# International Standard 1743

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

# Glucose syrup — Determination of dry matter content — Refractive index method

*Sirops de glucose — Détermination de la teneur en matière sèche — Méthode réfractométrique*

**Second edition — 1982-05-15**

**UDC 664.162 : 543.814** **Ref. No. ISO 1743-1982 (E)**

**Descriptors** : carbohydrates, glucose, tests, determination of content, dry matter, refractivity.



Price based on 11 pages

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1743 was developed by Technical Committee ISO/TC 93, *Starch (including derivatives and by-products)*, and was circulated to the member bodies in November 1979.

It has been approved by the member bodies of the following countries :

| | | |
|---|---|---|
| Australia | Netherlands | Spain |
| Canada | Philippines | USA |
| Ethiopia | Poland | USSR |
| Germany, F.R. | Romania | Yugoslavia |
| Korea, Rep. of | South Africa, Rep. of | |

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 1743-1973).



Printed in Switzerland

# Glucose syrup — Determination of dry matter content — Refractive index method

## 1 Scope and field of application

This International Standard specifies a method for the determination of the dry matter content of glucose syrups on the basis of their refractive index.

The method is also applicable to glucose syrup containing fructose.

## 2 Reference

ISO 5377, *Starch hydrolysis products — Determination of reducing power and dextrose equivalent — Lane and Eynon constant titre method.*

## 3 Principle

Determination of the refractive index of an undiluted product, at a specified temperature; calculation of the dry matter content by means of tables showing refractive index as a function of composition, concentration and temperature.

## 4 Apparatus

**4.1 Refractometer,** Abbe type or similar (see 7.1) allowing the reading or the estimation of refractive indices of between 1,300 0 and 1,550 0 to the nearest 0,000 2 unit.

It shall be so designed that samples can be introduced easily and rapidly, and shall be easy to clean. The instrument shall be provided with a thermometer the scale of which covers the temperatures of measurement between 20 and 60 °C, and with a device for the circulation of water to maintain the instrument at these temperatures to ± 0,2 °C.

The operating instructions for this instrument shall always be strictly complied with, especially as far as the calibration is concerned.

**4.2 Glass rod,** with bent flattened end covered with PTFE[1], for applying the sample to the measuring prism.

**4.3 Light source** : full daylight or an incandescent bulb (25 to 50 W) or other light source recommended by the manufacturer of the refractometer, arranged so that the light falls on the illumination prism or mirror.

## 5 Procedure

### 5.1 Preparation of test sample

Use the product as received.

### 5.2 Preparation of apparatus

Adjust the water circulation to operate at the required temperature (20 ± 0,2 °C or 30 ± 0,2 °C or 45 ± 0,2 °C or 60 ± 0,2 °C) and to bring the prisms to the same temperature (see 8.3).

### 5.3 Determination

Bring the test sample (5.1) to the measuring temperature and apply a small quantity of this test sample to the fixed prism of the refractometer (4.1), by means of the glass rod (4.2), and immediately clamp down the movable prism (see 8.4).

Generally, 1 to 3 drops suffice to fill uniformly the space between the prisms. (If the quantity is too small, the contrast is insufficient when reading is attempted.)

With the instrument suitably illuminated, read or estimate the refractive index to the nearest 0,000 2 unit.

Take at least two readings on each test portion and take as the result of the determination the arithmetical mean of the two values obtained.

### 5.4 Number of determinations

Clean and dry completely the two prisms and carry out a second determination on a new test portion taken from the same test sample (5.1).

1) Polytetrafluoroethylene.

## 6 Expression of results

Read from the appropriate table the percentage by mass of dry matter in the test portion, corresponding to the measured refractive index (see the annex).

Take as the result the arithmetic mean of two determinations, if the conditions of repeatability (clause 7) are fulfilled.

## 7 Repeatability

The difference between the results of two determinations carried out in rapid succession and on the same sample by the same analyst shall not exceed 0,2 g of dry matter per 100 g of the product.

## 8 Notes on procedure

**8.1** The procedure specified in 5.3 and the values given in the tables were established as a result of the use of an Abbe type refractometer (4.1).

**8.2** The values indicated in the tables were determined by using the method of Lane and Eynon specified in ISO 5377.

**8.3** The measuring temperature shall be equal to or higher than the room temperature, and the relative humidity in the room shall be low in order to avoid any fogging of the prisms. Difficulties arising in the analysis of concentrated highly viscous syrups can best be overcome by carrying out the measurement at the higher temperature, at which the viscosity is lower.

**8.4** To obtain accurate results with warmed samples, the measurement shall be carried out rapidly; the application of the test portion to the prism face shall not take more than 2 s.

## 9 Test report

The test report shall show the method used and the results obtained. It shall also mention any operating conditions not specified in this International Standard, or regarded as optional, as well as any circumstances that may have influenced the results.

The test report shall include all details required for complete identification of the sample.

# Annex

## Tables showing refractive index as a function of composition, concentration and temperature

**A.1** The refractive indices of glucose syrups depend on various factors, particularly the degree of saccharification or the value of the dextrose equivalent (DE) and the ash.

**A.2** The tables below resume the data published in the *Critical Data Tables* established by the Corn Refiners Association (USA) (1978/1979).

**A.3** Tables 1 are valid for glucose syrups obtained by acidic hydrolysis :

1a) 28 DE 0,4 % ash at 20, 30, 45 and 60 °C

1b) 42 DE 0,4 % ash at 20, 30, 45 and 60 °C

1c) 55 DE 0,4 % ash at 20, 30, 45 and 60 °C

**A.4** Tables 2 are valid for glucose syrups obtained by partial or total enzymic hydrolysis.

**A.5** Tables 3a) and 3b) are valid for high maltose glucose syrups obtained by partial or total enzymic hydrolysis.

**A.6** Tables 4 are valid for high fructose glucose syrups obtained by partial or total enzymic hydrolysis :

4a) HFCS 42 % fructose 0,05 % ash at 20, 30, 45 and 60 °C

4b) HFCS 55 % fructose 0,05 % ash at 20, 30, 45 and 60 °C

4c) HFCS 90 % fructose 0,05 % ash at 20, 30, 45 and 60 °C

**A.7** Table 5 indicates the correction factors for tables 1, 2, 3 and 4 as a function of temperature.

**A.8** Table 6 indicates the correction factors for tables 1, 2, 3 and 4 as a function of DE and ash.

# Table 1

Table 1a) — Corn Syrup, Acid Conversion, 28 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 97 | 1,334 90 | 1,332 77 | 1,330 15 |
| 4 | 1,339 04 | 1,337 93 | 1,335 78 | 1,333 13 |
| 6 | 1,342 15 | 1,341 02 | 1,338 83 | 1,336 15 |
| 8 | 1,345 31 | 1,344 15 | 1,341 93 | 1,339 23 |
| 10 | 1,348 52 | 1,347 34 | 1,345 08 | 1,342 36 |
| 12 | 1,351 78 | 1,350 57 | 1,348 29 | 1,345 54 |
| 14 | 1,355 09 | 1,353 85 | 1,351 54 | 1,348 77 |
| 16 | 1,358 46 | 1,357 19 | 1,354 84 | 1,352 05 |
| 18 | 1,361 87 | 1,360 58 | 1,358 20 | 1,355 38 |
| 20 | 1,365 34 | 1,364 02 | 1,361 61 | 1,358 77 |
| 22 | 1,368 86 | 1,367 52 | 1,365 08 | 1,362 22 |
| 24 | 1,372 44 | 1,371 07 | 1,368 60 | 1,365 72 |
| 26 | 1,376 07 | 1,374 68 | 1,372 18 | 1,369 28 |
| 28 | 1,379 76 | 1,378 35 | 1,375 82 | 1,372 90 |
| 30 | 1,383 52 | 1,382 07 | 1,379 52 | 1,376 58 |
| 32 | 1,387 33 | 1,385 86 | 1,383 28 | 1,380 32 |
| 34 | 1,391 20 | 1,389 71 | 1,387 10 | 1,384 13 |
| 36 | 1,395 13 | 1,393 62 | 1,390 98 | 1,387 99 |
| 38 | 1,399 13 | 1,397 59 | 1,394 93 | 1,391 92 |
| 40 | 1,403 19 | 1,401 63 | 1,398 94 | 1,395 92 |
| 42 | 1,407 32 | 1,405 73 | 1,403 02 | 1,399 98 |
| 44 | 1,411 52 | 1,409 91 | 1,407 17 | 1,404 11 |
| 46 | 1,415 78 | 1,414 15 | 1,411 39 | 1,408 32 |
| 48 | 1,420 11 | 1,418 46 | 1,415 67 | 1,412 59 |
| 50 | 1,424 52 | 1,422 84 | 1,420 03 | 1,416 94 |
| 52 | 1,429 00 | 1,427 30 | 1,424 47 | 1,421 36 |
| 54 | 1,433 55 | 1,431 83 | 1,428 97 | 1,425 85 |
| 56 | 1,438 18 | 1,436 43 | 1,433 56 | 1,430 42 |
| 58 | 1,442 88 | 1,441 12 | 1,438 22 | 1,435 07 |
| 60 | 1,447 67 | 1,445 88 | 1,442 96 | 1,439 81 |
| 62 | 1,452 53 | 1,450 72 | 1,447 79 | 1,444 62 |
| 64 | 1,457 48 | 1,455 65 | 1,452 69 | 1,449 52 |
| 66 | 1,462 51 | 1,460 66 | 1,457 68 | 1,454 50 |
| 68 | 1,467 62 | 1,465 76 | 1,462 76 | 1,459 57 |
| 70 | 1,472 83 | 1,470 94 | 1,467 92 | 1,464 73 |

Table 1b) — Corn Syrup, Acid Conversion, 42 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 93 | 1,334 85 | 1,332 73 | 1,330 10 |
| 4 | 1,338 95 | 1,337 84 | 1,335 69 | 1,333 04 |
| 6 | 1,342 02 | 1,340 89 | 1,338 70 | 1,336 02 |
| 8 | 1,345 14 | 1,343 98 | 1,341 76 | 1,339 06 |
| 10 | 1,348 30 | 1,347 12 | 1,344 87 | 1,342 14 |
| 12 | 1,351 52 | 1,350 31 | 1,348 03 | 1,345 28 |
| 14 | 1,354 79 | 1,353 55 | 1,351 24 | 1,348 46 |
| 16 | 1,358 11 | 1,356 84 | 1,354 50 | 1,351 70 |
| 18 | 1,361 48 | 1,360 19 | 1,357 81 | 1,355 00 |
| 20 | 1,364 90 | 1,363 59 | 1,361 18 | 1,358 34 |
| 22 | 1,368 38 | 1,367 04 | 1,364 60 | 1,361 75 |
| 24 | 1,371 91 | 1,370 55 | 1,368 08 | 1,365 20 |
| 26 | 1,375 50 | 1,374 11 | 1,371 61 | 1,368 72 |
| 28 | 1,379 14 | 1,377 73 | 1,375 20 | 1,372 29 |
| 30 | 1,382 84 | 1,381 40 | 1,378 85 | 1,375 92 |
| 32 | 1,386 60 | 1,385 13 | 1,382 56 | 1,379 60 |
| 34 | 1,390 42 | 1,388 93 | 1,386 32 | 1,383 35 |
| 36 | 1,394 29 | 1,392 78 | 1,390 15 | 1,387 16 |
| 38 | 1,398 23 | 1,396 69 | 1,394 03 | 1,391 03 |
| 40 | 1,402 22 | 1,400 66 | 1,397 98 | 1,394 96 |
| 42 | 1,406 28 | 1,404 70 | 1,401 99 | 1,398 96 |
| 44 | 1,410 40 | 1,408 80 | 1,406 07 | 1,403 02 |
| 46 | 1,414 59 | 1,412 96 | 1,410 21 | 1,407 14 |
| 48 | 1,418 84 | 1,417 19 | 1,414 41 | 1,411 33 |
| 50 | 1,423 16 | 1,421 49 | 1,418 69 | 1,415 59 |
| 52 | 1,427 55 | 1,425 85 | 1,423 03 | 1,419 92 |
| 54 | 1,432 00 | 1,430 28 | 1,427 44 | 1,424 32 |
| 56 | 1,436 53 | 1,434 79 | 1,431 92 | 1,428 79 |
| 58 | 1,441 12 | 1,439 36 | 1,436 47 | 1,433 33 |
| 60 | 1,445 79 | 1,444 01 | 1,441 10 | 1,437 95 |
| 62 | 1,450 53 | 1,448 73 | 1,445 80 | 1,442 64 |
| 64 | 1,455 34 | 1,453 52 | 1,450 57 | 1,447 41 |
| 66 | 1,460 23 | 1,458 39 | 1,455 42 | 1,452 25 |
| 68 | 1,465 20 | 1,463 34 | 1,460 35 | 1,457 17 |
| 70 | 1,470 24 | 1,468 36 | 1,465 36 | 1,462 18 |
| 72 | 1,475 37 | 1,473 47 | 1,470 45 | 1,467 26 |
| 74 | 1,480 58 | 1,478 66 | 1,475 62 | 1,472 43 |
| 76 | 1,485 87 | 1,483 93 | 1,480 88 | 1,477 68 |
| 78 | 1,491 24 | 1,489 29 | 1,486 22 | 1,483 01 |
| 80 | 1,496 70 | 1,494 73 | 1,491 64 | 1,488 44 |
| 82 | 1,502 25 | 1,500 26 | 1,497 16 | 1,493 95 |
| 84 | 1,507 88 | 1,505 87 | 1,502 76 | 1,499 56 |

## Table 1 (*concluded*)

### Table 1c) — Corn Syrup, Acid Conversion, 55 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 90 | 1,334 83 | 1,332 71 | 1,330 08 |
| 4 | 1,338 90 | 1,337 80 | 1,335 64 | 1,332 99 |
| 6 | 1,341 95 | 1,340 81 | 1,338 63 | 1,335 95 |
| 8 | 1,345 04 | 1,343 88 | 1,341 66 | 1,338 96 |
| 10 | 1,348 18 | 1,346 99 | 1,344 74 | 1,342 02 |
| 12 | 1,351 37 | 1,350 16 | 1,347 87 | 1,345 13 |
| 14 | 1,354 61 | 1,353 37 | 1,351 06 | 1,348 28 |
| 16 | 1,357 90 | 1,356 63 | 1,354 29 | 1,351 49 |
| 18 | 1,361 24 | 1,359 95 | 1,357 57 | 1,354 76 |
| 20 | 1,364 63 | 1,363 31 | 1,360 91 | 1,358 07 |
| 22 | 1,368 07 | 1,366 73 | 1,364 30 | 1,361 44 |
| 24 | 1,371 57 | 1,370 20 | 1,367 74 | 1,364 86 |
| 26 | 1,375 12 | 1,373 73 | 1,371 23 | 1,368 34 |
| 28 | 1,378 72 | 1,377 31 | 1,374 79 | 1,371 87 |
| 30 | 1,382 38 | 1,380 94 | 1,378 39 | 1,375 46 |
| 32 | 1,386 10 | 1,384 63 | 1,382 06 | 1,379 10 |
| 34 | 1,389 87 | 1,388 38 | 1,385 78 | 1,382 81 |
| 36 | 1,393 70 | 1,392 18 | 1,389 56 | 1,386 57 |
| 38 | 1,397 58 | 1,396 05 | 1,393 39 | 1,390 39 |
| 40 | 1,401 53 | 1,399 97 | 1,397 29 | 1,394 27 |
| 42 | 1,405 54 | 1,403 95 | 1,401 25 | 1,398 22 |
| 44 | 1,409 60 | 1,408 00 | 1,405 27 | 1,402 22 |
| 46 | 1,413 73 | 1,412 10 | 1,409 35 | 1,406 29 |
| 48 | 1,417 92 | 1,416 27 | 1,413 50 | 1,410 42 |
| 50 | 1,422 18 | 1,420 51 | 1,417 71 | 1,414 62 |
| 52 | 1,426 50 | 1,424 80 | 1,421 98 | 1,418 88 |
| 54 | 1,430 88 | 1,429 17 | 1,426 32 | 1,423 21 |
| 56 | 1,435 33 | 1,433 60 | 1,430 73 | 1,427 61 |
| 58 | 1,439 85 | 1,438 09 | 1,435 21 | 1,432 08 |
| 60 | 1,444 44 | 1,442 66 | 1,439 76 | 1,436 61 |
| 62 | 1,449 10 | 1,447 30 | 1,444 37 | 1,441 22 |
| 64 | 1,453 82 | 1,452 01 | 1,449 06 | 1,445 90 |
| 66 | 1,458 62 | 1,456 79 | 1,453 82 | 1,450 66 |
| 68 | 1,463 50 | 1,461 64 | 1,458 66 | 1,455 49 |
| 70 | 1,468 44 | 1,466 57 | 1,463 57 | 1,460 39 |
| 72 | 1,473 47 | 1,471 57 | 1,468 56 | 1,465 37 |
| 74 | 1,478 57 | 1,476 65 | 1,473 62 | 1,470 44 |
| 76 | 1,483 74 | 1,481 81 | 1,478 77 | 1,475 58 |
| 78 | 1,489 00 | 1,487 05 | 1,483 99 | 1,480 80 |
| 80 | 1,494 34 | 1,492 37 | 1,489 30 | 1,486 10 |
| 82 | 1,499 76 | 1,497 77 | 1,494 69 | 1,491 49 |
| 84 | 1,505 26 | 1,503 26 | 1,500 16 | 1,496 97 |

## Table 2

Table 2a) — Corn Syrup, Dual Conversion, 32 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 94 | 1,334 87 | 1,332 75 | 1,330 12 |
| 4 | 1,338 99 | 1,337 88 | 1,335 73 | 1,333 08 |
| 6 | 1,342 08 | 1,340 95 | 1,338 76 | 1,336 08 |
| 8 | 1,345 22 | 1,344 06 | 1,341 84 | 1,339 14 |
| 10 | 1,348 41 | 1,347 23 | 1,344 98 | 1,342 25 |
| 12 | 1,351 66 | 1,350 45 | 1,348 16 | 1,345 41 |
| 14 | 1,354 95 | 1,353 72 | 1,351 40 | 1,348 63 |
| 16 | 1,358 30 | 1,357 04 | 1,354 69 | 1,351 90 |
| 18 | 1,361 71 | 1,360 42 | 1,358 04 | 1,355 22 |
| 20 | 1,365 17 | 1,363 85 | 1,361 44 | 1,358 60 |
| 22 | 1,368 68 | 1,367 34 | 1,364 90 | 1,362 04 |
| 24 | 1,372 25 | 1,370 88 | 1,368 41 | 1,365 54 |
| 26 | 1,375 87 | 1,374 48 | 1,371 99 | 1,369 09 |
| 28 | 1,379 56 | 1,378 14 | 1,375 62 | 1,372 70 |
| 30 | 1,383 30 | 1,381 86 | 1,379 31 | 1,376 37 |
| 32 | 1,387 10 | 1,385 64 | 1,383 06 | 1,380 10 |
| 34 | 1,390 97 | 1,389 48 | 1,386 87 | 1,383 90 |
| 36 | 1,394 89 | 1,393 38 | 1,390 74 | 1,387 75 |
| 38 | 1,398 88 | 1,397 34 | 1,394 68 | 1,391 67 |
| 40 | 1,402 93 | 1,401 37 | 1,398 68 | 1,395 66 |
| 42 | 1,407 04 | 1,405 46 | 1,402 75 | 1,399 71 |
| 44 | 1,411 22 | 1,409 62 | 1,406 88 | 1,403 83 |
| 46 | 1,415 47 | 1,413 84 | 1,411 08 | 1,408 01 |
| 48 | 1,419 78 | 1,418 13 | 1,415 35 | 1,412 27 |
| 50 | 1,424 17 | 1,422 49 | 1,419 69 | 1,416 59 |
| 52 | 1,428 62 | 1,426 92 | 1,424 09 | 1,420 98 |
| 54 | 1,433 14 | 1,431 42 | 1,428 57 | 1,425 45 |
| 56 | 1,437 74 | 1,436 00 | 1,433 12 | 1,429 99 |
| 58 | 1,442 41 | 1,440 65 | 1,437 75 | 1,434 61 |
| 60 | 1,447 15 | 1,445 37 | 1,442 45 | 1,439 30 |
| 62 | 1,451 97 | 1,450 17 | 1,447 23 | 1,444 07 |
| 64 | 1,456 87 | 1,455 04 | 1,452 09 | 1,448 92 |
| 66 | 1,461 84 | 1,460 00 | 1,457 02 | 1,453 85 |
| 68 | 1,466 90 | 1,465 03 | 1,462 04 | 1,458 86 |
| 70 | 1,472 04 | 1,470 15 | 1,467 14 | 1,463 95 |
| 72 | 1,477 26 | 1,475 35 | 1,472 32 | 1,469 13 |
| 74 | 1,482 56 | 1,480 64 | 1,477 59 | 1,474 39 |
| 76 | 1,487 95 | 1,486 01 | 1,482 95 | 1,479 74 |
| 78 | 1,493 43 | 1,491 47 | 1,488 39 | 1,485 18 |
| 80 | 1,498 99 | 1,497 01 | 1,493 92 | 1,490 71 |
| 82 | 1,504 65 | 1,502 65 | 1,499 55 | 1,496 33 |
| 84 | 1,510 40 | 1,508 39 | 1,505 27 | 1,502 05 |

Table 2b) — Corn Syrup, Dual Conversion, 63 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 89 | 1,334 81 | 1,332 69 | 1,330 06 |
| 4 | 1,338 87 | 1,337 77 | 1,335 61 | 1,332 96 |
| 6 | 1,341 90 | 1,340 77 | 1,338 58 | 1,335 90 |
| 8 | 1,344 98 | 1,343 82 | 1,341 60 | 1,338 90 |
| 10 | 1,348 10 | 1,346 91 | 1,344 66 | 1,341 94 |
| 12 | 1,351 27 | 1,350 06 | 1,347 77 | 1,345 03 |
| 14 | 1,354 49 | 1,353 25 | 1,350 93 | 1,348 16 |
| 16 | 1,357 75 | 1,356 49 | 1,354 14 | 1,351 35 |
| 18 | 1,361 07 | 1,359 78 | 1,357 40 | 1,354 59 |
| 20 | 1,364 44 | 1,363 12 | 1,360 72 | 1,357 88 |
| 22 | 1,367 85 | 1,366 51 | 1,364 08 | 1,361 22 |
| 24 | 1,371 32 | 1,369 96 | 1,367 49 | 1,364 62 |
| 26 | 1,374 84 | 1,373 45 | 1,370 96 | 1,368 07 |
| 28 | 1,378 42 | 1,377 00 | 1,374 48 | 1,371 57 |
| 30 | 1,382 04 | 1,380 61 | 1,378 06 | 1,375 13 |
| 32 | 1,385 73 | 1,384 26 | 1,381 69 | 1,378 74 |
| 34 | 1,389 46 | 1,387 98 | 1,385 38 | 1,382 41 |
| 36 | 1,393 26 | 1,391 75 | 1,389 12 | 1,386 14 |
| 38 | 1,397 11 | 1,395 57 | 1,392 92 | 1,389 92 |
| 40 | 1,401 01 | 1,399 46 | 1,396 78 | 1,393 76 |
| 42 | 1,404 98 | 1,403 40 | 1,400 70 | 1,397 67 |
| 44 | 1,409 00 | 1,407 40 | 1,404 67 | 1,401 63 |
| 46 | 1,413 09 | 1,411 46 | 1,408 71 | 1,405 65 |
| 48 | 1,417 23 | 1,415 58 | 1,412 81 | 1,409 74 |
| 50 | 1,421 44 | 1,419 77 | 1,416 97 | 1,413 89 |
| 52 | 1,425 71 | 1,424 02 | 1,421 20 | 1,418 10 |
| 54 | 1,430 04 | 1,428 33 | 1,425 49 | 1,422 38 |
| 56 | 1,434 44 | 1,432 71 | 1,429 85 | 1,426 73 |
| 58 | 1,438 90 | 1,437 15 | 1,434 27 | 1,431 14 |
| 60 | 1,443 43 | 1,441 66 | 1,438 76 | 1,435 62 |
| 62 | 1,448 03 | 1,446 24 | 1,443 32 | 1,440 17 |
| 64 | 1,452 70 | 1,450 88 | 1,447 94 | 1,444 79 |
| 66 | 1,457 43 | 1,455 60 | 1,452 64 | 1,449 48 |
| 68 | 1,462 24 | 1,460 39 | 1,457 41 | 1,454 25 |
| 70 | 1,467 12 | 1,465 25 | 1,462 25 | 1,459 08 |
| 72 | 1,472 07 | 1,470 18 | 1,467 17 | 1,464 00 |
| 74 | 1,477 10 | 1,475 19 | 1,472 16 | 1,468 98 |
| 76 | 1,482 20 | 1,480 27 | 1,477 23 | 1,474 05 |
| 78 | 1,487 38 | 1,485 43 | 1,482 38 | 1,479 19 |
| 80 | 1,492 63 | 1,490 67 | 1,487 60 | 1,484 42 |
| 82 | 1,497 97 | 1,495 99 | 1,492 91 | 1,489 72 |
| 84 | 1,503 38 | 1,501 39 | 1,498 30 | 1,495 11 |

## Table 2 (*concluded*)

### Table 2c) — Corn Syrup, Dual Conversion, 70 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 88 | 1,334 80 | 1,332 68 | 1,330 05 |
| 4 | 1,338 85 | 1,337 74 | 1,335 59 | 1,332 93 |
| 6 | 1,341 86 | 1,340 73 | 1,338 54 | 1,335 87 |
| 8 | 1,344 92 | 1,343 77 | 1,341 55 | 1,338 84 |
| 10 | 1,348 03 | 1,346 85 | 1,344 59 | 1,341 87 |
| 12 | 1,351 19 | 1,349 97 | 1,347 69 | 1,344 94 |
| 14 | 1,354 39 | 1,353 15 | 1,350 84 | 1,348 07 |
| 16 | 1,357 64 | 1,356 38 | 1,354 03 | 1,351 24 |
| 18 | 1,360 94 | 1,359 65 | 1,357 28 | 1,354 46 |
| 20 | 1,364 29 | 1,362 97 | 1,360 57 | 1,357 73 |
| 22 | 1,367 69 | 1,366 35 | 1,363 91 | 1,361 06 |
| 24 | 1,371 14 | 1,369 77 | 1,367 31 | 1,364 44 |
| 26 | 1,374 64 | 1,373 25 | 1,370 76 | 1,367 86 |
| 28 | 1,378 19 | 1,376 78 | 1,374 26 | 1,371 35 |
| 30 | 1,381 80 | 1,380 36 | 1,377 81 | 1,374 88 |
| 32 | 1,385 46 | 1,383 99 | 1,381 42 | 1,378 47 |
| 34 | 1,389 17 | 1,387 68 | 1,385 08 | 1,382 12 |
| 36 | 1,392 94 | 1,391 43 | 1,388 80 | 1,385 82 |
| 38 | 1,396 76 | 1,395 23 | 1,392 58 | 1,389 58 |
| 40 | 1,400 64 | 1,399 09 | 1,396 41 | 1,393 39 |
| 42 | 1,404 58 | 1,403 00 | 1,400 30 | 1,397 27 |
| 44 | 1,408 57 | 1,406 97 | 1,404 25 | 1,401 20 |
| 46 | 1,412 63 | 1,411 00 | 1,408 25 | 1,405 20 |
| 48 | 1,416 74 | 1,415 09 | 1,412 32 | 1,409 25 |
| 50 | 1,420 91 | 1,419 24 | 1,416 45 | 1,413 37 |
| 52 | 1,425 14 | 1,423 45 | 1,420 64 | 1,417 54 |
| 54 | 1,429 44 | 1,427 73 | 1,424 89 | 1,421 79 |
| 56 | 1,433 80 | 1,432 07 | 1,429 21 | 1,426 09 |
| 58 | 1,438 22 | 1,436 47 | 1,433 59 | 1,430 46 |
| 60 | 1,442 71 | 1,440 93 | 1,438 04 | 1,434 90 |
| 62 | 1,447 26 | 1,445 47 | 1,442 55 | 1,439 41 |
| 64 | 1,451 88 | 1,450 07 | 1,447 13 | 1,443 98 |
| 66 | 1,456 56 | 1,454 73 | 1,451 78 | 1,448 62 |
| 68 | 1,461 32 | 1,459 47 | 1,456 50 | 1,453 34 |
| 70 | 1,466 14 | 1,464 27 | 1,461 29 | 1,458 12 |
| 72 | 1,471 04 | 1,469 15 | 1,466 15 | 1,462 98 |
| 74 | 1,476 01 | 1,474 10 | 1,471 08 | 1,467 91 |
| 76 | 1,481 05 | 1,479 12 | 1,476 09 | 1,472 91 |
| 78 | 1,486 16 | 1,484 22 | 1,481 17 | 1,477 99 |
| 80 | 1,491 35 | 1,489 39 | 1,486 33 | 1,483 15 |
| 82 | 1,496 62 | 1,494 64 | 1,491 57 | 1,488 39 |
| 84 | 1,501 96 | 1,499 97 | 1,496 88 | 1,493 70 |

### Table 2d) — Corn Syrup, Dual Conversion, 95 DE, 0,5 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 82 | 1,334 75 | 1,332 63 | 1,330 00 |
| 4 | 1,338 74 | 1,337 64 | 1,335 49 | 1,332 84 |
| 6 | 1,341 71 | 1,340 58 | 1,338 40 | 1,335 72 |
| 8 | 1,344 72 | 1,343 56 | 1,341 35 | 1,338 65 |
| 10 | 1,347 76 | 1,346 58 | 1,344 34 | 1,341 62 |
| 12 | 1,350 86 | 1,349 65 | 1,347 37 | 1,344 63 |
| 14 | 1,353 99 | 1,352 76 | 1,350 45 | 1,347 69 |
| 16 | 1,357 17 | 1,355 91 | 1,353 58 | 1,350 79 |
| 18 | 1,360 39 | 1,359 11 | 1,356 75 | 1,353 94 |
| 20 | 1,363 66 | 1,362 36 | 1,359 96 | 1,357 14 |
| 22 | 1,366 98 | 1,365 65 | 1,363 22 | 1,360 38 |
| 24 | 1,370 34 | 1,368 98 | 1,366 53 | 1,363 67 |
| 26 | 1,373 75 | 1,372 37 | 1,369 89 | 1,367 01 |
| 28 | 1,377 21 | 1,375 80 | 1,373 29 | 1,370 39 |
| 30 | 1,380 71 | 1,379 28 | 1,376 75 | 1,373 83 |
| 32 | 1,384 27 | 1,382 81 | 1,380 25 | 1,377 32 |
| 34 | 1,387 87 | 1,386 40 | 1,383 81 | 1,380 86 |
| 36 | 1,391 53 | 1,390 03 | 1,387 42 | 1,384 45 |
| 38 | 1,395 24 | 1,393 71 | 1,391 08 | 1,388 09 |
| 40 | 1,399 00 | 1,397 45 | 1,394 79 | 1,391 79 |
| 42 | 1,402 81 | 1,401 24 | 1,398 55 | 1,395 54 |
| 44 | 1,406 68 | 1,405 08 | 1,402 37 | 1,399 35 |
| 46 | 1,410 60 | 1,408 98 | 1,406 25 | 1,403 21 |
| 48 | 1,414 58 | 1,412 94 | 1,410 18 | 1,407 13 |
| 50 | 1,418 61 | 1,416 95 | 1,414 17 | 1,411 10 |
| 52 | 1,422 70 | 1,421 02 | 1,418 22 | 1,415 14 |
| 54 | 1,426 85 | 1,425 15 | 1,422 33 | 1,419 23 |
| 56 | 1,431 06 | 1,429 34 | 1,426 49 | 1,423 39 |
| 58 | 1,435 33 | 1,433 59 | 1,430 72 | 1,427 61 |
| 60 | 1,439 66 | 1,437 90 | 1,435 01 | 1,431 89 |
| 62 | 1,444 05 | 1,442 27 | 1,439 36 | 1,436 23 |
| 64 | 1,448 51 | 1,446 70 | 1,443 78 | 1,440 64 |
| 66 | 1,453 03 | 1,451 20 | 1,448 26 | 1,445 11 |
| 68 | 1,457 61 | 1,455 77 | 1,452 80 | 1,449 65 |
| 70 | 1,462 26 | 1,460 40 | 1,457 42 | 1,454 26 |
| 72 | 1,466 98 | 1,465 10 | 1,462 10 | 1,458 93 |
| 74 | 1,471 77 | 1,469 86 | 1,466 85 | 1,463 68 |

## Table 3

Table 3a) — Corn Syrup, High Maltose, Dual Conversion, 42 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index 20 °C | 30 °C | 45 °C | 60 °C |
|---|---|---|---|---|
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 94 | 1,334 86 | 1,332 74 | 1,330 11 |
| 4 | 1,338 97 | 1,337 87 | 1,335 72 | 1,333 06 |
| 6 | 1,342 06 | 1,340 93 | 1,338 74 | 1,336 06 |
| 8 | 1,345 19 | 1,344 03 | 1,341 81 | 1,339 11 |
| 10 | 1,348 37 | 1,347 18 | 1,344 93 | 1,342 20 |
| 12 | 1,351 60 | 1,350 38 | 1,348 10 | 1,345 35 |
| 14 | 1,354 88 | 1,353 64 | 1,351 32 | 1,348 55 |
| 16 | 1,358 21 | 1,356 94 | 1,354 60 | 1,351 80 |
| 18 | 1,361 59 | 1,360 30 | 1,357 92 | 1,355 11 |
| 20 | 1,365 02 | 1,363 71 | 1,361 30 | 1,358 46 |
| 22 | 1,368 51 | 1,367 17 | 1,364 73 | 1,361 88 |
| 24 | 1,372 05 | 1,370 69 | 1,368 22 | 1,365 34 |
| 26 | 1,375 65 | 1,374 26 | 1,371 77 | 1,368 87 |
| 28 | 1,379 30 | 1,377 89 | 1,375 37 | 1,372 45 |
| 30 | 1,383 01 | 1,381 57 | 1,379 02 | 1,376 09 |
| 32 | 1,386 78 | 1,385 32 | 1,382 74 | 1,379 78 |
| 34 | 1,390 61 | 1,389 12 | 1,386 51 | 1,383 54 |
| 36 | 1,394 49 | 1,392 98 | 1,390 35 | 1,387 36 |
| 38 | 1,398 44 | 1,396 90 | 1,394 24 | 1,391 24 |
| 40 | 1,402 44 | 1,400 88 | 1,398 20 | 1,395 18 |
| 42 | 1,406 51 | 1,404 93 | 1,402 22 | 1,399 18 |
| 44 | 1,410 64 | 1,409 04 | 1,406 30 | 1,403 25 |
| 46 | 1,414 84 | 1,413 21 | 1,410 45 | 1,407 39 |
| 48 | 1,419 10 | 1,417 45 | 1,414 67 | 1,411 59 |
| 50 | 1,423 42 | 1,421 75 | 1,418 95 | 1,415 86 |
| 52 | 1,427 82 | 1,426 12 | 1,423 30 | 1,420 19 |
| 54 | 1,432 28 | 1,430 56 | 1,427 72 | 1,424 60 |
| 56 | 1,436 81 | 1,435 07 | 1,432 21 | 1,429 08 |
| 58 | 1,441 42 | 1,439 66 | 1,436 77 | 1,433 63 |
| 60 | 1,446 09 | 1,444 31 | 1,441 40 | 1,438 25 |
| 62 | 1,450 84 | 1,449 04 | 1,446 11 | 1,442 95 |
| 64 | 1,455 66 | 1,453 84 | 1,450 89 | 1,447 72 |
| 66 | 1,460 56 | 1,458 72 | 1,455 75 | 1,452 58 |
| 68 | 1,465 53 | 1,463 67 | 1,460 69 | 1,457 51 |
| 70 | 1,470 59 | 1,468 71 | 1,465 70 | 1,462 52 |
| 72 | 1,475 72 | 1,473 82 | 1,470 80 | 1,467 61 |
| 74 | 1,480 93 | 1,479 02 | 1,475 98 | 1,472 78 |
| 76 | 1,486 23 | 1,484 29 | 1,481 24 | 1,478 04 |
| 78 | 1,491 61 | 1,489 66 | 1,486 59 | 1,483 39 |
| 80 | 1,497 08 | 1,495 11 | 1,492 02 | 1,488 82 |
| 82 | 1,502 63 | 1,500 64 | 1,497 55 | 1,494 34 |
| 84 | 1,508 28 | 1,506 27 | 1,503 16 | 1,499 95 |

Table 3b) — Corn Syrup, High Maltose, Dual Conversion, 50 DE, 0,4 % Ash (dry basis)

| Dry substance % | Refractive index 20 °C | 30 °C | 45 °C | 60 °C |
|---|---|---|---|---|
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 92 | 1,334 84 | 1,332 72 | 1,330 09 |
| 4 | 1,338 94 | 1,337 83 | 1,335 68 | 1,333 02 |
| 6 | 1,342 00 | 1,340 87 | 1,338 68 | 1,336 00 |
| 8 | 1,345 11 | 1,343 95 | 1,341 73 | 1,339 03 |
| 10 | 1,348 27 | 1,347 08 | 1,344 83 | 1,342 11 |
| 12 | 1,351 48 | 1,350 27 | 1,347 98 | 1,345 23 |
| 14 | 1,354 74 | 1,353 50 | 1,351 18 | 1,348 41 |
| 16 | 1,358 05 | 1,356 78 | 1,354 44 | 1,351 64 |
| 18 | 1,361 41 | 1,360 12 | 1,357 74 | 1,354 92 |
| 20 | 1,364 82 | 1,363 50 | 1,361 10 | 1,358 26 |
| 22 | 1,368 28 | 1,366 94 | 1,364 51 | 1,361 65 |
| 24 | 1,371 80 | 1,370 44 | 1,367 97 | 1,365 09 |
| 26 | 1,375 38 | 1,373 99 | 1,371 49 | 1,368 59 |
| 28 | 1,379 01 | 1,377 59 | 1,375 07 | 1,372 15 |
| 30 | 1,382 69 | 1,381 25 | 1,378 70 | 1,375 76 |
| 32 | 1,386 43 | 1,384 97 | 1,382 39 | 1,379 44 |
| 34 | 1,390 23 | 1,388 74 | 1,386 14 | 1,383 17 |
| 36 | 1,394 09 | 1,392 57 | 1,389 94 | 1,386 96 |
| 38 | 1,398 00 | 1,396 47 | 1,393 81 | 1,390 81 |
| 40 | 1,401 98 | 1,400 42 | 1,397 74 | 1,394 72 |
| 42 | 1,406 02 | 1,404 44 | 1,401 73 | 1,398 69 |
| 44 | 1,410 12 | 1,408 51 | 1,405 78 | 1,402 73 |
| 46 | 1,414 28 | 1,412 65 | 1,409 90 | 1,406 83 |
| 48 | 1,418 51 | 1,416 86 | 1,414 08 | 1,411 00 |
| 50 | 1,422 80 | 1,421 13 | 1,418 32 | 1,415 23 |
| 52 | 1,427 16 | 1,425 46 | 1,422 64 | 1,419 53 |
| 54 | 1.431 58 | 1,429 86 | 1,427 02 | 1,423 90 |
| 56 | 1,436 07 | 1,434 34 | 1,431 47 | 1,428 34 |
| 58 | 1,440 64 | 1,438 88 | 1,435 99 | 1,432 85 |
| 60 | 1,445 27 | 1,443 49 | 1,440 58 | 1,437 43 |
| 62 | 1,449 97 | 1,448 17 | 1,445 24 | 1,442 09 |
| 64 | 1,454 75 | 1,452 93 | 1,449 98 | 1,446 82 |
| 66 | 1,459 60 | 1,457 76 | 1,454 79 | 1,451 62 |
| 68 | 1,464 52 | 1,462 66 | 1,459 68 | 1,456 50 |
| 70 | 1,469 53 | 1,467 65 | 1,464 65 | 1,461 46 |
| 72 | 1,474 61 | 1,472 71 | 1,469 69 | 1,466 50 |
| 74 | 1,479 77 | 1,477 85 | 1,474 81 | 1,471 62 |
| 76 | 1,485 01 | 1,483 07 | 1,480 02 | 1,476 82 |
| 78 | 1,490 33 | 1,488 37 | 1,485 31 | 1,482 11 |
| 80 | 1,495 73 | 1,493 76 | 1,490 68 | 1,487 48 |
| 82 | 1,501 22 | 1,499 23 | 1,496 14 | 1,492 94 |
| 84 | 1,506 80 | 1,504 79 | 1,501 69 | 1,498 48 |

## Table 4

Table 4a) — HFCS 42 % fructose, 0,05 % Ash (dry basis)

| Dry substance % | Refractive index 20 °C | 30 °C | 45 °C | 60 °C |
|---|---|---|---|---|
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 88 | 1,334 79 | 1,332 65 | 1,330 02 |
| 4 | 1,338 77 | 1,337 65 | 1,335 47 | 1,332 79 |
| 6 | 1,341 71 | 1,340 55 | 1,338 33 | 1,335 61 |
| 8 | 1,344 70 | 1,343 50 | 1,341 23 | 1,338 48 |
| 10 | 1,347 72 | 1,346 50 | 1,344 18 | 1,341 40 |
| 12 | 1,350 80 | 1,349 54 | 1,347 18 | 1,344 36 |
| 14 | 1,353 92 | 1,352 62 | 1,350 22 | 1,347 37 |
| 16 | 1,357 09 | 1,355 75 | 1,353 31 | 1,350 42 |
| 18 | 1,360 30 | 1,358 93 | 1,356 45 | 1,353 53 |
| 20 | 1,363 56 | 1,362 16 | 1,359 63 | 1,356 68 |
| 22 | 1,366 87 | 1,365 44 | 1,362 87 | 1,359 88 |
| 24 | 1,370 23 | 1,368 76 | 1,366 15 | 1,363 14 |
| 26 | 1,373 63 | 1,372 14 | 1,369 49 | 1,366 44 |
| 28 | 1,377 09 | 1,375 56 | 1,372 87 | 1,369 80 |
| 30 | 1,380 59 | 1,379 03 | 1,376 31 | 1,373 20 |
| 32 | 1,384 15 | 1,382 56 | 1,379 79 | 1,376 66 |
| 34 | 1,387 76 | 1,386 13 | 1,383 33 | 1,380 17 |
| 36 | 1,391 41 | 1,389 76 | 1,386 92 | 1,383 73 |
| 38 | 1,395 12 | 1,393 44 | 1,390 57 | 1,387 35 |
| 40 | 1,398 89 | 1,397 17 | 1,394 26 | 1,391 02 |
| 42 | 1,402 70 | 1,400 96 | 1,398 02 | 1,394 75 |
| 44 | 1,406 57 | 1,404 80 | 1,401 82 | 1,398 53 |
| 46 | 1,410 49 | 1,408 69 | 1,405 68 | 1,402 37 |
| 48 | 1,414 47 | 1,412 64 | 1,409 60 | 1,406 27 |
| 50 | 1,418 51 | 1,416 65 | 1,413 58 | 1,410 22 |
| 52 | 1,422 60 | 1,420 71 | 1,417 61 | 1,414 23 |
| 54 | 1,426 75 | 1,424 83 | 1,421 70 | 1,418 30 |
| 56 | 1,430 95 | 1,429 01 | 1,425 85 | 1,422 43 |
| 58 | 1,435 22 | 1,433 25 | 1,430 06 | 1,426 62 |
| 60 | 1,439 54 | 1,437 55 | 1,434 33 | 1,430 87 |
| 62 | 1,443 92 | 1,441 91 | 1,438 66 | 1,435 19 |
| 64 | 1,448 37 | 1,446 33 | 1,443 05 | 1,439 56 |
| 66 | 1,452 87 | 1,450 81 | 1,447 50 | 1,444 00 |
| 68 | 1,457 44 | 1,455 35 | 1,452 02 | 1,448 51 |
| 70 | 1,462 07 | 1,459 96 | 1,456 60 | 1,453 08 |
| 72 | 1,466 77 | 1,464 63 | 1,461 25 | 1,457 71 |
| 74 | 1,471 52 | 1,469 36 | 1,465 96 | 1,462 41 |
| 76 | 1,476 35 | 1,474 16 | 1,470 74 | 1,467 18 |
| 78 | 1,481 24 | 1,479 03 | 1,475 59 | 1,472 02 |
| 80 | 1,486 20 | 1,483 97 | 1,480 51 | 1,476 93 |
| 82 | 1,491 22 | 1,488 97 | 1,485 49 | 1,481 91 |
| 84 | 1,496 32 | 1,494 05 | 1,490 55 | 1,486 96 |

Table 4b) — HFCS 55 % fructose, 0,05 % Ash (dry basis)

| Dry substance % | Refractive index 20 °C | 30 °C | 45 °C | 60 °C |
|---|---|---|---|---|
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 87 | 1,334 79 | 1,332 65 | 1,330 02 |
| 4 | 1,338 76 | 1,337 64 | 1,335 46 | 1,332 79 |
| 6 | 1,341 70 | 1,340 54 | 1,338 32 | 1,335 61 |
| 8 | 1,344 68 | 1,343 49 | 1,341 22 | 1,338 48 |
| 10 | 1,347 71 | 1,346 48 | 1,344 17 | 1,341 39 |
| 12 | 1,350 78 | 1,349 52 | 1,347 17 | 1,344 35 |
| 14 | 1,353 89 | 1,352 60 | 1,350 20 | 1,347 36 |
| 16 | 1,357 06 | 1,355 73 | 1,353 29 | 1,350 41 |
| 18 | 1,360 27 | 1,358 91 | 1,356 43 | 1,353 51 |
| 20 | 1,363 52 | 1,362 13 | 1,359 61 | 1,356 66 |
| 22 | 1,366 83 | 1,365 40 | 1,362 84 | 1,359 86 |
| 24 | 1,370 18 | 1,368 72 | 1,366 12 | 1,363 10 |
| 26 | 1,373 58 | 1,372 09 | 1,369 44 | 1,366 40 |
| 28 | 1,377 03 | 1,375 51 | 1,372 82 | 1,369 75 |
| 30 | 1,380 54 | 1,378 97 | 1,376 25 | 1,373 14 |
| 32 | 1,384 09 | 1,382 49 | 1,379 73 | 1,376 59 |
| 34 | 1,387 69 | 1,386 06 | 1,383 26 | 1,380 09 |
| 36 | 1,391 34 | 1,389 68 | 1,386 84 | 1,383 64 |
| 38 | 1,395 05 | 1,393 36 | 1,390 48 | 1,387 25 |
| 40 | 1,398 81 | 1,397 08 | 1,394 16 | 1,390 91 |
| 42 | 1,402 62 | 1,400 86 | 1,397 91 | 1,394 62 |
| 44 | 1,406 49 | 1,404 70 | 1,401 70 | 1,398 39 |
| 46 | 1,410 41 | 1,408 59 | 1,405 55 | 1,402 22 |
| 48 | 1,414 38 | 1,412 53 | 1,409 46 | 1,406 10 |
| 50 | 1,418 41 | 1,416 53 | 1,413 43 | 1,410 04 |
| 52 | 1,422 50 | 1,420 59 | 1,417 45 | 1,414 03 |
| 54 | 1,426 65 | 1,424 71 | 1,421 53 | 1,418 08 |
| 56 | 1,430 85 | 1,428 88 | 1,425 66 | 1,422 20 |
| 58 | 1,435 11 | 1,433 11 | 1,429 86 | 1,426 37 |
| 60 | 1,439 44 | 1,437 40 | 1,434 12 | 1,430 60 |
| 62 | 1,443 82 | 1,441 75 | 1,438 44 | 1,434 90 |
| 64 | 1,448 26 | 1,446 17 | 1,442 81 | 1,439 25 |
| 66 | 1,452 77 | 1,450 64 | 1,447 26 | 1,443 67 |
| 68 | 1,457 33 | 1,455 18 | 1,451 76 | 1,448 16 |
| 70 | 1,461 97 | 1,459 78 | 1,456 33 | 1,452 71 |
| 72 | 1,466 66 | 1,464 45 | 1,460 97 | 1,457 32 |
| 74 | 1,471 42 | 1,469 18 | 1,465 67 | 1,462 00 |
| 76 | 1,476 25 | 1,473 98 | 1,470 43 | 1,466 75 |
| 78 | 1,481 15 | 1,478 85 | 1,475 27 | 1,471 56 |
| 80 | 1,486 11 | 1,483 78 | 1,480 17 | 1,476 45 |
| 82 | 1,491 14 | 1,488 78 | 1,485 14 | 1,481 41 |
| 84 | 1,496 24 | 1,493 86 | 1,490 19 | 1,486 43 |

## Table 4 (*concluded*)

### Table 4c) — HFCS 90 % fructose, 0,05 % Ash (dry basis)

| Dry substance % | Refractive index | | | |
|---|---|---|---|---|
| | 20 °C | 30 °C | 45 °C | 60 °C |
| 0 | 1,332 99 | 1,331 94 | 1,329 85 | 1,327 25 |
| 2 | 1,335 86 | 1,334 77 | 1,332 63 | 1,329 98 |
| 4 | 1,338 75 | 1,337 62 | 1,335 42 | 1,332 74 |
| 6 | 1,341 69 | 1,340 51 | 1,338 27 | 1,335 53 |
| 8 | 1,344 67 | 1,343 45 | 1,341 15 | 1,338 38 |
| 10 | 1,347 69 | 1,346 44 | 1,344 09 | 1,341 27 |
| 12 | 1,350 76 | 1,349 47 | 1,347 07 | 1,344 20 |
| 14 | 1,353 88 | 1,352 55 | 1,350 09 | 1,347 19 |
| 16 | 1,357 04 | 1,355 67 | 1,353 16 | 1,350 22 |
| 18 | 1,360 25 | 1,358 84 | 1,356 28 | 1,353 29 |
| 20 | 1,363 51 | 1,362 06 | 1,359 45 | 1,356 42 |
| 22 | 1,366 81 | 1,365 32 | 1,362 67 | 1,359 60 |
| 24 | 1,370 17 | 1,368 64 | 1,365 93 | 1,362 82 |
| 26 | 1,373 57 | 1,372 00 | 1,369 25 | 1,366 09 |
| 28 | 1,377 02 | 1,375 42 | 1,372 61 | 1,369 42 |
| 30 | 1,380 52 | 1,378 88 | 1,376 03 | 1,372 79 |
| 32 | 1,384 08 | 1,382 39 | 1,379 49 | 1,376 22 |
| 34 | 1,387 68 | 1,385 96 | 1,383 01 | 1,379 70 |
| 36 | 1,391 33 | 1,389 57 | 1,386 57 | 1,383 23 |
| 38 | 1,395 04 | 1,393 24 | 1,390 19 | 1,386 81 |
| 40 | 1,398 80 | 1,396 96 | 1,393 87 | 1,390 44 |
| 42 | 1,402 61 | 1,400 74 | 1,397 59 | 1,394 13 |
| 44 | 1,406 48 | 1,404 56 | 1,401 38 | 1,397 88 |
| 46 | 1,410 40 | 1,408 44 | 1,405 21 | 1,401 68 |
| 48 | 1,414 37 | 1,412 38 | 1,409 10 | 1,405 53 |
| 50 | 1,418 40 | 1,416 37 | 1,413 05 | 1,409 44 |
| 52 | 1,422 49 | 1,420 42 | 1,417 05 | 1,413 41 |
| 54 | 1,426 63 | 1,424 53 | 1,421 11 | 1,417 43 |
| 56 | 1,430 83 | 1,428 69 | 1,425 23 | 1,421 52 |
| 58 | 1,435 08 | 1,432 91 | 1,429 40 | 1,425 66 |
| 60 | 1,439 40 | 1,437 19 | 1,433 64 | 1,429 86 |
| 62 | 1,443 78 | 1,441 53 | 1,437 93 | 1,434 12 |
| 64 | 1,448 21 | 1,445 93 | 1,442 29 | 1,438 45 |
| 66 | 1,452 71 | 1,450 39 | 1,446 70 | 1,442 83 |
| 68 | 1,457 27 | 1,454 91 | 1,451 18 | 1,447 28 |
| 70 | 1,461 89 | 1,459 49 | 1,455 72 | 1,451 79 |
| 72 | 1,466 57 | 1,464 14 | 1,460 33 | 1,456 36 |
| 74 | 1,471 32 | 1,468 85 | 1,465 00 | 1,461 00 |
| 76 | 1,476 13 | 1,473 62 | 1,469 73 | 1,465 70 |
| 78 | 1,481 00 | 1,478 46 | 1,474 53 | 1,470 47 |
| 80 | 1,485 95 | 1,483 37 | 1,479 40 | 1,475 31 |
| 82 | 1,490 96 | 1,488 35 | 1,484 33 | 1,480 22 |
| 84 | 1,496 03 | 1,493 39 | 1,489 33 | 1,485 19 |

**Table 5 — Factors for Approximate Calculation of Refractive Index at Temperatures from 10 to 70 °C[1)]**

| $t$, °C | Water | 28 to 95 DE syrups | High fructose corn syrup |
|---|---|---|---|
| 10 | 0,000 716 | 0,002 260 | 0,002 590 |
| 12 | 0,000 605 | 0,001 808 | 0,002 072 |
| 14 | 0,000 477 | 0,001 356 | 0,001 554 |
| 16 | 0,000 333 | 0,000 904 | 0,001 036 |
| 18 | 0,000 174 | 0,000 452 | 0,000 518 |
| 20 | 0,000 000 | 0,000 000 | 0,000 000 |
| 22 | −0,000 187 | −0,000 452 | −0,000 518 |
| 24 | −0,000 389 | −0,000 904 | −0,001 036 |
| 26 | −0,000 603 | −0,001 356 | −0,001 554 |
| 28 | −0,000 829 | −0,001 808 | −0,002 072 |
| 30 | −0,001 068 | −0,002 260 | −0,002 590 |
| 32 | −0,001 318 | −0,002 712 | −0,003 108 |
| 34 | −0,001 579 | −0,003 164 | −0,003 625 |
| 36 | −0,001 850 | −0,003 616 | −0,004 144 |
| 38 | −0,002 133 | −0,004 068 | −0,004 662 |
| 40 | −0,002 425 | −0,004 520 | −0,005 180 |
| 42 | −0,002 727 | −0,004 972 | −0,005 698 |
| 44 | −0,003 039 | −0,005 424 | −0,006 216 |
| 46 | −0,003 360 | −0,005 876 | −0,006 734 |
| 48 | −0,003 690 | −0,006 328 | −0,007 251 |
| 50 | −0,004 029 | −0,006 780 | −0,007 770 |
| 52 | −0,004 377 | −0,007 232 | −0,008 288 |
| 54 | −0,004 734 | −0,007 684 | −0,008 806 |
| 56 | −0,005 099 | −0,008 136 | −0,009 324 |
| 58 | −0,005 472 | −0,008 588 | −0,009 842 |
| 60 | −0,005 853 | −0,009 040 | −0,010 360 |
| 62 | −0,006 331 | −0,009 492 | −0,010 878 |
| 64 | −0,006 760 | −0,009 944 | −0,011 396 |
| 66 | −0,007 168 | −0,010 396 | −0,011 914 |
| 68 | −0,007 586 | −0,010 848 | −0,012 432 |
| 70 | −0,008 035 | −0,011 300 | −0,012 949 |

1) The approximate refractive index change with temperature can be represented as the sum of the water effect and the solids effect :

$n_D^t = n_D^{20} + F_w\,(1 - s) + F_s\,(s)$, where $s$ = percentage dry substance/100, $F_w$ = water factor from table, $F_s$ = solids factor from table, appropriate to the product type. Exact refractive index at any temperature can be calculated from the above equation, but this is a tedious procedure. This table is presented as a convenient alternative.

**Table 6 — Ash and DE Corrections**

| Dry substance, % | Change in $n_D$ for an increase of : | |
|---|---|---|
| | 1 % ash | 1 DE |
| 2 | 0,000 000 | −0,000 001 |
| 4 | 0,000 000 | 0,000 003 |
| 6 | 0,000 001 | −0,000 005 |
| 8 | 0,000 002 | −0,000 007 |
| 10 | 0,000 003 | −0,000 010 |
| 12 | 0,000 004 | −0,000 012 |
| 14 | 0,000 006 | −0,000 015 |
| 16 | 0,000 008 | −0,000 017 |
| 18 | 0,000 010 | −0,000 020 |
| 20 | 0,000 013 | −0,000 023 |
| 22 | 0,000 016 | −0,000 026 |
| 24 | 0,000 019 | −0,000 029 |
| 26 | 0,000 022 | −0,000 033 |
| 28 | 0,000 026 | −0,000 036 |
| 30 | 0,000 030 | −0,000 040 |
| 32 | 0,000 034 | −0,000 044 |
| 34 | 0,000 039 | −0,000 048 |
| 36 | 0,000 044 | −0,000 052 |
| 38 | 0,000 049 | −0,000 057 |
| 40 | 0,000 055 | −0,000 061 |
| 42 | 0,000 061 | −0,000 066 |
| 44 | 0,000 068 | −0,000 071 |
| 46 | 0,000 074 | −0,000 076 |
| 48 | 0,000 082 | −0,000 081 |
| 50 | 0,000 089 | −0,000 087 |
| 52 | 0,000 097 | −0,000 093 |
| 54 | 0,000 105 | −0,000 099 |
| 56 | 0,000 114 | −0,000 105 |
| 58 | 0,000 123 | −0,000 112 |
| 60 | 0,000 133 | −0,000 118 |
| 62 | 0,000 143 | −0,000 125 |
| 64 | 0,000 153 | −0,000 132 |
| 66 | 0,000 164 | −0,000 140 |
| 68 | 0,000 175 | −0,000 147 |
| 70 | 0,000 187 | 0,000 155 |
| 72 | 0,000 199 | −0,000 163 |
| 74 | 0,000 212 | −0,000 172 |
| 76 | 0,000 225 | −0,000 181 |
| 78 | 0,000 239 | −0,000 190 |
| 80 | 0,000 253 | −0,000 199 |
| 82 | 0,000 268 | −0,000 208 |
| 84 | 0,000 283 | −0,000 218 |

This page intentionally left blank

This page intentionally left blank

This page intentionally left blank