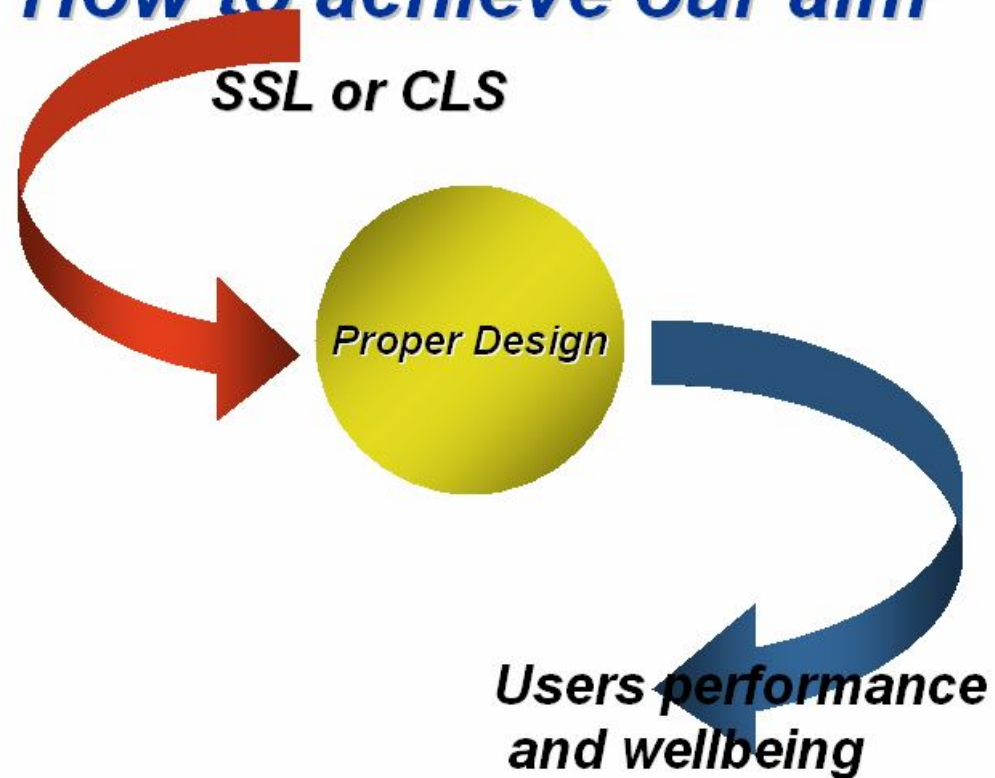
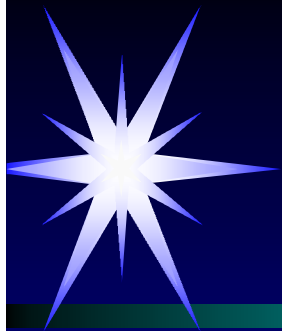


## *How to achieve our aim*

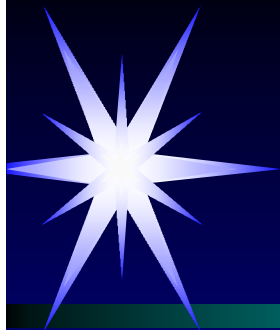




**עולם התאורה קיבל לחיקו מקור אור נוסף ומבטיח**

**בנוסף למקורות האור הקוננציונלים והמוכרים**

**ואשר עדיין כוחם במותניהם.**



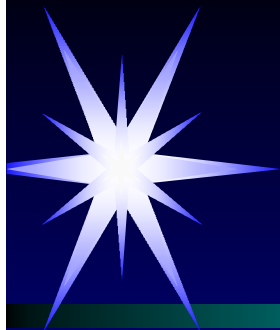
# תכנון תאורה משרדית



21 March 2011

Daniel Kalina-Senior Lighting Engineer

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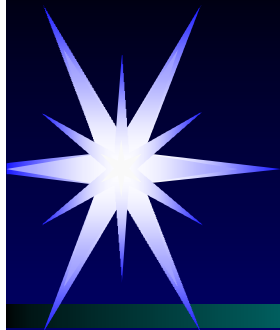


# הגישא ההיסטורית



## Historical Perspective



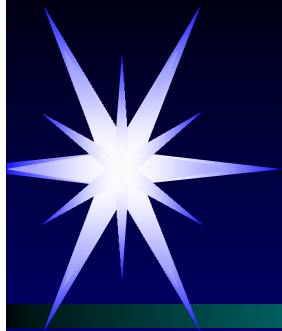


# מסלול יחיד: הפיזיולוגי



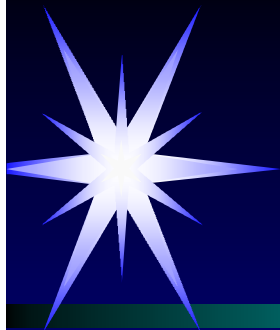
## Single Path – Physiological





# גופים פרבולים ישירים (במזל הותקנו בכיוון הנכון)

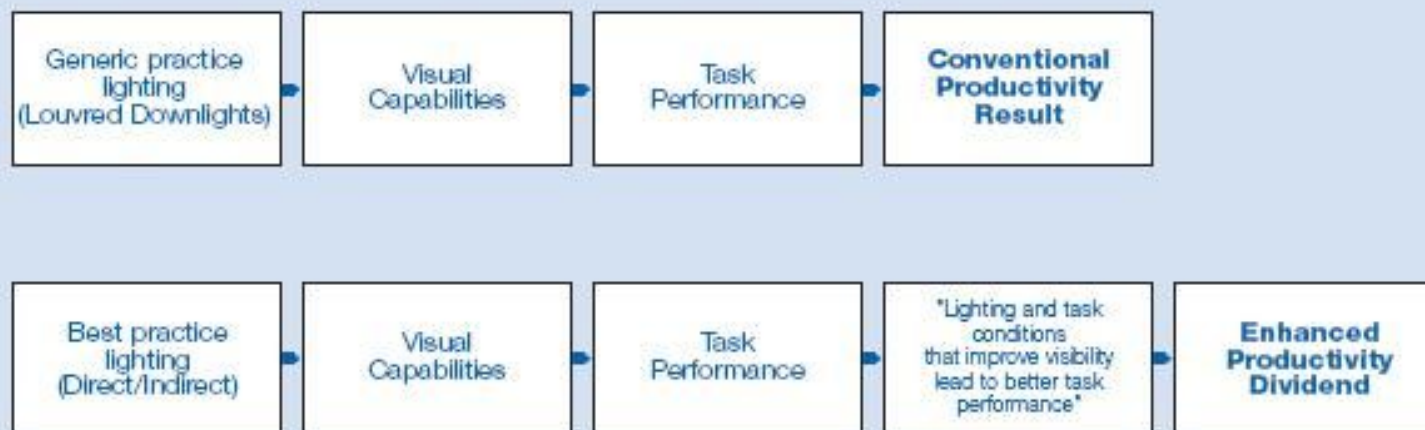


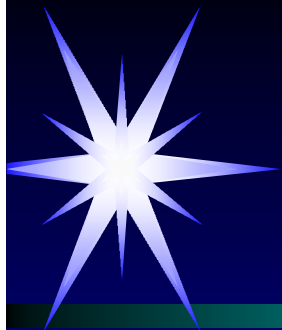


# מסלול יחיד: הפיזיולוגי



## Single Path – Physiological



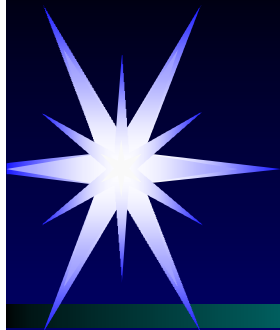


# פרבולים ישירים/בלתי ישירים

(הכיוון לא נכון אבל הרכיב המוחזר מתקן את המצב)

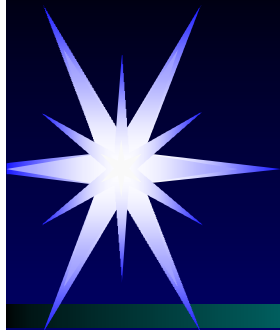






טוב לדעתכם??.....





# הגישת המודרנית



## Contemporary Best Practice

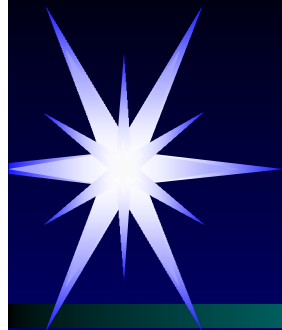


### Productivity factors

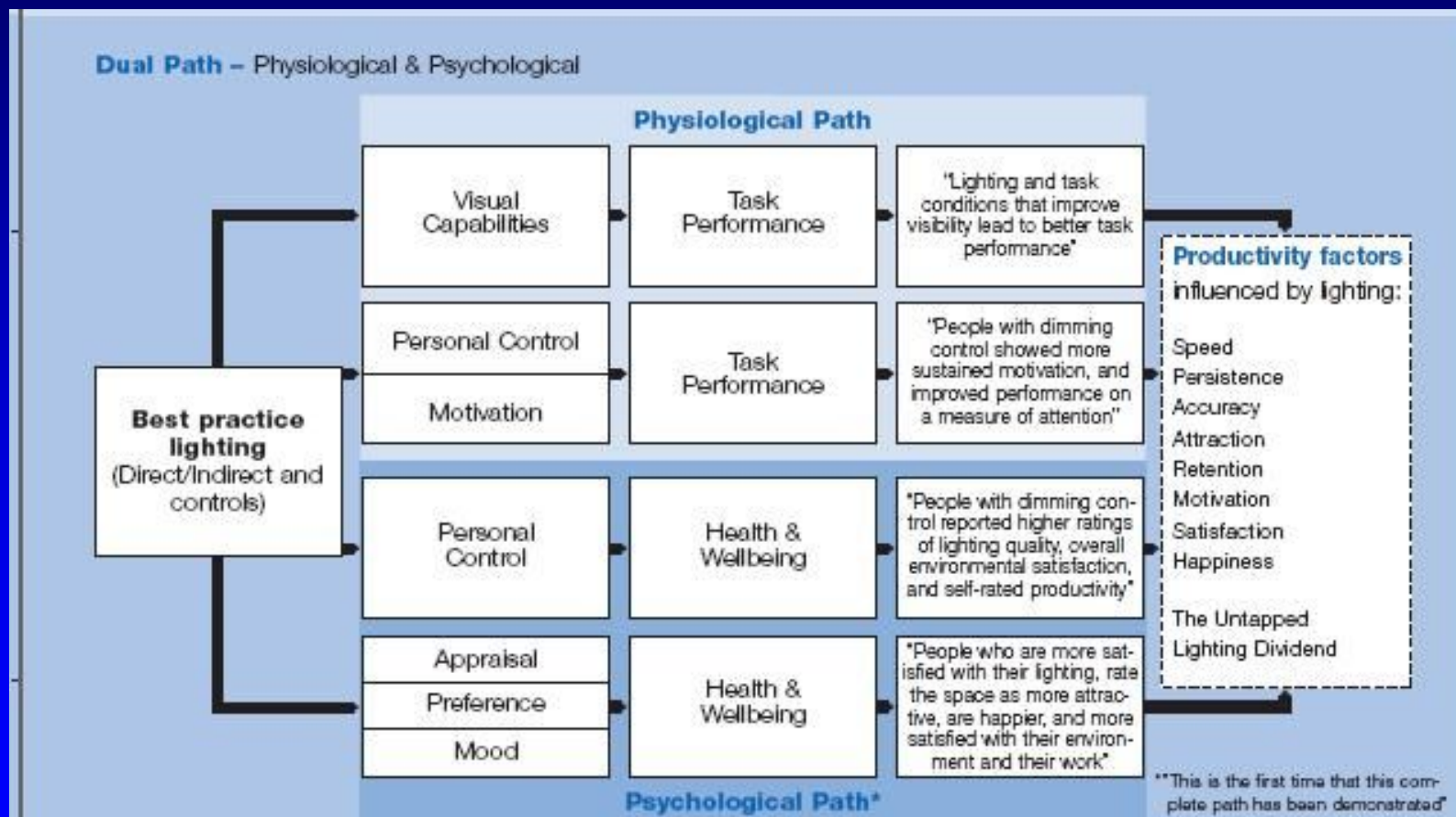
influenced by lighting:

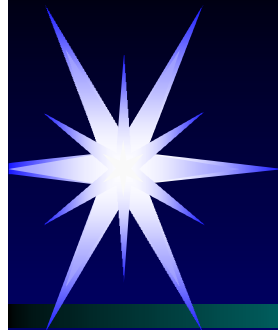
Speed  
Persistence  
Accuracy  
Attraction  
Retention  
Motivation  
Satisfaction  
Happiness

Potential Untapped Lighting  
Dividend

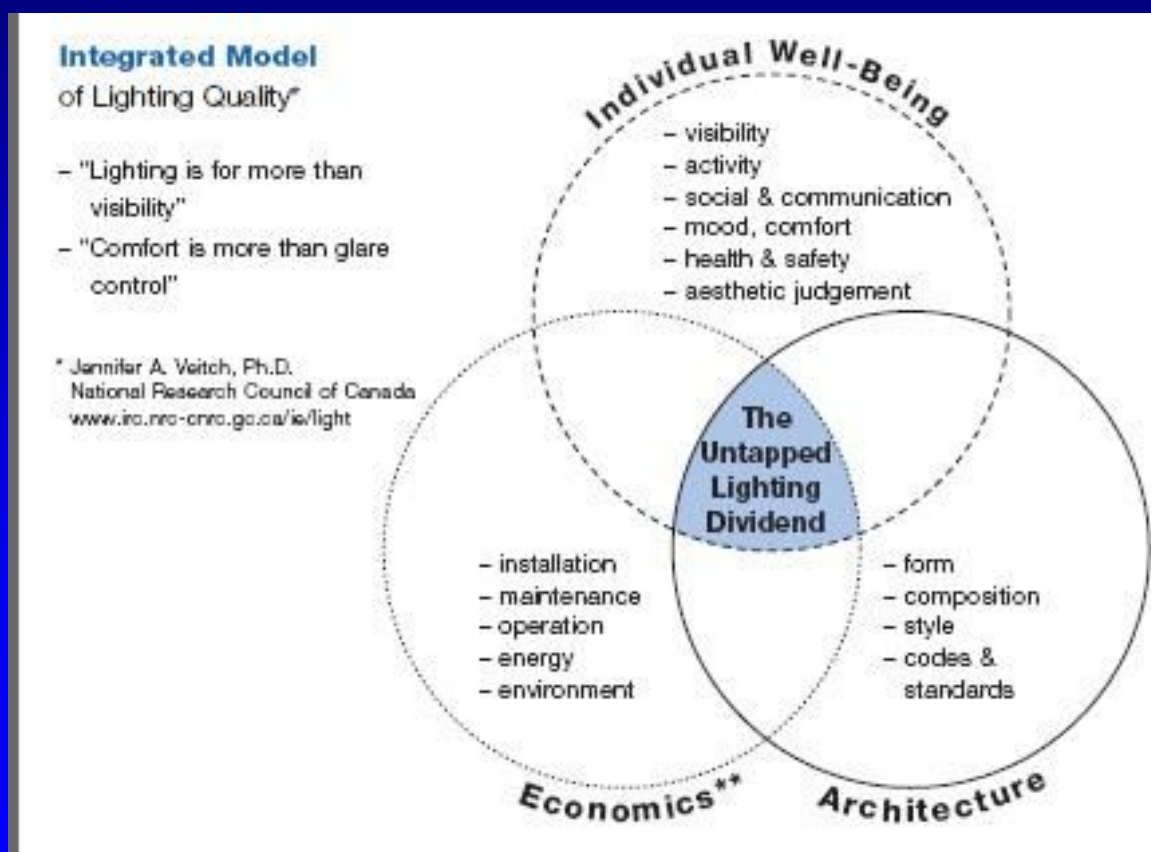


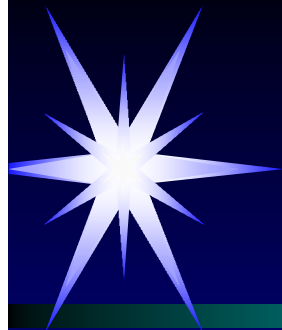
# המסלול הכפול: פיזיולוגי ופסיכולוגי





# *Integrated model of lighting quality*





# שימוש בתקנים האם זה מספיק?

לדעתי הכרחי אבל לא מספיק



ת"י 8995

*EN 12464* הישן

*LG3---àLG7*

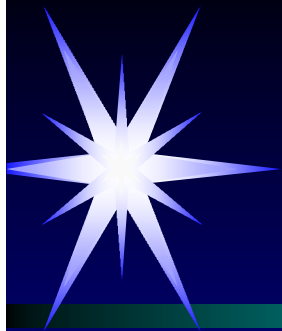
*EN12464* החדש

### 3 פראמטרים....המתיחסים רק



#### 4.1 Indoor workplaces (continued)

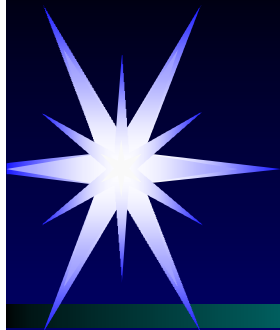
Type of task or activity	$E_m$	$UGR_L$	$R_a$
Polishing, painting, fancy joinery	750	22	80
Work on wood working machines e.g. turning, fluting, dressing, rebating, grooving, cutting, sawing, sinking	500	19	80
Selection of veneer woods	750	22	90
Marquetry, inlay work	750	22	90
Quality control, inspection	1000	19	90
Offices			
Offices			
Filing, copying, etc.	300	19	80
Writing, typing, reading, data processing	500	19	80
Technical drawing	750	16	80
CAD work stations	500	19	80
Conference and meeting rooms	500	19	80
Reception desk	300	22	80
Archives	200	25	80
Retail premises			
Retail premises			
Sales area	300	22	80
Till area	500	19	80
Wrapper table	500	19	80



## למשטח העבודה







**UGR**

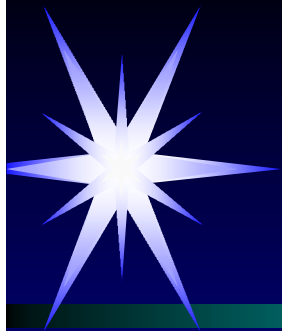


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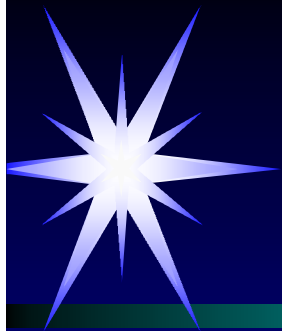




**CRI**



ליבון, הלוגן <מצויין  
פלורסנט, *PL*, מטל <בסדר לרוב השימושים  
*LED* <עדיין אין תקנים לקביעת ה-*CRI*  
אך האמצעים הם כל כך רבים ומגוונים  
שבטוח 'יהיה בסדר'



**שימוש בתקנים האם זה מספיק?**

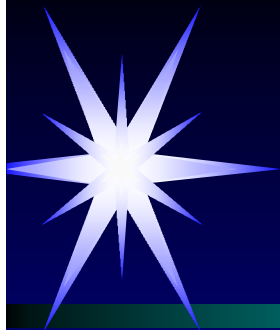


**ת"י 8995**

***EN 12464* הישן**

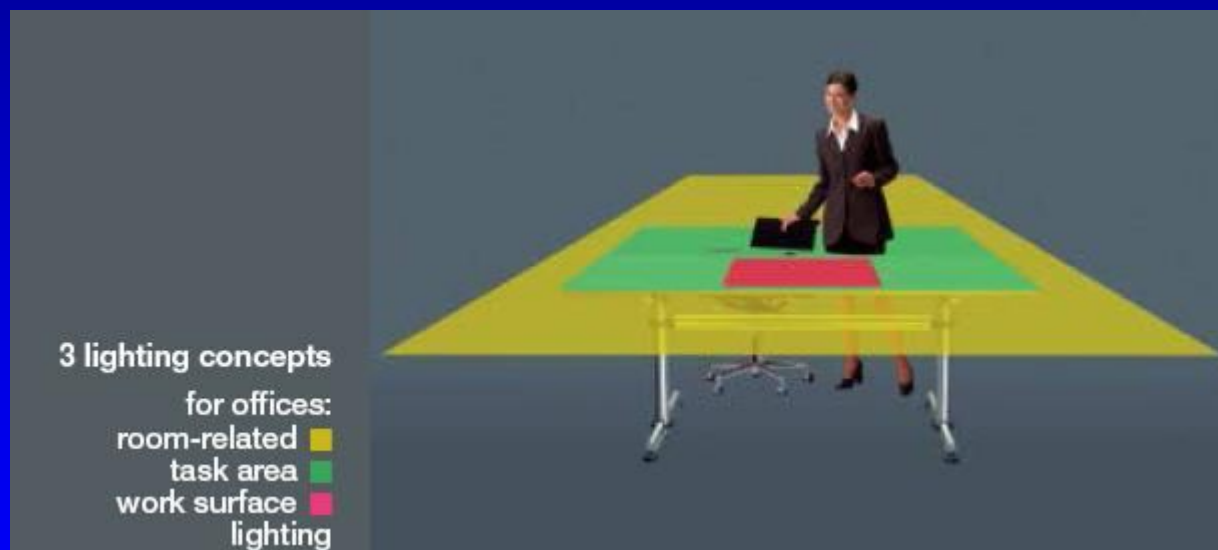
***LG3---àLG7***

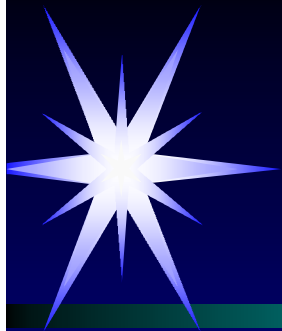
***EN12464* החדש**



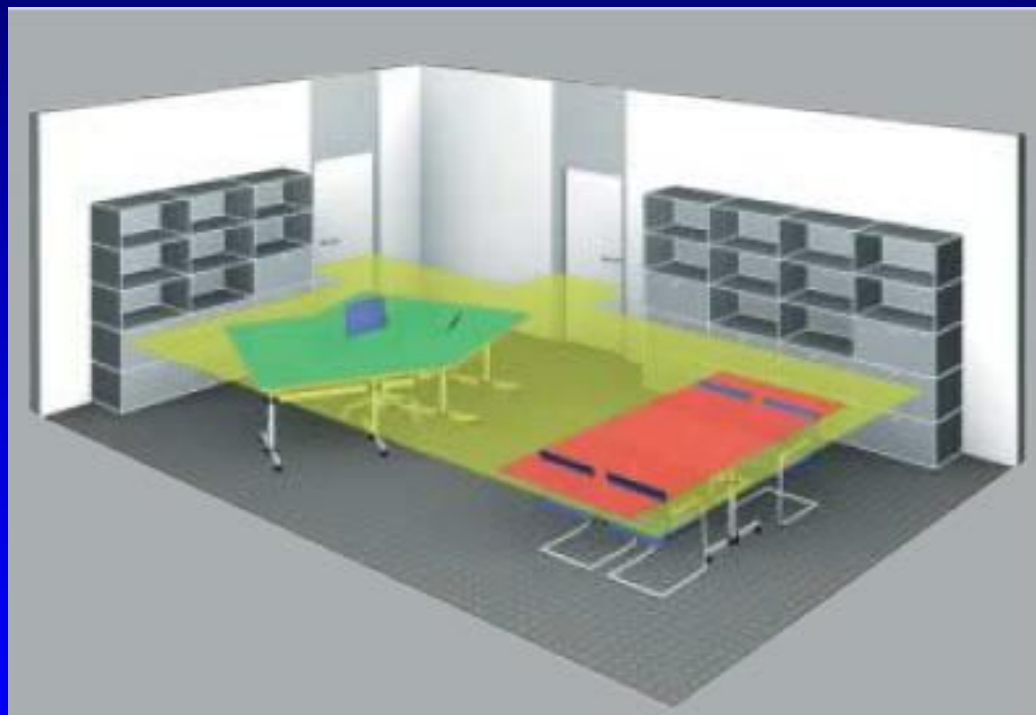
# EN12464

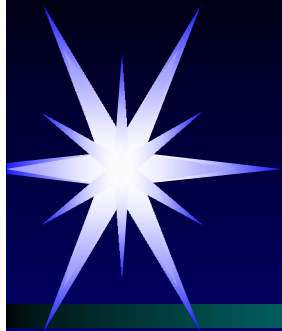
עדיין לא אומץ בישראל וחבל



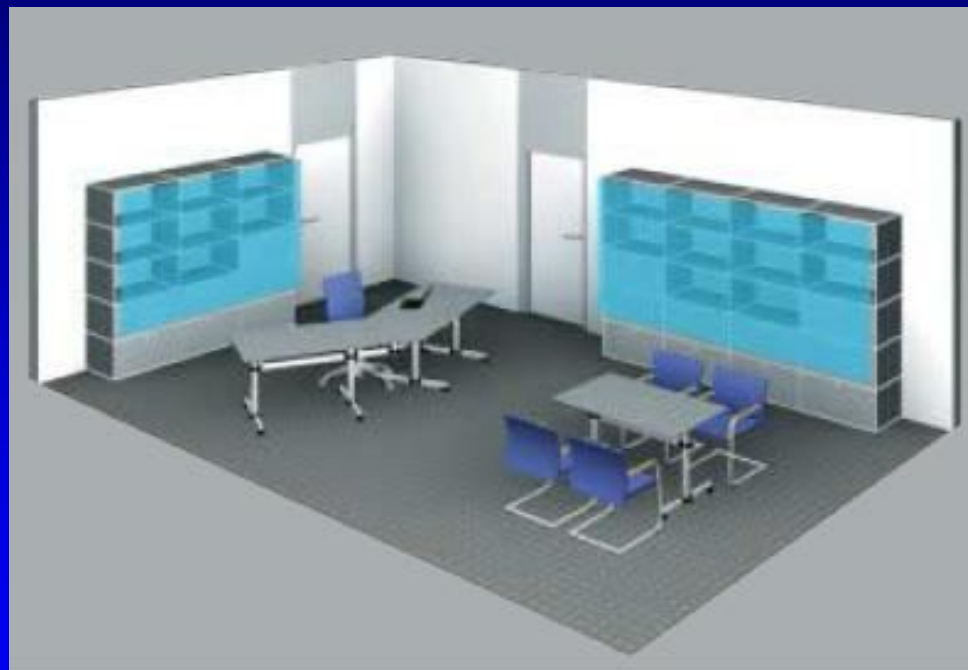


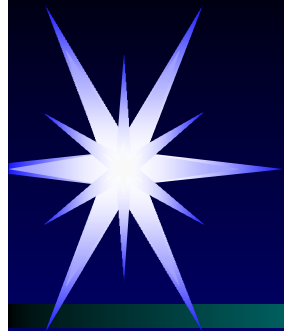
# האזורים האופקיים השונים והדרישות היחסיות





## וגם המישורים האנכיים





**שימוש בתקנים האם זה מספיק?**

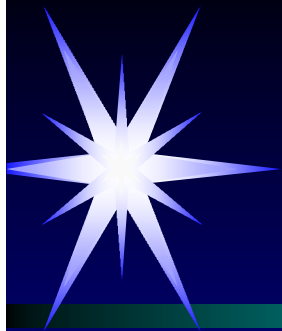


**ת"י 8995**

***EN 12464* הישן**

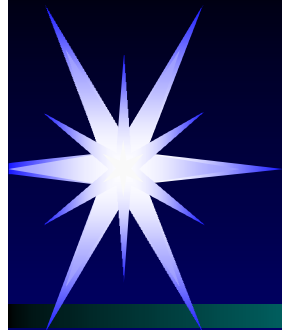
***LG3---àLG7***

***EN12464* החדש**

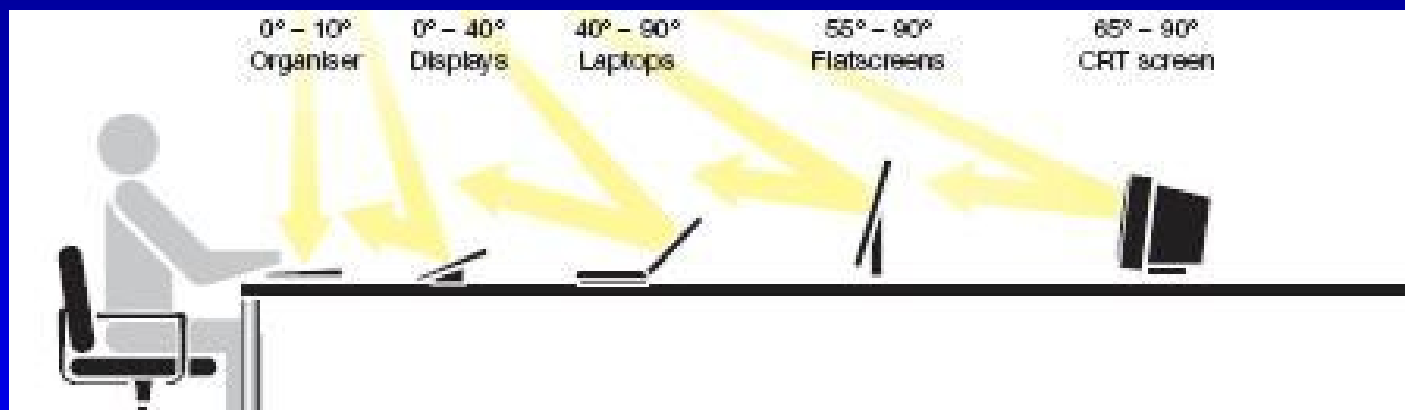


## LG3 חשוב אך לא מספיק

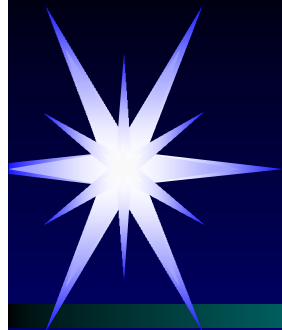




# ריבוי סוגי מסכים



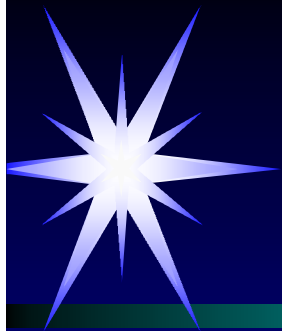


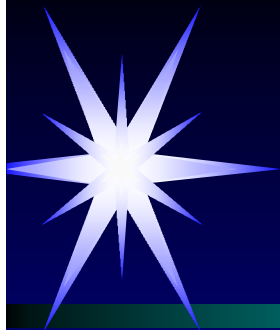


# LG 7 כל מה שאמרנו עד עכשו ועוד יותר



A balanced ambience creates a pleasant work environment. Ensuring light falls onto the walls and ceiling helps prevent dark surfaces creating an oppressive atmosphere. Generally, ensuring wall lighting levels are 50% of the horizontal task lighting level and ceiling levels are 30% of the horizontal task level will give a good balance. Careful use of wall-washing luminaires and indirect lighting can help produce a positive environment.





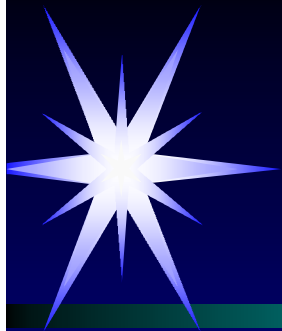
## האם סופם מתקרב?



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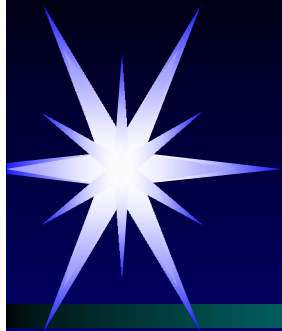
# האם זאת הדרך החדשה??



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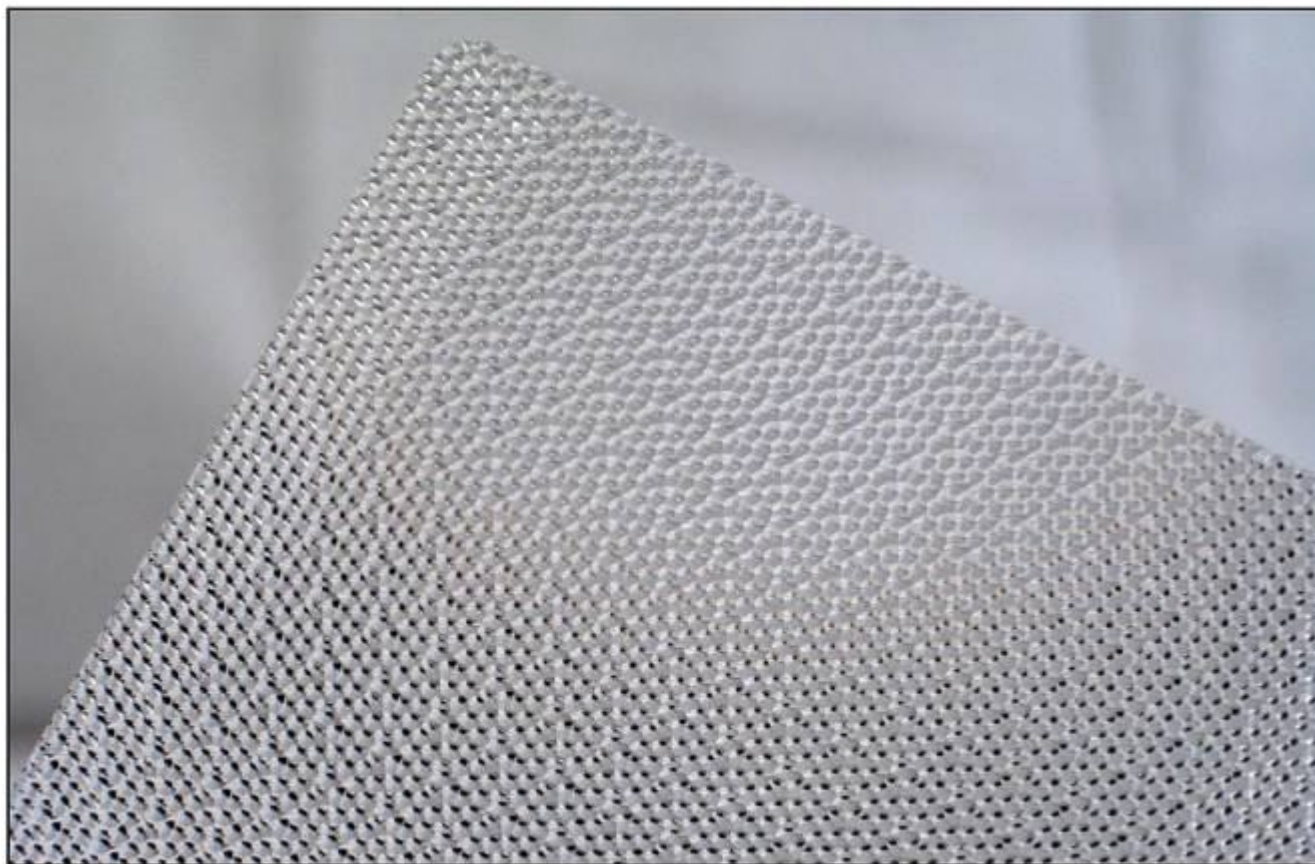


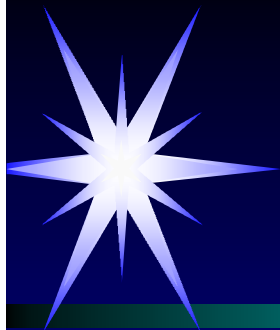
## *Micro-prism*



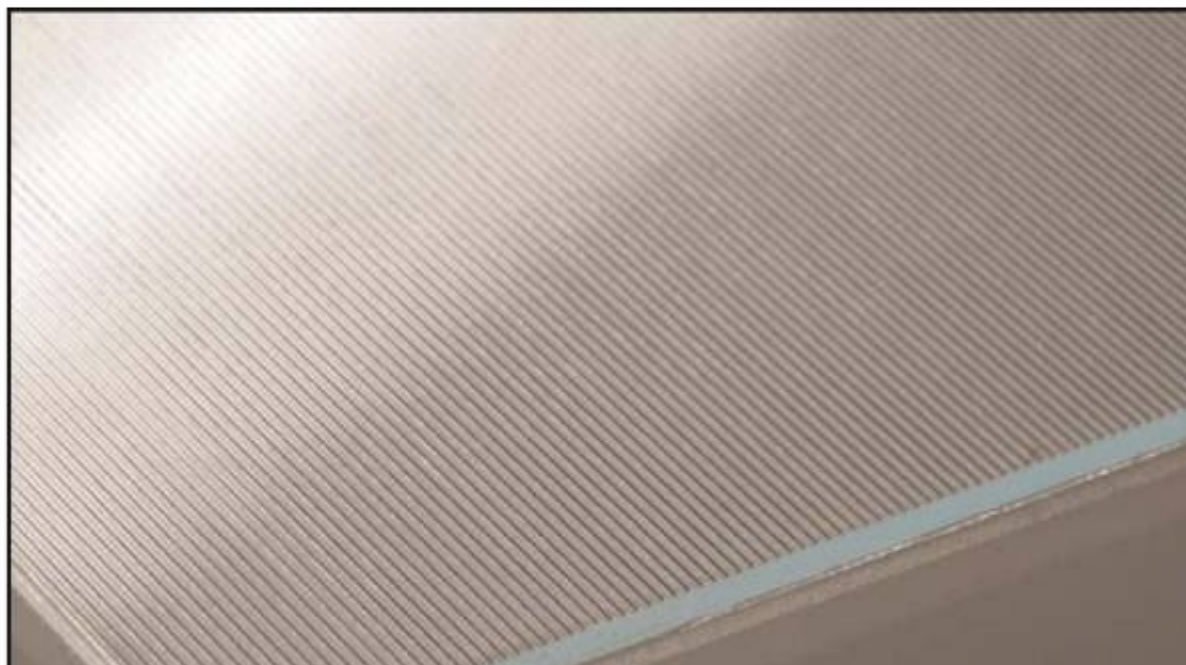
**האם כל חתיכת פלסטיק רשאית לשאת שם זה?**

**Micro Prism Control Lens**





## MicroLinear®



### MicroLinear® Sheet

High angle brightness control  
Excellent lamp obscuration  
90% transmission

**Materials:** Acrylic, Impact Acrylic

**Pattern:** Linear prismatic

**Thicknesses:**

.8mm - Impact Acrylic

2mm - Acrylic

2.9mm - Acrylic

**Max temp:**

**Impact acrylic:** 70°C

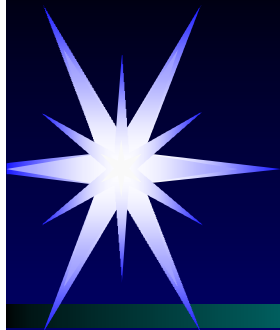
**Acrylic:** 80°C

**Standard size:** 1270mm x 1270mm

**Max size:** 1270mm x 2540mm

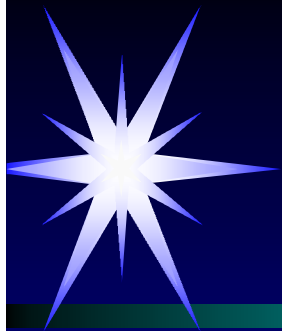
**Custom sizes available**





## TRANSMISSIONS AND LAMP HIDING

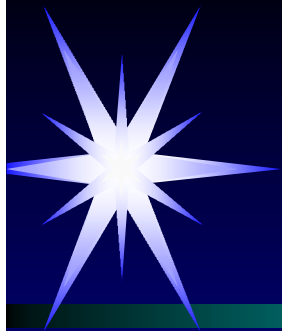
PART CODE	PRODUCT	TRANSMISSION		LAMP HIDING
S84	LUMIEO	73%		HIGH
PL1	MICROLINEAR	90%		MODERATE
S80FC100	HT FROST 100%	85%		HIGH
S80FC50	HT FROST 50%	90%		MODERATE
PL1AF	MICROLINEAR FROST	Prism Up 84%	Prism Down 78%	MODERATE
CDP	CONICAL DEGLARING PRISM	92%		
MPC	MICROPRISM CONTROL	92%		MODERATE
MTD	MICRO TRANSVERSE	88%		HIGH
ALP49	PATTERN 49 PRISMATIC	75%		MODERATE
ALP12	PATTERN 12 PRISMATIC	70%		LOW
ALP32	PATTERN 32 PRISMATIC	74%		MODERATE



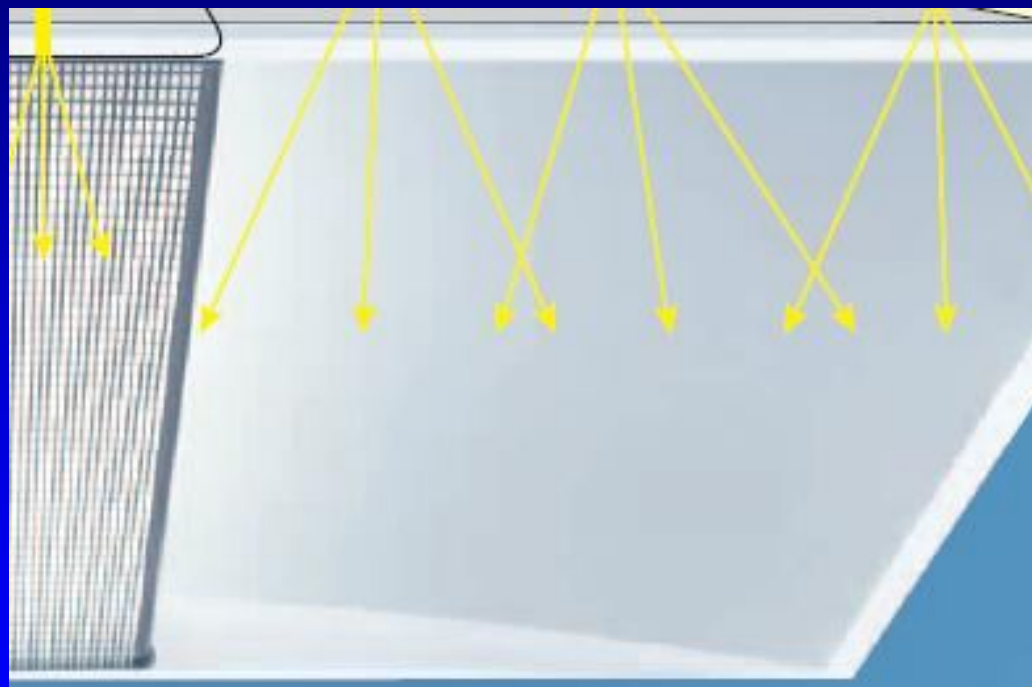
# רכיב התאורה הישירה מבוקר *micro prism* בעזרת





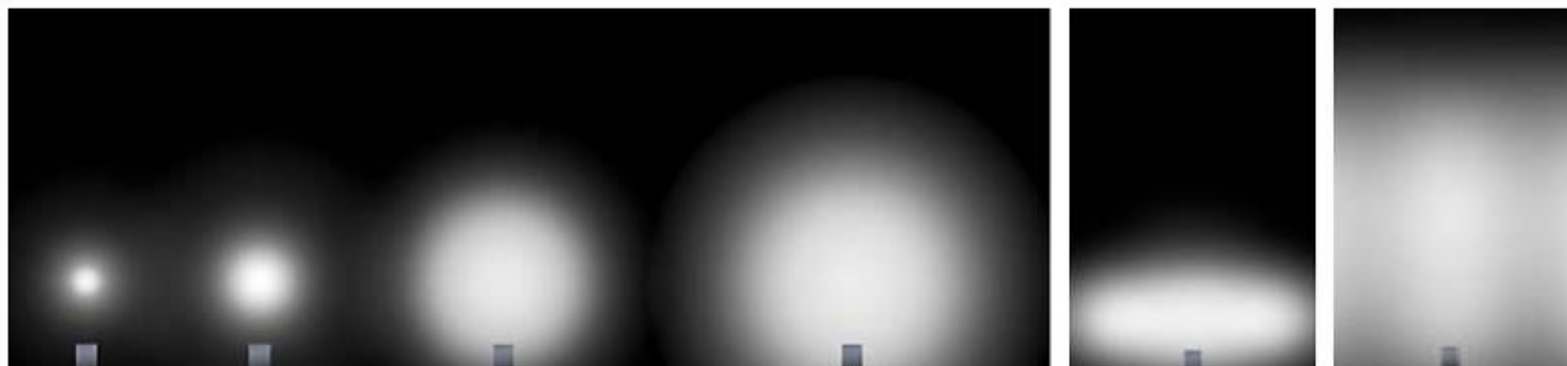


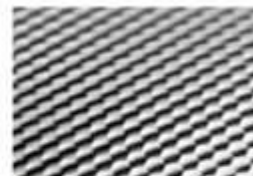

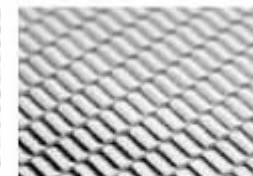
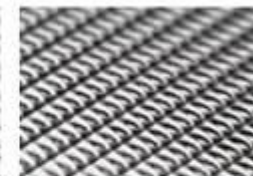


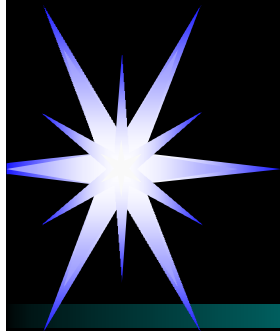
# התאורה הישירה והמוחזרת *micro prism* מבוקרות בעזרת

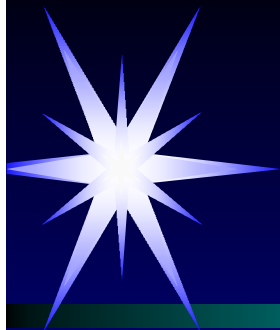


## הדרישה לאופטיקה מדויקת גדולה יותר

### Characteristics with Spherolit lenses

					
					
<b>Narrow spot</b> To accentuate small objects with high light intensity or to cover large distances between luminaire and object. Beam angle $< 10^\circ$	<b>Spot</b> The standard characteristic for highlighting objects of all types, especially to accentuate three-dimensional shape. Beam angle $10^\circ - 20^\circ$	<b>Flood</b> To efficiently illuminate larger objects or to emphasise spatial zones such as a specific area. Beam angle $25^\circ - 35^\circ$	<b>Wide flood</b> To give a flexible, flood illumination of surfaces and spatial zones, especially in retail presentation. Beam angle $> 45^\circ$	<b>Oval flood</b> The Spherolit lens, oval flood, has an axially symmetrical light intensity distribution, producing an oval beam of about $30^\circ$ by $90^\circ$	<b>Wallwash</b> The light distribution of the lens wallwasher is designed to provide very good uniformity.

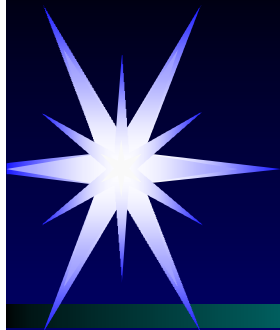




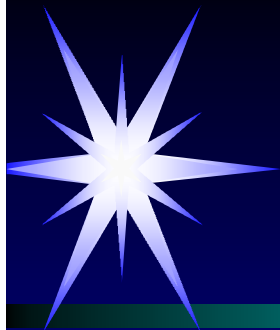
### Projection: collimating lens



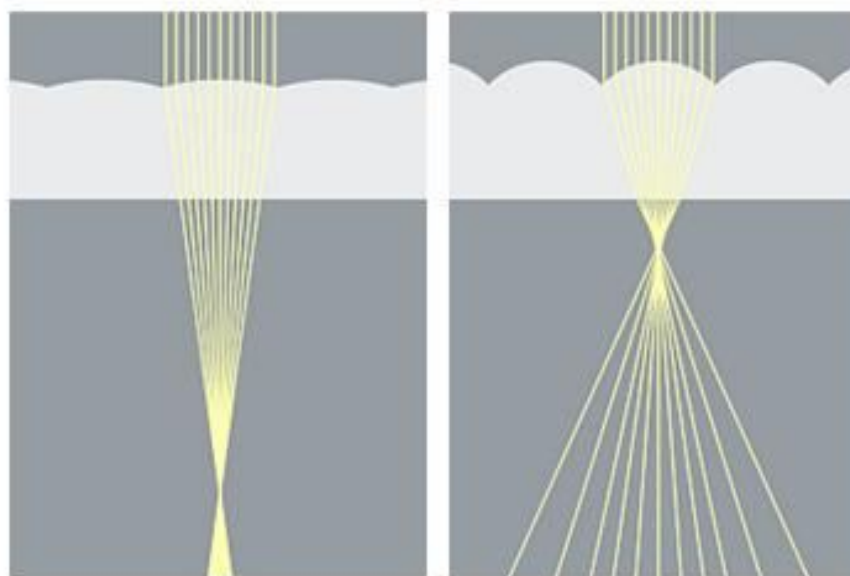
The quality of the optical systems greatly affects the overall efficiency of an LED luminaire. To produce directed light, as occurs in spotlights, ERCO develops their optical projection systems in-house. A collimating lens, as a secondary lens, is the interface between the LED lens on the printed circuit board and the exchangeable Spherolit lenses acting as tertiary lenses. The collimating lens directs the light of the LEDs into a parallel beam in order that the required light distribution can then be formed by a tertiary lens. The principle of total internal reflection in the collimating lens contributes to the high efficiency of the optical system. Decades of experience in injection-moulded polymers ensure the highest quality levels from our in-house production plant.



<p><b>Optical principle</b> The light is guided by three elements in an ERGO LED spotlight: the primary lens which is directly mounted on the LED chip and produces a semi-spherical beam, the secondary lens in the form of a collimating lens to create a parallel beam and the tertiary lens in the form of a Spherolit lens. The design of the tertiary lens determines the actual light distribution for the specific application.</p>	<p><b>Collimating lens</b> For all characteristics - except for narrow spot - the three-piece collimating lens is suitable for the module with three LEDs. The beam is controlled by total internal reflection at the sides and by the central lens. Precise mounting points result in secure and effective mounting.</p>	<p><b>Collimating lens for narrow spot</b> The appropriate collimating lens is used with LED spotlights and projectors with the narrow spot characteristic. Its function is solely based on the optical principle of total internal reflection, which contributes to the high efficiency of the optical system.</p>
<p><b>Total internal reflection</b></p>	<p>Due to its shape and material, the collimating lens for narrow spot directs the light with practically no losses using the principle of total internal reflection. This results in optimum light guidance efficiency.</p>	<p><b>Spherolit lens</b></p> <p>After focusing the beam through the collimating lens, it is the Spherolit tertiary lens that determines the light distribution. This ranges from narrow beams to wide beams and asymmetric light distributions for vertical illuminance.</p>



### Spherolit lenses



#### Spot

The Spherolit lens, spot, has flat Spherolit surfaces producing low dispersion for a narrow beam angle.

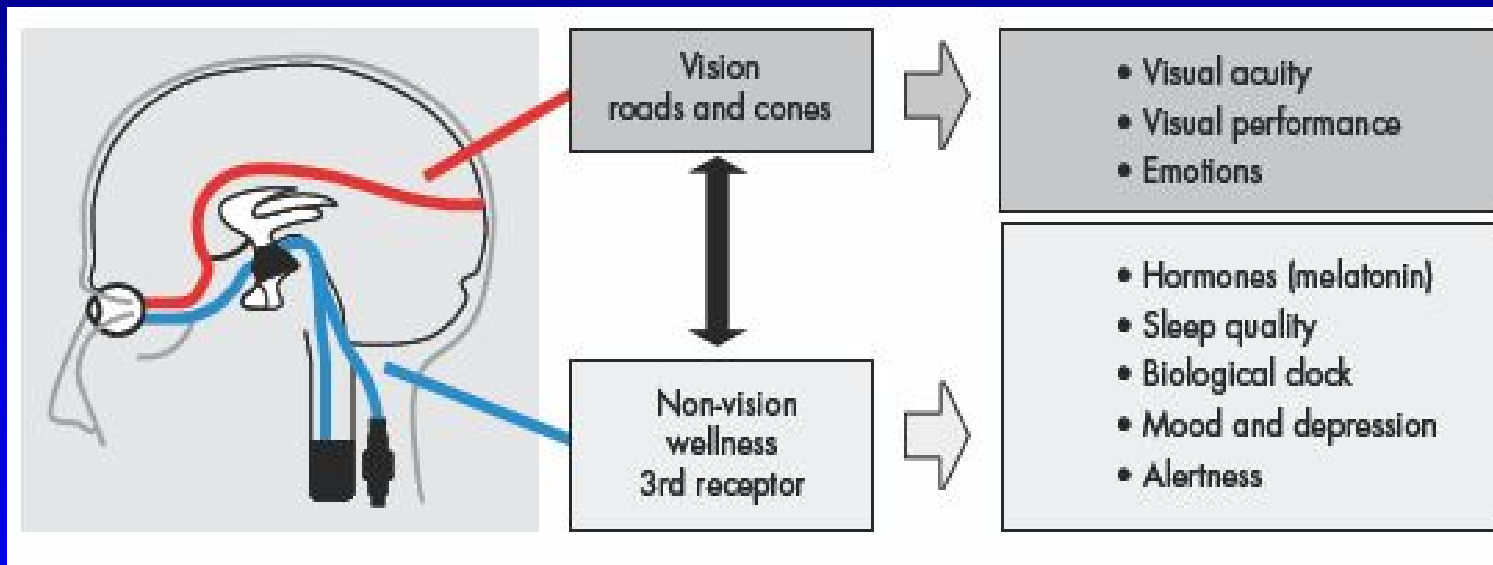
#### Wide flood

The wide flood Spherolit lens has the greatest curvature. The wide spread produces a beam with a large emission angle.

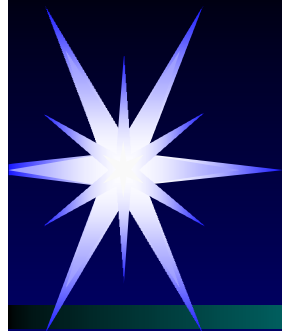
By designing the shape of each Spherolit lens individually, a wide range of lens characteristics can be created. The parallel incident light is spread to a greater or lesser extent depending on the curvature of the surface. This results in lenses that have different beam angles, ranging from narrow spot to wide flood, yet retain the same overall geometry. In addition, asymmetrical spherolites enable oval beams and wallwashing lenses. A common feature of all these beam characteristics is light of the highest quality: the beams are particularly uniform, free of striations and have a clean, slightly soft edge.

כעת נבחן את הצרכים הראיתיים

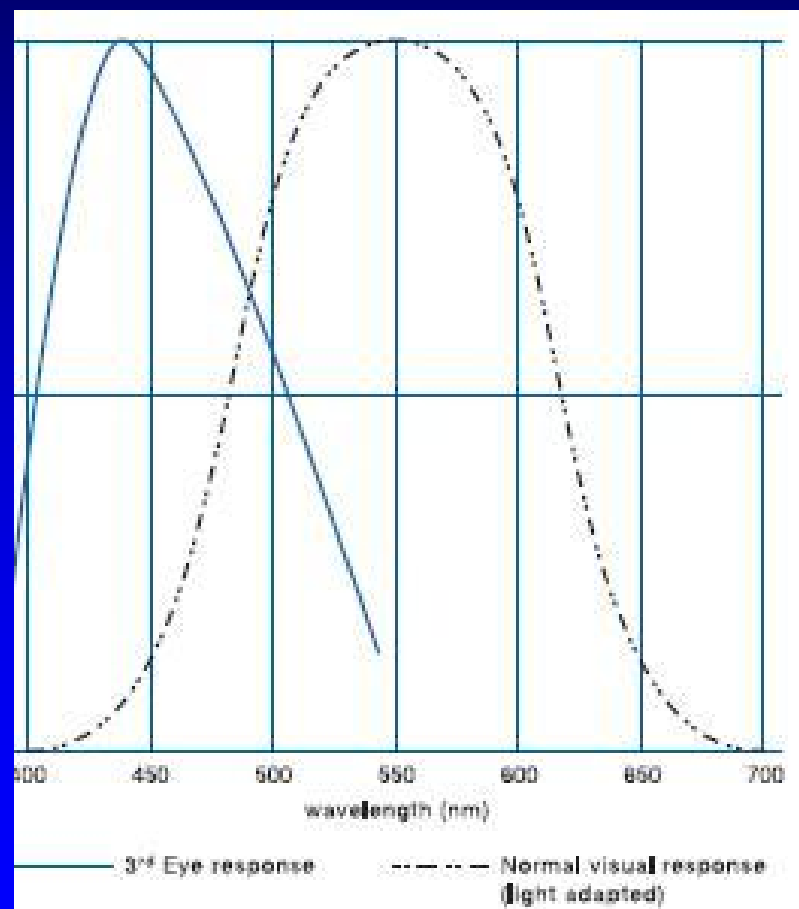
ואלו של העין השלישית



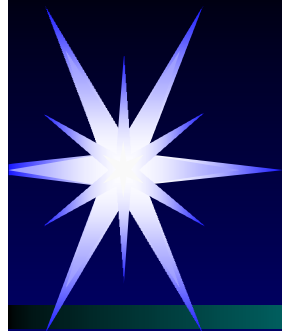




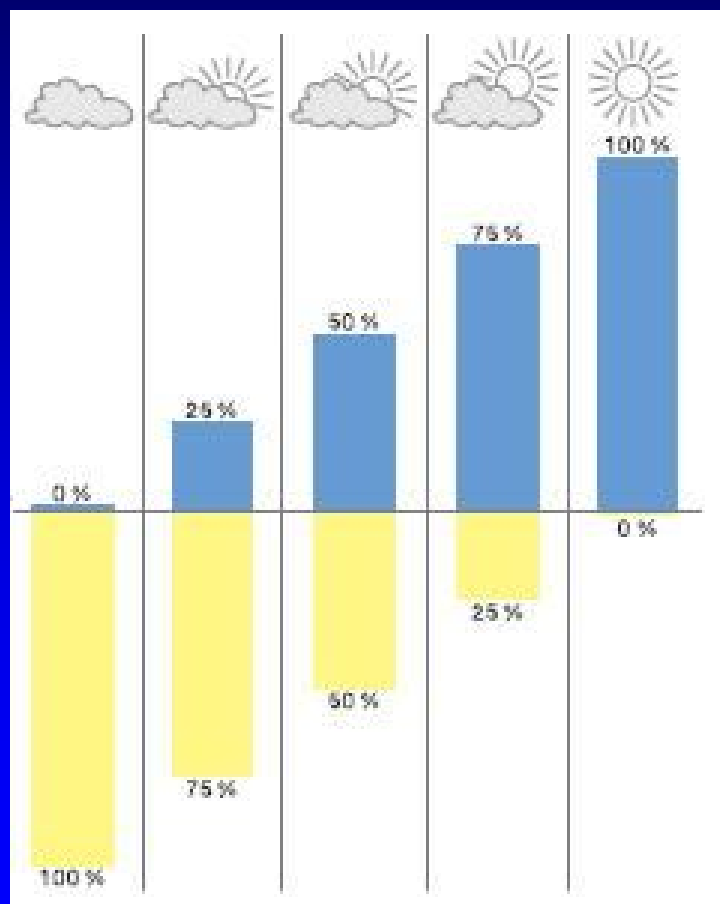
# 3 הרספטורים מגיבים שונה לאורכי גל שונים

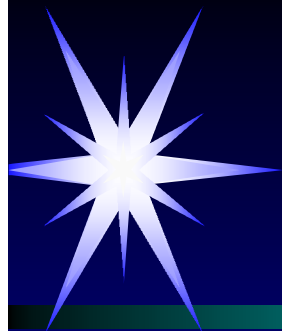






# תוצאות מחקר על העדפת גוון אור מלאכותי ביחס לאור היום



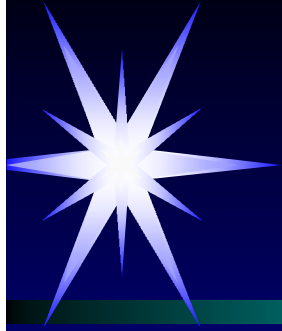


# התאמת התאורה המלאכותית לשעון הביולוגי-יתרון בולט לשימוש ב **LED**



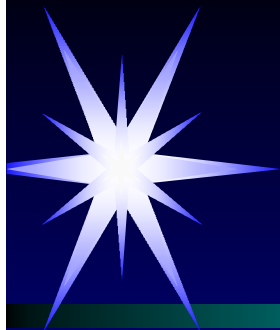
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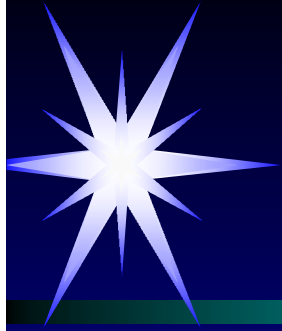
*11.00*





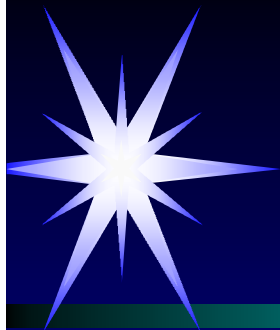
*14.00*





*19.00*





**תודה רבה**

