

COEI-1-SUCRAI Grape sugar (rectified concentrated grape musts)**1. Objective, origin and scope of application**

Grape sugar is obtained exclusively from grape musts. The addition of grape sugar to wine is subject to regulation.

The label, or, when this is absent, the documentation accompanying the containers of grape sugar, must cite the sugar percentage.

2. Properties

Syrupy, milk-white or slightly yellowish liquid with a sugary flavor.

| | |
|---|-------------------|
| Refraction index at 20 °C | 1.42410-1.46663 |
| Total sugar in terms of invert sugar | 63% (m/m) minimum |
| Absorbance at 425 nm under 1 cm at 25° Brix | maximum 0.100 |
| pH at 25° Brix | maximum 5 * |
| Titration acidity in mEq/kg of sugar | maximum 15 * |
| Sucrose by recommended method | negative |
| Sulfur dioxide in mg/kg of sugar | maximum 25 |
| Folin-Ciocalteu index at 25° Brix | maximum 6 |
| Total cations in mEq/kg of sugar | maximum 8 |
| Conductivity at 25° Brix in Micro-Siemens/cm (μScm^{-1}) | maximum 120 |
| 5-(hydroxymethyl)furfural in mg/kg sugar | maximum 25 |
| Residual ethanol in g/kg sugar | maximum 8 |
| Heavy metals in mg/kg grape sugar expressed in terms of lead | less than 10 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| |
|---|
| No antiseptics and anti-fermenting agents |
| 1° Brix = 1 g of sugar in 100 g of solution |

* after vacuum removal of the carbon dioxide

3. Tests

3.1. Preparing the Sample

Drawing samples for the various different analyses is difficult; therefore, the following two dilutions are recommended:

3.1.1. Principal Solution I - for the following tests: titration acidity, total sulfur dioxide and total cations

Weigh exactly 200 g of grape sugar. Fill to 500 ml with water.

3.1.2. Principal Solution II - necessary for the following tests: Folin-Ciocalteu index, pH, conductivity, sucrose test and absorbance at 425 nm.

Dilute the grape sugar with water until it has a concentration of $25^{\circ} \pm 0.5^{\circ}$ Brix (25 g of sugar in 100 g of solution).

3.2. Refraction Index at 20 °C (total sugars)

3.2.1. Equipment:

The refractometer used gives the following, based on type of graduation:

- 0.1% by mass of sucrose (or dry matter or Brix degrees)
- the 5th decimal of the index of refraction

The refractometer used should be equipped with a thermometer (+ 10 °C at + 30 °C).

3.2.2. Procedure Method:

Place two drops of grape sugar on the surface of the fixed prism. Lower the moving prism and point the instrument toward a light source that illuminates the graduated scale. Observe the line of separation on this scale between a lower clear zone and an upper dark. Read the graduation line at which this line of separation occurs and record the temperature in °C.

3.2.3. Calculation:

If the device is graduated in percentage (m/m) of sucrose (or dry matter or Brix degrees), the measurement converted to 20 °C using Table 2 is recorded in Table 1 which provides (Column 3) total sugar content in percent (m/m) expressed in terms of

sugar.

If the device is graduated by refraction index, the index measured at t °C is used to obtain the corresponding value in percent of sucrose (m/m) at t °C in Table 1 (Column 1). This value as expressed at 20 °C using the temperature correction table N° 2, transferred to Table 1, which, in Column 3, gives the total sugar number in percent (m/m) of invert sugar.

To obtain the refraction index at 20 °C, refer to the total sugar content expressed in terms of invert sugar in Table 1.

3.2.4. Recording the Findings:

Total sugar content is expressed parts per 100 by mass of sucrose and is recorded with a decimal.

The refraction index at 20 °C is expressed to 5 decimal places.

3.3. Absorbance of a 25° Brix Solution at 425 nm (Chromatic characteristics)^[1]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-08).

3.4. Measuring pH^[2]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-06).

3.5. Titration Acidity^[3]

Place 10 ml of Principal Solution I in a cylindrical vessel (3.1.1). Add Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-05).

3.6. Sucrose Test by HPLC^[4]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-04).

3.7. Sulfur Dioxide^[5]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-07).

3.8. Folin-Ciocalteu Index of the 25° Brix Solution

Place the following, in order, in a 100 ml volumetric flask:

- 5 ml of Principal Solution II
- 50 ml water

- 5 ml Folin-Ciocalteu reagent (R)
- 20 ml of sodium carbonate solution (R)

Fill to the 100 ml level with water. Stir to homogenize. Wait 30 minutes for the reaction to stabilize.

Determine absorbance at 750 nm in 1 cm as compared with a control prepared with water instead of Principal Solution II.

Expressing the results:

Express the results in the form of an index obtained by multiplying the absorbance by 16 in order to obtain a scale comparable to that used for wines.

3.9. Total Cations

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-09).

3.10. Conductivity of the Solution at 25° Brix^[6]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-01).

3.11. 5-(Hydroxymethyl)furfural(HMF)^[7]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-02)

3.12. Heavy Metals

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-10; Method OIV-MA-F1-11).

(Heavy metal content, expressed in terms of lead, should be less than 10 mg/kg).

3.13. Lead

Using the method set forth in the Compendium, quantitatively analyze lead in the Principal Solution I (3.1.1). (Lead content should be less than 1 mg/kg.)

3.14. Mercury

Using the method set forth in the annex, quantitatively analyze mercury in the Principal Solution I (3.1.1). (Mercury content should be less than 0.3 mg/kg.)

3.15. Arsenic

Using the method described in the annex, quantitatively analyze arsenic in the Principal Solution I (3.1.1). (Arsenic concentration should be less than 0.5 mg/kg.)

3.16. Ethanol^[8]

Proceed to the analysis according to the method described in the Compendium of international methods of wine and must analysis (Method OIV-MA-F1-03).

3.17. Meso-Inositol

Gas phase chromatography of a silyl-containing derivative.

N.B. : The information given above is provided for informational purposes. There are other techniques for deriving sugars and polyhydroxy alcohols, and chromatographic methods for determining meso-inositol concentrations

3.17.1. Preparing the sample:

Dilute 5 g of grape sugar in 50 ml of water. Dry 50 µl of the dilution and 50 µl of a methyl D-glucopyranoside solution in a concentration of 1 g/liter, (internal standard) under a vacuum in a small 2 ml flask.

Dissolve the residue with 100 µl of pyridine. Add 100 µl of trimethylchlorosilane. Seal the small flask with a teflon stopper and heat at 80 °C for 1 hour. Inject 1 µl with division of the injected volume to 1/60.

3.17.2. Separation

Column: apolar capillary type of fused silica 25 m long and inner diameter of 0.2 mm.

Supporting Gas: helium, 1 ml/minute

Injector and detector: 280 °C

Column temperature: 60-250 °C, at 4 °C per minute, then isothermal at 250 °C.

3.17.3. Expressing the results: g per kg of sugar

4. Storage

Grape sugar must be stored in impermeable containers and at ambient temperature from the time it is made.

Annex 1 (sugars)

Table 1 : Sugar content in musts using refractometry

| Sucrose % (m/m) | Index of refraction at 20°C | Density at 20°C | Sugars in g/l | Sugars in g/kg |
|--------------------|-----------------------------------|--------------------|------------------|-------------------|
| 50.0 | 1.42008 | 1.2342 | 627.6 | 508.5 |
| 50.1 | 1.42029 | 1.2348 | 629.3 | 509.6 |
| 50.2 | 1.42050 | 1.2355 | 630.9 | 510.6 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 50.3 | 1.42071 | 1.2362 | 632.4 | 511.6 |
| 50.4 | 1.42092 | 1.2367 | 634.1 | 512.7 |
| 50.5 | 1.42113 | 1.2374 | 635.7 | 513.7 |
| 50.6 | 1.42135 | 1.2381 | 637.3 | 514.7 |
| 50.7 | 1.42156 | 1.2386 | 638.7 | 515.7 |
| 50.8 | 1.42177 | 1.2391 | 640.4 | 516.8 |
| 50.9 | 1.42198 | 1.2396 | 641.9 | 517.8 |
| 51.0 | 1.42219 | 1.2401 | 643.4 | 518.8 |
| 51.1 | 1.42240 | 1.2406 | 645.0 | 519.9 |
| 51.2 | 1.42261 | 1.2411 | 646.5 | 520.9 |
| 51.3 | 1.42282 | 1.2416 | 648.1 | 522.0 |
| 51.4 | 1.42304 | 1.2421 | 649.6 | 523.0 |
| 51.5 | 1.42325 | 1.2427 | 651.2 | 524.0 |
| 51.6 | 1.42347 | 1.2434 | 652.9 | 525.1 |
| 51.7 | 1.42368 | 1.2441 | 654.5 | 526.1 |
| 51.8 | 1.42389 | 1.2447 | 656.1 | 527.1 |
| 51.9 | 1.42410 | 1.2454 | 657.8 | 528.2 |
| 52.0 | 1.42432 | 1.2461 | 659.4 | 529.2 |
| 52.1 | 1.42453 | 1.2466 | 661.0 | 530.2 |
| 52.2 | 1.42475 | 1.2470 | 662.5 | 531.3 |
| 52.3 | 1.42496 | 1.2475 | 664.1 | 532.3 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 52.4 | 1.42517 | 1.2480 | 665.6 | 533.3 |
| 52.5 | 1.42538 | 1.2486 | 667.2 | 534.4 |
| 52.6 | 1.42560 | 1.2493 | 668.9 | 535.4 |
| 52.7 | 1.42581 | 1.2500 | 670.5 | 536.4 |
| 52.8 | 1.42603 | 1.2506 | 672.2 | 537.5 |
| 52.9 | 1.42624 | 1.2513 | 673.8 | 538.5 |
| 53.0 | 1.42645 | 1.2520 | 675.5 | 539.5 |
| 53.1 | 1.42667 | 1.2525 | 677.1 | 540.6 |
| 53.2 | 1.42689 | 1.2530 | 678.5 | 541.5 |
| 53.3 | 1.42711 | 1.2535 | 680.2 | 542.6 |
| 53.4 | 1.42733 | 1.2540 | 681.8 | 543.7 |
| 53.5 | 1.42754 | 1.2546 | 683.4 | 544.7 |
| 53.6 | 1.42776 | 1.2553 | 685.1 | 545.8 |
| 53.7 | 1.42797 | 1.2560 | 686.7 | 546.7 |
| 53.8 | 1.42819 | 1.2566 | 688.4 | 547.8 |
| 53.9 | 1.42840 | 1.2573 | 690.1 | 548.9 |
| 54.0 | 1.42861 | 1.2580 | 691.7 | 549.8 |
| 54.1 | 1.42884 | 1.2585 | 693.3 | 550.9 |
| 54.2 | 1.42906 | 1.2590 | 694.9 | 551.9 |
| 54.3 | 1.42927 | 1.2595 | 696.5 | 553.0 |
| 54.4 | 1.42949 | 1.2600 | 698.1 | 554.0 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 54.5 | 1.42971 | 1.2606 | 699.7 | 555.1 |
| 54.6 | 1.42993 | 1.2613 | 701.4 | 556.1 |
| 54.7 | 1.43014 | 1.2620 | 703.1 | 557.1 |
| 54.8 | 1.43036 | 1.2625 | 704.7 | 558.2 |
| 54.9 | 1.43058 | 1.2630 | 706.2 | 559.1 |
| 55.0 | 1.43079 | 1.2635 | 707.8 | 560.2 |
| 55.1 | 1.43102 | 1.2639 | 709.4 | 561.3 |
| 55.2 | 1.43124 | 1.2645 | 711.0 | 562.3 |
| 55.3 | 1.43146 | 1.2652 | 712.7 | 563.3 |
| 55.4 | 1.43168 | 1.2659 | 714.4 | 564.3 |
| 55.5 | 1.43189 | 1.2665 | 716.1 | 565.4 |
| 55.6 | 1.43211 | 1.2672 | 717.8 | 566.4 |
| 55.7 | 1.43233 | 1.2679 | 719.5 | 567.5 |
| 55.8 | 1.43255 | 1.2685 | 721.1 | 568.5 |
| 55.9 | 1.43277 | 1.2692 | 722.8 | 569.5 |
| 56.0 | 1.43298 | 1.2699 | 724.5 | 570.5 |
| 56.1 | 1.43321 | 1.2703 | 726.1 | 571.6 |
| 56.2 | 1.43343 | 1.2708 | 727.7 | 572.6 |
| 56.3 | 1.43365 | 1.2713 | 729.3 | 573.7 |
| 56.4 | 1.43387 | 1.2718 | 730.9 | 574.7 |
| 56.5 | 1.43409 | 1.2724 | 732.6 | 575.8 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 56.6 | 1.43431 | 1.2731 | 734.3 | 576.8 |
| 56.7 | 1.43454 | 1.2738 | 736.0 | 577.8 |
| 56.8 | 1.43476 | 1.2744 | 737.6 | 578.8 |
| 56.9 | 1.43498 | 1.2751 | 739.4 | 579.9 |
| 57.0 | 1.43519 | 1.2758 | 741.1 | 580.9 |
| 57.1 | 1.43542 | 1.2763 | 742.8 | 582.0 |
| 57.2 | 1.43564 | 1.2768 | 744.4 | 583.0 |
| 57.3 | 1.43586 | 1.2773 | 745.9 | 584.0 |
| 57.4 | 1.43609 | 1.2778 | 747.6 | 585.1 |
| 57.5 | 1.43631 | 1.2784 | 749.3 | 586.1 |
| 57.6 | 1.43653 | 1.2791 | 751.0 | 587.1 |
| 57.7 | 1.43675 | 1.2798 | 752.7 | 588.1 |
| 57.8 | 1.43698 | 1.2804 | 754.4 | 589.2 |
| 57.9 | 1.43720 | 1.2810 | 756.1 | 590.2 |
| 58.0 | 1.43741 | 1.2818 | 757.8 | 591.2 |
| 58.1 | 1.43764 | 1.2822 | 759.5 | 592.3 |
| 58.2 | 1.43784 | 1.2827 | 761.1 | 593.4 |
| 58.3 | 1.43809 | 1.2832 | 762.6 | 594.3 |
| 58.4 | 1.43832 | 1.2837 | 764.3 | 595.4 |
| 58.5 | 1.43854 | 1.2843 | 766.0 | 596.4 |
| 58.6 | 1.43877 | 1.2850 | 767.8 | 597.5 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 58.7 | 1.43899 | 1.2857 | 769.5 | 598.5 |
| 58.8 | 1.43922 | 1.2863 | 771.1 | 599.5 |
| 58.9 | 1.43944 | 1.2869 | 772.9 | 600.6 |
| 59.0 | 1.43966 | 1.2876 | 774.6 | 601.6 |
| 59.1 | 1.43988 | 1.2882 | 776.3 | 602.6 |
| 59.2 | 1.44011 | 1.2889 | 778.1 | 603.7 |
| 59.3 | 1.44034 | 1.2896 | 779.8 | 604.7 |
| 59.4 | 1.44057 | 1.2902 | 781.6 | 605.8 |
| 59.5 | 1.44079 | 1.2909 | 783.3 | 606.8 |
| 59.6 | 1.44102 | 1.2916 | 785.2 | 607.9 |
| 59.7 | 1.44124 | 1.2921 | 786.8 | 608.9 |
| 59.8 | 1.44147 | 1.2926 | 788.4 | 609.9 |
| 59.9 | 1.44169 | 1.2931 | 790.0 | 610.9 |
| 60.0 | 1.44192 | 1.2936 | 791.7 | 612.0 |
| 60.1 | 1.44215 | 1.2942 | 793.3 | 613.0 |
| 60.2 | 1.44238 | 1.2949 | 795.2 | 614.1 |
| 60.3 | 1.44260 | 1.2956 | 796.9 | 615.1 |
| 60.4 | 1.44283 | 1.2962 | 798.6 | 616.1 |
| 60.5 | 1.44305 | 1.2969 | 800.5 | 617.2 |
| 60.6 | 1.44328 | 1.2976 | 802.2 | 618.2 |
| 60.7 | 1.44351 | 1.2981 | 803.9 | 619.3 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 60.8 | 1.44374 | 1.2986 | 805.5 | 620.3 |
| 60.9 | 1.44397 | 1.2991 | 807.1 | 621.3 |
| 61.0 | 1.44419 | 1.2996 | 808.7 | 622.3 |
| 61.1 | 1.44442 | 1.3002 | 810.5 | 623.4 |
| 61.2 | 1.44465 | 1.3009 | 812.3 | 624.4 |
| 61.3 | 1.44488 | 1.3016 | 814.2 | 625.5 |
| 61.4 | 1.44511 | 1.3022 | 815.8 | 626.5 |
| 61.5 | 1.44534 | 1.3029 | 817.7 | 627.6 |
| 61.6 | 1.44557 | 1.3036 | 819.4 | 628.6 |
| 61.7 | 1.44580 | 1.3042 | 821.3 | 629.7 |
| 61.8 | 1.44603 | 1.3049 | 823.0 | 630.7 |
| 61.9 | 1.44626 | 1.3056 | 824.8 | 631.7 |
| 62.0 | 1.44648 | 1.3062 | 826.6 | 632.8 |
| 62.1 | 1.44672 | 1.3068 | 828.3 | 633.8 |
| 62.2 | 1.44695 | 1.3075 | 830.0 | 634.8 |
| 62.3 | 1.44718 | 1.3080 | 831.8 | 635.9 |
| 62.4 | 1.44741 | 1.3085 | 833.4 | 636.9 |
| 62.5 | 1.44764 | 1.3090 | 835.1 | 638.0 |
| 62.6 | 1.44787 | 1.3095 | 836.8 | 639.0 |
| 62.7 | 1.44810 | 1.3101 | 838.5 | 640.0 |
| 62.8 | 1.44833 | 1.3108 | 840.2 | 641.0 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 62.9 | 1.44856 | 1.3115 | 842.1 | 642.1 |
| 63.0 | 1.44879 | 1.3121 | 843.8 | 643.1 |
| 63.1 | 1.44902 | 1.3128 | 845.7 | 644.2 |
| 63.2 | 1.44926 | 1.3135 | 847.5 | 645.2 |
| 63.3 | 1.44949 | 1.3141 | 849.3 | 646.3 |
| 63.4 | 1.44972 | 1.3148 | 851.1 | 647.3 |
| 63.5 | 1.44955 | 1.3155 | 853.0 | 648.4 |
| 63.6 | 1.45019 | 1.3161 | 854.7 | 649.4 |
| 63.7 | 1.45042 | 1.3168 | 856.5 | 650.4 |
| 63.8 | 1.45065 | 1.3175 | 858.4 | 651.5 |
| 63.9 | 1.45088 | 1.3180 | 860.0 | 652.5 |
| 64.0 | 1.45112 | 1.3185 | 861.6 | 653.5 |
| 64.1 | 1.45135 | 1.3190 | 863.4 | 654.6 |
| 64.2 | 1.45158 | 1.3195 | 865.1 | 655.6 |
| 64.3 | 1.45181 | 1.3201 | 866.9 | 656.7 |
| 64.4 | 1.45205 | 1.3208 | 868.7 | 657.7 |
| 64.5 | 1.45228 | 1.3215 | 870.6 | 658.8 |
| 64.6 | 1.45252 | 1.3221 | 872.3 | 659.8 |
| 64.7 | 1.45275 | 1.3228 | 874.1 | 660.8 |
| 64.8 | 1.45299 | 1.3235 | 876.0 | 661.9 |
| 64.9 | 1.45322 | 1.3241 | 877.8 | 662.9 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 65.0 | 1.45347 | 1.3248 | 879.7 | 664.0 |
| 65.1 | 1.45369 | 1.3255 | 881.5 | 665.0 |
| 65.2 | 1.45393 | 1.3261 | 883.2 | 666.0 |
| 65.3 | 1.45416 | 1.3268 | 885.0 | 667.0 |
| 65.4 | 1.45440 | 1.3275 | 886.9 | 668.1 |
| 65.5 | 1.45463 | 1.3281 | 888.8 | 669.2 |
| 65.6 | 1.45487 | 1.3288 | 890.6 | 670.2 |
| 65.7 | 1.45510 | 1.3295 | 892.4 | 671.2 |
| 65.8 | 1.45534 | 1.3301 | 894.2 | 672.3 |
| 65.9 | 1.45557 | 1.3308 | 896.0 | 673.3 |
| 66.0 | 1.45583 | 1.3315 | 898.0 | 674.4 |
| 66.1 | 1.45605 | 1.3320 | 899.6 | 675.4 |
| 66.2 | 1.45629 | 1.3325 | 901.3 | 676.4 |
| 66.3 | 1.45652 | 1.3330 | 903.1 | 677.5 |
| 66.4 | 1.45676 | 1.3335 | 904.8 | 678.5 |
| 66.5 | 1.45700 | 1.3341 | 906.7 | 679.6 |
| 66.6 | 1.45724 | 1.3348 | 908.5 | 680.6 |
| 66.7 | 1.45747 | 1.3355 | 910.4 | 681.7 |
| 66.8 | 1.45771 | 1.3361 | 912.2 | 682.7 |
| 66.9 | 1.45795 | 1.3367 | 913.9 | 683.7 |
| 67.0 | 1.45820 | 1.3374 | 915.9 | 684.8 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 67.1 | 1.45843 | 1.3380 | 917.6 | 685.8 |
| 67.2 | 1.45867 | 1.3387 | 919.6 | 686.9 |
| 67.3 | 1.45890 | 1.3395 | 921.4 | 687.9 |
| 67.4 | 1.45914 | 1.3400 | 923.1 | 688.9 |
| 67.5 | 1.45938 | 1.3407 | 925.1 | 690.0 |
| 67.6 | 1.45962 | 1.3415 | 927.0 | 691.0 |
| 67.7 | 1.45986 | 1.3420 | 928.8 | 692.1 |
| 67.8 | 1.46010 | 1.3427 | 930.6 | 693.1 |
| 67.9 | 1.46034 | 1.3434 | 932.6 | 694.2 |
| 68.0 | 1.46060 | 1.3440 | 934.4 | 695.2 |
| 68.1 | 1.46082 | 1.3447 | 936.2 | 696.2 |
| 68.2 | 1.46106 | 1.3454 | 938.0 | 697.2 |
| 68.3 | 1.46130 | 1.3460 | 939.9 | 698.3 |
| 68.4 | 1.46154 | 1.3466 | 941.8 | 699.4 |
| 68.5 | 1.46178 | 1.3473 | 943.7 | 700.4 |
| 68.6 | 1.46202 | 1.3479 | 945.4 | 701.4 |
| 68.7 | 1.46226 | 1.3486 | 947.4 | 702.5 |
| 68.8 | 1.46251 | 1.3493 | 949.2 | 703.5 |
| 68.9 | 1.46275 | 1.3499 | 951.1 | 704.6 |
| 69.0 | 1.46301 | 1.3506 | 953.0 | 705.6 |
| 69.1 | 1.46323 | 1.3513 | 954.8 | 706.6 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|-------|-------|
| 69.2 | 1.46347 | 1.3519 | 956.7 | 707.7 |
| 69.3 | 1.46371 | 1.3526 | 958.6 | 708.7 |
| 69.4 | 1.46396 | 1.3533 | 960.6 | 709.8 |
| 69.5 | 1.46420 | 1.3539 | 962.4 | 710.8 |
| 69.6 | 1.46444 | 1.3546 | 964.3 | 711.9 |
| 69.7 | 1.46468 | 1.3553 | 966.2 | 712.9 |
| 69.8 | 1.46493 | 1.3560 | 968.2 | 714.0 |
| 69.9 | 1.46517 | 1.3566 | 970.0 | 715.0 |
| 70.0 | 1.46544 | 1.3573 | 971.8 | 716.0 |
| 70.1 | 1.46565 | 1.3579 | 973.8 | 717.1 |
| 70.2 | 1.46590 | 1.3586 | 975.6 | 718.1 |
| 70.3 | 1.46614 | 1.3593 | 977.6 | 719.2 |
| 70.4 | 1.46639 | 1.3599 | 979.4 | 720.2 |
| 70.5 | 1.46663 | 1.3606 | 981.3 | 721.2 |
| 70.6 | 1.46688 | 1.3613 | 983.3 | 722.3 |
| 70.7 | 1.46712 | 1.3619 | 985.2 | 723.4 |
| 70.8 | 1.46737 | 1.3626 | 987.1 | 724.4 |
| 70.9 | 1.46761 | 1.3633 | 988.9 | 725.4 |
| 71.0 | 1.46789 | 1.3639 | 990.9 | 726.5 |
| 71.1 | 1.46810 | 1.3646 | 992.8 | 727.5 |
| 71.2 | 1.46835 | 1.3653 | 994.8 | 728.6 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|--------|-------|
| 71.3 | 1.46859 | 1.3659 | 996.6 | 729.6 |
| 71.4 | 1.46884 | 1.3665 | 998.5 | 730.7 |
| 71.5 | 1.46908 | 1.3672 | 1000.4 | 731.7 |
| 71.6 | 1.46933 | 1.3678 | 1002.2 | 732.7 |
| 71.7 | 1.46957 | 1.3685 | 1004.2 | 733.8 |
| 71.8 | 1.46982 | 1.3692 | 1006.1 | 734.8 |
| 71.9 | 1.47007 | 1.3698 | 1008.0 | 735.9 |
| 72.0 | 1.47036 | 1.3705 | 1009.9 | 736.9 |
| 72.1 | 1.47056 | 1.3712 | 1012.0 | 738.0 |
| 72.2 | 1.47081 | 1.3718 | 1013.8 | 739.0 |
| 72.3 | 1.47106 | 1.3725 | 1015.7 | 740.0 |
| 72.4 | 1.47131 | 1.3732 | 1017.7 | 741.1 |
| 72.5 | 1.47155 | 1.3738 | 1019.5 | 742.1 |
| 72.6 | 1.47180 | 1.3745 | 1021.5 | 743.2 |
| 72.7 | 1.47205 | 1.3752 | 1023.4 | 744.2 |
| 72.8 | 1.47230 | 1.3758 | 1025.4 | 745.3 |
| 72.9 | 1.47254 | 1.3765 | 1027.3 | 746.3 |
| 73.0 | 1.47284 | 1.3772 | 1029.3 | 747.4 |
| 73.1 | 1.47304 | 1.3778 | 1031.2 | 748.4 |
| 73.2 | 1.47329 | 1.3785 | 1033.2 | 749.5 |
| 73.3 | 1.47354 | 1.3792 | 1035.1 | 750.5 |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | | | | |
|------|---------|--------|--------|-------|
| 73.4 | 1.47379 | 1.3798 | 1037.1 | 751.6 |
| 73.5 | 1.47404 | 1.3805 | 1039.0 | 752.6 |
| 73.6 | 1.47429 | 1.3812 | 1040.9 | 753.6 |
| 73.7 | 1.47454 | 1.3818 | 1042.8 | 754.7 |
| 73.8 | 1.47479 | 1.3825 | 1044.8 | 755.7 |
| 73.9 | 1.47504 | 1.3832 | 1046.8 | 756.8 |
| 74.0 | 1.47534 | 1.3838 | 1048.6 | 757.8 |
| 74.1 | 1.47554 | 1.3845 | 1050.7 | 758.9 |
| 74.2 | 1.47579 | 1.3852 | 1052.6 | 759.9 |
| 74.3 | 1.47604 | 1.3858 | 1054.6 | 761.0 |
| 74.4 | 1.47629 | 1.3865 | 1056.5 | 762.0 |
| 74.5 | 1.47654 | 1.3871 | 1058.5 | 763.1 |
| 74.6 | 1.47679 | 1.3878 | 1060.4 | 764.1 |
| 74.7 | 1.47704 | 1.3885 | 1062.3 | 765.1 |
| 74.8 | 1.47730 | 1.3892 | 1064.4 | 766.2 |
| 74.9 | 1.47755 | 1.3898 | 1066.3 | 767.2 |
| 75.0 | 1.47785 | 1.3905 | 1068.3 | 768.3 |

Table 2 Correction of the Conventional Sugar Mass Titer as a Function of Temperature Mass Titer Measured in %

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| Tempé- rature °C | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | |
|------------------------|-------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|
| 5 | -0,82 | -0,87 | -0,92 | -0,95 | -0,99 | | | | | | | | | | |
| 6 | -0,80 | -0,82 | -0,87 | -0,90 | -0,94 | | | | | | | | | | |
| 7 | -0,74 | -0,78 | -0,82 | -0,84 | -0,88 | | | | | | | | | | |
| 8 | -0,69 | -0,73 | -0,76 | -0,79 | -0,82 | | | | | | | | | | |
| 9 | -0,64 | -0,67 | -0,71 | -0,73 | -0,75 | | | | | | | | | | |
| 10 | -0,59 | -0,62 | -0,65 | -0,67 | -0,69 | -0,71 | -0,72 | -0,73 | -0,74 | -0,75 | -0,75 | -0,75 | -0,75 | -0,75 | |
| 11 | -0,54 | -0,57 | -0,59 | -0,61 | -0,63 | -0,64 | -0,65 | -0,66 | -0,67 | -0,68 | -0,68 | -0,68 | -0,68 | -0,67 | |
| 12 | -0,49 | -0,51 | -0,53 | -0,55 | -0,56 | -0,57 | -0,58 | -0,59 | -0,60 | -0,60 | -0,61 | -0,61 | -0,60 | -0,60 | |
| 13 | -0,43 | -0,45 | -0,47 | -0,48 | -0,50 | -0,51 | -0,52 | -0,52 | -0,53 | -0,53 | -0,53 | -0,53 | -0,53 | -0,53 | |
| 14 | -0,38 | -0,39 | -0,40 | -0,42 | -0,43 | -0,44 | -0,44 | -0,45 | -0,45 | -0,46 | -0,46 | -0,46 | -0,46 | -0,45 | |
| 15 | -0,32 | -0,33 | -0,34 | -0,35 | -0,36 | -0,37 | -0,37 | -0,38 | -0,38 | -0,38 | -0,38 | -0,38 | -0,38 | -0,38 | |
| 16 | -0,26 | -0,27 | -0,28 | -0,28 | -0,29 | -0,30 | -0,30 | -0,30 | -0,31 | -0,31 | -0,31 | -0,31 | -0,31 | -0,30 | |
| 17 | -0,20 | -0,20 | -0,21 | -0,21 | -0,22 | -0,22 | -0,23 | -0,23 | -0,23 | -0,23 | -0,23 | -0,23 | -0,23 | -0,23 | |
| 18 | -0,13 | -0,14 | -0,14 | -0,14 | -0,15 | -0,15 | -0,15 | -0,15 | -0,15 | -0,15 | -0,15 | -0,15 | -0,15 | -0,15 | |
| 19 | -0,07 | -0,07 | -0,07 | -0,07 | -0,07 | -0,08 | -0,08 | -0,08 | -0,08 | -0,08 | -0,08 | -0,08 | -0,08 | -0,08 | |
| 20 | 0 | R É F É R E N C E | | | | | | | | | | | | | 0 |
| 21 | +0,07 | +0,07 | +0,07 | +0,07 | +0,08 | +0,08 | +0,08 | +0,08 | +0,08 | +0,08 | +0,08 | +0,08 | +0,08 | +0,08 | |
| 22 | +0,14 | +0,14 | +0,15 | +0,15 | +0,15 | +0,15 | +0,16 | +0,16 | +0,16 | +0,16 | +0,16 | +0,16 | +0,15 | +0,15 | |
| 23 | +0,21 | +0,22 | +0,22 | +0,23 | +0,23 | +0,23 | +0,23 | +0,24 | +0,24 | +0,24 | +0,24 | +0,23 | +0,23 | +0,23 | |
| 24 | +0,29 | +0,29 | +0,30 | +0,30 | +0,31 | +0,31 | +0,31 | +0,32 | +0,32 | +0,32 | +0,32 | +0,31 | +0,31 | +0,31 | |
| 25 | +0,36 | +0,37 | +0,38 | +0,38 | +0,39 | +0,39 | +0,40 | +0,40 | +0,40 | +0,40 | +0,40 | +0,39 | +0,39 | +0,39 | |
| 26 | +0,44 | +0,45 | +0,46 | +0,46 | +0,47 | +0,47 | +0,48 | +0,48 | +0,48 | +0,48 | +0,48 | +0,47 | +0,47 | +0,46 | |
| 27 | +0,52 | +0,53 | +0,54 | +0,55 | +0,55 | +0,56 | +0,56 | +0,56 | +0,56 | +0,56 | +0,56 | +0,55 | +0,55 | +0,54 | |
| 28 | +0,60 | +0,61 | +0,62 | +0,63 | +0,64 | +0,64 | +0,64 | +0,65 | +0,65 | +0,64 | +0,64 | +0,64 | +0,63 | +0,62 | |
| 29 | +0,68 | +0,69 | +0,70 | +0,71 | +0,72 | +0,73 | +0,73 | +0,73 | +0,73 | +0,73 | +0,72 | +0,72 | +0,71 | +0,70 | |
| 30 | +0,77 | +0,78 | +0,79 | +0,80 | +0,81 | +0,81 | +0,81 | +0,82 | +0,81 | +0,81 | +0,81 | +0,80 | +0,79 | +0,78 | |
| 31 | +0,85 | +0,87 | +0,88 | +0,89 | +0,89 | +0,90 | +0,90 | +0,90 | +0,90 | +0,90 | +0,89 | +0,88 | +0,87 | +0,86 | |
| 32 | +0,94 | +0,95 | +0,96 | +0,97 | +0,98 | +0,99 | +0,99 | +0,99 | +0,99 | +0,98 | +0,97 | +0,96 | +0,95 | +0,94 | |
| 33 | +1,03 | +1,04 | +1,05 | +1,06 | +1,07 | +1,08 | +1,08 | +1,08 | +1,07 | +1,07 | +1,06 | +1,05 | +1,03 | +1,02 | |
| 34 | +1,12 | +1,19 | +1,15 | +1,15 | +1,16 | +1,17 | +1,17 | +1,17 | +1,16 | +1,15 | +1,14 | +1,13 | +1,12 | +1,10 | |
| 35 | +1,22 | +1,23 | +1,24 | +1,25 | +1,25 | +1,26 | +1,26 | +1,25 | +1,25 | +1,24 | +1,23 | +1,21 | +1,20 | +1,18 | |
| 36 | +1,31 | +1,32 | +1,33 | +1,34 | +1,35 | +1,35 | +1,35 | +1,35 | +1,34 | +1,33 | +1,32 | +1,30 | +1,28 | +1,26 | |
| 37 | +1,41 | +1,42 | +1,43 | +1,44 | +1,44 | +1,44 | +1,44 | +1,44 | +1,43 | +1,42 | +1,40 | +1,38 | +1,36 | +1,34 | |
| 38 | +1,51 | +1,52 | +1,53 | +1,53 | +1,54 | +1,54 | +1,53 | +1,53 | +1,52 | +1,51 | +1,49 | +1,47 | +1,45 | +1,42 | |
| 39 | +1,61 | +1,62 | +1,62 | +1,63 | +1,63 | +1,63 | +1,63 | +1,62 | +1,61 | +1,60 | +1,58 | +1,56 | +1,53 | +1,50 | |
| 40 | +1,71 | +1,72 | +1,72 | +1,73 | +1,73 | +1,73 | +1,72 | +1,71 | +1,70 | +1,69 | +1,67 | +1,64 | +1,62 | +1,59 | |

(N.B. : In the French original reproduced here, commas should be replaced with decimal points)

Table 3: Conductivity Corrections for Temperatures Other Than 20oC in μ siemens/cm-1

| Temperatures | | | | | | | | | | |
|--------------|------|------|-------|------|------|------|------|------|------|---------|
| | 20.2 | 20.4 | 20.26 | 20.8 | 21.0 | 21.2 | 21.4 | 21.6 | 21.8 | 22.0(1) |

INTERNATIONAL OENOLOGICAL CODEX

Grape sugar

| | 19.8 | 19.6 | 19.4 | 19.2 | 19.0 | 18.8 | 18.6 | 18.4 | 18.2 | 18.0(2) |
|---------------------|------|------|------|------|------|------|------|------|------|---------|
| Conductivity | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 100 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 |
| 150 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 |
| 200 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 250 | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 9 | 10 | 11 |
| 300 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | 13 |
| 350 | 1 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 15 |
| 400 | 2 | 3 | 5 | 7 | 9 | 11 | 12 | 14 | 16 | 18 |
| 450 | 2 | 3 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 500 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 18 | 20 | 22 |
| 550 | 2 | 5 | 7 | 10 | 12 | 14 | 17 | 19 | 22 | 24 |
| 600 | 3 | 5 | 8 | 11 | 13 | 16 | 18 | 21 | 24 | 26 |

(1) Subtract the correction

(2) Add the correction

^[1] Modified by resolution OIV-OENO 419A-2011

^[2] Modified by resolution OIV-OENO 419A-2011

^[3] Modified by resolution OIV-OENO 419A-2011

^[4] Modified by resolution OIV-OENO 419A-2011

^[5] Modified by resolution OIV-OENO 419A-2011

^[6] Modified by resolution OIV-OENO 419A-2011

^[7] Modified by resolution OIV-OENO 419A-2011

^[8] Modified by resolution OIV-OENO 419A-2011