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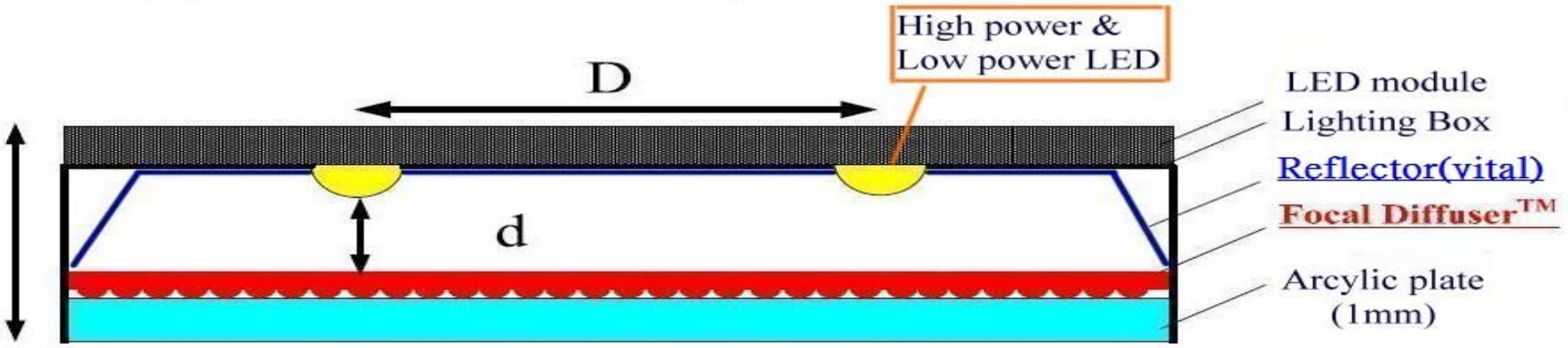
Attention for the Usage of Focal Diffuser ™

- **Focal Diffuser is called FD in shortening.**
- **FD should be used directly to light source. The structured surface should be on the outside, and the non-structured surface is on the inner side (i.e. Light irradiation side).**
- **Please follow the rule of "space ratio" to set up the distance between FD & LED light source.**
- **Avoid touching the surface of the structure side, in case the Micro-Lens structure scratched.**
- **FD is prohibited from pressing which will cause damaging to the structure on the surface.**
- **FD needs to be protected so that can prevent from scratching and damaging.**
- **FD is prohibited from using any kind of solvents.**

✧ **Important: Must use "Reflector" with FD, to get the best light efficiency (90-95%).**

Focal Diffuser ™ space ratio

Skeleton drawing of LED luminaire loading Focal Diffuser Film ™



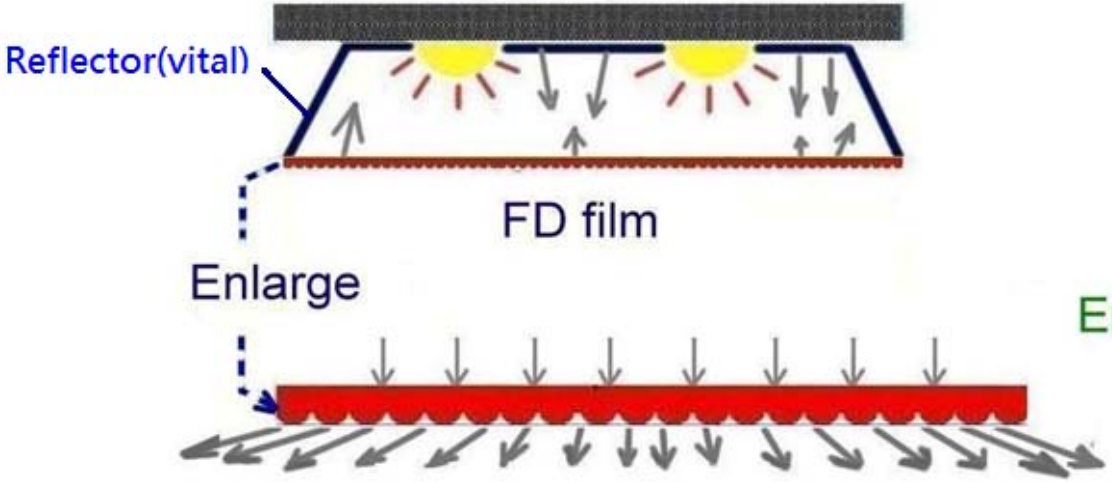
The Rules Of Design　Space Ratio（d/D）＞0.66

D：LED spacing (dot to dot)　　d：LED to FD film (the distance)

Remark:	**1.**	**FD can be used with high or low-power LED.**
	2.	**The luminance of the surface can be adjusted according to the diffused area. (Enlarging the measurement of area of the FD film with the geometric proportion at the same measure of light can reduce the luminance of FD surface and make the light more comfortable.)(same as the relation between the pressureand the measurementt of area)**
	3.	**You must add the device of high efficiency reflector to reflect LED light.(Higher reflection rate can get higher light efficiency.)**
	4.	**Fit for any kind of LED light source and any luminous angle.**
	5.	**Acrylic is the protective layer to keep FD structure away from scratching and polluting.**
	6.	**The thickness of lamps depends on d/D value. If the light can be recycled and reflected entirely, the d/D could be any values bigger than 0.66. However, in fact the light could not be efficiently recycled and reflected entirely (100%). Hence, the recommendation of the d/D should be in the range between 0.66 and 2. (means *0.66 < d/D < 2*)**

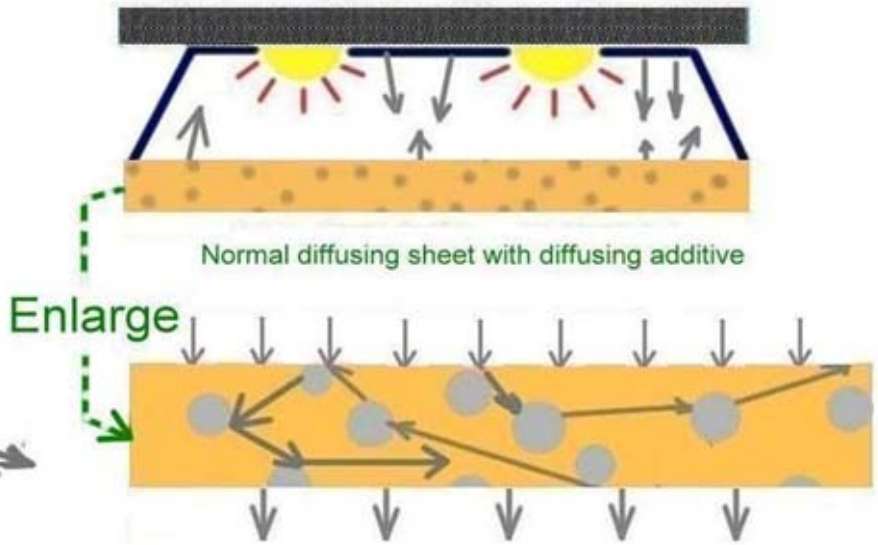
※　Please be sure to obey all the rules of design, then, FD can be performed perfectly.

FD compares with the Normal Diffuser plate with diffusing additive



- Micro-structured on FD surface makes no lose of the light efficiency with multi-collisions. Light reflects in the structure regularly and the rates of light recycling and reusing are extremely high.
- There are many kinds of micro-structured diffuser sheets or films in current market (pyramid type, diamond type, pillar type, V shaped mirror…….), but they can't change the light source perfectly from point to area. As a result, we cannot use single piece of diffuser sheets or films to deal with the problems such as glare, multiple shadows, and light efficiency at the same time.
- Due to high luminance on the surface, people misunderstand the glare does not be eliminated

Light Efficiency is 90% - 95%



- Light is transmitted inside the diffuser plate, and irregular reflects after colliding with the additive particle. Under the situation, light can't be recycled and reused completely, even reflects out with majority consumption.
- If you reduce diffusing additive to raise the light efficiency, the light spots will become glaring and multi-shadows will not be eliminated.
- Generally speaking, we will use the "Mean Free Path" in modern physics to explain the light as a particle in Wave Optics. More collision will reduce more light efficiency. Normal diffusing additives produce more discrete differentiation of multi-phase refection, and the "mean free path" of light is much more than in the transparent material. (The concept is like the fuel consumption different from driving on high way to downtown roads)

Light Efficiency is only 50% - 60%