



FRIGOLED

LED LIGHTING SYSTEMS FOR COLD STORAGEES

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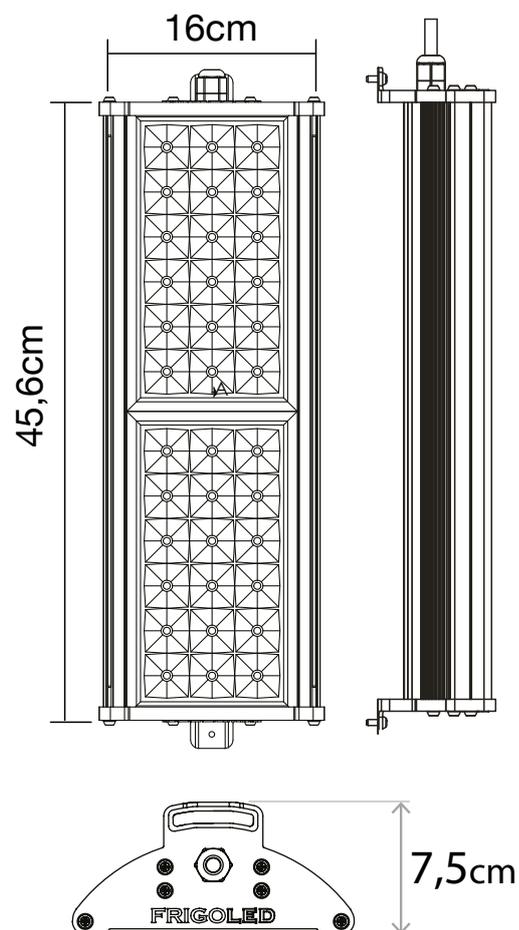
The future light source in cold storage

LED lighting is considered to be the greatest revolution in lighting technologies since Edison invented the lamp. LED light bulbs have started to replace commonly used halogen, metal, fluorescent and sodium light bulbs.

LED light bulbs will be the light source of the future owing to their high efficiency, low energy consumption and life cycle up to 50,000 hours.

These devices are based on a semi-conductive technology placed inside a module that is assembled to the surface of a standard lamp body.

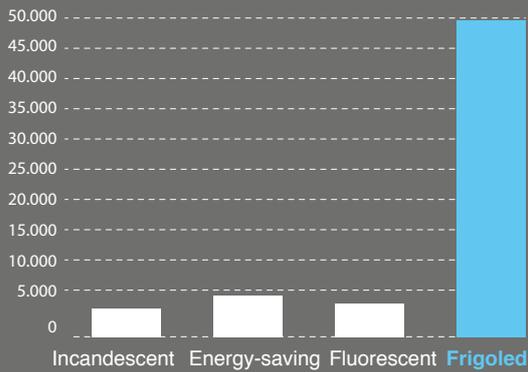
What better than a lighting system that can last 8 hours a day for 35 years and, moreover, consumes ten times less electricity than a regular light bulb?



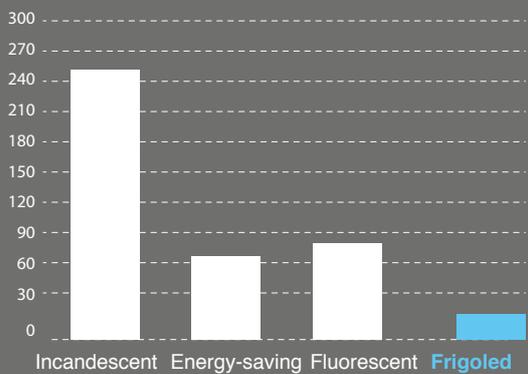
Advantages of frigoled lighting

1. Operating life up to 50.000 hours
2. Very low energy consumption. (about 10% of the conventional sources)
3. Can be re-installed to the place of old armatures.
4. Works as soon as it's on.
5. Works directly by means of 220 VAC.
6. Almost does not produce heat.
7. No need for maintenance.
8. IP65 protection class.
9. Shock and vibration resistant. Does not contain fragile elements such as glass, filament
10. Does not include ultraviolet and infrared rays; safer to use for the food sector and light-sensitive materials.
11. There is no heavy metal in its structure such as mercury and halogen so it is an environmental friend
12. Interoperability at temperatures as low as -40°C
13. Suitable for indoor and outdoor use as it can work at dry and wet environments.

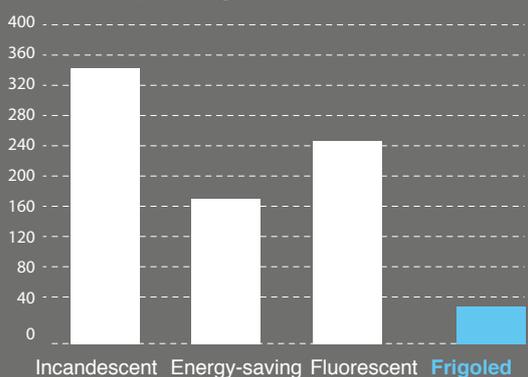
Life cycle (hours)



Energy consumption under equal lighting (W)



3-year operating cost * (€)



*6,640 hours



The effects of the low temperatures on lighting systems

Normal and compact fluorescent lightings (energy saving lamps) used in cold rooms are being replaced by LED armatures.

The most important reason of this replacement is the excessive decline in lighting intensity connected with the decreasing temperature. In the tests at different temperatures carried out by different refrigeration firms, it has been observed that the compact fluorescents lose too much lighting intensity compared to LED armatures in cold ambiants.

Tests were carried out at 5°C, -5°C, -18°C and -25°C storage temperatures.

In these tests measured light intensities were accepted as 100 units at normal room temperature.

These values are calculated over 100 lighting unit named as lighting efficiency.

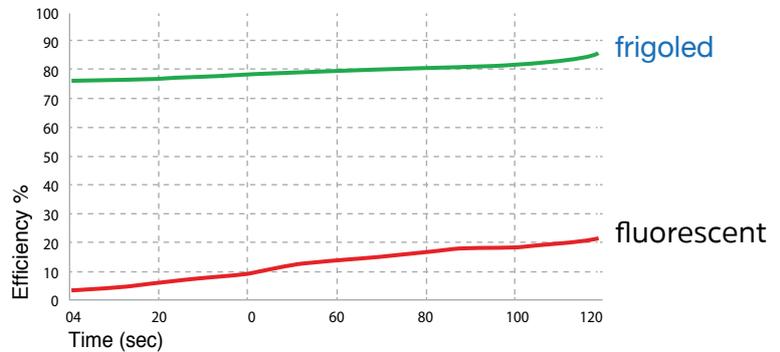
Normal and compact fluorescents lighting efficiency decreases by 10% especially at lower temperatures than 15°C.

A light density has observed in every 10 seconds in 120 seconds time period.

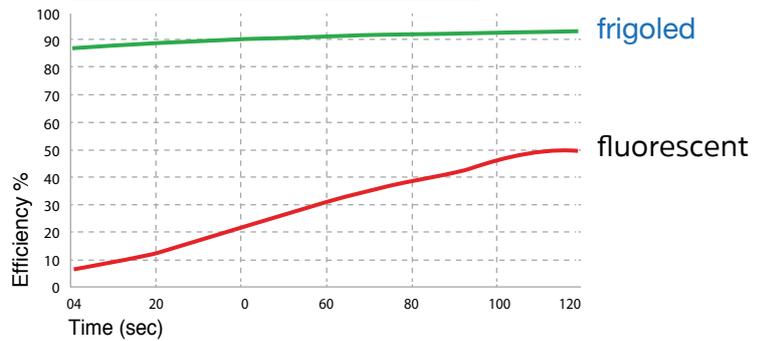
According to the observed results it is obvious that led armatures are more efficient than compact ones.

If the input-output time of the loading goods is accepted average 120 sec to the cold storages; old lighting systems can't reach even the half capacity of LED lighting.

LIGHTING EFFICIENCY % (T=-18°C)



LIGHTING EFFICIENCY % (T=- 5°C)



Frigoled lighting systems

LED revolution on cold storage

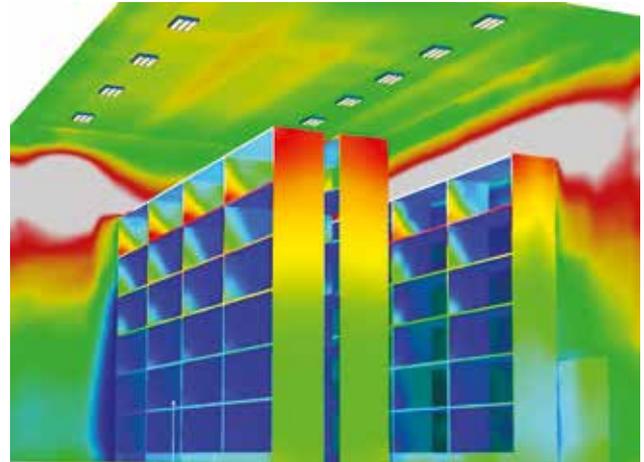
PROJECT SERVICE

Led Lighting Systems, where in many fields in lighting business were found have also begun to be used as FRIGOLED brand for the first time in cold storages.

The negative effects of cold on any other lighting systems, provide positive contribution to Led Lighting as an increase in lifetime LED lighting is not a source of heat in cold temperatures.

Unlike other lighting systems, lighting intensity doesn't decrease excessively in low temperatures.

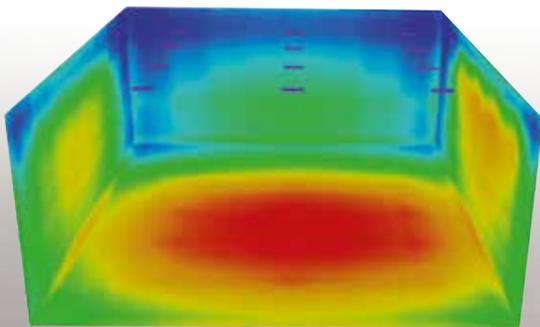
Frigoled 5 years R&D work which is still working with 15.000 armatures has already completed the whole of its experiences from -40 °C to +10 °C. When we are given the room plan , you will be able to have **FREE** lighting project.



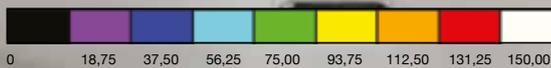
LUX



Thermal color distribution of frigoled lighting system



LUX



FRIGOLED LIGHTING ARMATURE SELECTION TABLES

Product range is the determining factor in the LED lighting applications of the cold storages. While 50 LUX Standard illumination is recommended for larger products, 100 Lux Good lighting for smaller pieces are recommended. 200 Lux Excellent lighting is recommended for very small pieces.

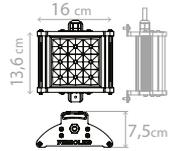
W: Width / H: Height

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900
933 LM
12,1 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	2,2 m	2,4 m	2,6 m	2,8 m	W→H	2 m	2,2 m	2,4 m	2,6 m	2,8 m	W→H	2 m	2,2 m	2,4 m	2,6 m	2,8 m
8 m ²	1	1	1	1	1	8 m ²	2	2	2	2	2	8 m ²	2	2	3	3	3
10 m ²	1	1	1	1	1	10 m ²	2	2	2	2	2	10 m ²	3	3	3	4	4
12 m ²	1	1	1	2	2	12 m ²	2	2	2	3	3	12 m ²	3	4	4	5	6
14 m ²	1	1	2	2	2	14 m ²	2	2	3	3	3	14 m ²	3	4	5	6	7
16 m ²	2	2	2	2	2	16 m ²	3	3	3	3	3	16 m ²	5	6	7	7	7
18 m ²	2	2	2	2	2	18 m ²	3	3	3	4	4	18 m ²	6	7	7	8	8

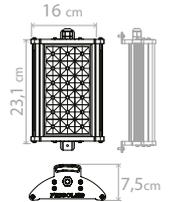


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1800
1866 LM
22,9 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m
20 m ²	1	1				20 m ²	1	2				20 m ²	3	5			
50 m ²	1	2	3	3		50 m ²	3	5	6	7		50 m ²	6	10	12	14	
100 m ²		4	5	5		100 m ²		7	9	10		100 m ²		15	18	20	
250 m ²			8	10	12	250 m ²			16	20	25	250 m ²			33	36	39
500 m ²			15	16	18	500 m ²			29	33	37	500 m ²			59	66	74

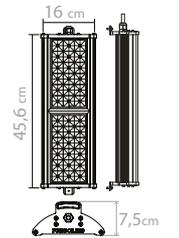


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3600
3732 LM
45,8 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m
20 m ²	1	1				20 m ²	1	2				20 m ²	1	2			
50 m ²	1	1	2	2		50 m ²	2	2	3	3		50 m ²	3	5	6	6	
100 m ²		2	2	2		100 m ²		4	5	5		100 m ²		7	9	10	
250 m ²			4	5	5	250 m ²			8	10	10	250 m ²			16	20	22
500 m ²			7	7	8	500 m ²			14	16	18	500 m ²			29	31	33

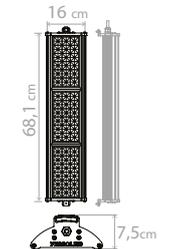


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5400
5598 LM
68,7 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m
20 m ²						20 m ²						20 m ²					
50 m ²	1	1	1	1		50 m ²	1	2	2	2		50 m ²	2	3	5	6	
100 m ²		1	2	2		100 m ²		2	2	3		100 m ²		4	6	7	
250 m ²			3	4	4	250 m ²			5	6	6	250 m ²			11	12	13
500 m ²			5	6	7	500 m ²			10	11	12	500 m ²			20	22	24

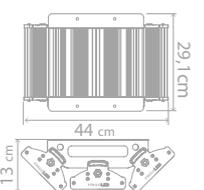


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3X1800
5598 LM
68,7 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m
20 m ²						20 m ²						20 m ²					
50 m ²	1	1	1	1		50 m ²	1	2	2	2		50 m ²	2	3	5	6	
100 m ²		1	2	2		100 m ²		2	2	3		100 m ²		4	6	7	
250 m ²			3	4	4	250 m ²			5	6	6	250 m ²			11	12	13
500 m ²			5	6	7	500 m ²			10	11	12	500 m ²			20	22	24

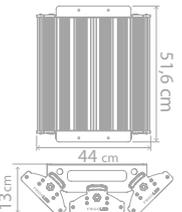


FRIGOLED

3X3600
11196 LM
137,4 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m
20 m ²						20 m ²						20 m ²					
50 m ²						50 m ²						50 m ²					
100 m ²		1	1	1		100 m ²		1	2	2		100 m ²		1	2	3	
250 m ²			2	2	2	250 m ²			2	3	3	250 m ²			5	6	7
500 m ²			2	3	3	500 m ²			5	6	7	500 m ²			10	11	12

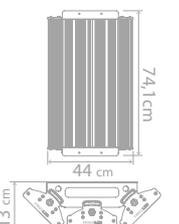


FRIGOLED

3X5400
16794 LM
206,1 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m	W→H	2 m	4 m	6 m	7,5 m	9 m
20 m ²						20 m ²						20 m ²					
50 m ²						50 m ²						50 m ²					
100 m ²		1	1	1		100 m ²		1	1	2		100 m ²		2	2	2	
250 m ²			1	2	2	250 m ²			2	2	2	250 m ²			3	4	5
500 m ²			2	2	2	500 m ²			3	3	4	500 m ²			5	6	7

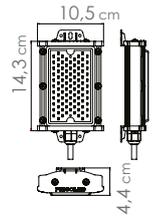


FRIGOLED

EL 18
1702 LM
16,25 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
A↔H	2 m	4 m	6 m	7,5 m	9 m	A↔H	2 m	4 m	6 m	7,5 m	9 m	A↔H	2 m	4 m	6 m	7,5 m	9 m
20 m²	1	1				20 m²	1	2				20 m²	3	5			
50 m²	1	2	3	3		50 m²	3	5	6	8		50 m²	6	10	13	16	
100 m²		4	6	7		100 m²		8	10	12		100 m²		15	18	21	
250 m²			10	11	13	250 m²			18	22	24	250 m²			36	42	48
500 m²			16	18	20	500 m²			32	35	38	500 m²			60	66	72

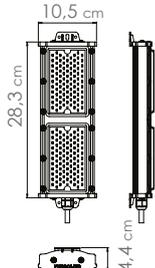


FRIGOLED

EL 36
3404 LM
33 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W↔H	2 m	4 m	6 m	7,5 m	9 m	W↔H	2 m	4 m	6 m	7,5 m	9 m	W↔H	2 m	4 m	6 m	7,5 m	9 m
20 m²			1			20 m²		1	2			20 m²	2	3			
50 m²	1	1	2	2		50 m²		2	3	4		50 m²	3	5	6	8	
100 m²		2	3	3		100 m²		4	5	6		100 m²		7	9	11	
250 m²			4	5	6	250 m²			10	11	12	250 m²			18	20	24
500 m²			8	9	10	500 m²			16	18	20	500 m²			32	34	36

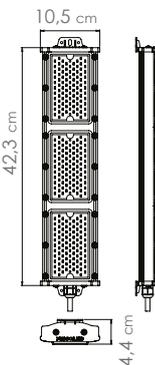


FRIGOLED

EL 54
5106 LM
49,5 W



50 Lux STANDART						100 Lux GOOD					200 Lux EXCELLENT						
W↔H	2 m	4 m	6 m	7,5 m	9 m	W↔H	2 m	4 m	6 m	7,5 m	9 m	W↔H	2 m	4 m	6 m	7,5 m	9 m
20 m²						20 m²						20 m²					
50 m²	1	1	1	1		50 m²	1	2	2	3		50 m²	2	3	4	6	
100 m²		1	2	2		100 m²		2	3	4		100 m²		5	6	7	
250 m²			3	4	4	250 m²			6	7	8	250 m²			12	14	16
500 m²			6	7	8	500 m²			10	12	14	500 m²			20	22	24





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