Goniophotometer GMB 2000

FEATURES

Rotating goniophotometer of the device according to the EN 13032 Type 1 standard, corresponding to Type 1, Type 2, Type 3 of the CIE Recommendation n.70 Cap.5 and to Type A and Type B of the IESNA LM-75-01 standard for the survey of the photometric characteristics of lighting fixtures, lamps and LED sources with maximum dimensions of the luminous area which must be contained in a sphere with a diameter of 200 mm. The maximum dimensions of the luminaire can even reach 600 mm, depending on the relative position of the parts that emit light with respect to the structural parts.

It is possible to get measurements according with:

- C-Gamma
- V-H (B-Beta)
- per superficie coniche.

The machine consists of a structure in black anodized aluminum profiles which contain the positioning and measurement system made up of the following components:

- stepper motor and high precision lobe reducer with zero backlash for rotation around the vertical axis (Gamma angle movement).
- adjustable slide for support and positioning of the column which supports the fixture and which also houses the movement system around the horizontal axis.
- stepper motor and high-precision zero-backlash lobe reducer for moving the unit (movement by C planes).
- laser alignment.
- photocell holder column with alignment system and collimator, precision luxmeter with integration time up to 20 ms (typical 60 ms) compliant with the specifications of the EN 13032 standard and the IESNA LM-79 standard
- control and command system with TCP/IP interface.
- spectroradiometer column with alignment system and collimator.
- precision spectroradiometer with adaptive integration time compliant with the specifications of the EN 13032 standard and the IESNA LM-79 standard.
  Measures radiance and irradiance in the visible range, from 380 to 780 nm.
- Ewon remote assistance system.

The system is set up for reading and recording the following parameters:

- system power
- room temperature
- temperature of two points on the device detected by thermocouples

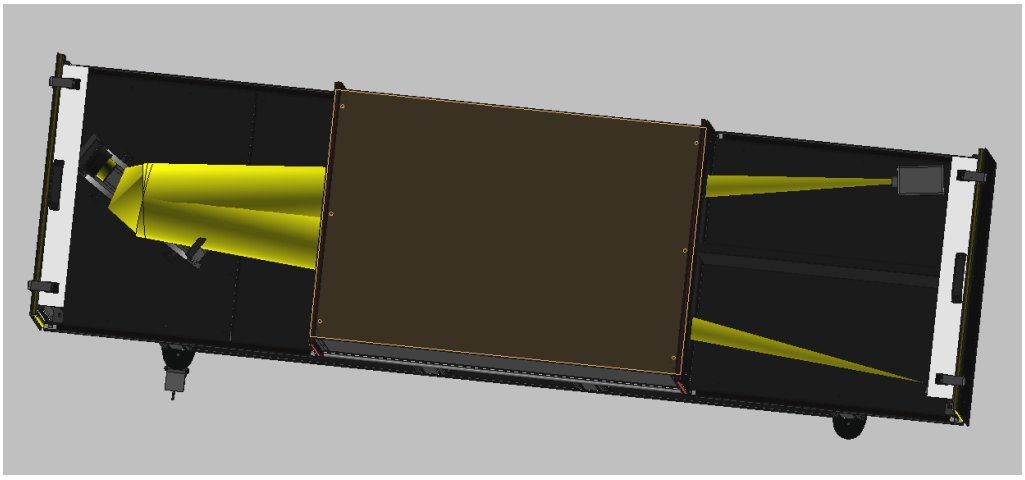
Instruments used for parameter monitoring:

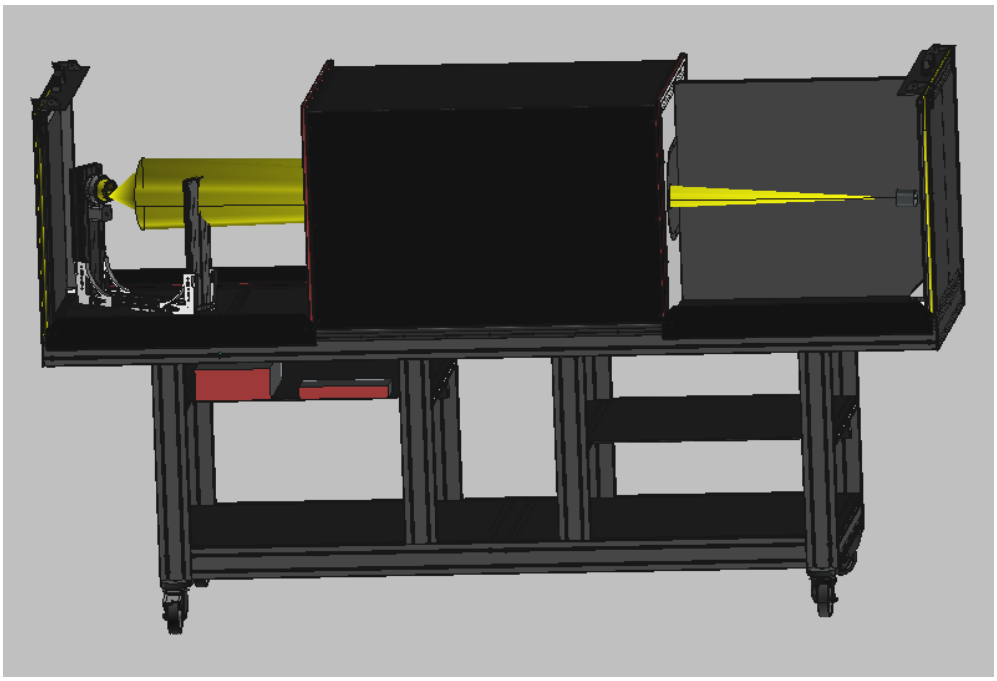
- Wattmeters Yokogawa.
- Wattmetres Newtons4th.
- Datalogger Agilent, for thermo couples reading.
- Datalogger Pico, for thermo couples reading.

The machine uses a single-phase power supply and uses around 500 W, with a maximum consumption of 700 W (3A) if the load is particularly heavy, for example in the case of heavy appliances mounted unbalanced with respect to the rotation axes.
The maximum measurable weight of the appliance is 2 kg.

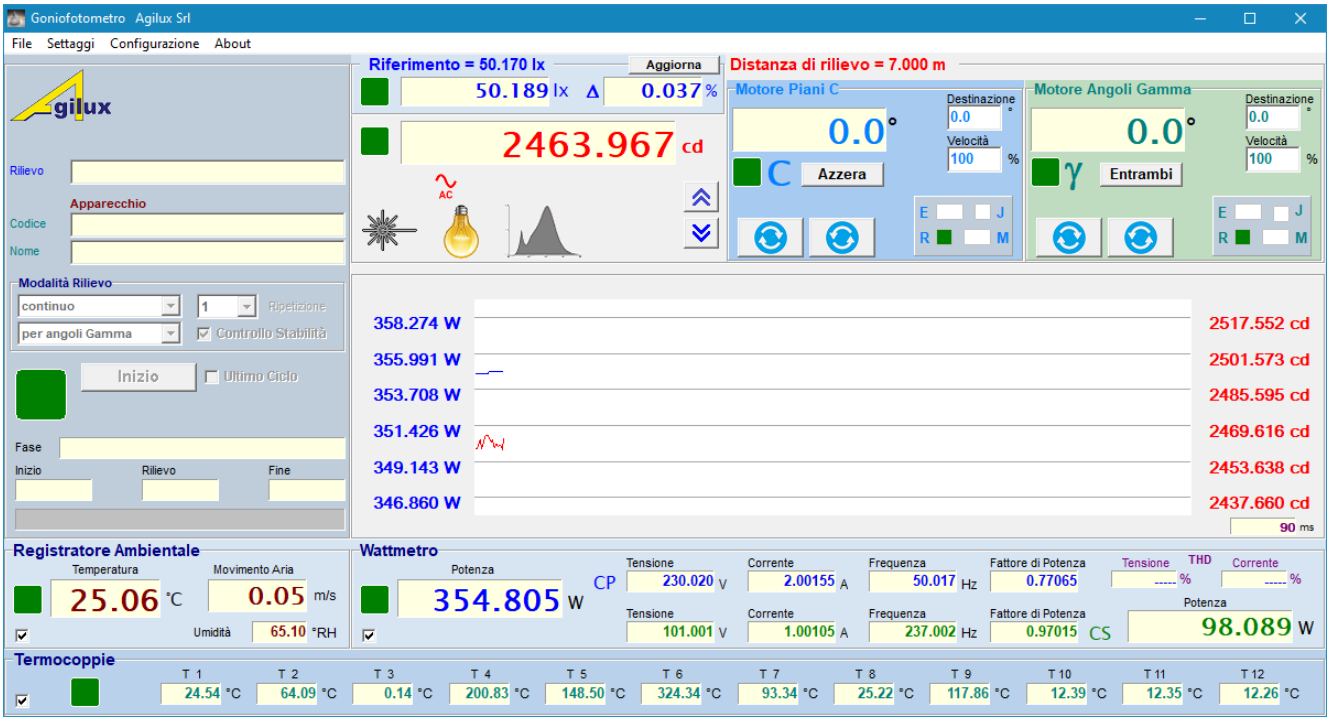
The Goniophotometer is equipped with a horizontal support to allow to operate with double constraint on the device and to guarantee perfect alignment even in case of V-H movement.

OPERATING LAYOUT





Goniophotometer operating software

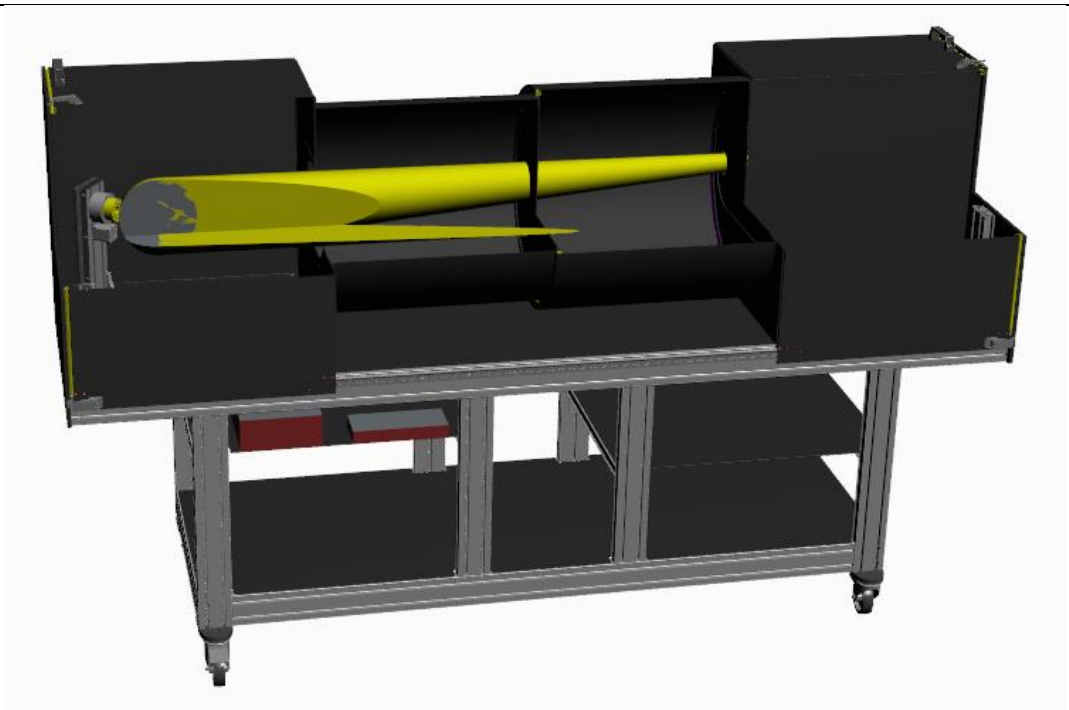


Goniophotometer software is able:

- to carry out measurements according to international standards (CIE Recommendations, EN 13032 Standard, IESNA LM79 Standard)
- to use user-customized measurement sequences
- to save the measured values and all the other parameters concerning the measurement - power used, environmental conditions, temperatures measured on the devices and on the power supplies - in a structured proprietary format from which it is possible to generate the Eulumdat, IES formats
- to carry out measurements in movement or with a stop (precision) in the measuring position
- to carry out up to 10 consecutive measurements on the same device
- to carry out checks of punctual values definable by the operator
- to check the stability of the apparatus in question to determine the start of the survey according to the standards in force
- to regulate the duration of the stops between one floor and another
- to adjust the rotation speed around the axes during the survey
- detect electrical parameters before and after power supplies (supports Newtons4th and Yokogawa wattmeters)
- to detect the parameters of temperature, humidity and wind speed during the survey using the DeltaOhm weather station
- to evaluate the stability of the electrical parameters during the survey with immediate stop of the same in case of differences greater than a predefined delta
- to evaluate the stability of the environmental parameters during the survey with immediate stop of the same in case of differences greater than a predefined delta
- to evaluate the flux curve of the appliance from start-up and for a specific period of time
- to evaluate the decay of the flux for emergency luminaires
- to display the polar diagram of the plane under examination during the entire measurement
- to switch off the device and the machine at the end of the survey (useful function in the case of long-term surveys that can also be carried out at night)
- to detect the temperatures of fixtures and lamps using a thermocouple system
- to notify via email (if an smtp server is available) the end of the survey in progress and any extraordinary events during the survey

Ambient:

Windows 11, 10, 8.x, 7.x



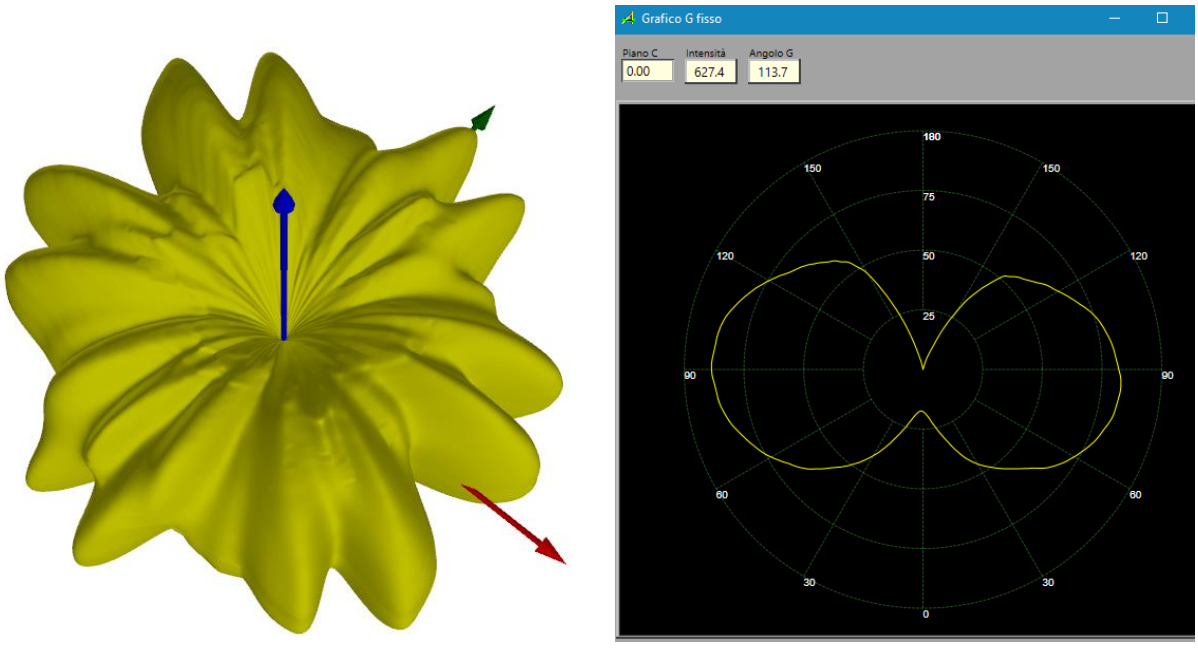
Measures available with Goniophotometer GMB2000

Photometric surveys

It is possible to carry out photometric surveys in a completely automatic way, setting the general parameters of the LED module and launching the survey:
the program checks that emission and absorption stability has been reached and starts the detection, at the end of which it automatically generates the most common photometric formats. Furthermore, an Excel file is generated which contains all the measurement parameters and finally all the files produced are zipped in a single backup file.

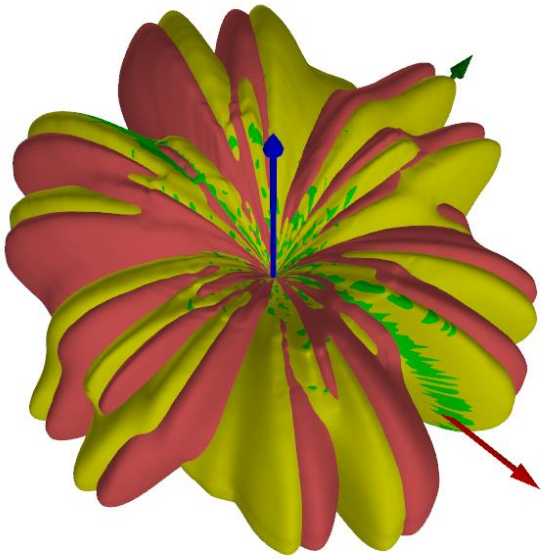
Photometric files format:

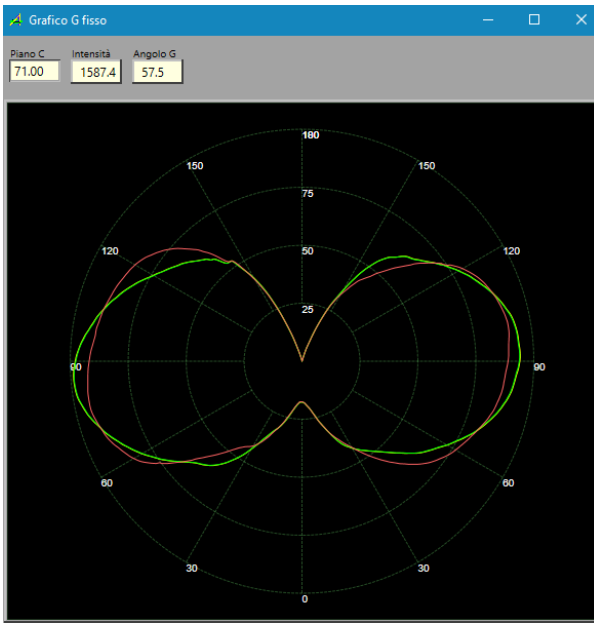
- Eulumdat LDT
- IESNA



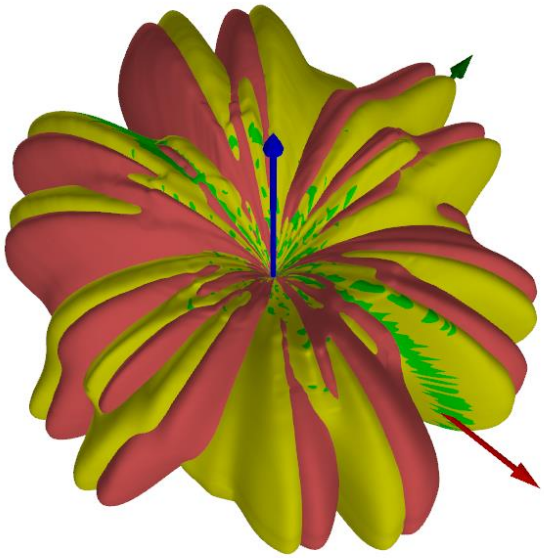
Example of photometric solid obtained from a filamentLED lamp survey

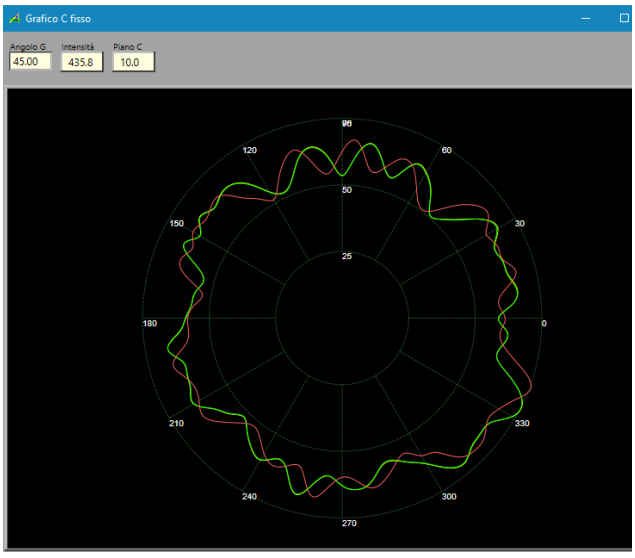
You can compare multiple surveys of similar products:





Also with conical surfaces:





Spectrometric surveys

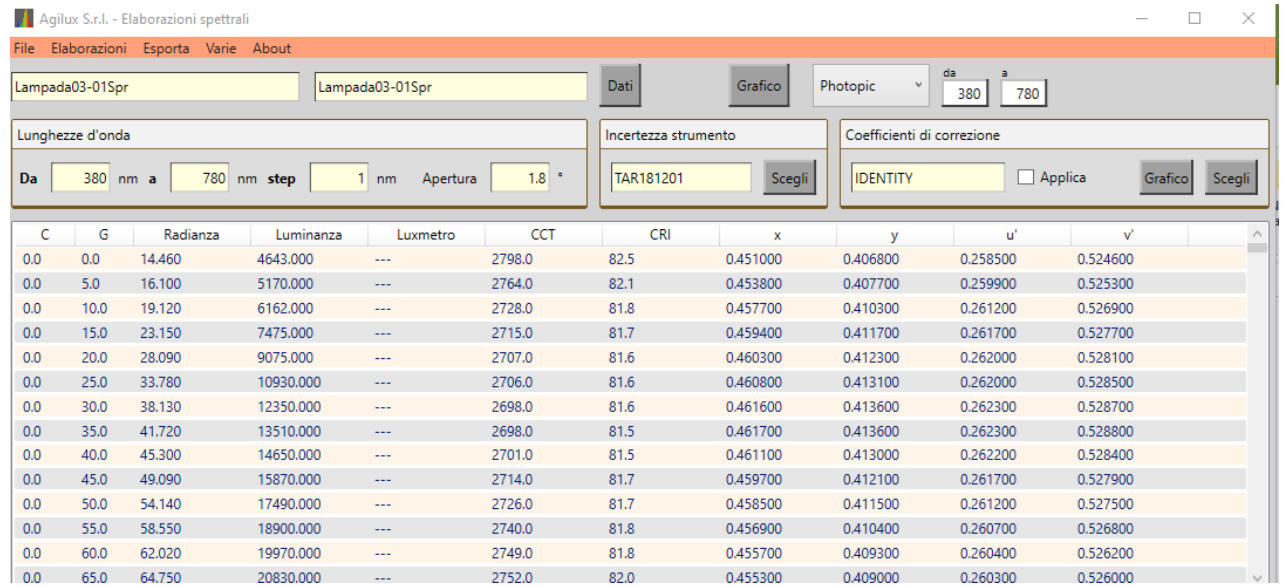
It is possible to carry out spectrometric surveys in a completely automatic way, by setting the general parameters of the LED module and launching the survey: the program carries out the survey of the spectrum in each required position by saving the data in a text format.
At the end of the survey it is possible to analyze the data and integrate them to obtain the integrated spectrum which is completely equivalent to the spectrum obtainable in the integrating sphere.
In aggiunta, però, in questo caso è possibile analizzare le variazioni spettrali di emissione in funzione delle varie direzioni spaziali e determinare l'Uniformità Angolare di Colore (Angular Colour Uniformity) Δu'v' secondo la norma EN13032-4.

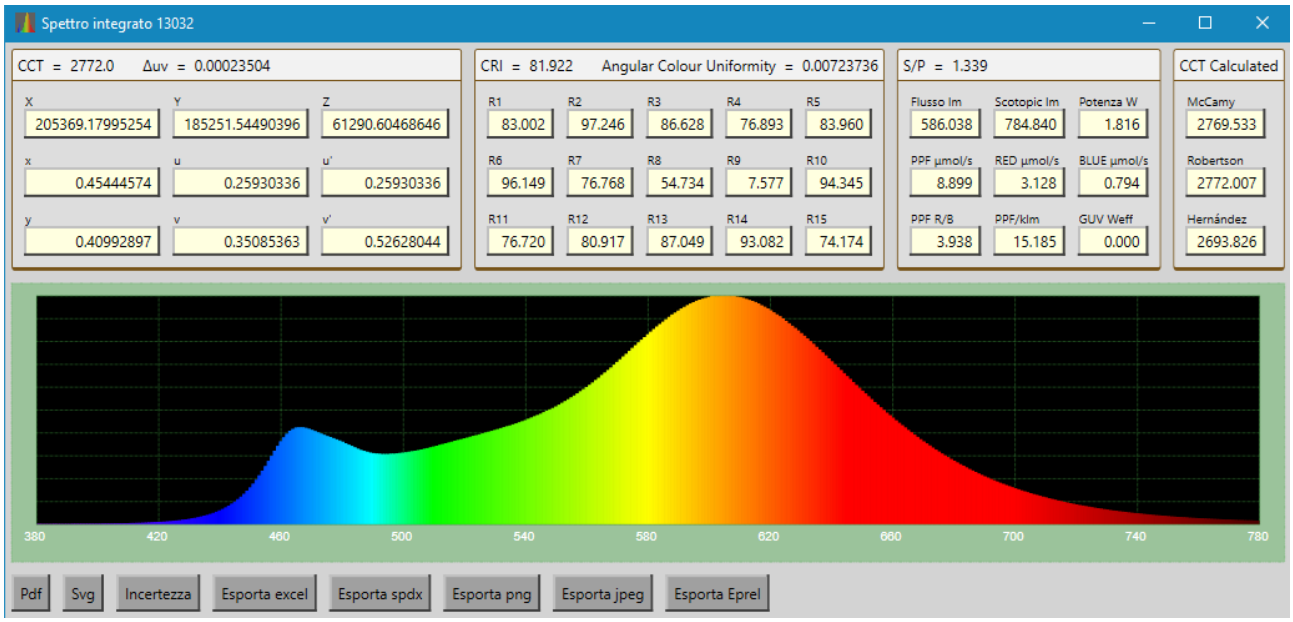
The integration can be performed according to the method described in EN 13032-4 or according to the IES LM-79 method.
Also in this case an LDT file and an IESNA file are generated containing the photometric intensity data detected by the spectroradiometer, the Excel file containing all the data measured during the survey and the backup Zip.

It is also possible to analyze the spectral data and obtain:

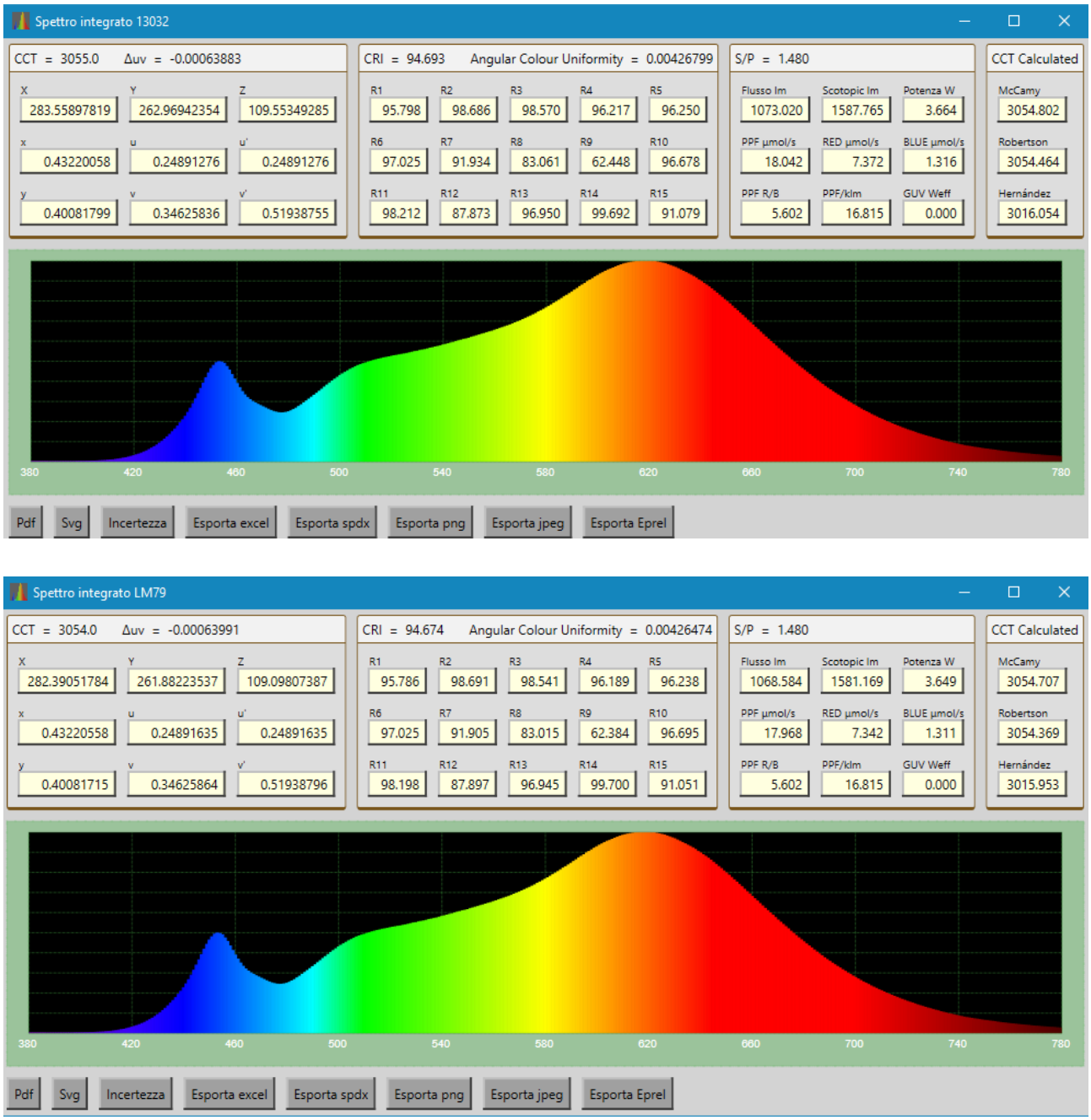
- the integrated spectrum
- the spectra and colorimetric parameters in each survey position
- the photopic photometric solid
- the scotopic photometric solid
- the solid of power radiated into space
- the solid of PAR effectiveness
- analysis of all parameters in specific wavelength ranges
- the variation of the CCT in the various spatial directions
- EULUMDAT files for each parameter considered

Spectral data can be saved in Excel format, in TM27-14 format and in the new TM33-19 or UNI11733 formats.

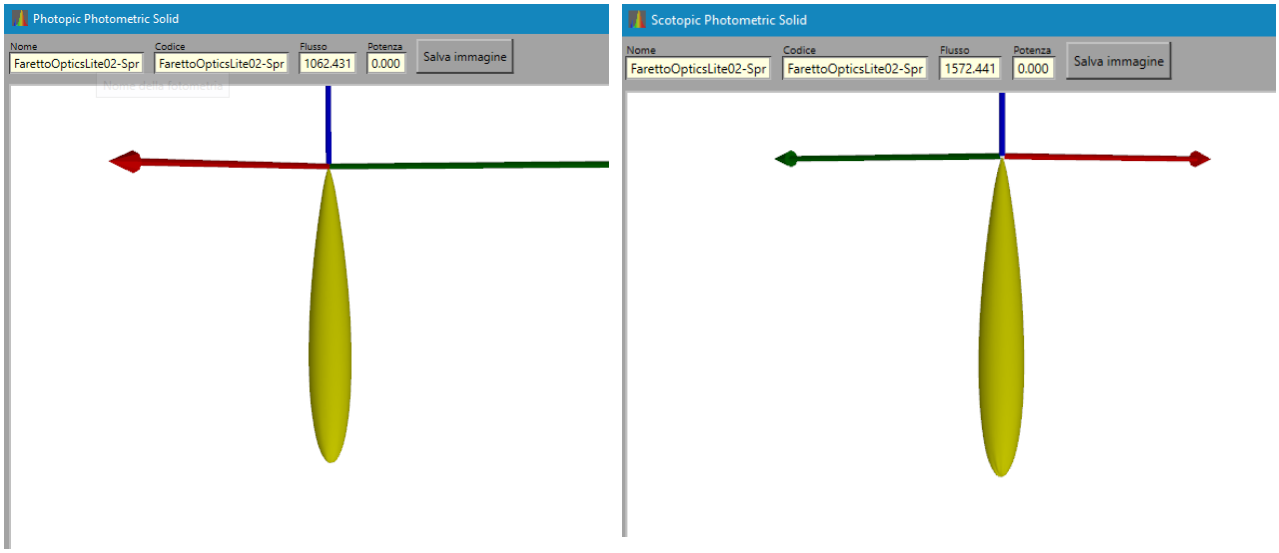




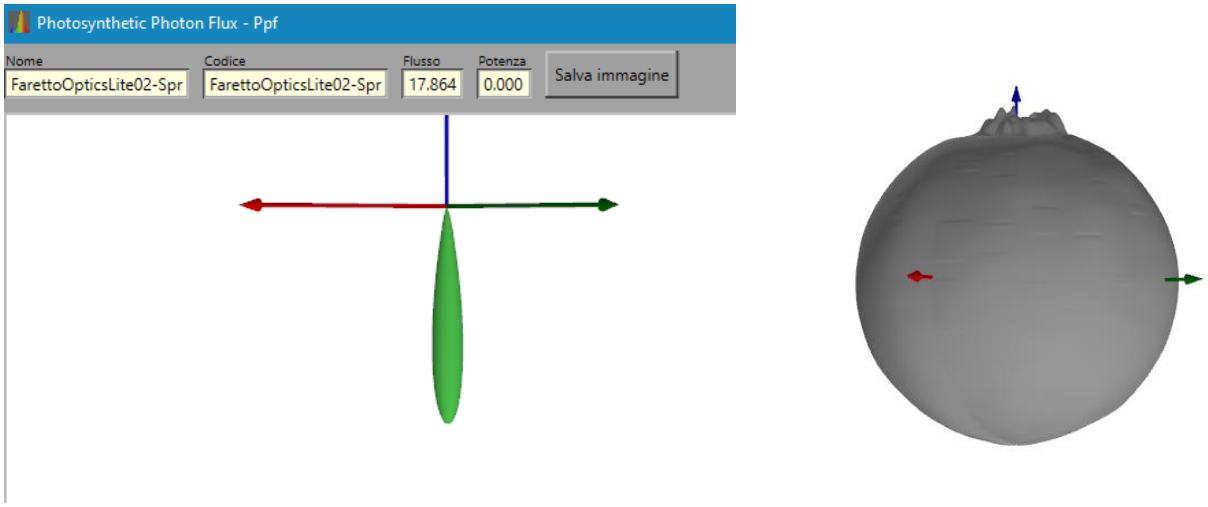
Example of single spectra in various directions and of integrated spectrum



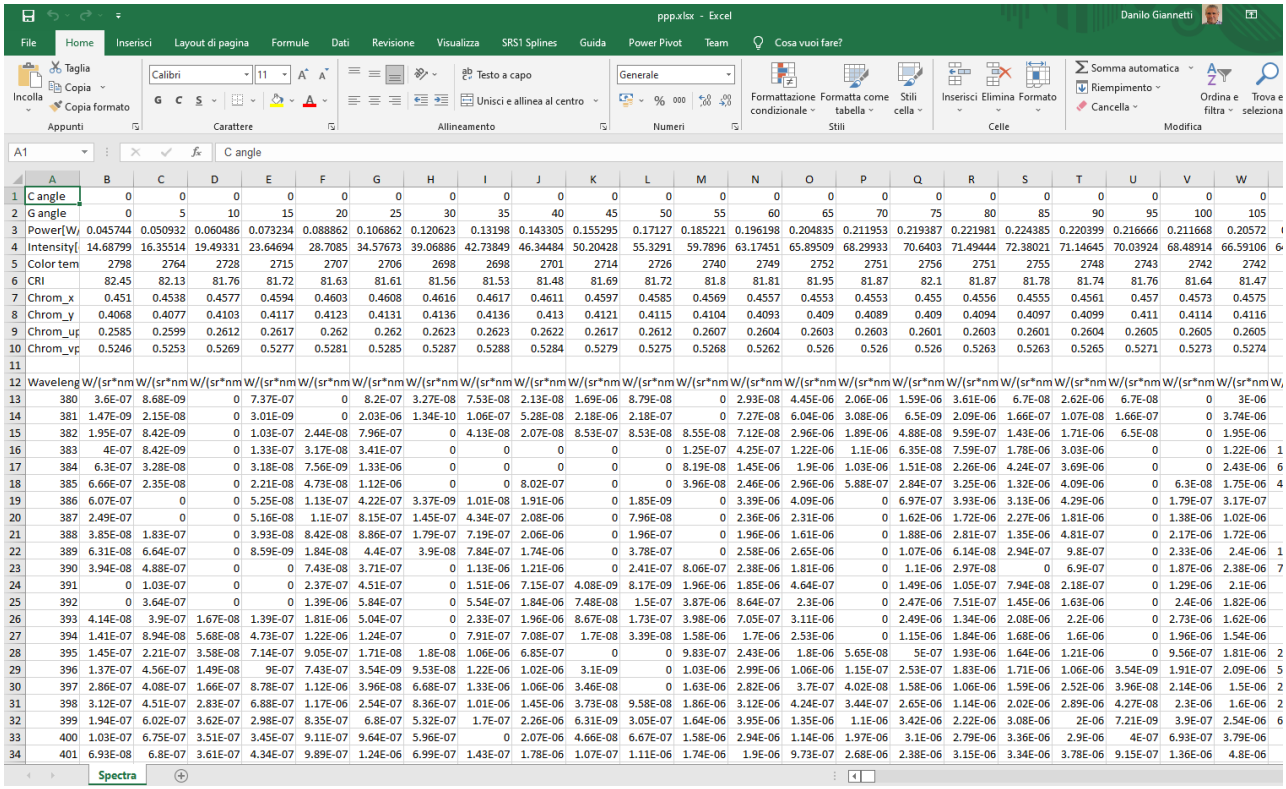
Spectra integrated according to different standards



Photopic and scotopic photometric solid of the same product obtained from spectrometric survey



Photometric solid PPF – photonic flux of photosynthesis – and the variation of the CCT in space



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	C angle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	G angle	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
3	Power[W/	0.045744	0.050932	0.060486	0.073234	0.088862	0.106862	0.120623	0.13198	0.143305	0.155295	0.17127	0.185221	0.196198	0.204835	0.211953	0.219387	0.221981	0.224385	0.220399	0.216666	0.211668	0.20572
4	Intensity[	14.68799	16.35514	19.49331	23.64694	28.7085	34.57673	39.06886	42.73849	46.34484	50.20428	55.3291	59.7896	63.17451	65.89509	68.29933	70.6403	71.49444	72.38021	71.14645	70.03924	68.48914	66.59106
5	Color tem	2798	2764	2728	2715	2707	2706	2698	2698	2701	2714	2726	2740	2749	2752	2751	2756	2751	2755	2748	2743	2742	2742
6	CRI	82.45	82.13	81.76	81.72	81.63	81.61	81.56	81.53	81.48	81.69	81.72	81.8	81.81	81.95	81.87	82.1	81.87	81.78	81.74	81.76	81.64	81.47
7	Chrom_x	0.451	0.4538	0.4577	0.4594	0.4603	0.4608	0.4616	0.4617	0.4611	0.4597	0.4585	0.4569	0.4557	0.4553	0.4553	0.455	0.4556	0.4555	0.4561	0.457	0.4573	0.4575
8	Chrom_y	0.4068	0.4077	0.4103	0.4117	0.4123	0.4131	0.4136	0.4136	0.413	0.4121	0.4115	0.4104	0.4093	0.409	0.4089	0.409	0.4094	0.4097	0.4099	0.411	0.4114	0.4116
9	Chrom_up	0.2585	0.2599	0.2612	0.2617	0.262	0.262	0.2623	0.2623	0.2622	0.2617	0.2612	0.2607	0.2604	0.2603	0.2603	0.2601	0.2603	0.2601	0.2604	0.2605	0.2605	0.2605
10	Chrom_vp	0.5246	0.5253	0.5269	0.5277	0.5281	0.5285	0.5287	0.5288	0.5284	0.5279	0.5275	0.5268	0.5262	0.526	0.526	0.526	0.5263	0.5263	0.5265	0.5271	0.5273	0.5274
11																							
12	Waveleng	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/(sr*nm	W/
13	380	3.6E-07	8.68E-09	0	7.37E-07	0	8.2E-07	3.27E-08	7.53E-08	2.13E-08	1.69E-06	8.79E-08	0	2.93E-08	4.45E-06	2.06E-06	1.59E-06	3.61E-06	6.7E-08	2.62E-06	6.7E-08	0	3E-06
14	381	1.47E-09	2.15E-08	0	3.01E-09	0	2.03E-06	1.34E-10	1.06E-07	5.28E-08	2.18E-06	2.18E-07	0	7.27E-08	6.04E-06	3.08E-06	6.5E-09	2.09E-06	1.66E-07	1.07E-08	1.66E-07	0	3.74E-06
15	382	1.95E-07	8.42E-09	0	1.03E-07	2.44E-08	7.96E-07	0	4.13E-08	2.07E-08	8.53E-07	8.53E-08	8.55E-08	7.12E-08	2.96E-06	1.89E-06	4.88E-08	9.59E-07	1.43E-06	1.71E-06	6.5E-08	0	1.95E-06
16	383	4E-07	8.42E-09	0	1.33E-07	3.17E-08	3.41E-07	0	0	0	0	0	1.25E-07	4.25E-07	1.22E-06	1.1E-06	6.35E-08	7.59E-07	1.78E-06	3.03E-06	0	0	1.22E-06
17	384	6.3E-07	3.28E-08	0	3.18E-08	7.56E-09	1.33E-06	0	0	0	0	0	8.19E-08	1.45E-06	1.9E-06	1.03E-06	1.51E-08	2.26E-06	4.24E-07	3.69E-06	0	0	2.43E-06
18	385	6.66E-07	2.35E-08	0	2.21E-08	4.73E-08	1.12E-06	0	0	8.02E-07	0	0	3.96E-08	2.46E-06	2.96E-06	5.88E-07	2.84E-07	3.25E-06	1.32E-06	4.09E-06	0	6.3E-08	1.75E-06
19	386	6.07E-07	0	0	5.25E-08	1.13E-07	4.22E-07	3.37E-09	1.01E-08	1.91E-06	0	1.85E-09	0	3.39E-06	4.09E-06	0	6.97E-07	3.93E-06	3.13E-06	4.29E-06	0	1.79E-07	3.17E-07
20	387	2.49E-07	0	0	5.16E-08	1.1E-07	8.15E-07	1.45E-07	4.34E-07	2.08E-06	0	7.96E-08	0	2.36E-06	2.31E-06	0	1.62E-06	1.72E-06	2.27E-06	1.81E-06	0	1.38E-06	1.02E-06
21	388	3.85E-08	1.83E-07	0	3.93E-08	8.42E-08	8.86E-07	1.79E-07	7.19E-07	2.06E-06	0	1.96E-07	0	1.96E-06	1.61E-06	0	1.88E-06	2.81E-07	1.35E-06	4.81E-07	0	2.17E-06	1.72E-06
22	389	6.31E-08	6.64E-07	0	8.59E-09	1.84E-08	4.4E-07	3.9E-08	7.84E-07	1.74E-06	0	3.78E-07	0	2.58E-06	2.65E-06	0	1.07E-06	6.14E-08	2.94E-07	9.8E-07	0	2.33E-06	2.4E-06
23	390	3.94E-08	4.88E-07	0	0	7.43E-08	3.71E-07	0	1.13E-06	1.21E-06	0	2.41E-07	8.06E-07	2.38E-06	1.81E-06	0	1.1E-06	2.97E-08	0	6.9E-07	0	1.87E-06	2.38E-06
24	391	0	1.03E-07	0	0	2.37E-07	4.51E-07	0	1.51E-06	7.15E-07	4.08E-09	8.17E-09	1.96E-06	1.85E-06	4.64E-07	0	1.49E-06	1.05E-07	7.94E-08	2.18E-07	0	1.29E-06	2.1E-06
25	392	0	3.64E-07	0	0	1.39E-06	5.84E-07	0	5.54E-07	1.84E-06	7.48E-08	1.5E-07	3.87E-06	8.64E-07	2.3E-06	0	2.47E-06	7.51E-07	1.45E-06	1.63E-06	0	2.4E-06	1.82E-06
26	393	4.14E-08	3.9E-07	1.67E-08	1.39E-07	1.81E-06	5.04E-07	0	2.33E-07	1.96E-06	8.67E-08	1.73E-07	3.98E-06	7.05E-07	3.11E-06	0	2.49E-06	1.34E-06	2.08E-06	2.2E-06	0	2.73E-06	1.62E-06
27	394	1.41E-07	8.94E-08	5.68E-08	4.73E-07	1.22E-06	1.24E-07	0	7.91E-07	7.08E-07	1.7E-08	3.39E-08	1.58E-06	1.7E-06	2.53E-06	0	1.15E-06	1.84E-06	1.68E-06	1.6E-06	0	1.96E-06	1.54E-06
28	395	1.45E-07	2.21E-07	3.58E-08	7.14E-07	9.05E-07	1.71E-08	1.8E-08	1.06E-06	6.85E-07	0	0	9.83E-07	2.43E-06	1.8E-06	5.65E-08	5E-07	1.93E-06	1.64E-06	1.21E-06	0	9.56E-07	1.81E-06
29	396	1.37E-07	4.56E-07	1.49E-08	9E-07	7.43E-07	3.54E-09	9.53E-08	1.22E-06	1.02E-06	3.1E-09	0	1.03E-06	2.99E-06	1.06E-06	1.15E-07	2.53E-07	1.83E-06	1.71E-06	1.06E-06	3.54E-09	1.91E-07	2.09E-06
30	397	2.86E-07	4.08E-07	1.66E-07	8.78E-07	1.12E-06	3.96E-08	6.68E-07	1.33E-06	1.06E-06	3.46E-08	0	1.63E-06	2.82E-06	3.7E-07	4.02E-08	1.58E-06	1.06E-06	1.59E-06	2.52E-06	3.96E-08	2.14E-06	1.5E-06
31	398	3.12E-07	4.51E-07	2.83E-07	6.88E-07	1.17E-06	2.54E-07	8.36E-07	1.01E-06	1.45E-06	3.73E-08	9.58E-08	1.86E-06	3.12E-06	4.24E-07	3.44E-07	2.65E-06	1.14E-06	2.02E-06	2.89E-06	4.27E-08	2.3E-06	1.6E-06
32	399	1.94E-07	6.02E-07	3.62E-07	2.98E-07	8.35E-07	6.8E-07	5.32E-07	1.7E-07	2.26E-06	6.31E-09	3.05E-07	1.64E-06	3.95E-06	1.35E-06	1.1E-06	3.42E-06	2.22E-06	3.08E-06	2E-06	7.21E-09	3.9E-07	2.54E-06
33	400	1.03E-07	6.75E-07	3.51E-07	3.45E-07	9.11E-07	9.64E-07	5.96E-07	0	2.07E-06	4.66E-08	6.67E-07	1.58E-06	2.94E-06	1.14E-06	1.97E-06	3.1E-06	2.79E-06	3.36E-06	2.9E-06	4E-07	6.93E-07	3.79E-06
34	401	6.93E-08	6.8E-07	3.61E-07	4.34E-07	9.89E-07	1.24E-06	6.99E-07	1.43E-07	1.78E-06	1.07E-07	1.11E-06	1.74E-06	1.9E-06	9.73E-07	2.68E-06	2.38E-06	3.15E-06	3.34E-06	3.78E-06	9.15E-07	1.36E-06	4.8E-06

Example of spectrometric Excel file