



The best technological choice

LIGHTENED SPECTRUM

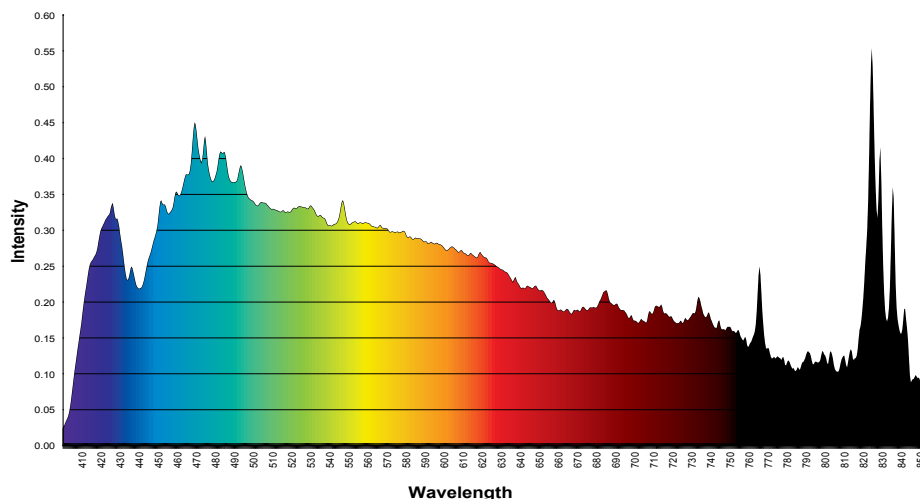
The light resulting from the flash light is a white light. This light is the combination of all the lights from purple colour to the red colour.

For example, a rainbow is the result from decomposition of the white light in a multicolour spectrum as well as a light ray through a prism.

This representation by colours is called spectrum of light.

This abscise (horizontal axe) corresponds to the length of the wave of the spectrum.

The graduation's scale is represented in nanometers (nm).



Spectrum issuing of a flash lamp unfiltered

The light produced is the combination of all the different colours distributed from the spectrum. All the white lights are not identical. Indeed, the white lights that are qualified as “warm” have red components more visible whereas the “cold” lights have more blue components which are visible.

A main point to keep in mind is that a light which has a particular and specific colour, for example the one coming from a laser, is characterized by a wave length which is unique (one ray).

A main advantage of the flash lamp such as the ones from the EFB beauté® IPL is that they are using white lights with a large spectrum which allows providing different treatments.

According to the kind of treatment to provide, the light's filter will be different.

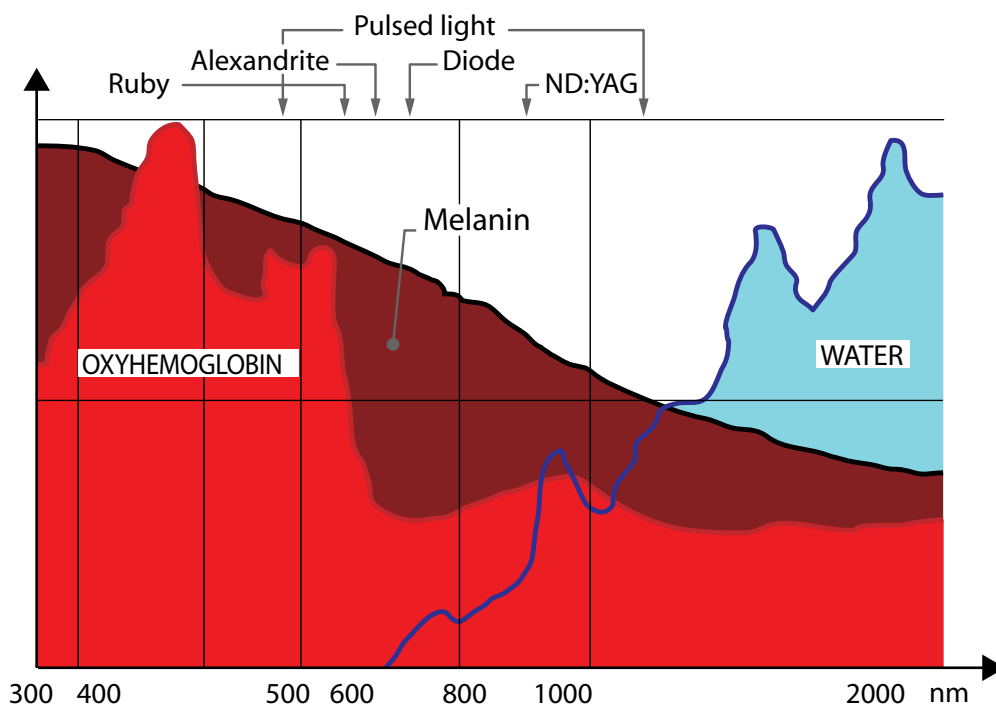
The parts of the spectrum which are considered as dangerous must be filtered and then will be completely removed. The only part of the spectrum kept is then only the one useful for the process.

The spectrum emitted from the lamp depends on the temperature of the plasma in the pipe and then from the electric current in the pipe. Then, it is possible to adapt the emitted spectrum to the target, choosing the right electric current; furthermore, it can be easily chosen by the operator thanks to the configuration panel settled on each model.

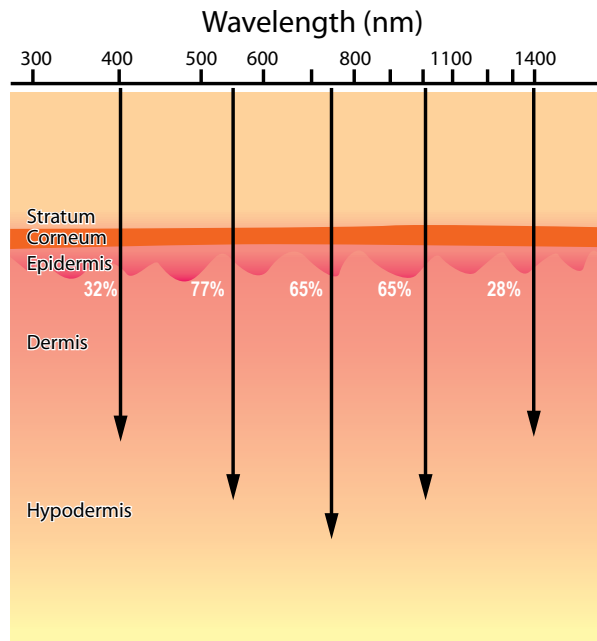
The EFB beauté® IPL are equipped with two applicators filtered differently for those 2 applications:

- Photo-epilation **HR** (Hair Removal), waves' length from 610 nm to 1100 nm
- Photo-rejuvenation **SR** (Skin Rejuvenation), wave's length from 475 nm to 1100 nm

The emitted spectrum adapted to the photo-epilation for exemple is adjusted in the strap 600 nm - 1200 nm between the absorption strap of the oxyhemoglobin and the water. A window in the absorption spectrum allows reaching the melanin from the hair.

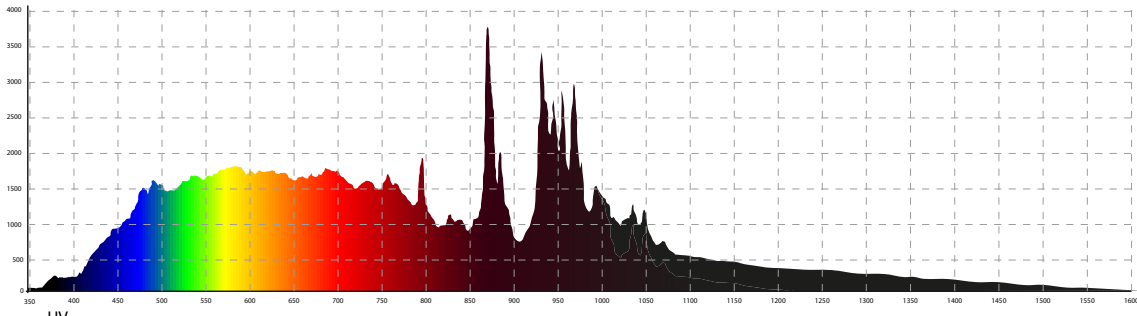


Absorption curves of the skin chromophores

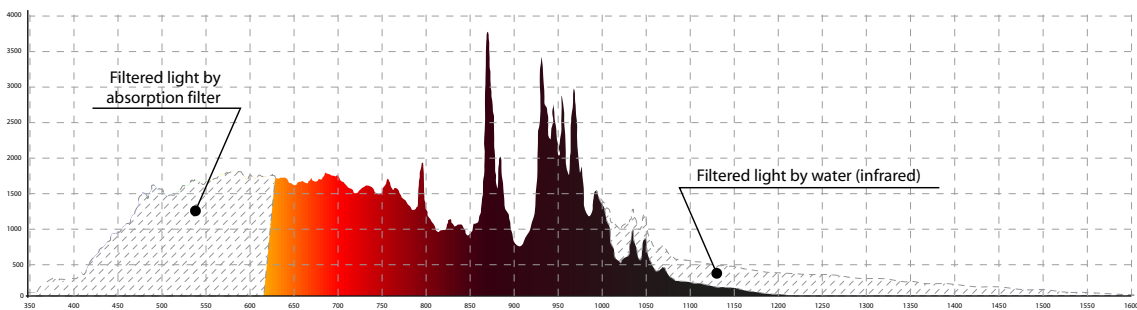


Light penetration through the skin

As we have seen, the light which is not filtered emitted by a flash lamp has a spectrum from 400 nm to 1200 nm. In order to get a safe protection of the epidermis and that is efficient, this light has to be rid of the waves less than 600 nm with the process of filtering. The hemoglobin particularly absorb the light at the waves under 600 nm and the frequency strap between 600 and 1200 nm is particularly adapted to the melanin present in the hair. The light filtered has a high facility to penetrate the tissues and could be absorbed with a selective manner by the melanin.



Spectrum issuing of a flash lamp unfiltered



Spectrum issuing of a flash lamp well filtered

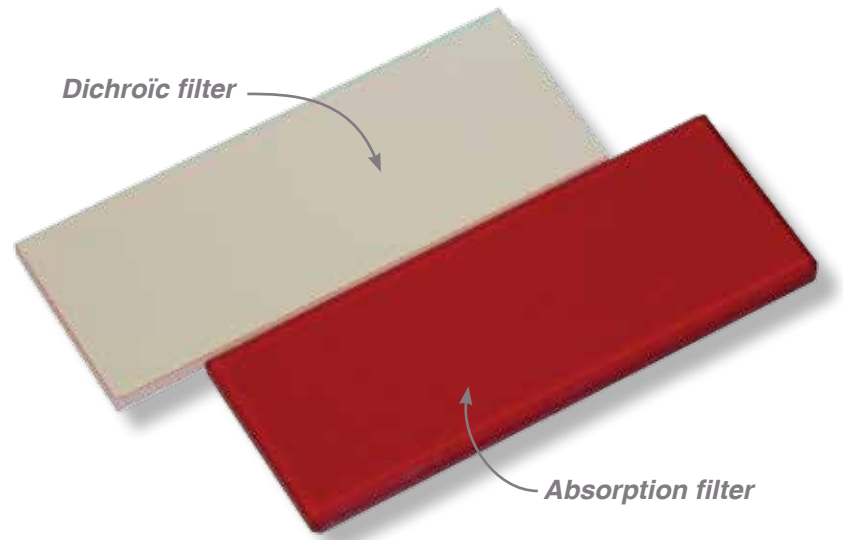
It would be then just needed to adapt the fluence and the time of the flashes concerning the different type of hair and skin that are treated in order to get excellent results.

All these parameters have been subject to numerous analyses and then included in the settings of the EFB beauté® IPL.

DIFFERENT OPTICAL FILTERS ON THE MARKET

Each applicator/handle is equipped with an **optical filter** which is specific for each application. The most relevant and performed filters are the **absorption filters**, used by all the EFB beauté® IPL, which need an appropriate water cooling system.

Most of the IPL used by other trademark are equipped with dichroic filters that do not heat but poorly filter the oblique rays that go through and are pretty much dangerous (risk of burns).



In order to provide a good and safe treatment, the lighting power must be of a high quality which implies to be well graded and precised which is the main condition.

The thermic effect from the pulsed light on the biological tissues is a complex process resulting from three distinct phenomena:

- A **conversion** of the light into heat
- A heating **transfer**
- A **reaction** from the tissues due to the temperature and the duration of the heat

The interaction conduct to the denaturation or to the destruction of a tissue's volume.

Temperature (°C)	Modifications
45	Vaso-dilatation, endothelial damages
50	Disappearance of the enzymatic activity
60	Dis-organisation of the cellular membranes
70	Protein de-naturation
	Collagen de-naturation
	Permeabilisation of the membranes
80	Contraction of the collagenous fibres
100	Coagulation necrose
	Water vaporisation
	Complete de-hydratation
>100	Vaporization of the organic constituents

Effect of temperature on the tissue components

In the visible zone (blue, green, yellow), the absorption occurs principally at the state of the hemoglobin and of the melanin (application of the photo-rejuvenation). The red and the near infrared (0,6 to 1,2 μm) are poorly absorbed and deeply penetrate into the tissues (photo-epilation application).

THE IMPORTANCE OF THE ENERGY STABILITY

The medical devices are under strict rules such as the norm EN60601-2-22 which concerns particularly the precision of the energies; this norm (§50) limits at $\pm 20\%$ the energies gap compared to the Nominal.

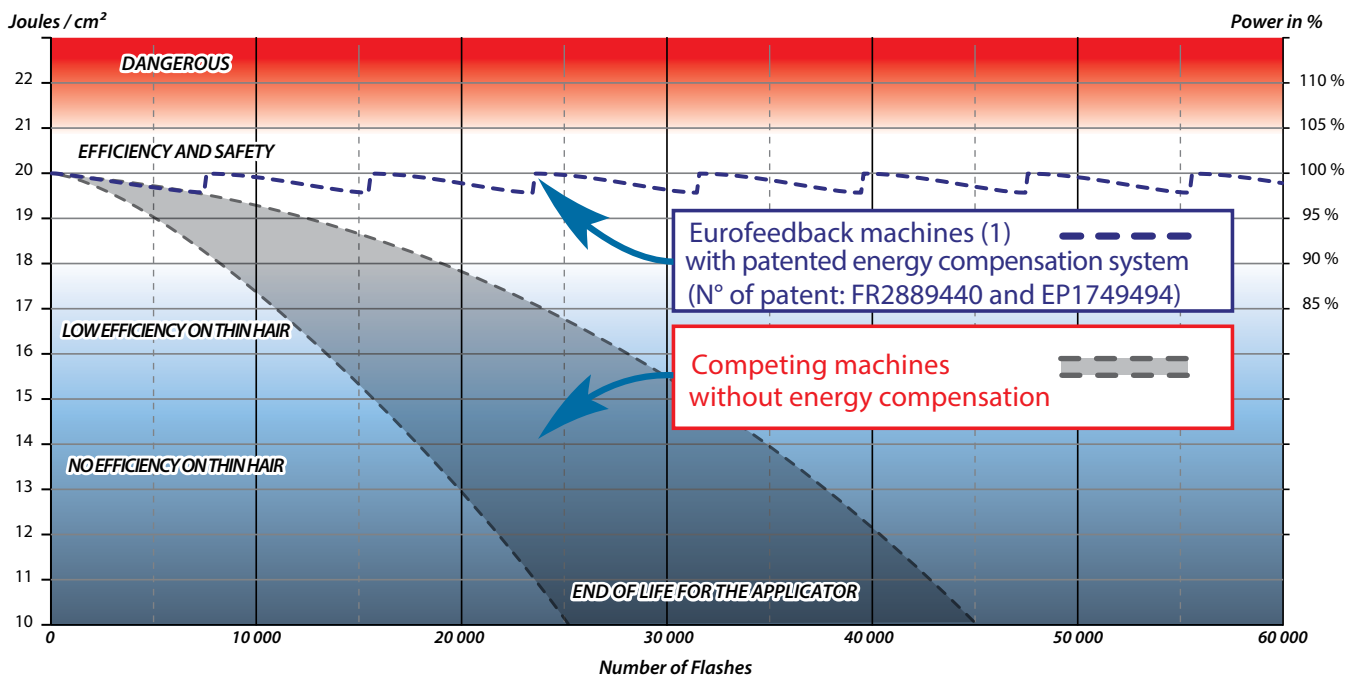
With a long time experience of use, it is demonstrated that variation of 10% of the energy has high consequences on the quality of the treatment and risk of burns. In order to provide a high quality process and then to limit all risks, a machine has to be equipped with applicators that can insure a better precision than 10% during all its lifetime. The energy precision has to be better than the exigencies from the conformity.



Most of manufacturers supply IPL material (Intense Pulsed Light) equipped with applicators that deliver approximate energies that could be $\pm 50\%$ in order to compensate the progressive diminution of energy of their applicators, which make these machines very dangerous for their clients.

In order to remedy to this default on the IPL, Eurofeedback has deposited one of its patents N°FR2889440 for France and EP1749494 for Europe, concerning the compensation of energy in order for it to remain constant during all the lifetime of its applicators.

Energy of applicators*



(1) Curve with countervailing power delivered during the life of the applicator, for 20j /cm² programmed.
*for water cooled machines

Eurofeedback's patented energy compensation system



THE NATIONAL PATENT ON WHITE AND BLOND HAIR



White hairs do not have melanin and do not absorb the light sent by flash lamp.

Eurofeedback has copyright at the INPI organization (National Institute of the Industrial Propriety) in 2005, a national patent concerning a method for hair removal in particular light colored hairs with IPL (white and blond hairs). Definitive publication on the patent N° FR2892012-B1 has been made since the 18th of July 2008.

Eurofeedback has the same patent, obtained on October 17th 2005 from OMPI (World Intellectual Property Organization) for a demand of international patent on the hair removal on the clear skins. The patent was published the 26th of April 2007, N° WO2007045793.

Eurofeedback is the only manufacturer to be able to use this process on its IPL EFB beauté®.

Any act of copy is liable to 3 years of detention and of 300 000 € of fees.

AFTER SALES SERVICE

The EFB beauté® IPL are tested one more time before shipment from factory.

EFB beauté® IPL have a very high standard of reliability, the rate of being not functional (break down) is less than 3% per year.

EFB beauté® IPL are warranted for a period of 2 years.



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