

SpectraShop Import/Export Text Format

The file is a text file containing a sequence of lines consisting of one or more keywords followed by other keywords or the corresponding parameters and data. A line is terminated by a carriage return character and a linefeed character. Each keyword is separated from its parameter by white space consisting of a tab character. The tab character makes it easier to process the file in spreadsheet or text editing programs.

File Structure

The file is composed of three parts: a file header, measurement metadata, specimen data.

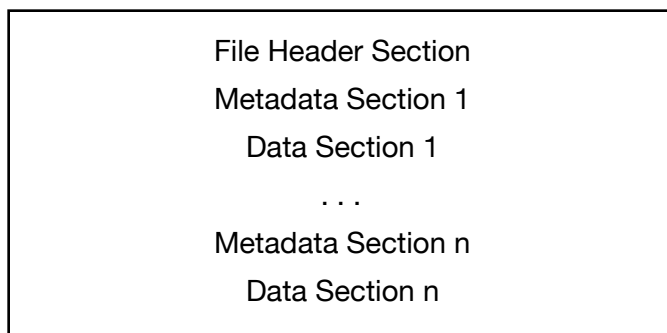
Part 1: The file header consists of keywords and parameters which apply to the entire collection.

Part 2: The next section contains the measurement metadata in common to all the specimens within the following specimen section.

Part 3: The third section consists of the metadata and data for each specimen.

Whenever an item in the measurement metadata changes, a new Part 2 is written, followed immediately by the associated Part 3 specimens. Thus Parts 2 and 3 are repeated until all the specimens within the collection are written.

Example: a collection consisting of reflective specimens followed by emissive-light specimens would be represented in the file as the file header, then the reflective measurement metadata, the reflective specimens, the emissive-light measurement metadata followed by the emissive-light specimens.



Import/Export file layout

File Section Keywords

Keyword	Parameter	Required?	Description
SpectraShop	3.0	Yes	Signifies the standard used for the file encoding. Must be the first item encountered in the file.
FILE_DESCRIPTOR	string		Description of the purpose or content of the file data.
NUMBER_OF_SETS	integer	Yes	Number of specimens in the file.

Metadata Section Keywords

Keyword	Parameter	Required?	Description
#		Yes	Signifies the standard used for the file encoding. Must be the first item encountered in the file.
ACQUIRE_NOTE	string		Description of the purpose or content of the file data.
BEGIN_DATA_FORMAT	integer	Yes	Number of specimens in the file.
CREATED	date string		Date the spectra were created or measured.
END_DATA_FORMAT		Yes	Marks the end of the list of data value identifiers.
ILLUMINANT	string	Note 1	Defines the illuminant used for calculating colorimetric values for reflective and transmissive specimens.
INSTRUMENTATION	string		Instrument used to make the spectral measurements.
MANUFACTURER	string		Manufacturer of the specimens.
MATERIAL	string		Composition of the specimens.
MEASUREMENT_APERTURE	string		Instrument's measurement aperture size, usually expressed in millimeters.
MEASUREMENT_FILTER	string		Filter used on the spectrometer during the measurements.
MEASUREMENT_GEOMETRY	string		Geometry of the instrument used to make the spectral measurements.
MEASUREMENT_SOURCE	string		Light source used with the instrument to make the spectral measurements.
MODEL	string		Model number, if applicable, for the specimens.
NMEASURE	integer		Number of measurements per specimen.
NOTE	string		Notes relating to the specimens.

Keyword	Parameter	Required?	Description
NUMBER_OF_FIELDS	integer	Yes	Must precede the BEGIN_DATA_FORMAT keyword. Number of data format identifiers prescribed in the data format definition that follows.
OBSERVER	string	Note 1	Defines the standard observer used for calculating the colorimetric values.
ORIGINATOR	string		Specific system, organization, or individual originating the spectra.
PROD_DATE	date string		Date when the specimens were manufactured.
RGB_SPACE	string	Note 2	Defines the RGB space used for calculating RGB values.
SAMPLE_BACKING	string		Backing used behind reflective samples during the measurement.
SERIAL	string		Serial number, if applicable, for the object being measured.
SPECTRUM_TYPE	string	Yes	Signifies the standard used for the file encoding.
SURFACE	string		Type of surface for a reflective specimen.

Note 1: Required for colorimetric data import/export.

Note 2: Required for RGB data import/export.

Data Format Keywords

Keyword	Parameter	Required?	Description
CCT	float		Correlated Color Temperature. Emissive light or monitor value.
CD	float		Cd/m ² . Emissive monitor radiance.
DOM_NM	float		Dominant wavelength.
ISO1	float		ISO1 density value.
ISO2	float		ISO2 density value.
JCH_A	float		CIECAM02 a* value, redness-greenness.
JCH_B	float		CIECAM02 b* value, yellowness-blueness.
JCH_C	float		CIECAM02 C* value, chroma.

Keyword	Parameter	Required?	Description
JCH_H	float		CIECAM02 H* value, hue angle, in degrees.
JCH_J	float		CIECAM02 J value, lightness.
LAB_A	float		CIELAB 1976 a* value, redness-greenness.
LAB_B	float		CIELAB 1976 b* value, yellowness-blueness.
LAB_C	float		CIELAB 1976 C* value, chroma.
LAB_H	float		CIELAB 1976 h value, hue angle, in degrees.
LAB_L	float		CIELAB 1976 L* value, lightness.
LUV_A	float		CIELUV 1976 a* value, redness-greenness.
LUV_B	float		CIELUV 1976 b* value, yellowness-blueness.
LUV_C	float		CIELUV 1976 C* value, chroma.
LUV_H	float		CIELUV 1976 h value, hue angle, in degrees.
LUV_L	float		CIELUV 1976 L* value, lightness.
LUV_S	float		CIELUV 1976 s value, saturation.
LUV_U	float		CIELUV 1976 u* value, redness-greenness.
LUV_V	float		CIELUV 1976 v* value, yellowness-blueness.
LUX	float		Lux. Emissive light illuminance.
PE	float		Excitation purity.
RGB_B	integer		RGB blue value.
RGB_G	integer		RGB green value.
RGB_R	integer		RGB red value.
RGB_OUT_OF_GAMUT	string		RGB clipped? Value is "True" or "False".
SAMPLE_ID1	string	Yes	Primary specimen identifier.
SAMPLE_ID2	string		Secondary specimen identifier.
SAMPLE_ID3	string		Tertiary specimen identifier.
SPECTRAL_END	integer	Note 1	Ending wavelength for the specimen spectra, in nanometers.
SPECTRAL_INC	integer	Note 1	Width of each band for the specimen spectra, in nanometers.
SPECTRAL_START	integer	Note 1	Starting wavelength for the specimen spectra, in nanometers.
SPECTRAL_SUM	float		Sum of spectral bands, approximate integral.

Keyword	Parameter	Required?	Description
SPECTRAL_VAL	float	Note 1	Denotes a spectral value for a measurement band. For non-fluorescing reflective and transmissive spectra the data is in the range 0-1. For emissive specimens the data is in W/(m ² sr nm).
STATUS_A_B	float		Status A blue density.
STATUS_A_G	float		Status A green density.
STATUS_A_R	float		Status A red density.
STATUS_E_B	float		Status E blue density.
STATUS_E_G	float		Status E green density.
STATUS_E_R	float		Status E red density.
STATUS_I_B	float		Status I blue density.
STATUS_I_G	float		Status I green density.
STATUS_I_R	float		Status I red density.
STATUS_M_B	float		Status M blue density.
STATUS_M_G	float		Status M green density.
STATUS_M_R	float		Status M red density.
STATUS_T_B	float		Status T blue density.
STATUS_T_G	float		Status T green density.
STATUS_T_R	float		Status T red density.
STATUS_V	float		Visual density.
UV_U	float		1964 u' value.
UV_V	float		1964 v' value.
WATTS	float		W/(m ² sr). Emissive light or monitor intensity.
XYX_X	float		Chromaticity x value.
XYX_Y	float		Chromaticity y value.
XYX_CAPY	float		Chromaticity Y value, same as XYZ_Y.
XYZ_X	float		Tristimulus X value.
XYZ_Y	float		Tristimulus Y value.
XYZ_Z	float		Tristimulus Z value.

Specimen Data Keywords

Keyword	Parameter	Required?	Description
BEGIN_DATA_FORMAT		Yes	Marks the beginning of the specimen data list defined by the data format list and the NUMBER_OF_SETS data keyword.
END_DATA_FORMAT		Yes	Marks the end of the specimen list.

Keyword Parameters

Keyword	Parameter Values
ILLUMINANT	Select one of: "A", "C", "D50", "D55", "D65", "D75", "E", "F1", "F2", "F3", "F4", "F5", "F6", "F7", "F8", "F9", "F10", "F11", "F12"
MEASUREMENT_FILTER	Examples: "Polarizer", "UV Block"
MEASUREMENT_GEOMETRY	Examples: "45/0", "d/0", "d/8 SCI"
OBSERVER	Select one of: "2 degree", "10 degree"
RGB_SPACE	Examples: "Adobe RGB", "sRGB", "Wide Gamut"
SAMPLE_BACKING	Examples: "Black", "White", "Substrate", "Self"
SPECTRUM_TYPE	Select one of: "Emissive-light", "Emissive-monitor", "Observer", "Reflective", "Transmissive"
SURFACE	Examples: "Matte", "Semigloss", "Gloss", "Metallic"

Parameter and Data Values

Keyword	Parameter Values
date string	A series of numeric characters 0 through 9, inclusive, with separating hyphen characters and representing the ISO 8601 format YYYY-MM-DD. Example: 2001-01-25 is 25 January 2001

Keyword	Parameter Values
float	<p>A combination of numeric characters 0 through 9, the decimal point character (.) or (,) and optionally including an exponent consisting of an E character with either a plus(+) or a minus (-) character. The data should include a decimal point character. A decimal point will be assumed at the end of the number if it does not contain one. Numbers less than 1 must contain a leading 0 and decimal point. The decimal point character is country dependent, either a “.” or a “,”. Thousands separator characters are not allowed. Reading programs are required to adapt to either decimal point character appropriately.</p> <p>Examples:</p> <p>10.45 0.3456 12345E+1 2.4567E-2 1.2345E1</p>
integer	<p>A combination of numeric characters 0 through 9, inclusive, without a decimal point or other alphanumeric characters.</p> <p>Example: 123</p>

Background

The SpectraShop text file format is derived from the CGATS 17 specification, not CGATS 5. It has been modified and extended to allow for emissive and observer data and to include SpectraShop metadata not allowed for in the CGATS format. The SpectraShop format is not backward compatible with CGATS. Programs that read CGATS files are not expected to read SpectraShop files, and with a few exceptions, SpectraShop will not read CGATS files.

Example 1

This example illustrates a file with a single reflective specimen. All keywords are separated by a tab characters. Each line ends with a carriage return character and a linefeed character. Spectral values are required to be contiguous within the file.

```
SpectraShop 5.0
FILE_DESCRIPTOR      "Theoretical 18% gray reference."
NUMBER_OF_SETS      1
ORIGINATOR          "Robin D. Myers"
CREATED             "2001-04-13"
SPECTRUM_TYPE       "Reflective"
SURFACE             "Matte"
INSTRUMENTATION     "Reference"
INSTRUMENT_SERIAL_NUMBER ""
MEASUREMENT_GEOMETRY "45/0"
MEASUREMENT_SOURCE  "A"
MEASUREMENT_APERTURE ""
MEASUREMENT_FILTER  "None"
SAMPLE_BACKING      "Black"
NSAMPLES            1
OBSERVER            "2 degree"
ILLUMINANT          "D65"
RGB_SPACE           "sRGB"
NUMBER_OF_FIELDS    85
BEGIN_DATA_FORMAT
SAMPLE_ID1  SAMPLE_ID2  SAMPLE_ID3  XYZ_X  XYZ_Y  XYZ_Z  LAB_L  LAB_A  LAB_B  RGB_R  RGB_G  RG-
B_B  RGB_OUT_OF_GAMUT  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL
SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL
SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM
SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL
SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM
SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL
SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM
SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL
SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_NM  SPECTRAL_VAL  SPECTRAL_VAL
END_DATA_FORMAT
BEGIN_DATA
"18% Gray aim point"      ""      ""      17.11  18.00  19.60  49.50  -0.01  -0.00  117    117    117
"False"
380  1.800000E-1  390  1.800000E-1  400  1.800000E-1  410  1.800000E-1
420  1.800000E-1  430  1.800000E-1  440  1.800000E-1  450  1.800000E-1
460  1.800000E-1  470  1.800000E-1  480  1.800000E-1  490  1.800000E-1
500  1.800000E-1  510  1.800000E-1  520  1.800000E-1  530  1.800000E-1
540  1.800000E-1  550  1.800000E-1  560  1.800000E-1  570  1.800000E-1
580  1.800000E-1  590  1.800000E-1  600  1.800000E-1  610  1.800000E-1
620  1.800000E-1  630  1.800000E-1  640  1.800000E-1  650  1.800000E-1
660  1.800000E-1  670  1.800000E-1  680  1.800000E-1  690  1.800000E-1
700  1.800000E-1  710  1.800000E-1  720  1.800000E-1  730  1.800000E-1
END_DATA
```


Example 2

This example contains a single emissive-light specimen. All keywords are separated by a tab characters. Each line ends with a carriage return character and a linefeed character. Spectral values are required to be contiguous within the file.

```
SpectraShop 5.0
NUMBER_OF_SETS      1
END_DATA
ORIGINATOR  "Robin D. Myers"
CREATED     "01.01.08"
MANUFACTURER      "Ikea"
SPECTRUM_TYPE     "Emissive-light"
INSTRUMENTATION   "EyeOne"
INSTRUMENT_SERIAL_NUMBER      ""
MEASUREMENT_GEOMETRY      "d/0"
MEASUREMENT_APERTURE      "4 mm"
MEASUREMENT_FILTER        "Ambient"
NSAMPLES      4
OBSERVER      "2 degree"
NUMBER_OF_FIELDS  75
BEGIN_DATA_FORMAT
SAMPLE_ID1  SAMPLE_ID2  SAMPLE_ID3  SPECTRAL_NM  SPECTRAL_VAL      SPECTRAL_NM  SPEC-
TRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM
SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_NM      SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_NM      SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_NM      SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL    SPECTRAL_NM  SPECTRAL_
TRAL_VAL    SPECTRAL_NM  SPECTRAL_VAL
END_DATA_FORMAT
BEGIN_DATA
"Ikea Dioder strip multi cyan"      ""      ""
380  2.450047E-4 390  1.921765E-4 400  1.682058E-4 410  1.728898E-4
420  3.814366E-4 430  1.843956E-3 440  9.252089E-3 450  3.592855E-2
460  8.032902E-2 470  7.487589E-2 480  4.004694E-2 490  2.335774E-2
500  2.826438E-2 510  4.903584E-2 520  5.836213E-2 530  4.261047E-2
540  2.536960E-2 550  1.371883E-2 560  7.153925E-3 570  3.807487E-3
580  2.067299E-3 590  1.281854E-3 600  8.535206E-4 610  6.081715E-4
620  5.106012E-4 630  4.590560E-4 640  4.616506E-4 650  4.115306E-4
660  3.495768E-4 670  3.255760E-4 680  3.294594E-4 690  3.648950E-4
700  3.429726E-4 710  2.619593E-4 720  3.469909E-4 730  4.222454E-4
END_DATA
```