. per pound = Calorics per gram.

International Atomic Weights

1917 Values

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Name of Element	Symbol	Atomic Weight	Name of Element	Symbol	Atomic Weight
Aluminum	Al	27.1	Neodymium	Nd	144.3
Antimony	Sb	120.2	Neon	Ne	20.2
Argon	A	39.88	Nickel	Ni	58.68
Arsenic	As	74.96	Niton (Radium		
Barium	Ba	137.37	emanation)	Nt	222.4
Bismuth	Bi	208.0	Nitrogen	N	14.01
Boron	B	11.0	Osmium	Os	190.9
Bromine	Br	79.92	Oxygen	O	16.0
Cadmium	Cd	112.4	Palladium	Pd	106.7
Caesium	Cs	132.81	Phosphorus	P	31.04
Calcium	Ca	40.07	Platinum	Pt	195.2
Carbon	C	12.005	Potassium	K	39.1
Cerium	Ce	140.25	Praseodymium	Pr	140.9
Chlorine	Cl	35.46	Radium	Ra	226.0
Chromium	Cr	52.0	Rhodium	Rh	102.9
Cobalt	Co	58.97	Rubidium	Rb	85.45
Columbium	Cb	93.1	Ruthenium	Ru	101.7
Copper	Cu	63.57	Samarium	Sa	150.4
Dysprosium	Dy	162.5	Scandium	Sc	44.1
Erbium	Er	167.7	Selenium	Se	79.2
Europium	Eu	152.0	Silicon	Si	28.3
Fluorine	F	19.0	Silver	Ag	107.88
Gadolinium	Gd	157.3	Sodium	Na	23.0
Gallium	Ga	69.9	Strontium	Sr	87.63
Germanium	Ge	72.5	Sulfur	S	32.06
Glucinum	Gl	9.1	Tantalum	Ta	181.5
Gold	Au	197.2	Tellurium	Te	127.5
Helium	He	4.0	Terbium	Tb	159.2
Holmium	Ho	163.5	Thallium	Tl	204.0
Hydrogen	H	1.008	Thorium	Th	232.4
Indium	In	114.8	Thulium	Tm	168.5
Iodine	I	126.92	Tin	Sn	118.7
Iridium	Ir	193.1	Titanium	Ti	48.1
Iron	Fe	55.84	Tungsten	W	184.0
Krypton	Kr	82.92	Uranium	U	238.2
Lanthanum	La	139.0	Vanadium	V	51.0
Lead	Pb	207.2	Xenon	Xe	130.2
Lithium	Li	6.94	Ytterbium (Neo-		
Lutecium	Lu	175.0	ytterbium)	Yb	173.5
Magnesium	Mg	24.32	Yttrium	Yt	88.7
Manganese	Mn	54.93	Zinc	Zn	65.37
Mercury	Hg	200.6	Zirconium	Zr	90.6
Molybdenum	Mo	96.0			

* The Journal of the American Chemical Society, Vol. XXXVIII, No. 11, N-
-- 1917

Tycos Straight Long Stem and Handled Industrial Thermometers

LONG STEM THERMOMETER

HANDLED THERMOMETER.

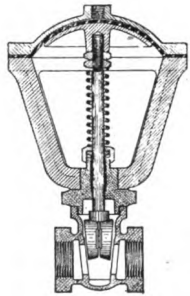
Equivalents of Decimal and Binary Fractions of an Inch in Millimeters

Fractions of an Inch	Millimeters	Decimals of an Inch	Fractions of an Inch	Millimeters	Decimals of an Inch
1/64	0.397	0.0156	33/64	13.097	0.5156
1/32	0.794	.0313	17/32	13.494	.5313
3/64	1.191	.0469	35/64	13.891	.5469
1/16	1.588	.0625	9/16	14.288	.5625
5/64	1.984	.0781	37/64	14.684	.5781
3/32	2.381	.0938	19/32	15.081	.5938
7/64	2.778	.1094	39/64	15.478	.6094
1/8	3.175	.1250	5/8	15.875	.6250
9/64	3.572	.1406	41/64	16.272	.6406
5/32	3.969	.1563	21/32	16.669	.6563
11/64	4.366	.1719	43/64	17.066	.6719
3/16	4.763	.1875	11/16	17.463	.6875
13/64	5.159	.2031	45/64	17.859	.7031
7/32	5.556	.2186	23/32	18.256	.7186
15/64	5.953	.2344	47/64	18.653	.7344
1/4	6.350	.2500	3/4	19.050	.7500
17/64	6.747	.2656	49/64	19.447	.7656
9/32	7.144	.2813	25/32	19.844	.7813
19/64	7.541	.2969	51/64	20.241	.7969
5/16	7.938	.3125	13/16	20.638	.8125
21/64	8.334	.3281	53/64	21.034	.8281
11/32	8.731	.3438	27/32	21.431	.8438
23/64	9.128	.3594	55/64	21.828	.8594
3/8	9.525	.3750	7/8	22.225	.8750
25/64	9.922	.3906	57/64	22.622	.8906
13/32	10.319	.4063	29/32	23.019	.9063
27/64	10.716	.4219	59/64	23.416	.9219
7/16	11.113	.4375	15/16	23.813	.9375
29/64	11.509	.4531	61/64	24.209	.9531
15/32	11.906	.4688	31/32	24.606	.9688
31/64	12.303	.4844	63/64	25.003	.9844
1/2	12.700	.5000	1	25.400	1.0000

English Inches Into Millimeters

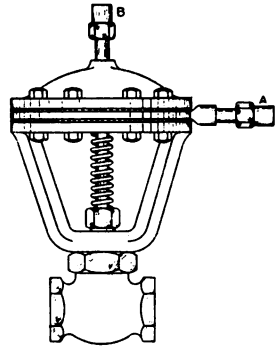
In.	0	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16
0	0.0	1.6	3.2	4.8	6.4	7.9	9.5	11.1	12.7	14.3	15.9	17.5	19.1	20.6	22.2	23.8
1	25.4	27.0	28.6	30.2	31.7	33.3	34.9	36.5	38.1	39.7	41.3	42.9	44.4	46.0	47.6	49.2
2	50.8	52.4	54.0	55.6	57.1	58.7	60.3	61.9	63.5	65.1	66.7	68.3	69.8	71.4	73.0	74.6
3	76.2	77.8	79.4	81.0	82.5	84.1	85.7	87.3	88.9	90.5	92.1	93.7	95.2	96.8	98.4	100.0
4	101.6	103.2	104.8	106.4	108.0	109.5	111.1	112.7	114.3	115.9	117.5	119.1	120.7	122.2	123.8	125.4
5	127.0	128.6	130.2	131.8	133.4	134.9	136.5	138.1	139.7	141.3	142.9	144.5	146.1	147.6	149.2	150.8
6	152.4	154.0	155.6	157.2	158.8	160.3	161.9	163.5	165.1	166.7	168.3	169.9	171.5	173.0	174.6	176.2
7	177.8	179.4	181.0	182.6	184.2	185.7	187.3	188.9	190.5	192.1	193.7	195.3	196.9	198.4	200.0	201.6
8	203.2	204.8	206.4	208.0	209.6	211.1	212.7	214.3	215.9	217.5	219.1	220.7	222.3	223.8	225.4	227.0
9	228.6	230.2	231.8	233.4	235.0	236.5	238.1	239.7	241.3	242.9	244.5	246.1	247.7	249.2	250.8	252.4
10	254.0	255.6	257.2	258.8	260.4	261.9	263.5	265.1	266.7	268.3	269.9	271.5	273.1	274.6	276.2	277.8
11	279.4	281.0	282.6	284.2	285.7	287.3	288.9	290.5	292.1	293.7	295.3	296.9	298.4	300.0	301.5	303.2
12	304.8	306.4	308.0	309.6	311.1	312.7	314.3	315.9	317.5	319.1	320.7	322.3	323.8	325.4	327.0	328.6
13	330.2	331.8	333.4	335.0	336.5	338.1	339.7	341.3	342.9	344.5	346.1	347.7	349.2	350.8	352.4	354.0
14	355.6	357.2	358.8	360.4	361.9	363.5	365.1	366.7	368.3	369.9	371.5	373.1	374.6	376.2	377.8	379.4
15	381.0	382.6	384.2	385.8	387.3	388.9	390.5	392.1	393.7	395.3	396.9	398.5	400.0	401.6	403.2	404.8
16	406.4	408.0	409.6	411.2	412.7	414.3	415.9	417.5	419.1	420.7	422.3	423.9	425.4	427.0	428.6	430.2
17	431.8	433.4	435.0	436.6	438.1	439.7	441.3	442.9	444.5	446.1	447.7	449.3	450.8	452.4	454.0	455.6
18	457.2	458.8	460.4	462.0	463.5	465.1	466.7	468.3	469.9	471.5	473.1	474.7	476.2	477.8	479.4	481.0
19	482.6	484.2	485.8	487.4	488.9	490.5	492.1	493.7	495.3	496.9	498.5	500.1	501.6	503.2	504.8	506.4
20	508.0	509.6	511.2	512.8	514.3	515.9	517.5	519.1	520.7	522.3	523.9	525.5	527.0	528.6	530.2	531.8
21	533.4	535.0	536.6	538.2	539.7	541.3	542.9	544.5	546.1	547.7	549.3	550.9	552.4	554.0	555.6	557.2
22	558 8	560 4	562.0	563.6	565.1	566.7	568.3	569.9	571.5	573.1	574.7	576.3	577.8	579.4	581.0	582.6
23	584.2	585.8	587.4	589.0	590.5	592.1	593.7	595.3	596.9	598.5	600.1	601.7	603.2	604.8	606.4	608.0

Tycos Diaphragm Valves



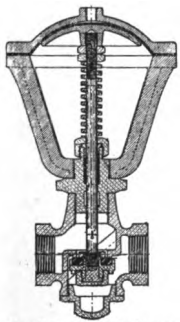
Discharge Valve (Gate Type)

The construction of this valve greatly reduces the liability of foreign matter lodging in the valve.



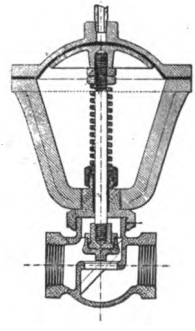
Direct-Acting Diaphragm Valve with "T. & T." Top

NOTE: The "T&T" top on a direct-acting diaphragm valve is desirable only when the Tycos TIME Regulator is used in conjunction with the Temperature Regulator.



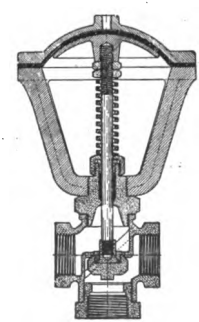
Reversed-Action Diaphragm Valve

Rubber Discs and Metal Seat on all sizes.



Direct Diaphragm Valve

Metal Seat, Rings and Discs are used on all sizes to 2" inclusive. From 2" up, hard rubber discs and metal seats are used.



Three-Way Diaphragm Valve

Metal Discs and Seat Rings on all sizes.

STANDARD UNITS OF MEASURE AND WEIGHT

Unit of Length

A *Meter* (m.) is taken from the international prototype meter at the International Bureau of Weights and Measures; at figure 0° C = 39.37 inches = 3.280833 feet = 100 centimeters.

A *Foot* (ft.) = 0.3048006 meters = 30.48006 centimeters = 12 inches.

Unit of Capacity

A *Liter* (l.) is the volume occupied by the mass of 1 kilogram of pure water at 4° C. under barometric pressure of 760 mm. = 0.264178 U. S. gallons = 61.025 cubic inches = 1000.027 cubic centimeters = 1,000 milliliters.

A *Gallon* U. S. (gal.) = 231 cubic inches = 3.785332 liters = 8.32823 lbs. pure water in air at 60° F = 3.777623 kilograms pure water in air at 60° F = 0.8327 imperial gallons = 4 quarts.

An *Imperial Gallon* (English) = 277.274 cubic inches = 4.54346 liters = 1.20032 U. S. gallons = 9.996 lbs. pure water at 60° F.

Unit of Weight or Mass

A *Kilogram* (kg.) is taken from the international prototype kilogram at the International Bureau of Weights and Measures = 2.204622341 lbs. avoirdupois = 2.6792285 lbs. troy = 15,432.356 grains = 1,000 grams.

A *Pound* (Avoirdupois) (lb.) = 0.4535924277 kg. = 453.5924277 grams = 1.2152778 lbs. troy = 16 oz. avoir. = 7000 grains.

Comparison of Metric and Customary Units*

1. Length

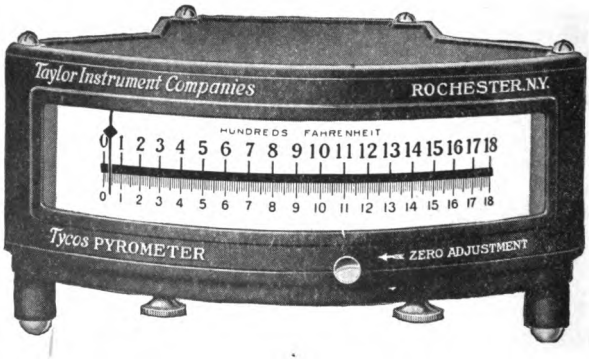
Inches (in.)		Milli-meters (mm.)	Feet (ft.)		Meters (m.)
0.039 37	=	1	1	=	0.304 801
0.078 74	=	2	2	=	0.609 601
0.118 11	=	3	3	=	0.914 402
0.157 48	=	4	4	=	1.219 202
0.196 85	=	5	5	=	1.524 003
0.236 22	=	6	6	=	1.828 804
0.275 59	=	7	7	=	2.133 604
0.314 96	=	8	8	=	2.438 405
0.354 33	=	9	9	=	2.743 205
1	=	25.4001	3.280 83	=	1
2	=	50.8001	6.561 67	=	2
3	=	76.2002	9.842 50	=	3
4	=	101.6002	13.123 33	=	4
5	=	127.0003	16.404 17	=	5
6	=	152.4003	19.685 00	=	6
7	=	177.8004	22.965 83	=	7
8	=	203.2004	26.246 67	=	8
9	=	228.6005	29.527 50	=	9

2. Area

Square inches (sq. in.)		Square centim's ($cm.^2$)	Square feet (sq. ft.)		Square meters ($m.^2$)
0.155 00	=	1	1	=	0.092 90
0.310 00	=	2	2	=	0.185 81
0.465 00	=	3	3	=	0.278 71
0.620 00	=	4	4	=	0.371 61
0.775 00	=	5	5	=	0.464 52
0.930 00	=	6	6	=	0.557 42
1.085 00	=	7	7	=	0.650 32
1.240 00	=	8	8	=	0.743 23
1.395 00	=	9	9	=	0.836 13
1	=	6.452	10.764	=	1
2	=	12.903	21.528	=	2
3	=	19.355	32.292	=	3
4	=	25.807	43.055	=	4
5	=	32.258	53.819	=	5
6	=	38.710	64.583	=	6
7	=	45.161	75.347	=	7
8	=	51.613	86.111	=	8
9	=	58.065	96.875	=	9

*Bureau of Standards Circular No. 47.

Tycos High Resistance Wall Type Indicator



Ask for Book 4014

Comparison of Metric and Customary Units (Continued)

3. Volume

Cubic inches* (cu. in.)		Cubic centimeters ($cm.^3$)	Cubic feet (cu. ft.)		Cubic meters ($m.^3$)	Cubic feet (cu. ft.)		Liters* (l.)
0.061 02	=	1	1	=	0.028 317	1	=	28.316
0.122 05	=	2	2	=	0.056 634	2	=	56.633
0.183 07	=	3	3	=	0.084 951	3	=	84.949
0.244 09	=	4	4	=	0.113 268	4	=	113.265
0.305 12	=	5	5	=	0.141 585	5	=	141.581
0.366 14	=	6	6	=	0.169 902	6	=	169.898
0.427 16	=	7	7	=	0.198 219	7	=	198.214
0.488 19	=	8	8	=	0.226 536	8	=	226.530
0.549 21	=	9	9	=	0.254 853	9	=	254.846
1	=	16.3872	35.314	=	1	0.035 315	=	1
2	=	32.7743	70.629	=	2	0.070 631	=	2
3	=	49.1615	105.943	=	3	0.105 946	=	3
4	=	65.5486	141.258	=	4	0.141 262	=	4
5	=	81.9358	176.572	=	5	0.176 577	=	5
6	=	98.3230	211.887	=	6	0.211 892	=	6
7	=	114.7101	247.201	=	7	0.247 208	=	7
8	=	131.0973	282.516	=	8	0.282 523	=	8
9	=	147.4845	317.830	=	9	0.317 839	=	9

*Cubic Inches to Liters divide comparative values in cubic centimeters by 1000. Liters to Cubic Inches multiply by 1000. Ex .1 Liter = 61.02 cu. in. and 1 cu. in. = 0.016387 l.

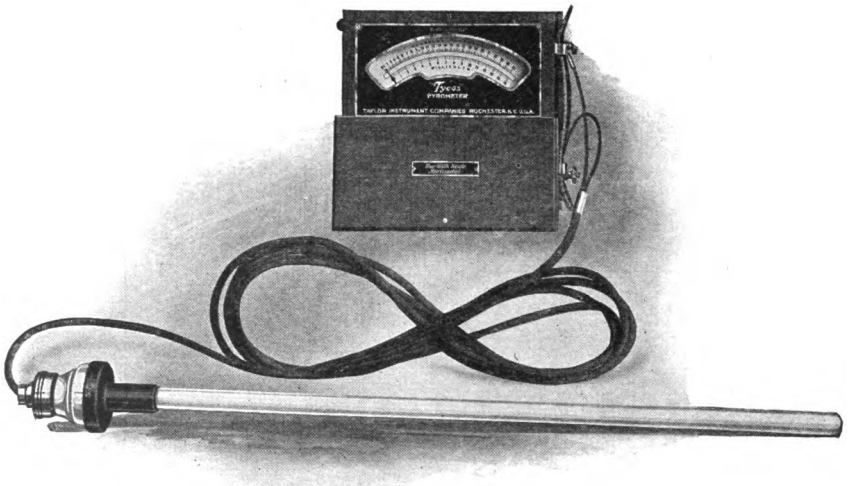
Comparison of Metric and Customary Units (Continued)

4. Capacity—Liquid Measure

U. S. fluid ounces (fl. oz.)		Milliliters (ml.) or (cc.) *	U. S. gallons (gal.)		Liters (l.)
0.033 815	=	1	0.264 18	=	1
0.067 629	=	2	0.528 36	=	2
0.101 444	=	3	0.792 53	=	3
0.135 259	=	4	1.056 71	=	4
0.169 074	=	5	1.320 89	=	5
0.202 888	=	6	1.585 07	=	6
0.236 703	=	7	1.849 24	=	7
0.270 518	=	8	2.113 42	=	8
0.304 333	=	9	2.377 60	=	9
1	=	29.573	1	=	3.785 33
2	=	59.146	2	=	7.570 66
3	=	88.719	3	=	11.356 00
4	=	118.292	4	=	15.141 33
5	=	147.865	5	=	18.926 66
6	=	177.437	6	=	22.711 99
7	=	207.010	7	=	26.497 33
8	=	236.583	8	=	30.282 66
9	=	266.156	9	=	34.067 99

*1 cc. is commercially considered to equal 1 ml. Actually 1 ml. equals 1.000027 cc.

Tycos Portable Pyrometer Outfit



Ask for Catalog Part 4015

Comparison of Metric and Customary Units (Continued)

5. Mass or Weight

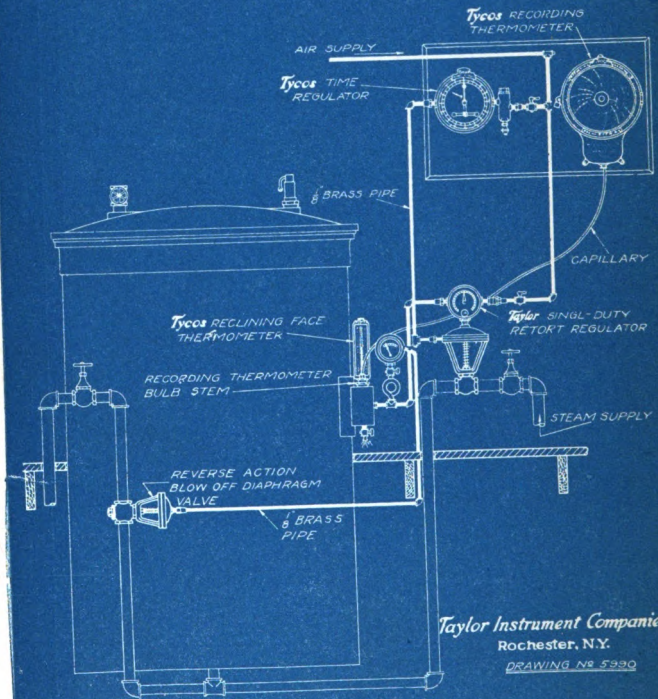
Grains (gr.)		Grams (g.)	Avoirdupois ounces (oz. av.)		Grams (g.)	Avoirdupois pounds (lb. av.)		Kilograms (kg.)
1	=	0.064 799	0.035 274	=	1	1	=	0.453 59
2	=	0.129 598	0.070 548	=	2	2	=	0.907 18
3	=	0.194 397	0.105 822	=	3	3	=	1.360 78
4	=	0.259 196	0.141 096	=	4	4	=	1.814 37
5	=	0.323 995	0.176 370	=	5	5	=	2.267 96
6	=	0.388 794	0.211 644	=	6	6	=	2.721 55
7	=	0.453 592	0.246 918	=	7	7	=	3.175 15
8	=	0.518 391	0.282 192	=	8	8	=	3.628 74
9	=	0.583 190	0.317 466	=	9	9	=	4.082 33
15.4324	=	1	1	=	28.350	2.204 62	=	1
30.8647	=	2	2	=	56.699	4.409 24	=	2
46.2971	=	3	3	=	85.049	6.613 87	=	3
61.7294	=	4	4	=	113.398	8.818 49	=	4
77.1618	=	5	5	=	141.748	11.023 11	=	5
92.5941	=	6	6	=	170.097	13.227 73	=	6
108.0265	=	7	7	=	198.447	15.432 36	=	7
123.4589	=	8	8	=	226.796	17.636 98	=	8
138.8912	=	9	9	=	255.146	19.841 60	=	9

Foreign Weights, Liquid Measure and Money with U. S. Equivalents

Country	Weight		Liquid Measure		Money	
	Name	Lbs. Av.	Name	U. S. Gal.	Name	U. S. Dollar*
Argentina	Libra	1.0127	Frasco	.6274	Peso	.9648
Austria	Pfund	1.235	Eimer	14.95	Krone	.2026
Belgium	Kilo	2.2046	Litre	0.264	Florin	.402
Brazil	Libre	1.011	Almude	4.422	Milreis	.5462
Central America	Libre	1.043	Centaro	4.2631		
Chili	Libre	1.014	Arroba	4.263	Peso	.365
China	Catty	1.333			Tael	.703
Cuba	Libre	1.0161	Arroba	4.263	Peso	.926
Denmark	Pund	1.102	Pott	.255	Krone	.268
Egypt	Rotl	.9905	Kadahs	.544	Pound	4.943
England	Pound	1.000	Imp. Gal.	1.201	Pound	4.8665
France	Kilo	2.2046	Litre	0.264	Franc	.193
Germany	Pfund	1.1023	Ohm	38.278	Mark	.238
Greece	Livre	1.1			Drachma	.193
Holland	Kilo	2.2046	Litre	0.264	Franc	.193
India	Maund	82.286			Rupee	.324
Italy	Cantaro	175.0	Barrel	11.4	Lira	.193
Japan	Catty	1.31	Sho	.476	Yen	.498
Mexico	Libra	1.0146	Frasco	.625	Peso	.498
Norway	Skalpund	.937	Kamea	.662	Krone	.268
Philippines	Catty	1.394	Gantah	.8796	Peseta	.193
Portugal	Libra	1.011	Almude	4.422	Milreis	1.08
Russia	Funt	.9028	Verdo	2.707	Rouble	.515
Spain	Libra	1.0144	Arroba	4.263	Peseta	.193
Sweden	Pund	1.102	Kamea	.662	Krona	.268
Switzerland	Kilo	2.2046	Litre	0.264	Franc	.193
Turkey	Oke	2.854			Piastre	.044
Venezuela	Libra	1.0161	Arroba	4.263	Bolivar	.193

*The money equivalents are constantly changing due to the fluctuating market value of the coinage of the different countries.

Taylor SINGL-DUTY RETORT AND *Tycos* TIME REGULATORS AND RECORDING THERMOMETER CONTROLLING AND RECORDING TEMPERATURE AND TIME AND EXHAUSTING RETORT AT END OF PROCESS.



Taylor Instrument Companies
Rochester, N.Y.
DRAWING No. 5930

Lines, Areas and Volumes

Circumference of a circle = diameter × 3.1416.
= radius × 6.2832.

Radius of a circle = circumference × .159155.

Diameter of a circle = circumference × .31831.

Side of an inscribed equilateral triangle = diameter of circle × .86.

Side of an inscribed square = diameter of circle × .7071.
= circumference of circle × .225.

Side of an inscribed cube = radius of sphere × 1.1547.

Area of a circle = radius^2 × 3.1416.
= diameter^2 × .7854.
= circumference^2 × .07958.

Area of a square = a side^2.

Area of a triangle = base × ½ altitude.

Area of a rectangle = base × altitude.

Area of a parallelogram = base × altitude.

Area of a trapezoid = altitude × ½ sum of parallel sides.

Area of a parabola = ⅗ base × altitude of exterior triangle.

Area of a trapezium = area of the two constituent triangles.

Area of a regular polygon = ½ the perpendicular from the center to one of the sides × sum of the sides.

Area of a sector = ½ radius × arc.

Area of an ellipse = ½ short diameter × ½ long diameter × 3.1416.

Surface of a sphere = circumference × diameter.
= diameter^2 × 3.1416.

Surface of a cube = area of one side × 6.

Surface of a cylinder = area of both ends + (length × circumference).

Surface of a zone or convex surface of segment of a sphere = 6.2832 × radius of sphere from which it is cut × altitude of the zone.

Surface of a frustrum of a cone = ½ (sum of circumferences at both ends) × slant height + area of both ends.

Volume of a sphere = surface × ⅙ diameter.
= diameter^3 × .5236.

Volume of a cube = one side^3.

Volume of a cylinder or prism = area of end × length.

Volume of a cone or pyramid = area of base × ⅓ altitude.

Volume of a frustrum of a cone or pyramid = ⅓ altitude × area of both ends + square root of area of both ends multiplied together.

Volume of a wedge = area of base × ½ altitude.

Volume of a spherical segment of one base = ½ altitude × 3.1416 × radius of base^2 + ⅙ altitude^3 × 3.1416.

DECIMAL EQUIVALENTS OF STANDARD GAUGES to Which Metal Materials in Various Forms Should be Ordered

As the manufacturers of metal materials in various forms have adopted widely different gauges for their standards, we offer herewith a table which gives the gauges to which commonly used materials are regularly made and can, therefore, be most readily and cheaply obtained. A table giving the equivalent in inches of each number of each gauge appears on pages 166 and 167.

Standard Gauges for Metal Materials in Various Forms

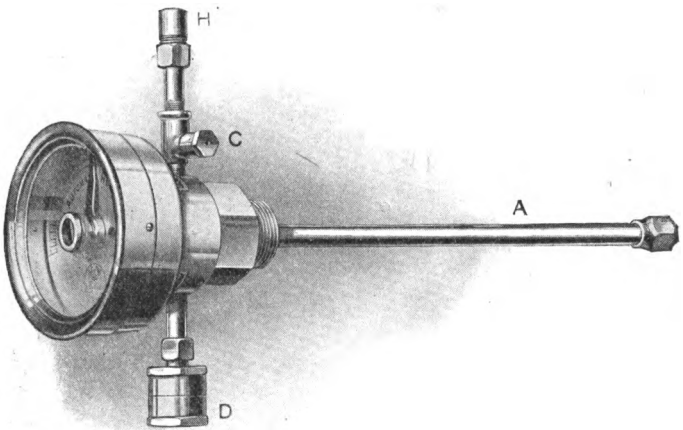
Material	Rod	Sheet or Strip	Seamless Tube	Wire
Brass	B. & S. gauge up to ⅛". Larger sizes, fractions of 1" in 16ths.	B. & S. gauge, std. width 12"	Birmingham or Stubs guage	Wash. and Moen gauge
Bronze	B. & S. gauge up to ⅛". Larger sizes, fractions of 1" in 16ths.	B. & S. guage, std. width 12"	Birmingham or Stubs gauge	Wash. and Moen guage
Copper	B. & S. gauge up to ⅛". Larger sizes, fractions of 1" in 16ths.	Oz. per sq. ft. See table Pages 166 and 167	Birmingham or Stubs gauge	Brown & Sharpe gauge
Nickel Silver	B. & S. gauge up to ⅛". Larger sizes, fractions of 1" in 16ths.	B. & S. guage, std. width 12"		Wash. & Moen gauge
Iron	Fractions of 1", standard sizes in 16ths.	U. S. std. gauge		Wash. & Moen gauge
Steel	Fractions of 1", standard sizes in 16ths.	U. S. std. gauge	Birmingham or Stubs gauge	Wash. & Moen gauge
Steel Drill	Stubs steel wire gauge.			
Zinc		Special ga. See table Pages 166 and 167		

Notes on Ordering

In ordering sheet metals specify deep drawing, soft, half-hard, hard, or spring stock. If the temper is of special importance, a sample of the metal wanted should accompany the order. In ordering wire specify soft, half-hard, hard, or spring stock. If allowable variation in thickness of metal is less than one one-thousandth of an inch either way, specify that dimension must be exact. This should not be done if commercial stock can be used, as extreme accuracy is special and therefore costly.

Brass and steel escutcheon pins are carried in Washburn & Moen Gauge and should be so ordered.

Tycos Type P Temperature Regulator



Ask for Catalog Part 17000

Comparison of Gauges

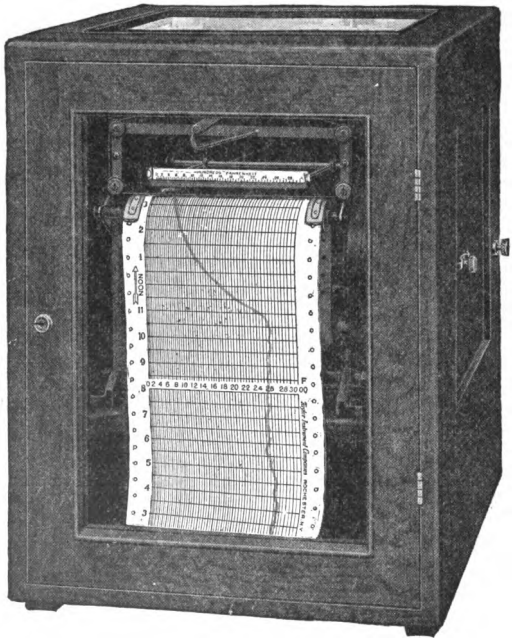
Gauge or Number	American or Brown & Sharpe's	Birmingham or Stubs	Wash. & Moen.	United States Standard	Stub's Steel Wire	Morse Twist Dril	Shee Zinc	Sheet Copper
0000000			.4900	.5000				See note
000000	.5800		.4600	.4688				below
00000	.5165		.4300	.4375				
0000	.4600	.454	.3938	.4063				
000	.4096	.425	.3625	.3750				
00	.3648	.380	.3310	.3438				
0	.3249	.340	.3065	.3125				
1	.2893	.300	.2830	.2813	.227	.2280		
2	.2576	.284	.2625	.2656	.219	.2210		.0027
3	.2294	.259	.2437	.2500	.212	.2130		
4	.2043	.238	.2253	.2344	.207	.2090	.008	.0054
5	.1819	.220	.2070	.2188	.204	.2055	.010	
6	.1620	.203	.1920	.2031	.201	.2040	.012	.0081
7	.1443	.180	.1770	.1875	.199	.2010	.014	
8	.1285	.165	.1620	.1719	.197	.1990	.016	.0108
9	.1144	.148	.1483	.1563	.194	.1960	.018	
10	.1019	.134	.1350	.1406	.191	.1935	.020	.0135
11	.0907	.120	.1205	.1250	.188	.1910	.024	
12	.0808	.109	.1055	.1094	.185	.1890	.028	.0162
13	.0720	.095	.0915	.0938	.182	.1850	.032	
14	.0641	.083	.0800	.0781	.180	.1820	.036	.0189
15	.0571	.072	.0720	.0703	.178	.1800	.040	
16	.0508	.065	.0625	.0625	.175	.1770	.045	.0216
17	.0453	.058	.0540	.0563	.172	.1730	.050	
18	.0403	.049	.0475	.0500	.168	.1695	.055	.0243
19	.0359	.042	.0410	.0438	.164	.1660	.060	
20	.0320	.035	.0348	.0375	.161	.1610	.070	.0270
21	.0285	.032	.0318	.0344	.157	.1590	.080	
22	.0254	.028	.0286	.0313	.155	.1570	.090	
23	.0226	.025	.0258	.0281	.153	.1540		
24	.0201	.022	.0230	.0250	.151	.1520		.0324
25	.0179	.020	.0204	.0219	.148	.1495		
26	.0159	.018	.0181	.0188	.146	.1470		
27	.0142	.016	.0173	.0172	.143	.1440		
28	.0126	.014	.0162	.0156	.139	.1405		.0378
29	.0113	.013	.0150	.0141	.134	.1360		
30	.0100	.012	.0140	.0125	.127	.1285		
31	.0089	.010	.0132	.0109	.120	.1200		
32	.0080	.009	.0128	.0102	.115	.1160		.0432
33	.0071	.008	.0118	.0094	.112	.1130		
34	.0063	.007	.0104	.0086	.110	.1110		
35	.0056	.005	.0095	.0078	.108	.1100		

Gauge or Number	American or Brown & Sharpe's	Birmingham or Stubs	Wash. & Moen.	United States Standard	Stub's Steel Wire	Morse Twist Drill	Sheet Zinc	Sheet Copper
36	.0050	.004	.0090	.0070	.106	.1065		.0486
37	.0045		.0085	.0066	.103	.1040		
38	.0040		.0080	.0063	.101	.1015		
39	.0035		.0075		.099	.0995		
40	.0031		.0070		.097	.0980		.0540
41	.0028				.095	.0960		
42	.0025				.092	.0935		
43	.0022				.088	.0890		
44	.0020				.085	.0860		.0594
45	.0018				.081	.0820		
46	.0016				.079	.0810		
47	.0014				.077	.0785		
48	.0012				.075	.0760		0648
49	.0010+				.072	.0730		
50	.0010—				.069	.0700		
51					.066	.0670		
52					.063	.0635		
53					.058	.0595		
54					.055	.0550		
55					.050	.0520		
56					.045	.0465		.0756
57					.042	.0430		
58					.041	.0420		
59					.040	.0410		
60					.039	.0400		
61					.038			
62					.037			
63					.036			
64					.035			.0864
65					.033			
66					.032			
67					.031			
68					.030			
69					.029			
70					.027			
71					.026			
72					.024			.0972
73					.023			
74					.022			
75					.020			
76					.018			
77					.016			
78					.015			
79					.014			
80					.013			.1080

NOTE: For sheet copper table numbers in left hand column give oz. per square foot.

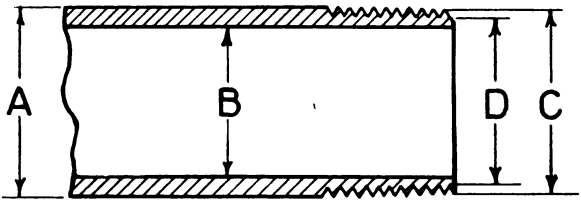
Tycos Thread Recorder

(For Recording Pyrometers)



Ask for Catalog Part 4017

Briggs' Pipe Thread Dimensions



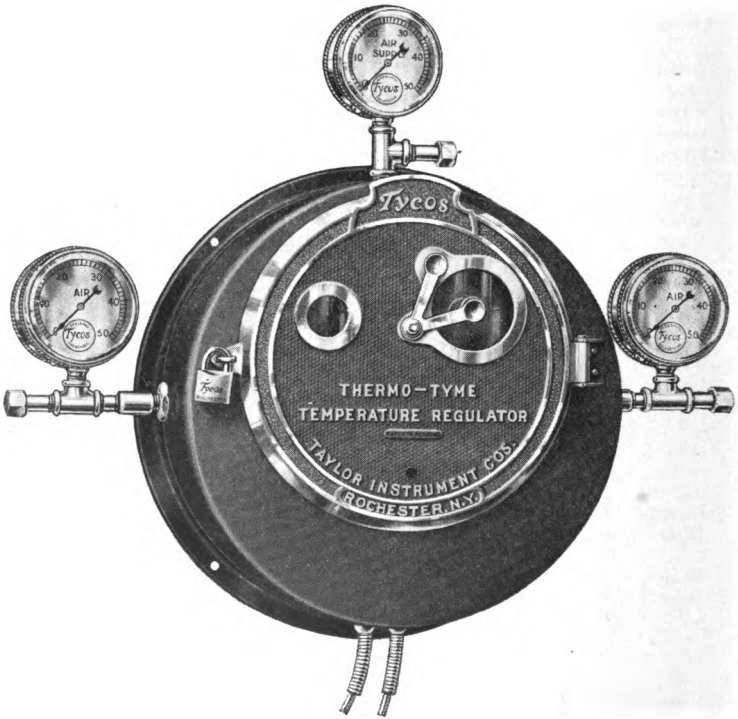
Taper of threads on Diameter equals $\frac{1}{16}$-inch per inch or $\frac{3}{4}$-inch per foot. The angle of Threads equals 60°. They are slightly rounded at both top and bottom.

Diameter of Pipe in inches			No. of Threads per Inch	Diam. at Top of Thread at End in Inches	Diam. at Bottom of Thread at End in Inches
Nominal Inside	Actual Inside	Actual Outside			
	B	A		C	D
$\frac{1}{8}$	0.270	0.405	27	0.393	0.334
$\frac{1}{4}$	0.364	0.540	18	0.522	0.433
$\frac{3}{8}$	0.494	0.675	18	0.656	0.568
$\frac{1}{2}$	0.623	0.840	14	0.815	0.701
$\frac{3}{4}$	0.824	1.050	14	1.025	0.911
1	1.048	1.315	$11\frac{1}{2}$	1.283	1.144
$1\frac{1}{4}$	1.380	1.660	$11\frac{1}{2}$	1.626	1.488
$1\frac{1}{2}$	1.610	1.900	$11\frac{1}{2}$	1.866	1.728
2	2.067	2.375	$11\frac{1}{2}$	2.339	2.201
$2\frac{1}{2}$	2.468	2.875	8	2.819	2.619
3	3.067	3.500	8	3.441	3.241
$3\frac{1}{2}$	3.548	4.000	8	3.938	3.738
4	4.026	4.500	8	4.434	4.234
$4\frac{1}{2}$	4.508	5.000	8	4.931	4.731
5	5.045	5.563	8	5.490	5.290
6	6.065	6.625	8	6.546	6.346
7	7.023	7.625	8	7.540	7.340
8	7.981	8.625	8	8.534	8.332
9	8.937	9.625	8	9.527	9.324
10	10.018	10.750	8	10.645	10.445
11	11.00	11.75	8	11.639	11.439
12	12.00	12.75	8	12.633	12.433
13	13.25	14.00	8	13.875	13.675
14	14.25	15.00	8	14.869	14.668
15	15.25	16.00	8	15.863	15.662
16	16.25	17.	8	16.856	16.656
17	17.25	18.	8	17.850	17.650
18	18.25	19.	8	18.844	18.644
19	19.25	20.	8	19.837	19.637
20	20.25	21.	8	20.831	20.631

Tycos

"Thermo-Tyme" Temperature Regulator

(Compound System)

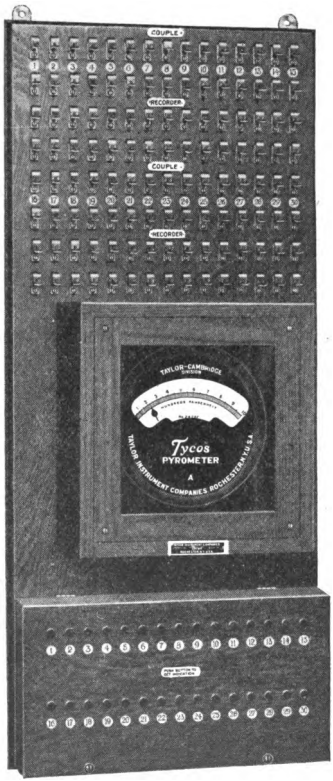


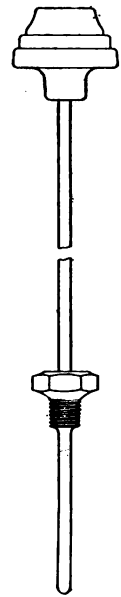
15404

Ask for Section 15000

INDEX

Tycos
Pyrometers





Tycos
Thermocouple with connection for Stills, etc.

Indicator and Multiple Switch Board for distance indication of temperature at any number of points.

Ask for Catalog 4014

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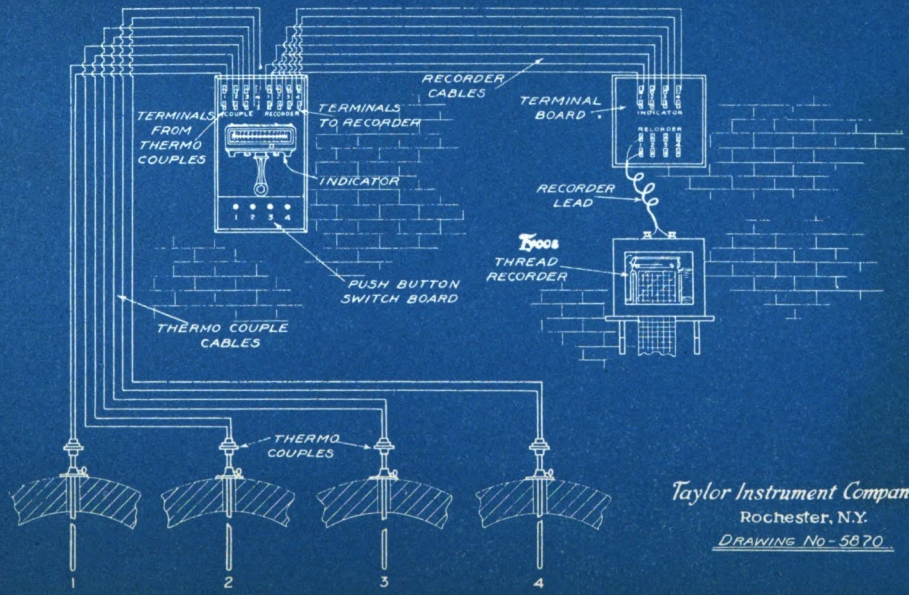
Tycos COMBINED INDICATING & RECORDING PYROMETER EQUIPMENT



Taylor Instrument Companies
Rochester, N.Y.
DRAWING No-5870

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