PAL Seminar

New Addition to SEIKO Back-surface PAL series !

New Product

SEIKO P-1EM

Fusion of SEIKO & PENTAX

It has been 2 years since the two International optical companies have been integrated.

The new PAL design has been born by the wisdom of both SEIKO & PENTAX.

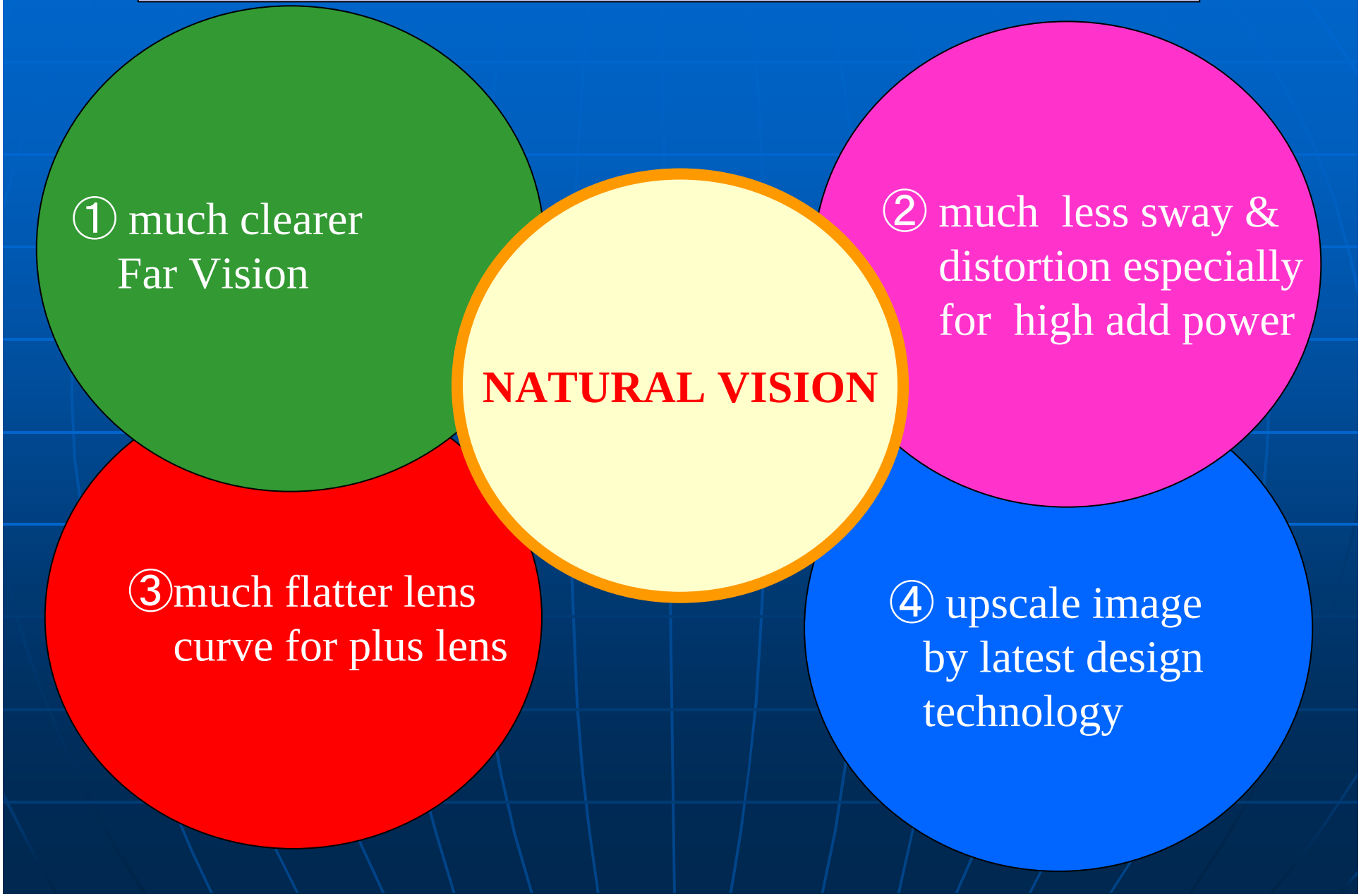
Top Engineers of SEIKO & PENTAX

Mr. Shinohara has been produced a wide range of SEIKO PAL.
Mr. Shirayanagi has developed Pentax PAL series .

SEIKO EPSON Design
Engineer Shinohara

SEIKO Optical Products
R&D Shirayanagi

Development Concept P-1 Emblem



Explanation for New Product “P-1 EM”

7 Merits of P-1 Emblem

1. Back-surface Technology

New Development

2. C＆S（Clear & Smooth Design）

New Development

3. Advanced Aspheric Design

New Development

4. CCCS（Triple-C S Design）

5. Optimum In-set Design

6. Curve Pairing system

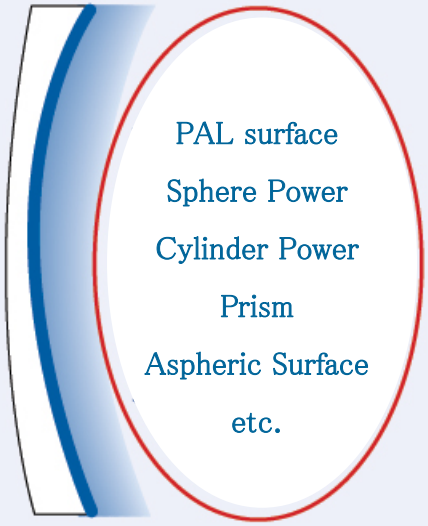
7. Optimum Prismatic Thinning

(1) Back-surface Technology

Front Surface

To minimize a change of magnification which causes sway & distortion

[Single Curve]



Back-surface

〈PAL Surface〉

+

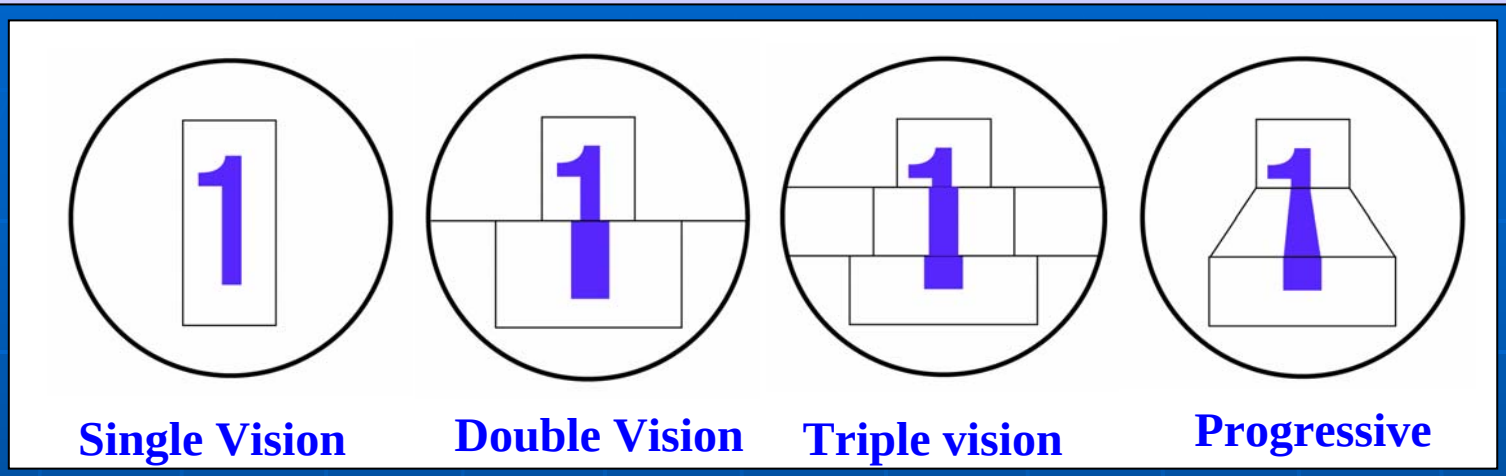
〈Astigmatism Correct Surface〉

+

Aspheric Surface

《 HYBRID 》

Spectacle Magnification



S.M.(Spectacle Magnification) = 眼鏡倍率

$$S.M. = Ms \times Mp$$

Ms=自己倍率(シェープファクター)

$$= \frac{1}{1 - \frac{T}{n} \cdot D_1}$$

Mp=度数倍率(パワーファクター)

$$= \frac{1}{1 - L \cdot P}$$

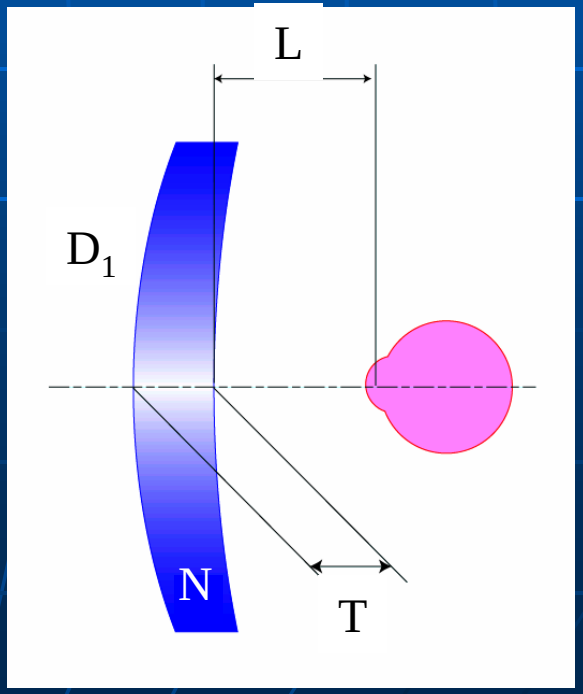
L:レンズ後方頂点から入射瞳点までの距離(m)

P:レンズ後方頂点屈折力(レンズ度数、D)

T:厚み(m)

D_1:外面のカーブ(D)

n:屈折率

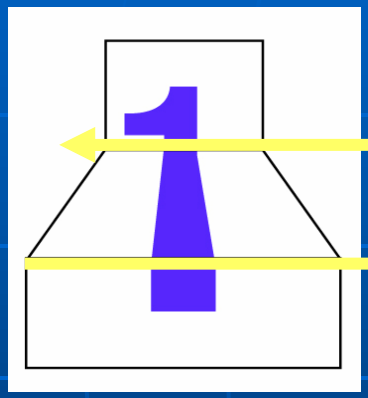


Factors of Spectacle Magnification

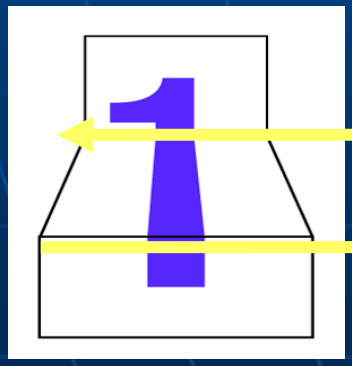
Change of Magnification

Change of Front Curve

Change of Power

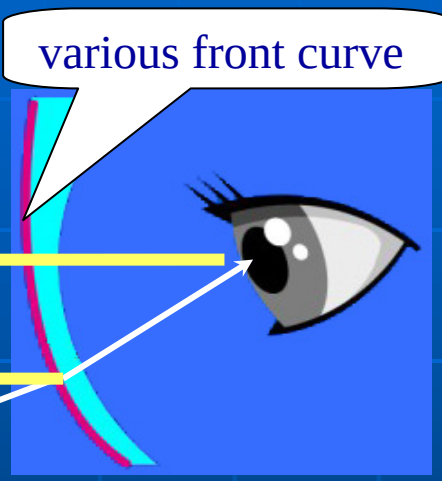


affected by 2 factors

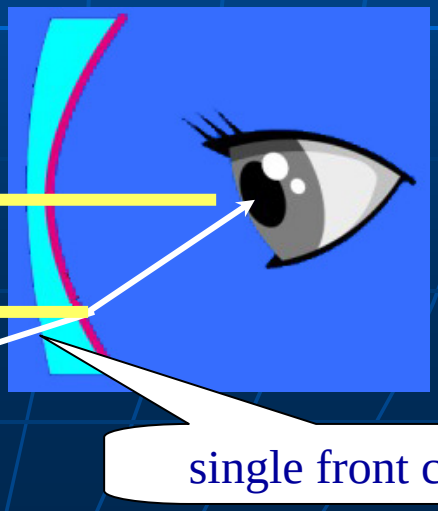


affected by only 1 factor

Conventional PAL



Back-surface Technology



Expansion of Filed of Vision

Field of vision《Back-surface Technology》

Expanded field of vision

Field of vision of Conventional PAL Design

Expanded field of vision

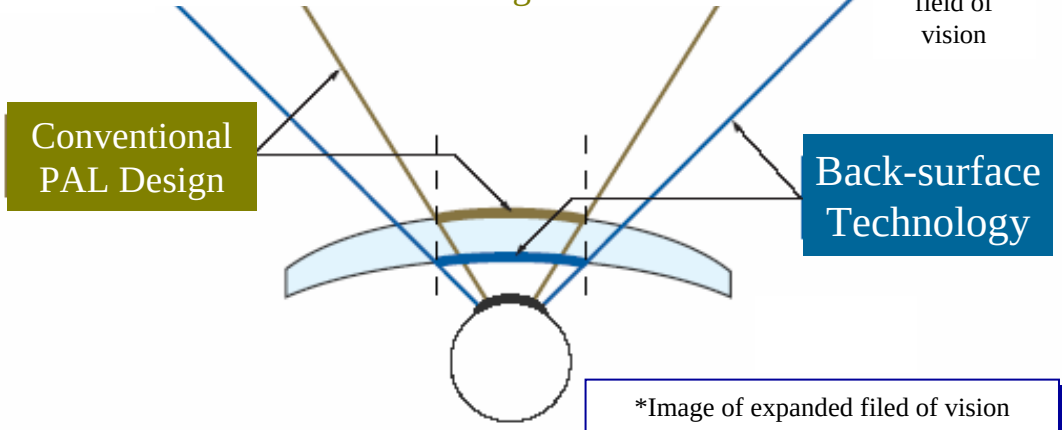


*Image of expanded filed of vision

Back-side aspheric

+ All power optimum design =

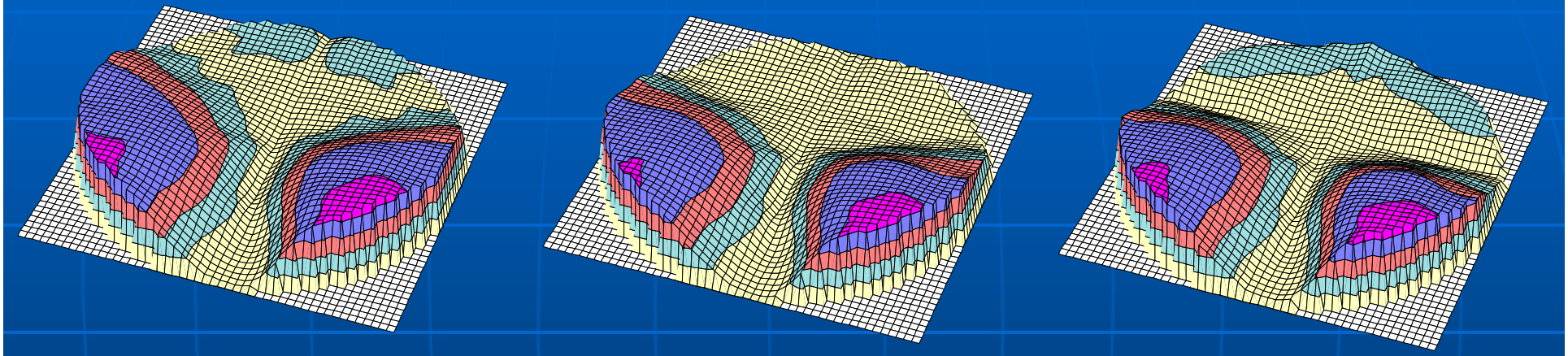
about 35% larger field of vision on average.

＊ Corridor Length＝**14mm Comparison**

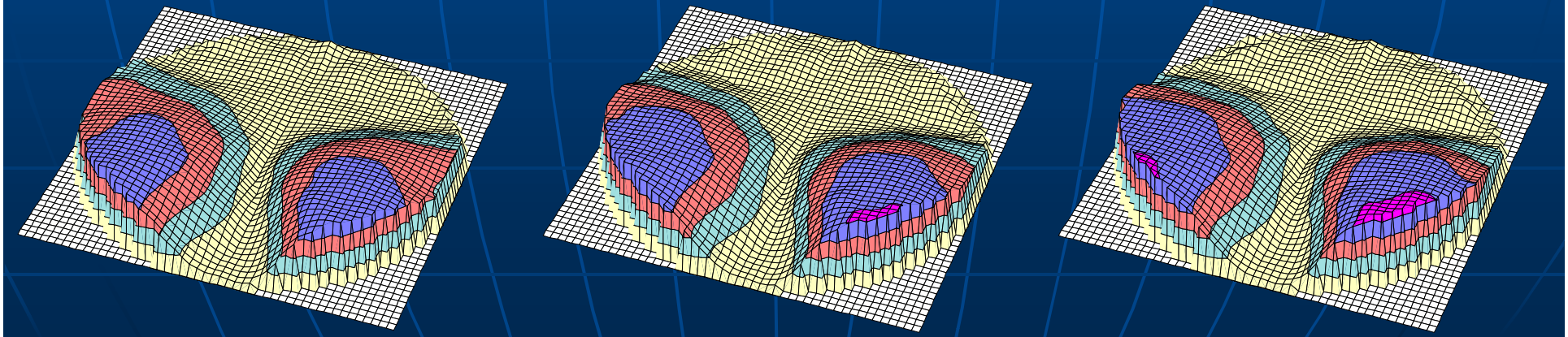
(1) Effect of All-power Optimum Designing

SPH-2.00 ADD 2.00 **SPH 0.00 ADD 2.00** **SPH+1.00 ADD 2.00**

Conventional Front-side PAL

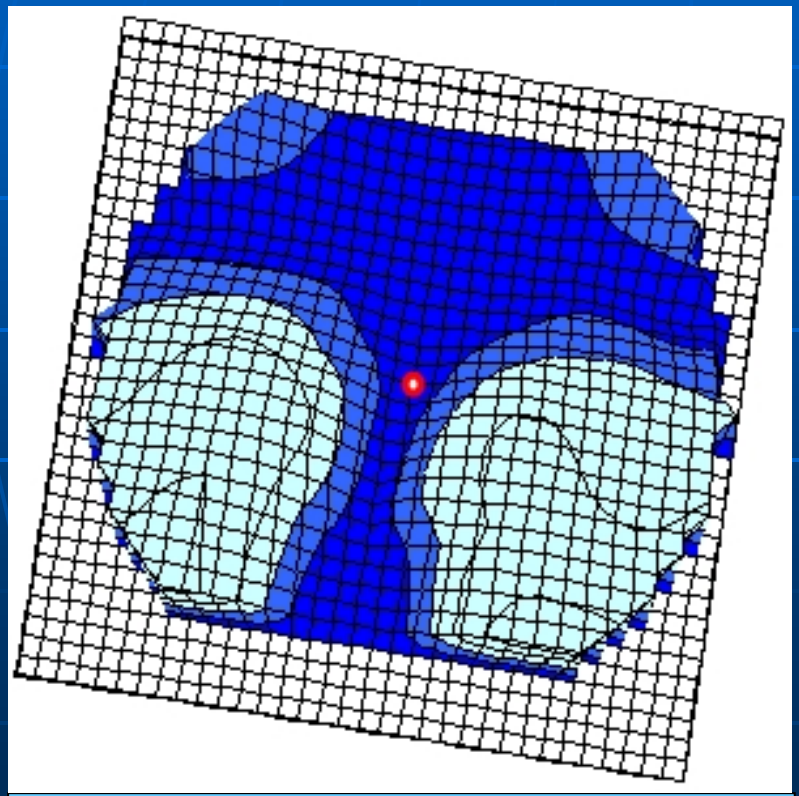


P－1 EM

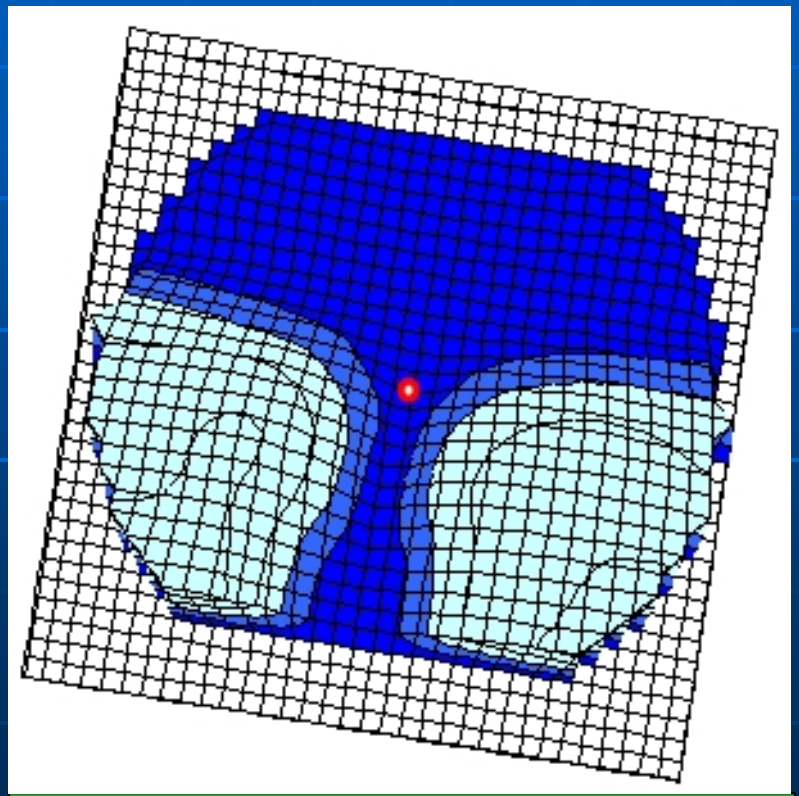


(2)C&S(Clear & Smooth) Designing

Far Area：45% Larger



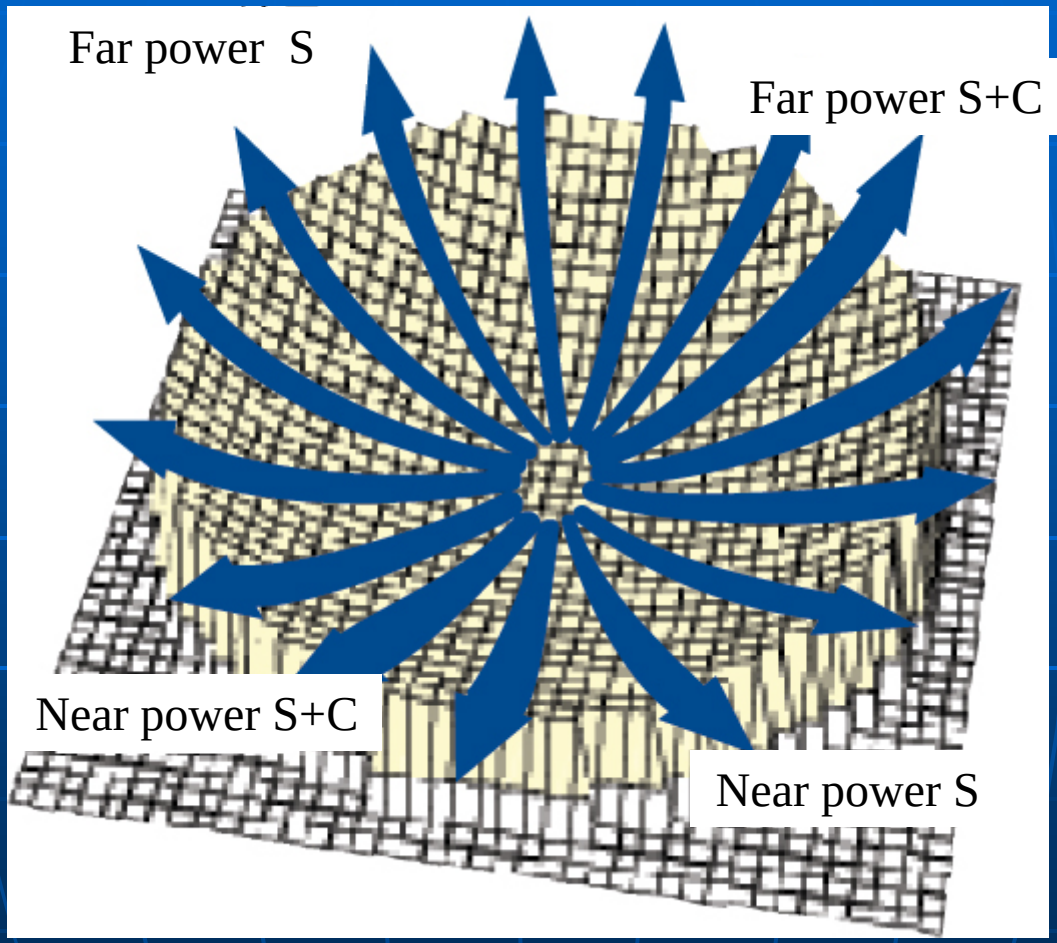
P-1 SY



P-1 EM

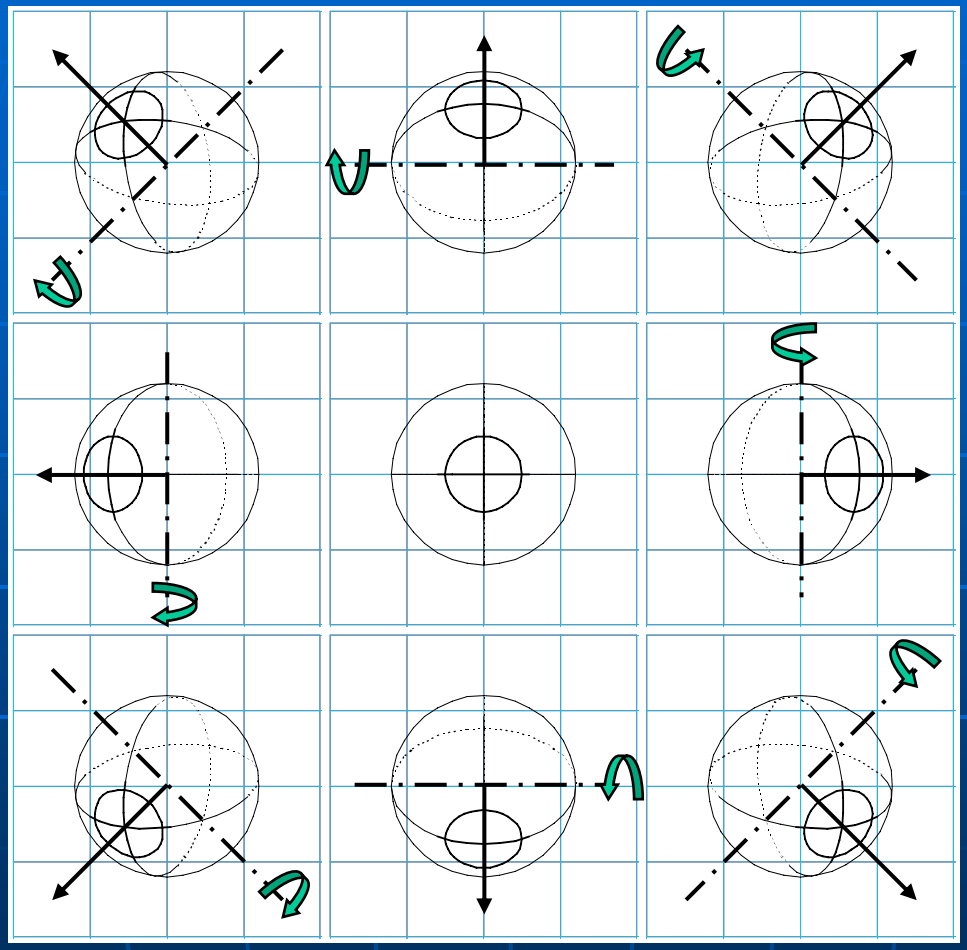
(3) Advanced Aspheric Design

Image



Having the most suitable aspheric correction on powers, close work distance, base curve, slant angle for all directions.

The Law of Listing



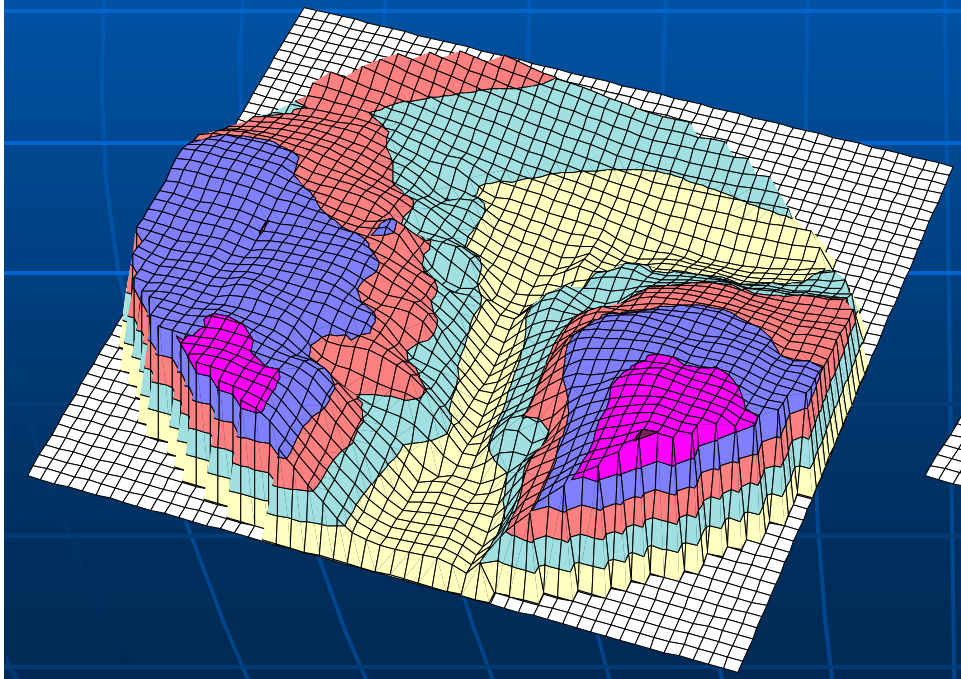
Our advanced aspheric design adopts the “Listing law” which decides the every position of eye ball movement for all direction.

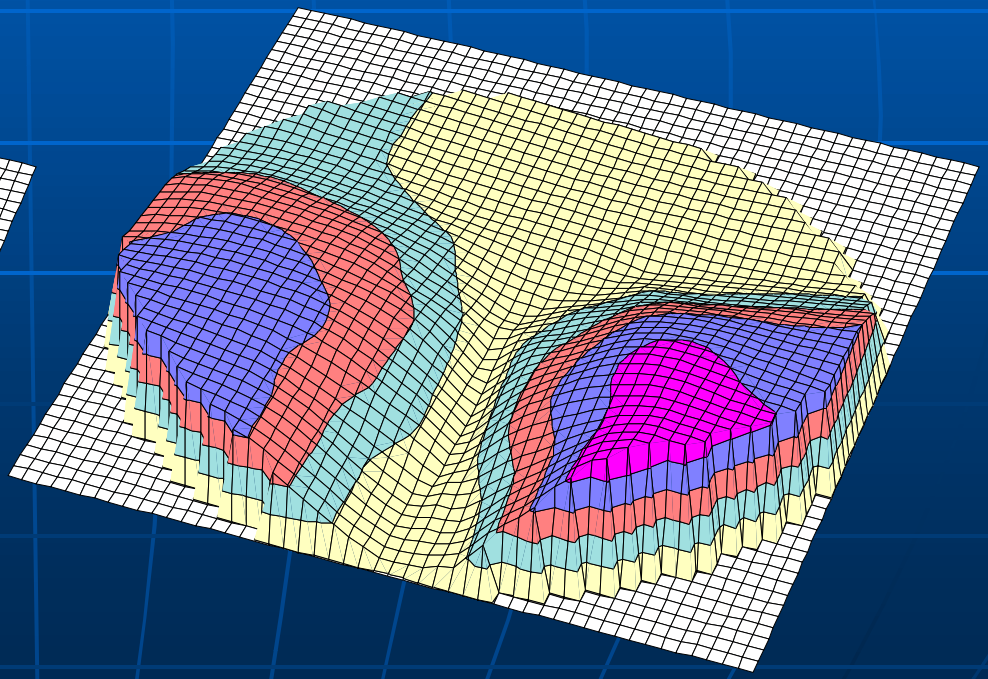
Performance Improvement of Astigmatic Lens

（Example） SPH −0.00 CYL −2.00 AX 45

Front-side
Progressive Lens

P-1 EM





(4)CCCS(TripleC S)Design

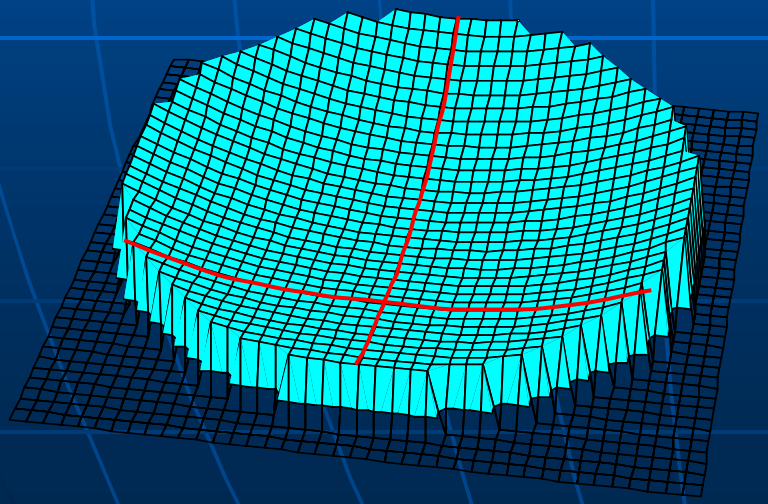
★ **Concave／Convex Combination Slim** Designing★

Combining Concave Surface & Convex surface on the back side of the plus lens having appropriate aspheric correction. This design makes slim & stylish plus lens with hi-level optical performance.

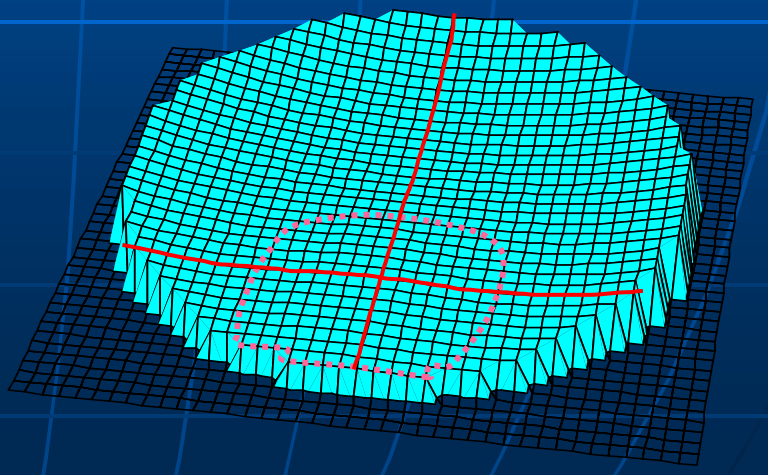
Comparison of Back-side shape

SPH+3.00/Add 3.00

P-1 SY



P-1 EM

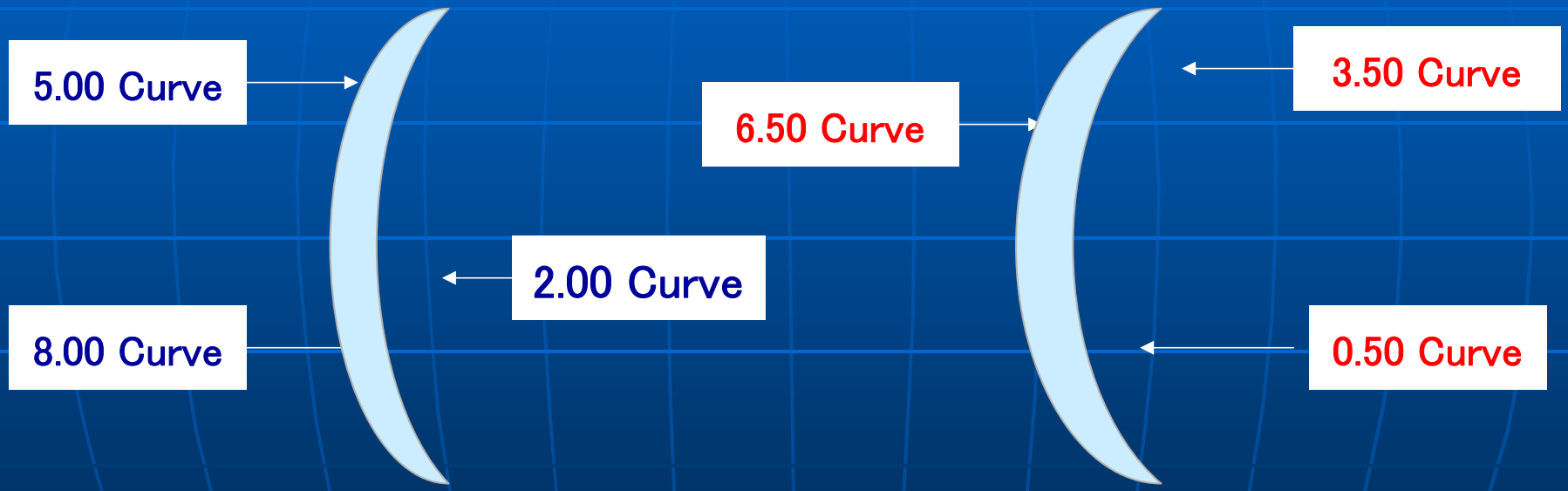


Why Back-surface PAL has Deep Curve?

Front-surface PAL

Back-surface PAL

(Example) SPH + 3.00 Add 3.00



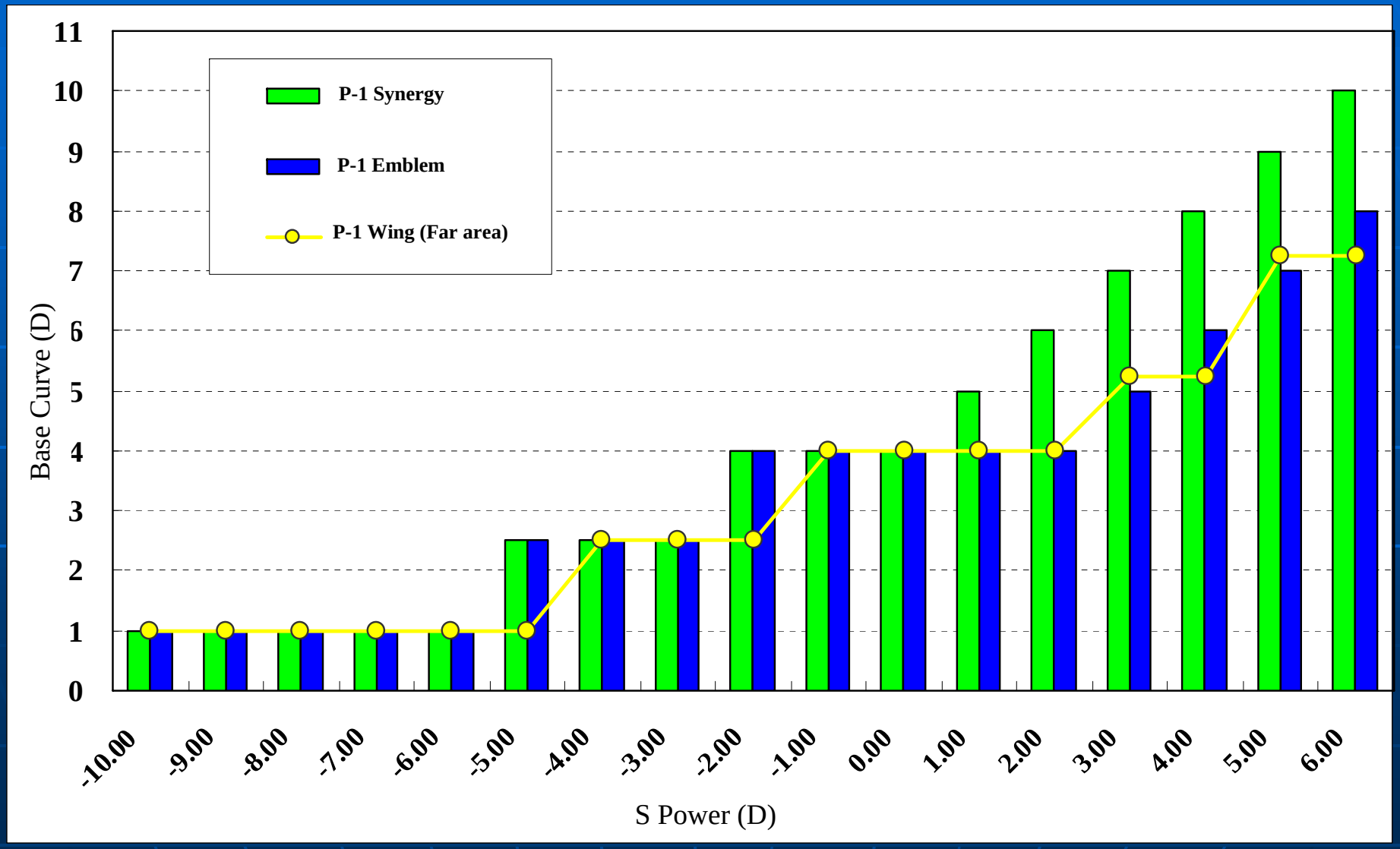
- Front-surface PAL has deep curve on near area, but the far area has flatter curve.

  Therefore the lens is not so deep from out-looking.

- Back-surface PAL has a certain limit of flatter curve on back surface which decides

  Therefore the plus lens looks deeper from out looking.

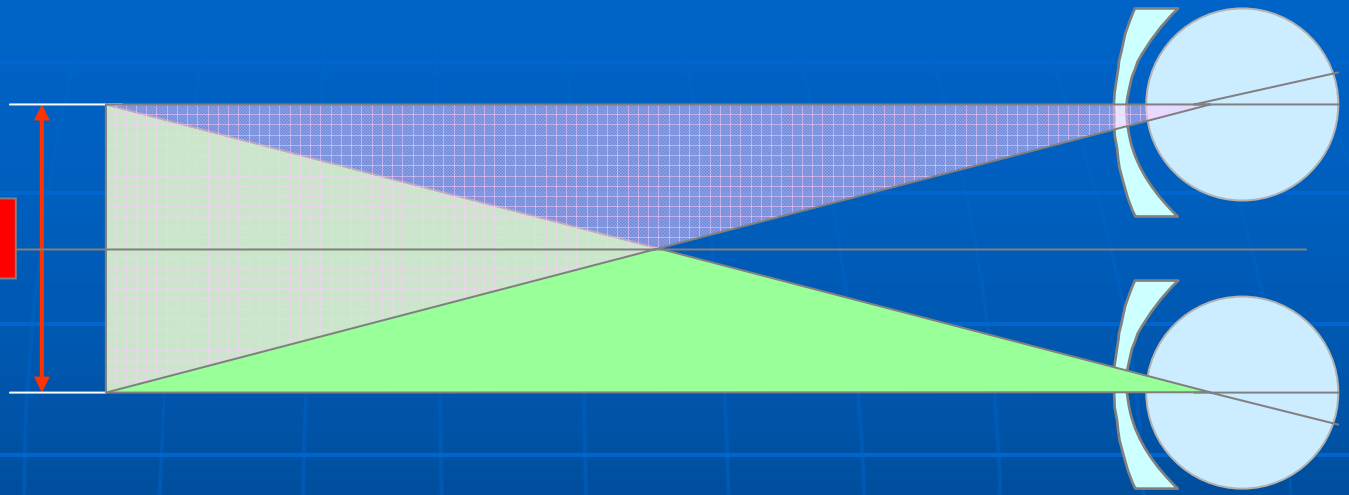
Comparison of Base Curve for 遠用（Add 3.00）



(5) Optimum In-Set Design (Minus lens)

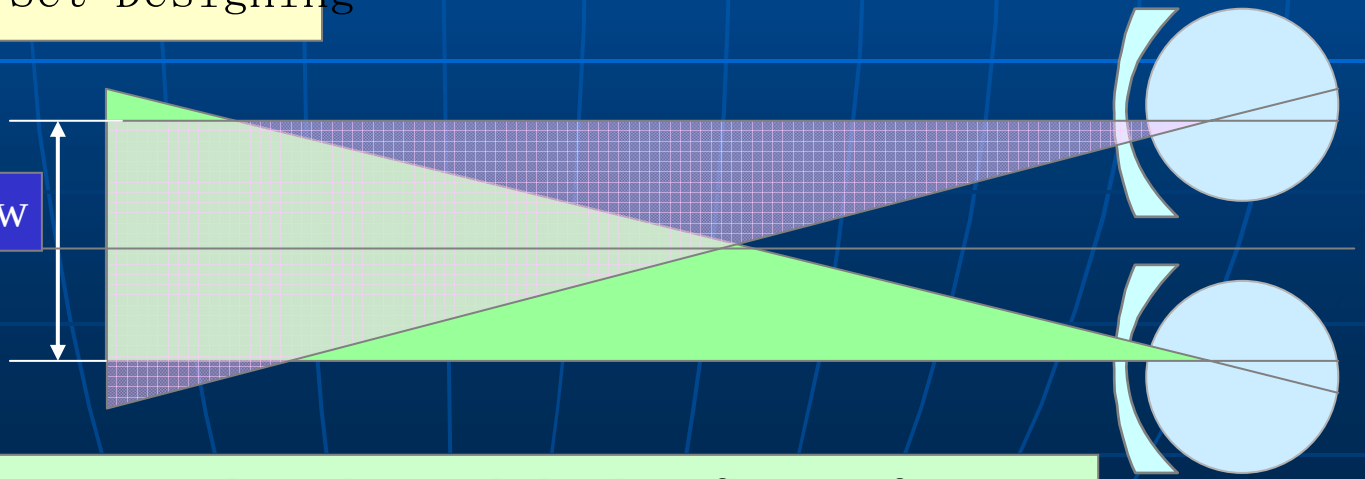
P－1EM

Wider field of view



Non Optimum In-Set Designing

Narrow field of view

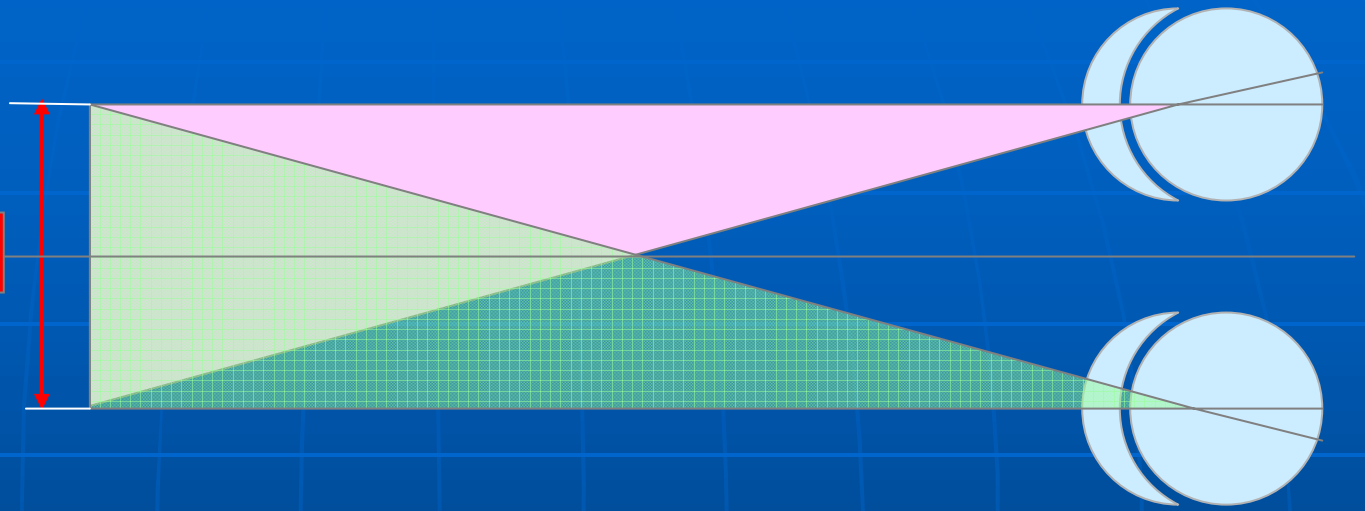


The filed image is not overlapped properly by the influence of prism.

Optimum In-Set Design (Plus Les)

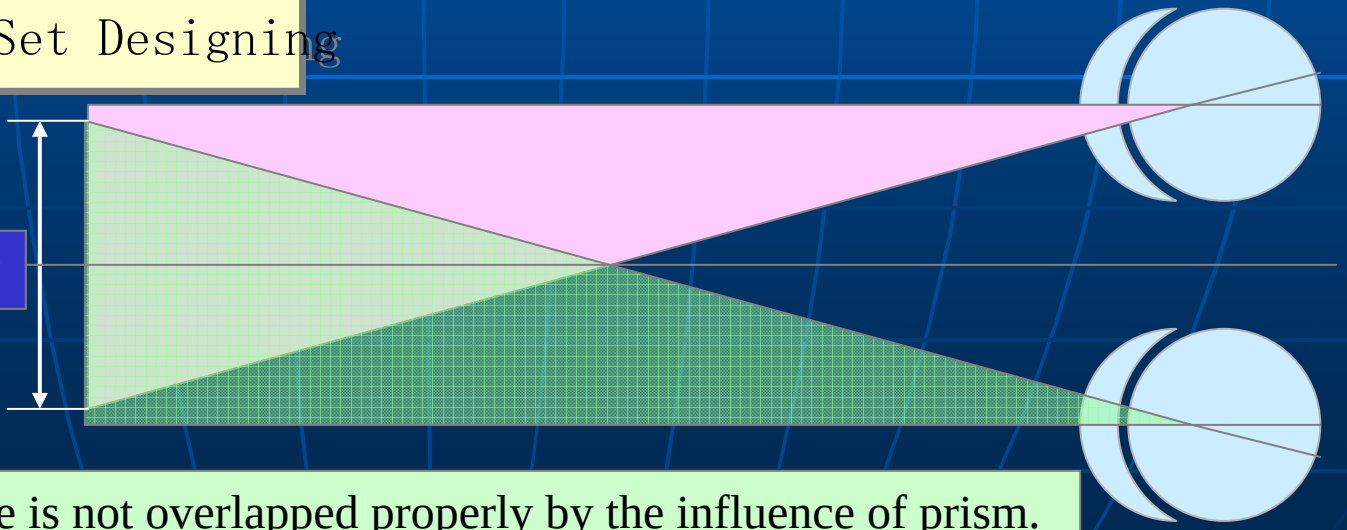
P－1 EM

Wider field of view



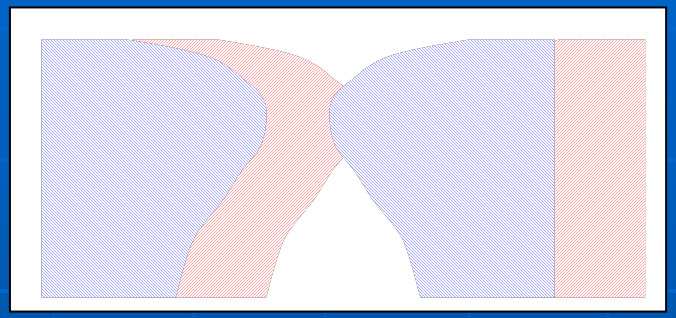
Non Optimum In-Set Designing

Narrow field of view



The field image is not overlapped properly by the influence of prism.

Optimum In-Set Design



Optimum in-set value effected by

- < Powers
- < Working distance
- < PD
- < length of eye-rotation

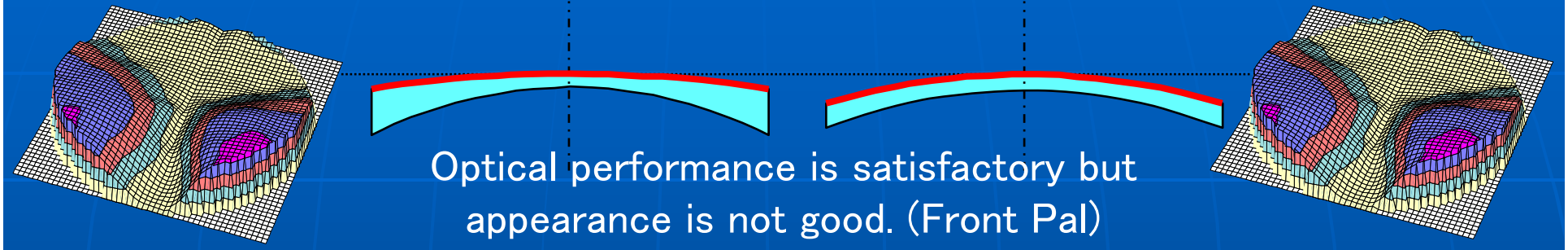
Working distance for near area

Vertical distance

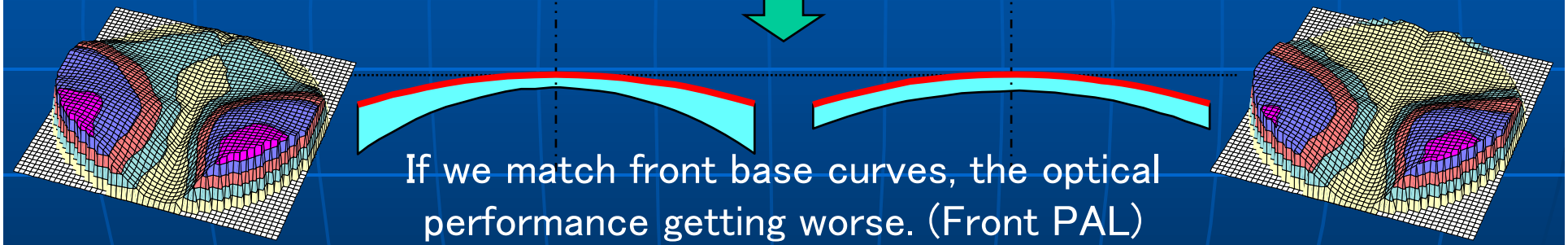
Pupil Distance

(6)Curve Pairing System

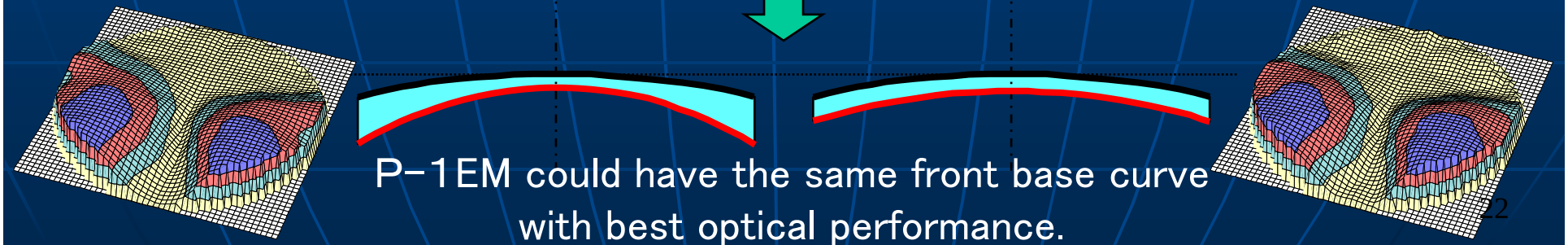
(R) SPH -4.00　　(L) SPH -1.00　ADD 2.00



Optical performance is satisfactory but appearance is not good. (Front Pal)



If we match front base curves, the optical performance getting worse. (Front PAL)



P-1EM could have the same front base curve with best optical performance.

（7）Optimum Prismatic Thinning

P-1 SY

ADD＼S	＋6.00 ～ －2.00	－2.25 ～ －5.00	－5.25 ～ －8.00
0.50～0.75	0	0	2.00 UP
1.00～1.50	0.75 DOWN	0	2.00 UP
1.75～2.25	1.20 DOWN	0	2.00 UP
2.50～3.00	1.65 DOWN	0	2.00 UP
3.25～3.50	2.00 DOWN	0	2.00 UP

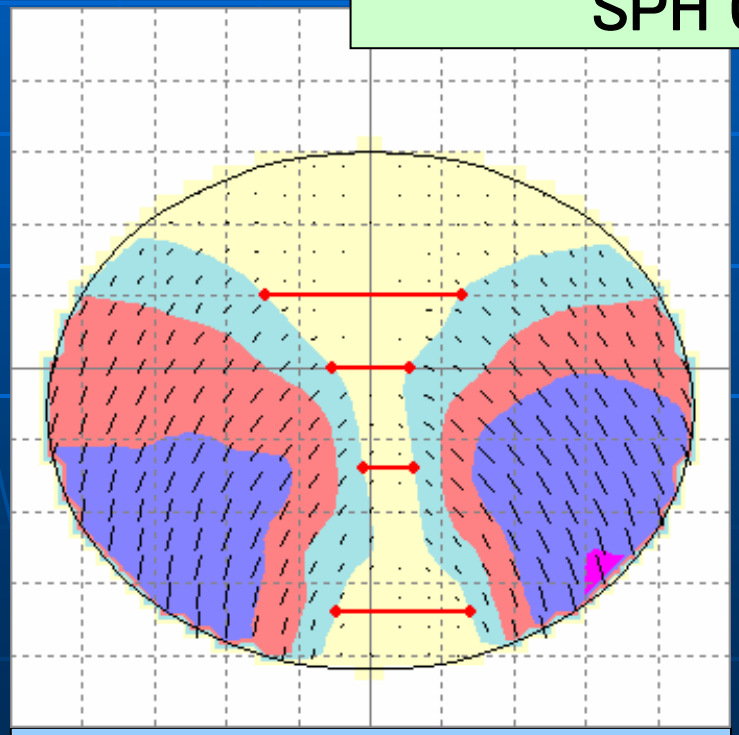
P-1 EM

ADD＼S	＋6.00～-2.00	-2.25～-5.00	-5.25～-8.00	-8.25～
0.50	0.30 DOWN	0.85 UP	2.00 UP	
0.75	0.40	0.75	1.90	
1.00	0.55	0.60	1.80	
1.25	0.70	0.50	1.70	
1.50	0.85	0.35	1.55	
1.75	0.95	0.25	1.45	
2.00	1.10	0.10	1.35	2.00UP
2.25	1.25	0.00	1.25	
2.50	1.40	0.15 DOWN	1.10	
2.75	1.50	0.25	1.00	
3.00	1.65	0.40	0.90	
3.25	1.80	0.50	0.80	
3.50	1.95	0.65	0.65	

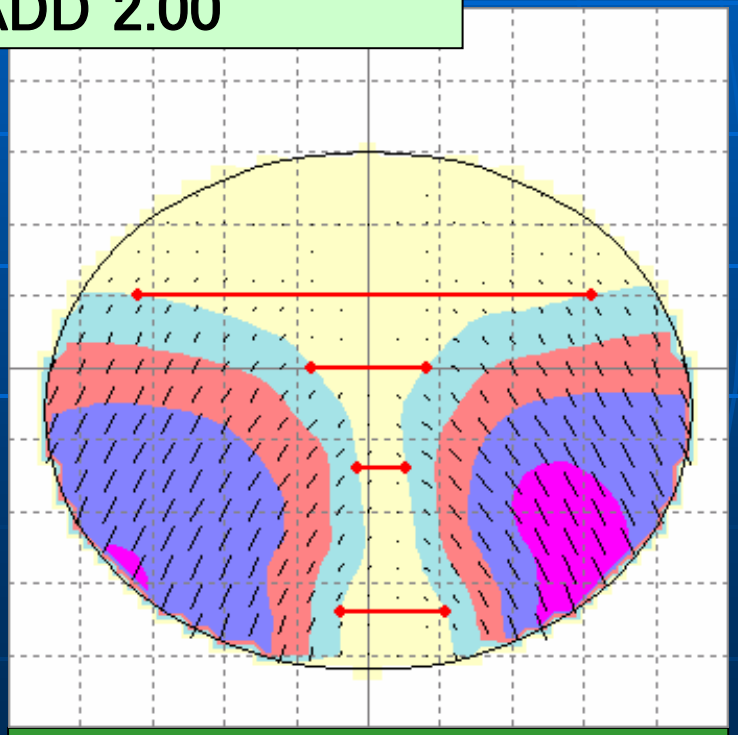
Comparison with P-1SY and P-1EM

In comparison to P-1 SY, P-1 EM provides a clearer and larger far field wit
Area. Also intermediate area is also smooth.

SPH 0.00 ADD 2.00

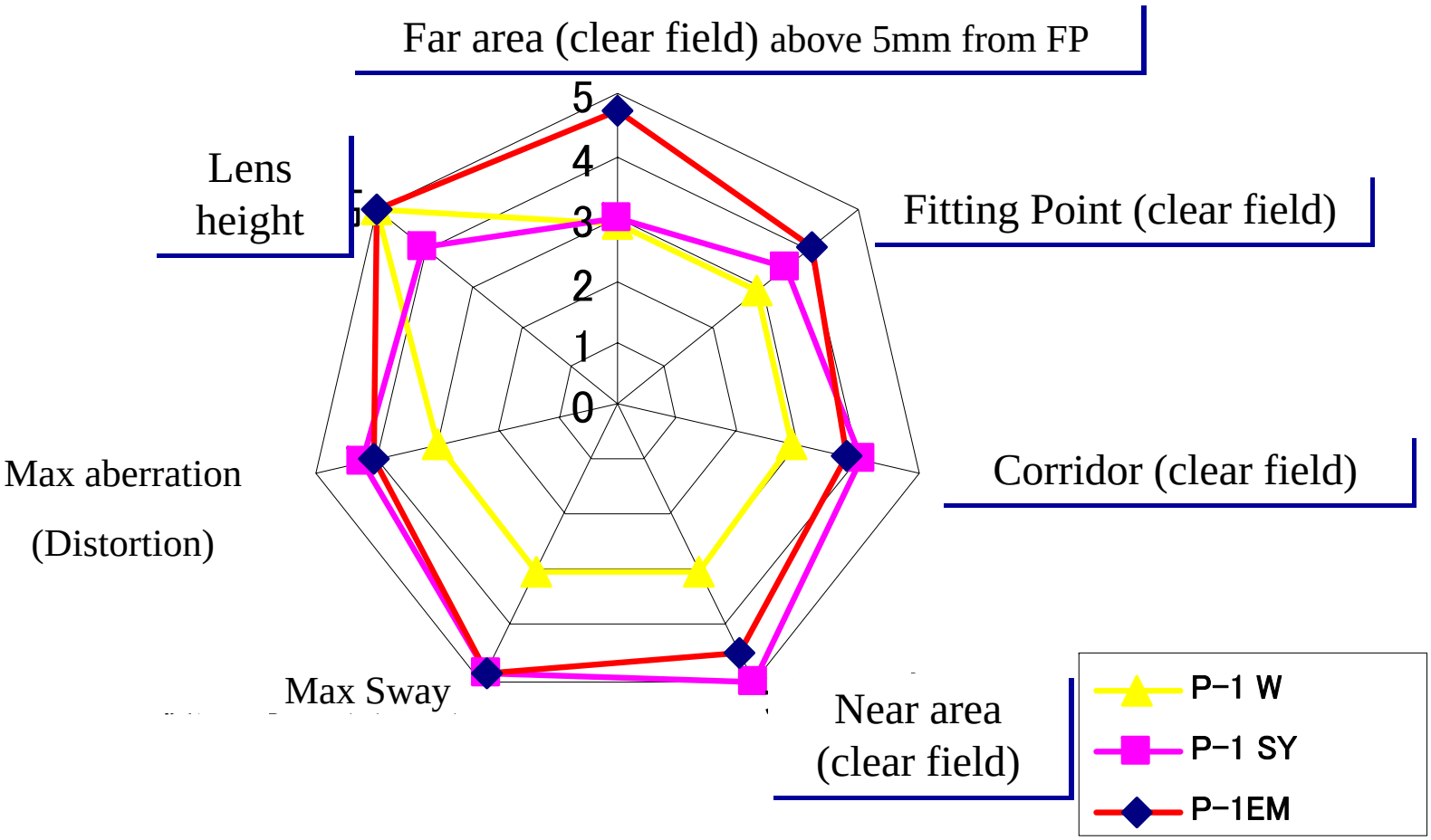


P-1 SY



P-1 EM

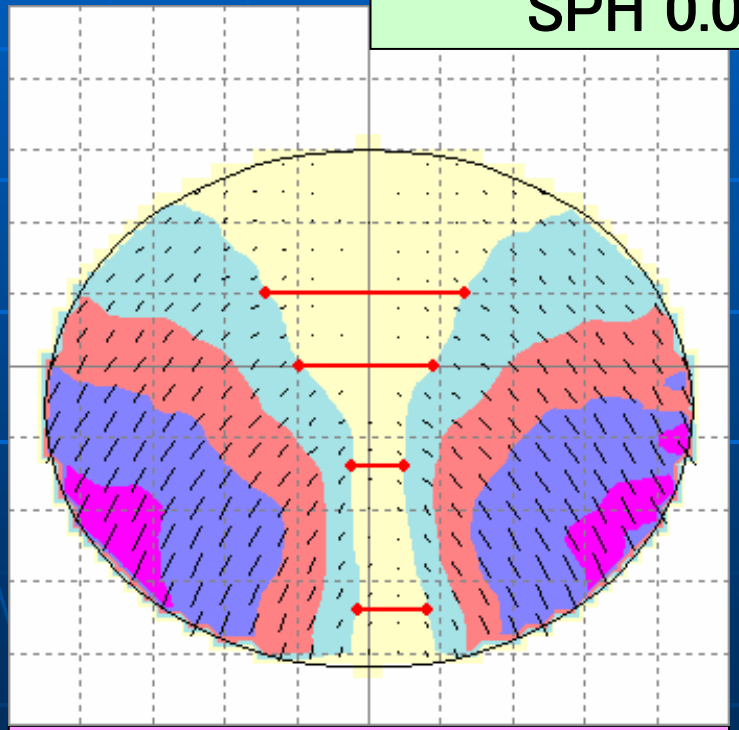
Rader chart of each performance (P-1W/ P-1SY/P-1EM)



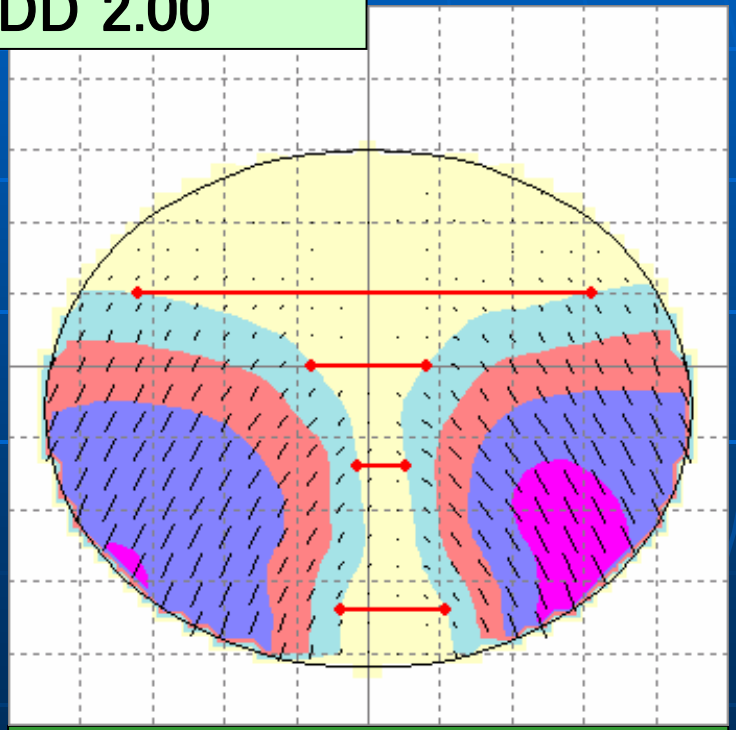
Comparison with lens X, company A

In comparison with X lens of company A, P-1EM has a wider field of clear vision for far area. The field of clear vision for near area is about two times wider.

SPH 0.00 ADD 2.00



Company A, lens X

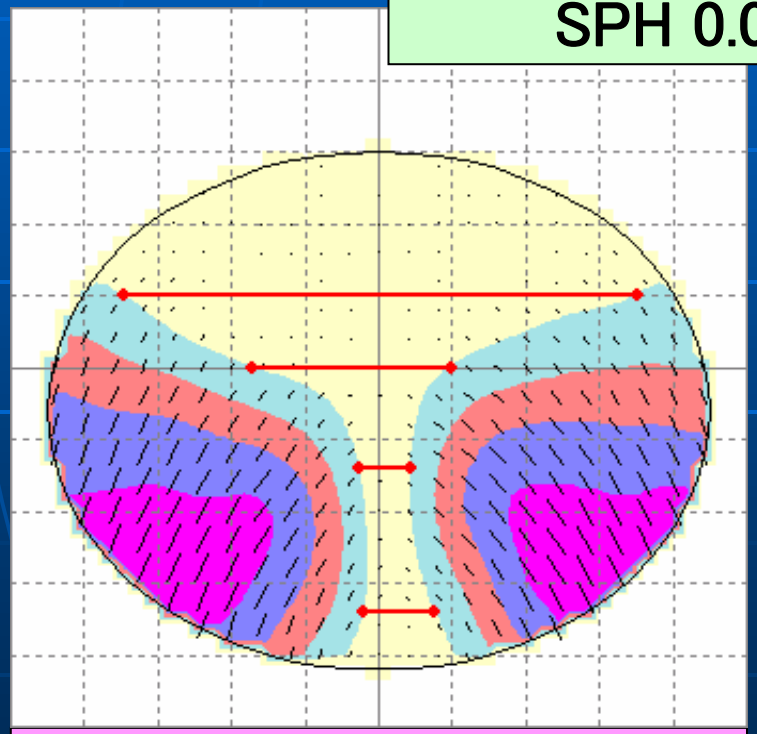


P-1 EM

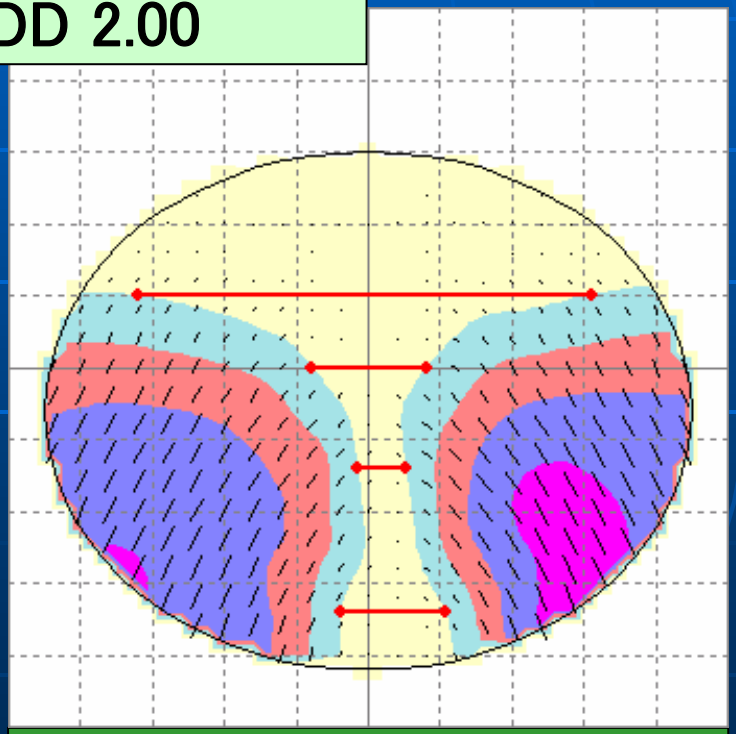
Comparison with Company B

In comparison to lens Y of Company B, P-1Emblem is designed to have a wider field of clear vision for near area and less aberrations!

SPH 0.00 ADD 2.00

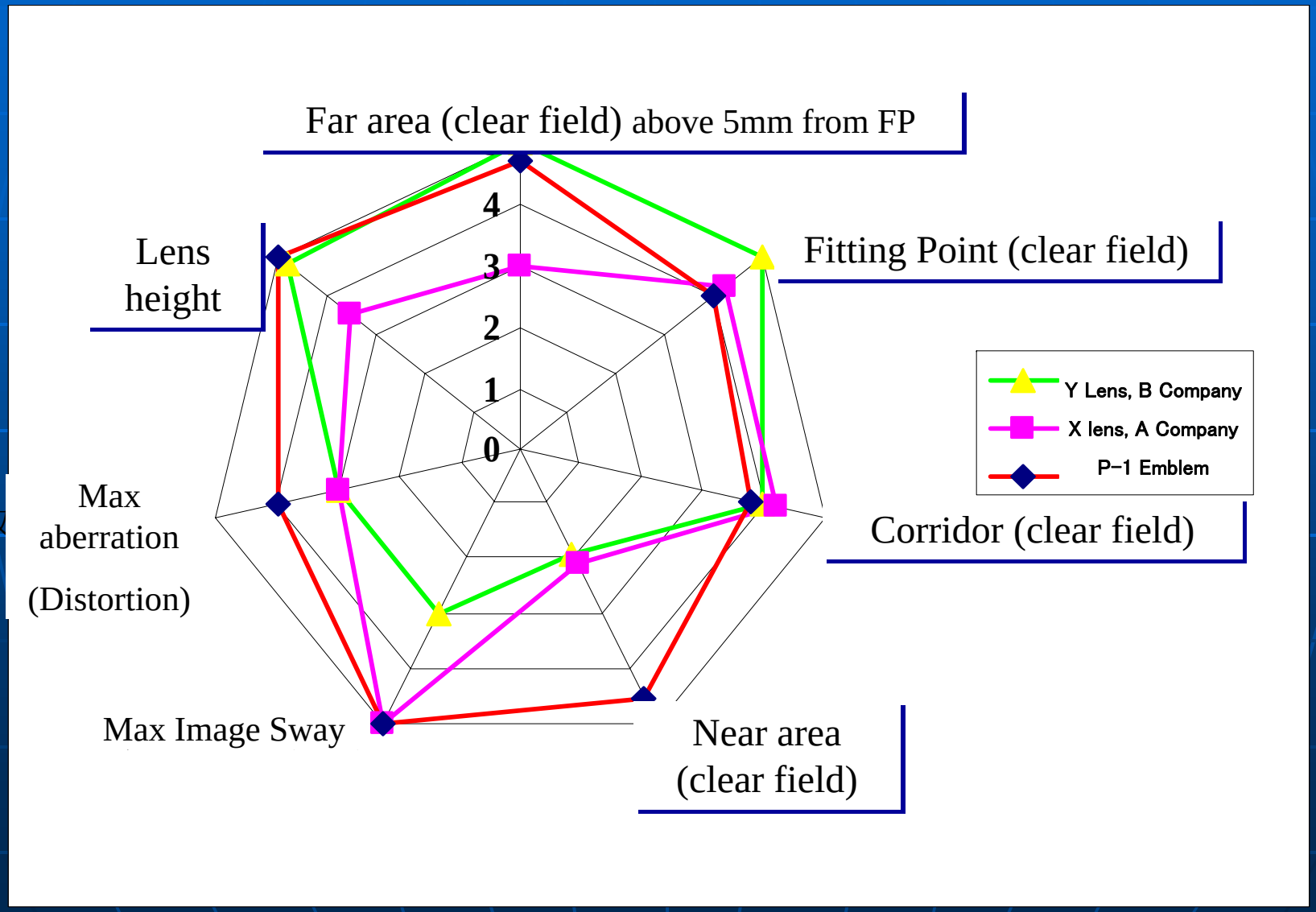


Company B, Lens Y



P-1 EM

Rader Chart of Comparison with Companies A& B



Sales Argument of P-1EM

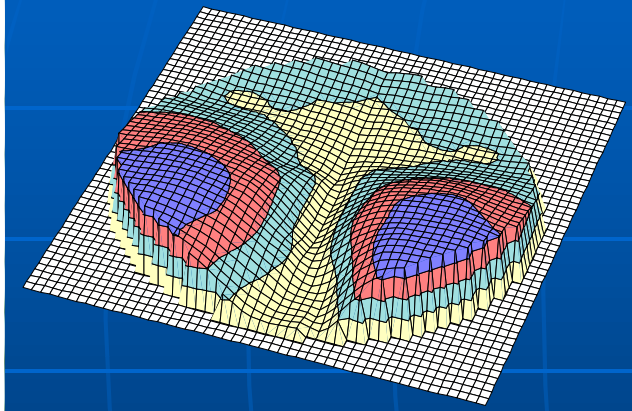
Astigmatism map of cylindrical PAL by different Axis

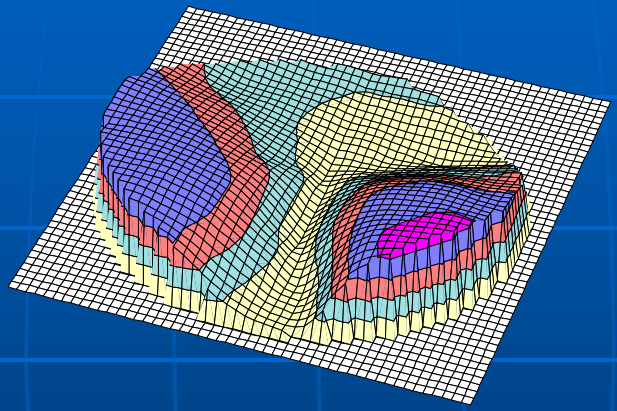
SPH 0.00 Add2.00
C-2.00 AX180

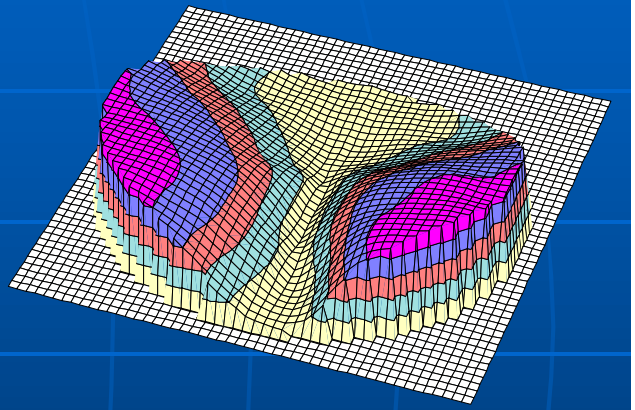
SPH 0.00 Add2.00
C-2.00 AX45

SPH 0.00
C-2.00 AX90

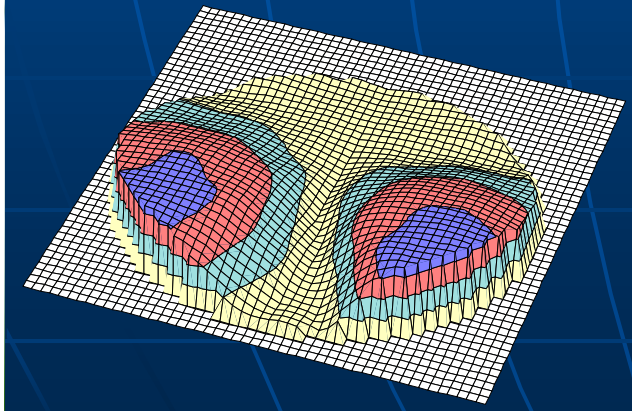
Conventional Front-surface PAL

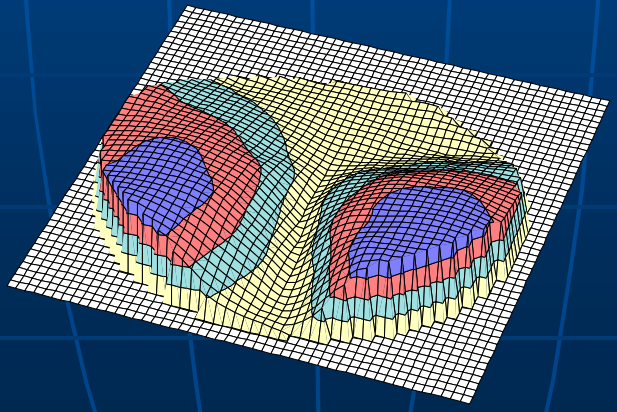


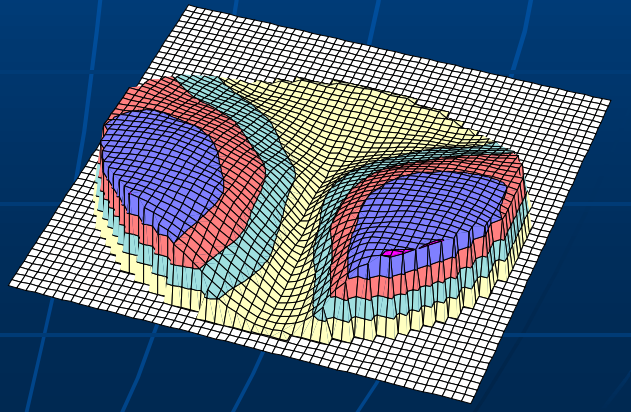




P－1 EM





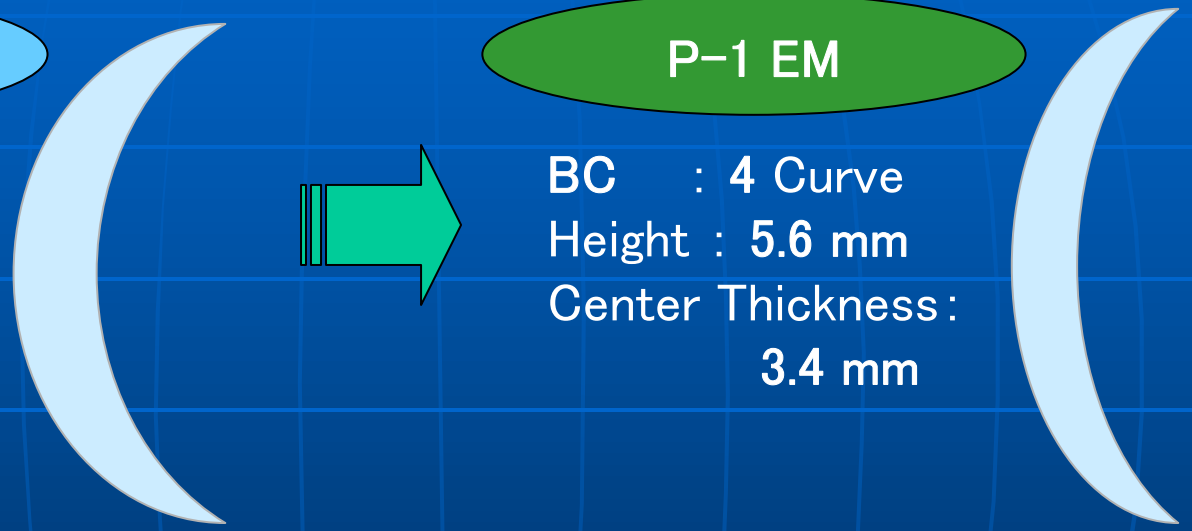


Lower base adoption for Hyperopia (Far sighted)

SPH +2.00 Add 3.00 n 1.67

P-1 SY

BC : 6 Curve
Height : 8.1 mm
Center Thickness :
3.9 mm



P-1 EM

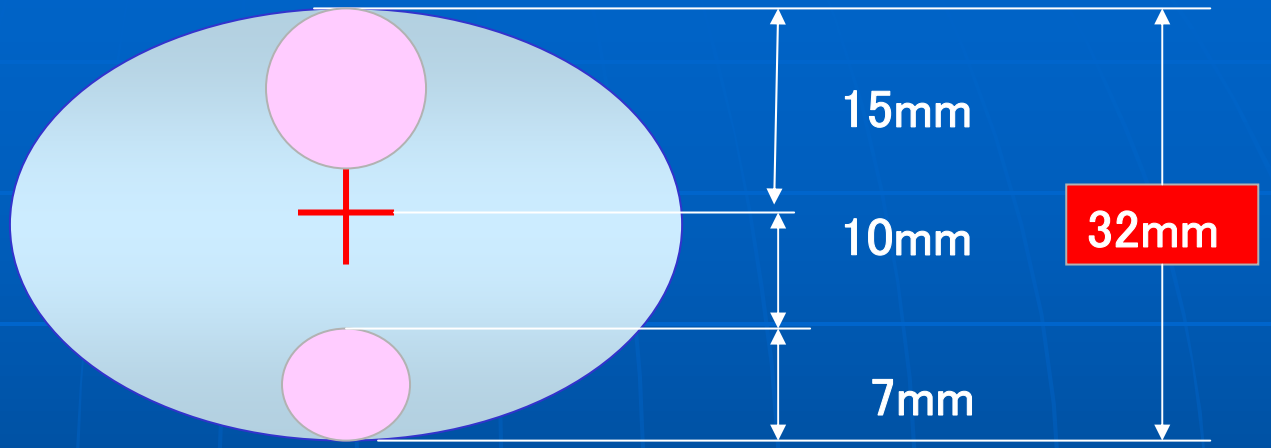
BC : 4 Curve
Height : 5.6 mm
Center Thickness :
3.4 mm

Problem Hyperopia (Far sighted): Deep Base Curve

Solution **P-1 EM designed by CCCS Design has a flatter base curve,** center thickness is about 10% thinner than conventional PAL.

For smaller frames

Corridor Length 10mm



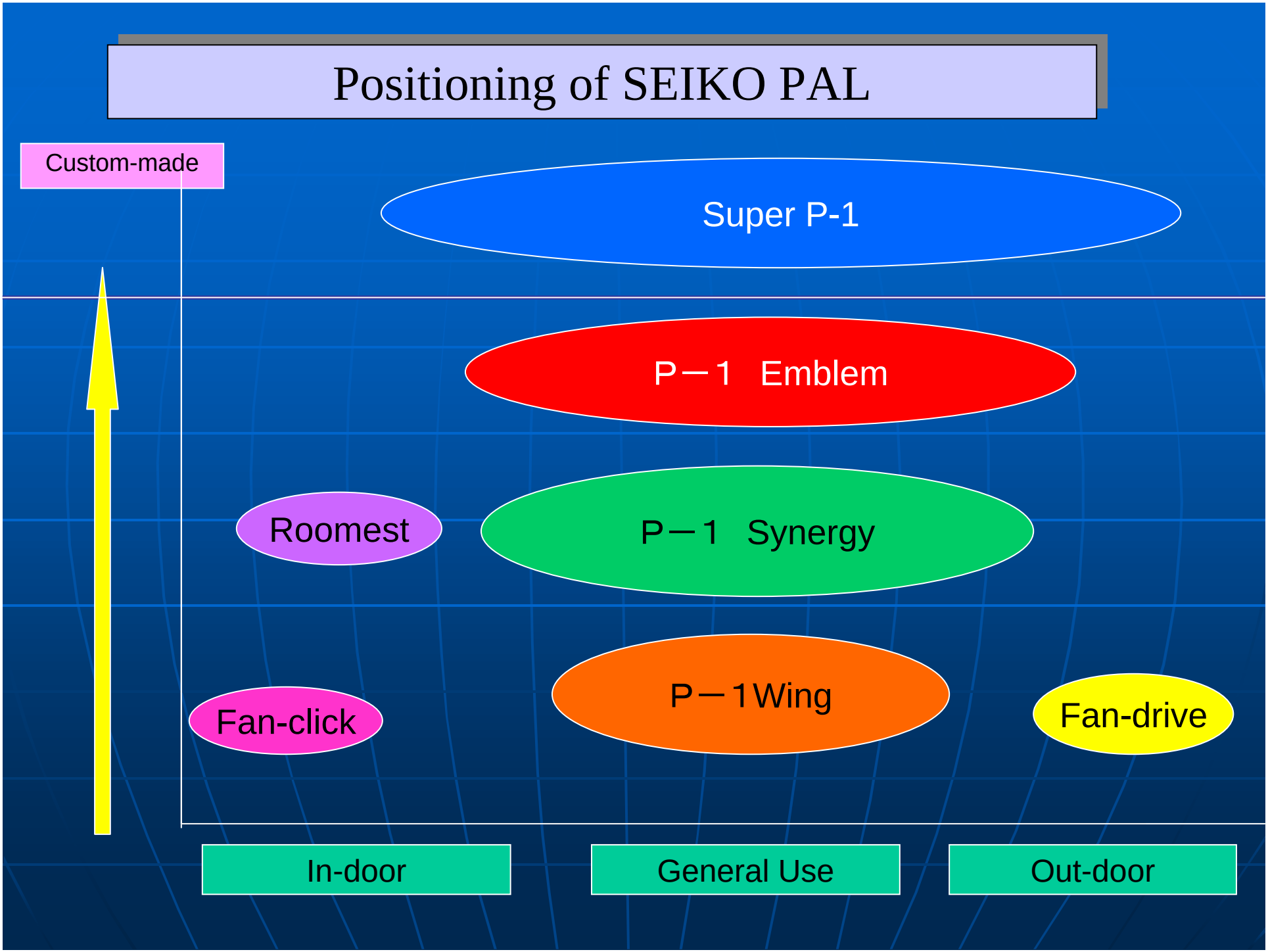
●Corridor Length	Recommended Frame Size	● 最小天地幅
10mm	32mm	25mm
12mm	34mm	27mm
14mm	36mm	29mm

Problem Hard to use PAL for small frames／worry for big distortion and sway

Solution Solution with the shorter corridor of P-1 EM.

P-1EM Specifications

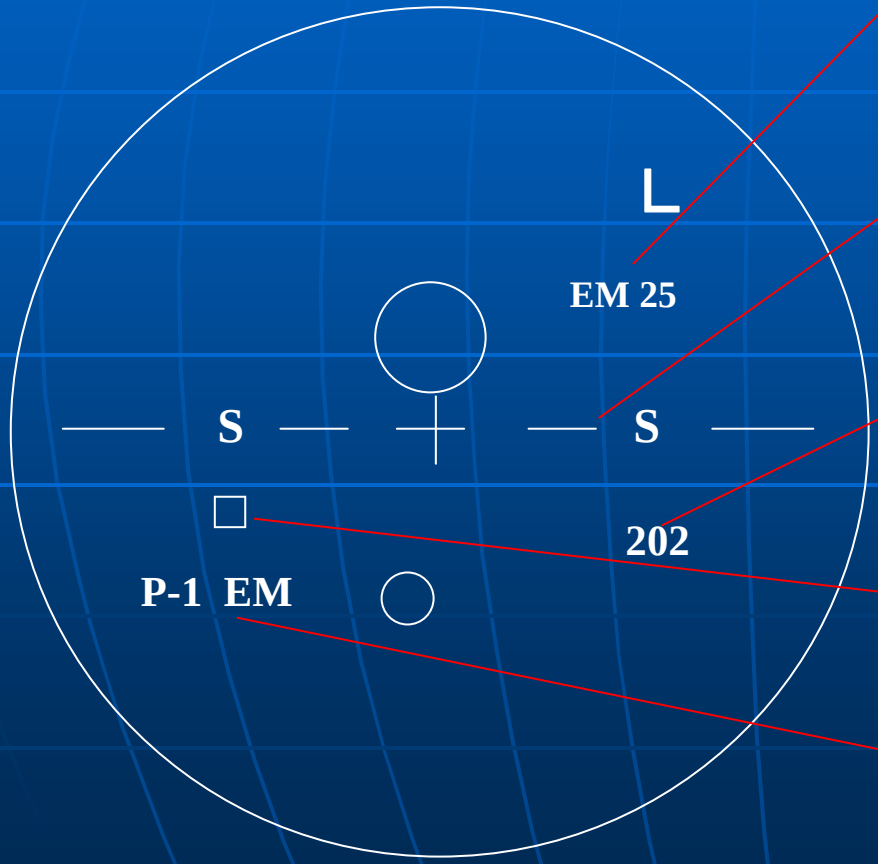
Positioning of SEIKO PAL



Launch Date / Specification

- Launch Date: ???
- Material: n=1.74 / n=1.67 / n= 1.60
- Design: Back-surface Technology / **C&S Design** / **CCCS Design** / Advances Aspheric design **etc**
- Production Range:
  1.74 (SPH+6.00～S-12.00／TC ±5.00)
  1.67 (SPH+6.00～S-12.00／TC ±5.00)
  1.60 (SPH+6.00～S-10.00／TC ±5.00)
- Addition Power: 0.50D ～3.50D
- Corridor Length: 10mm ／ 12mm ／ 14mm
- Inset Value: 0.0mm ～5.0mm (by 0.1mm step)
- Prism : 0.25△～3.00△

Lens Mark



1st&2nd letters: Quality Guarantee Mark
3rd&4th figures: In-set Value
(refer to table A)

Horizontal Standard Mark
Hidden Mark （refer to table C）

1st&2nd figures: Additional Power
3rd figure: Corridor Length
(refer to table B)

Reflective Index Mark
（refer to table C）

Print Mark
（refer to table D）

Mark Explanation

(Table A)

1st & 2nd letters Quality Guarantee Mark	3 & 4 figures	Inset REF
E M	0.0 mm	00
	0.1 mm	01
	1.0 mm	10
	2.5 mm	25
	5.0 mm	50

(Table B)

1st & 2nd figures	Additional Power	3rd figure	Corridor Length
0.50D	05	10 mm	0
0.75D	07	12 mm	2
1.75D	17	14 mm	4
2.50D	25		
3.50D	35		

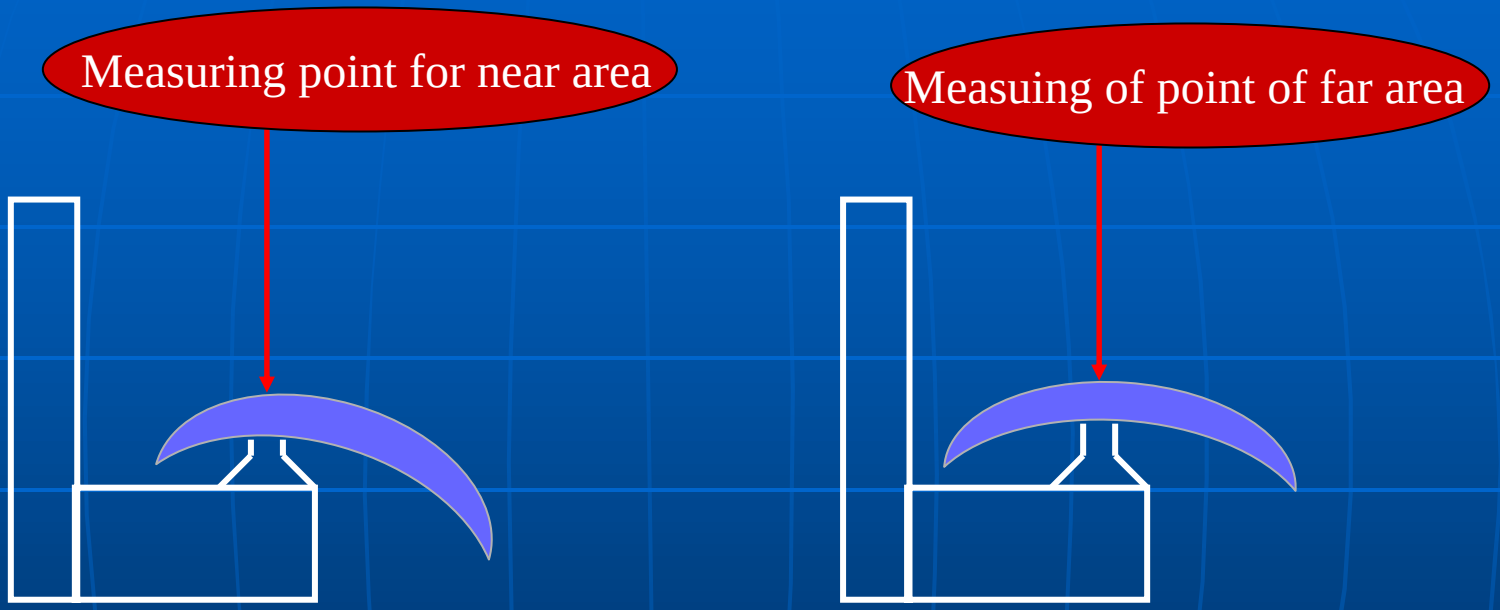
(Table C)

	Horizontal Standard Mark	Reflective Index Mark
1.74	◎	◇
1.67	S	□
1.60	S	△

(Table D)

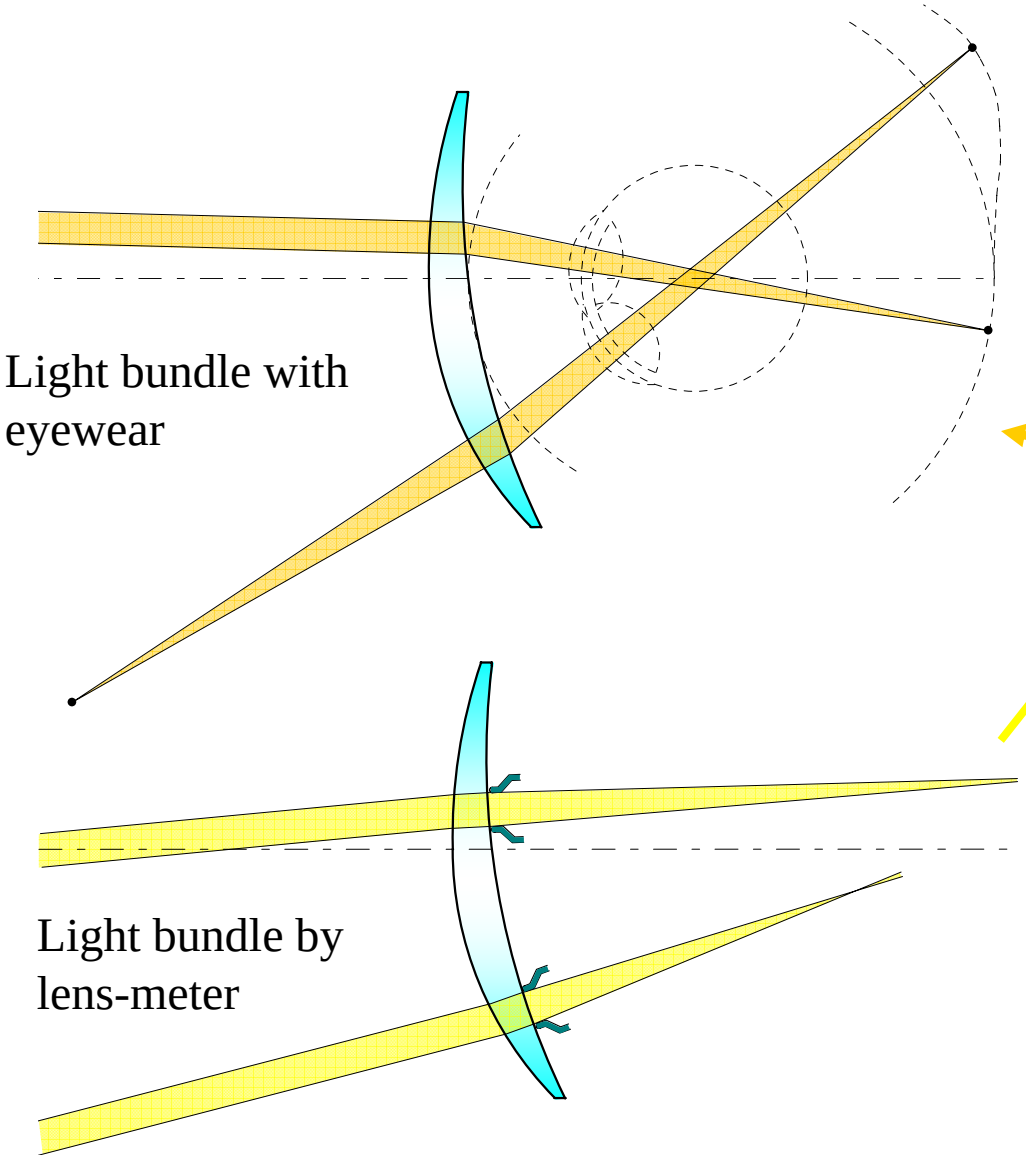
Brand Name	Print Mark
SEIKO	P-1 EM

Power Measuring Methods



How to measure P-1EM by lens meter.
Put the lens support on the back-side of P-1EM at both Far and Near measuring points and read SPH, CYL, AX data.

Confirmation Methods for Powers



Indication of package

SEIKO OPTICAL PRODUCTS