



Dongguan Hopewell Silicon Plastic Tech Co., Ltd.

东莞市合和硅塑科技有限公司

www.siliconinjection.com



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**Company
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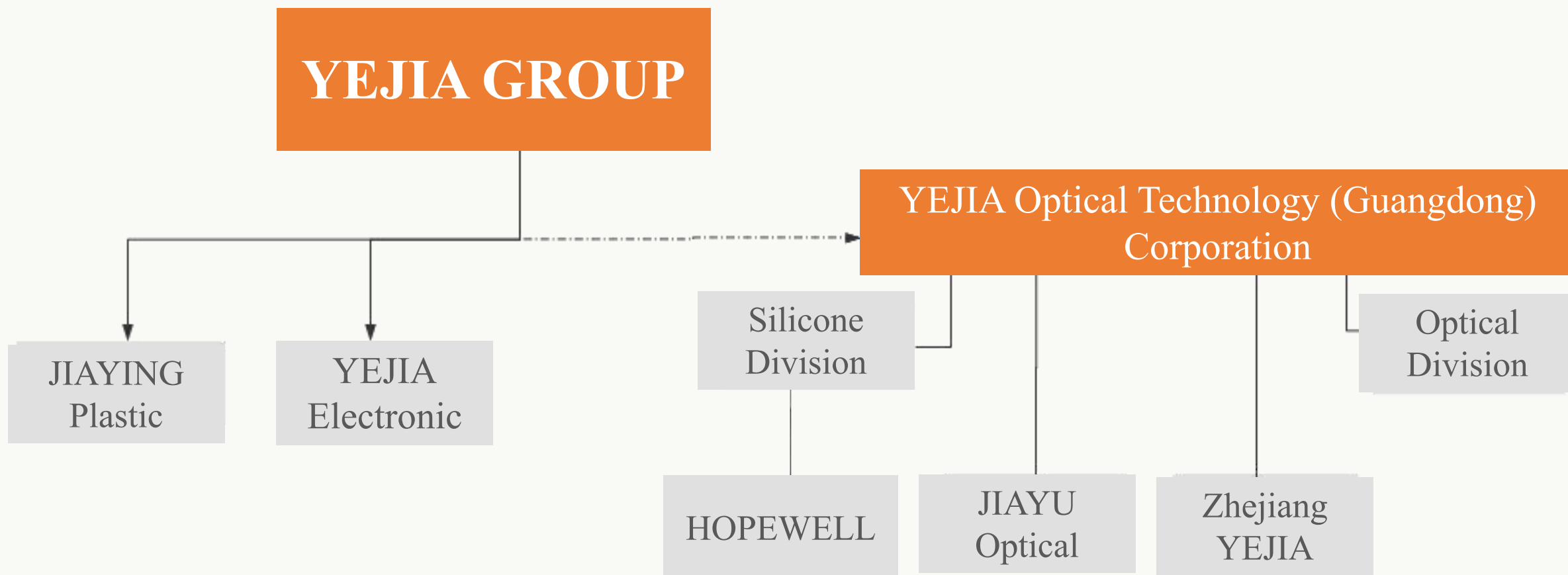
**Optical Lenses
Manufacturing**

0 3

**Silicone Lenses
Introduction**

- ◆ Established in 2009, specializing in R&D& production of LSR products, in 2013, optical division is founded, focusing on injection molding of plastic optics and silicon optics.
- ◆ 650 employees, 25,000 sqm production base, 10,000 production workshop, 1,000 camera assembly workshop
- ◆ In-house Precision Mold Design& Mold Making Capabilities
- ◆ Main Products: Car Lighting Optics, HUD Optics, AR/VR Lens, Silicone Optical Lens, Mobile Flash Lens, TV Backlight Lens& Other Custom Optics
- ◆ ISO9001, ISO14001, ISO13485& IATF16949 Certifications
- ◆ 64 Invention Patents: 58 (China) + 5 (USA)+ 1 (Germany), 14 Authorizations: 10 (China)+ 4 (USA), 181 Utility Model Patents, 5 Design Patents







Research Article

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Optics EXPRESS

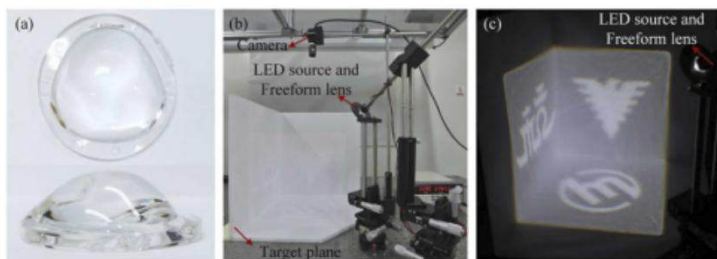
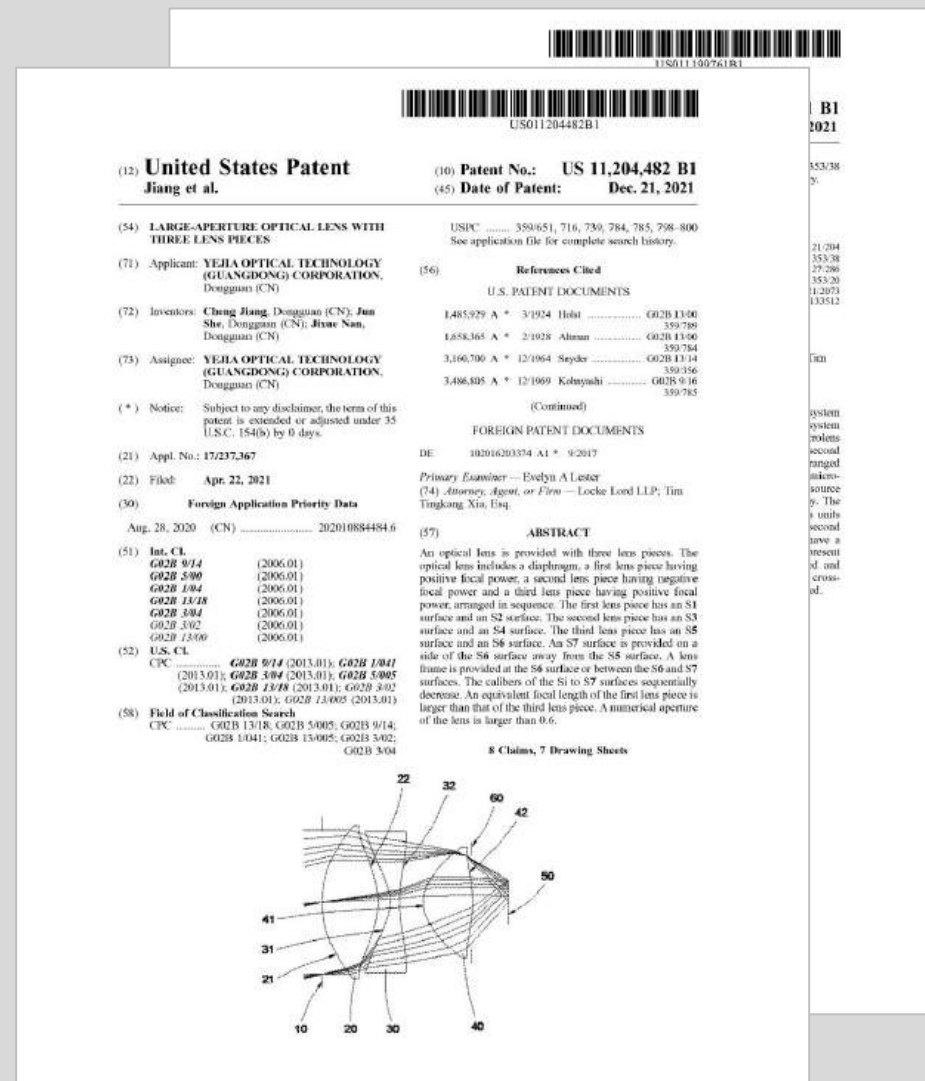


Fig. 8. Experimental verification of the second design: (a) the freeform lens, (b) the experimental setup, and (c) the lighting effect produced by the prototype.

Close scientific cooperation with Zhejiang University & Fudan University



Authorized Invention Patents: 10 (China), 4 (USA)

Provide Customers with Complete High Quality Optical Solutions

**Superior
Optical
Design
Capability**

**First Class
Mold
Processing
Capability**

**World Class
Injection
Molding
Capability**

**Skillful
Product
Inspection
Capability**

**Long-term
Supply of
Fortune 500
Management
Capability**

Core Technology

- A team of experts from China, Japan& Korea
- Mold design& manufacturing techniques
- High precision injection molding technology: optical resin& silicone materials
- Ultra-high precision Japanese& German inspection equipment, precise Inspection skills

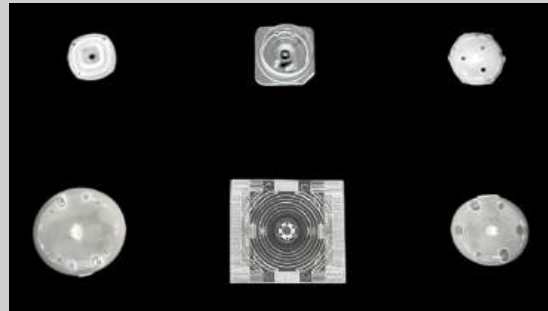
Our Advantages

- Superior optical design capability& precision products manufacturing capability
- Provide prototype molds, to validate product design rapidly
- Provide section profile analysis
- Provide various optical properties tests analysis of products
- Long-term supply of Fortune 500 management capability

Year 2013-2015



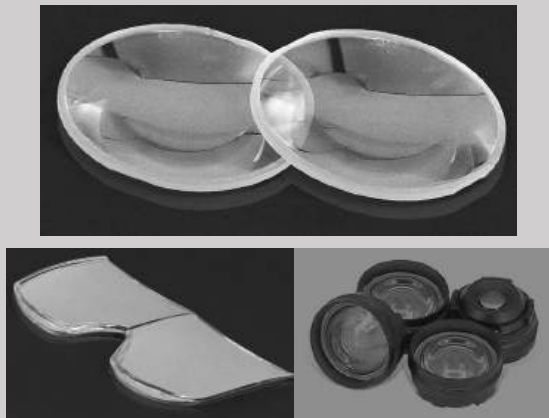
TV backlight lens
Mobile flash lens



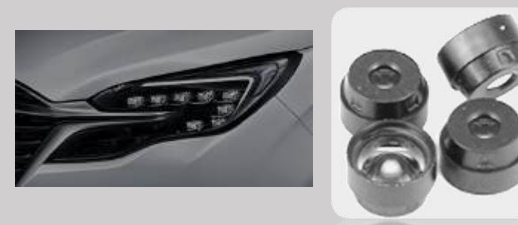
Year 2016-2017



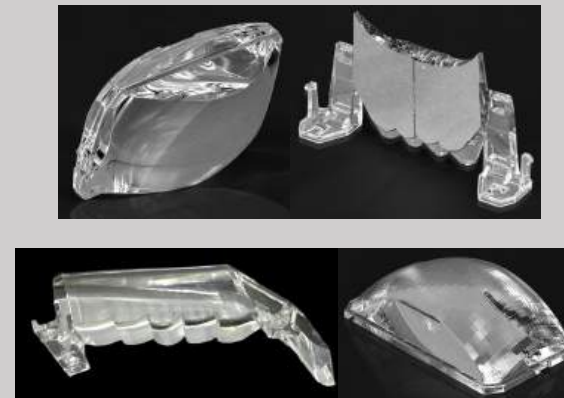
VR lens
Mobile lens module



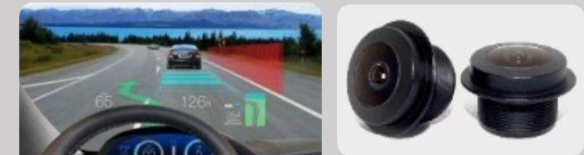
Year 2018-2019



Car headlamp lens& concentrator
Vehicle optical Camera
Light guide silicon concentrator



Year 2020-2024



HUD Reflector Lens
HUD Backlight Module
Pixel-type headlight lens module
LOGO lights



Optical Lens Manufacturing

**Mold
Design**

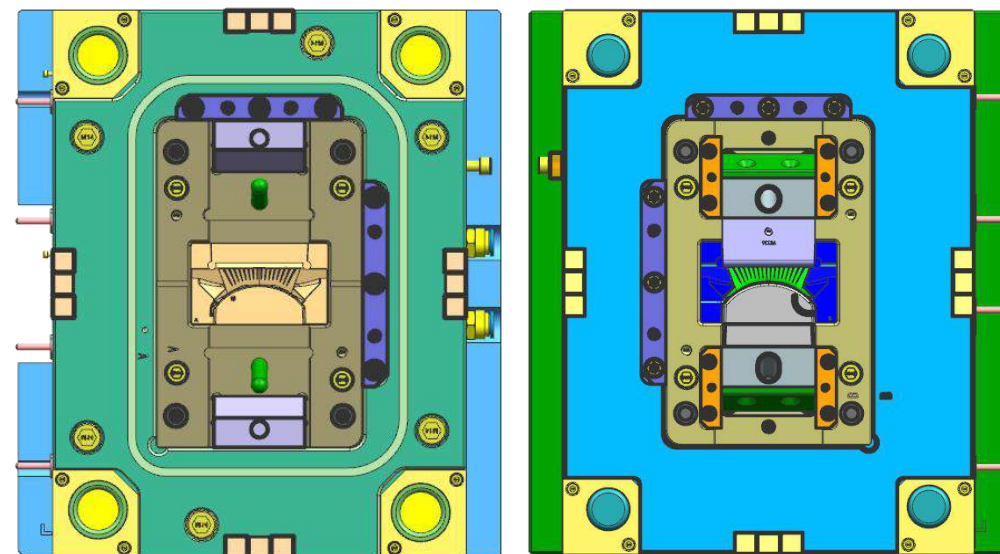
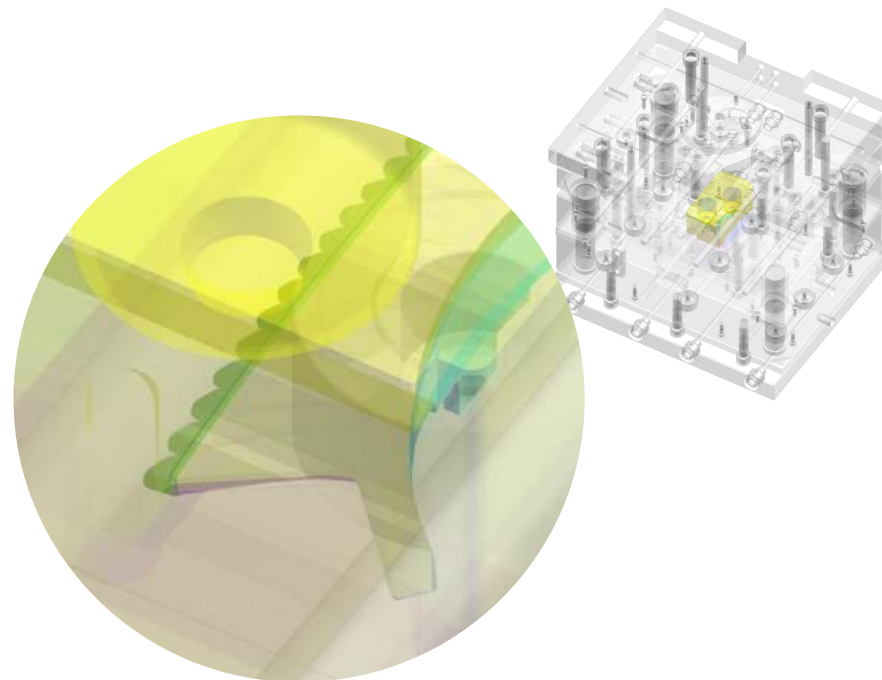
**Mold
Making**

**Injection
Molding**

**Optical
Testing**



- Professional LSR mold evaluation& design, provide mold flow for LSR molding
- Self-design& develop cold runner system for LSR manufacturing
- 45 sets LSR silicon optics molds (30 sets production molds/ 15 sets trial molds)
- Mature experience accumulated in design, ensure projects to succeed 100%
- Standard mold bases for rapid development of pre-researched silicon optical molds



High Precision
Internal & External
Grinding Machine



Precision Automatic
Surface Grinder



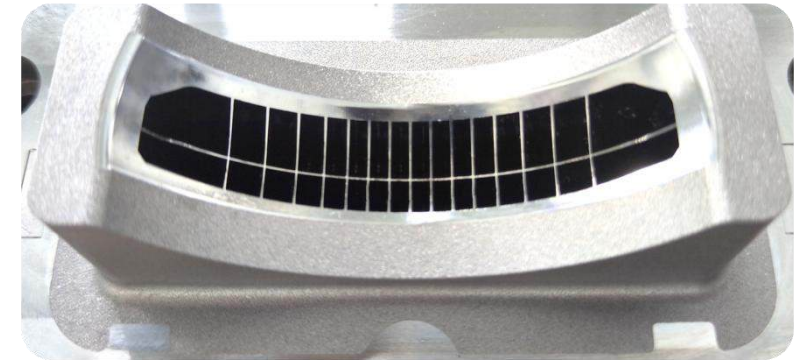
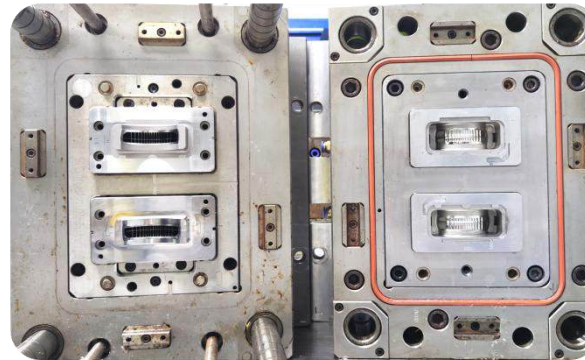
Diamond Turning
Lathe



High Precision
Aspheric and Free-
form Surface Grinder



High Precision
Machine Center

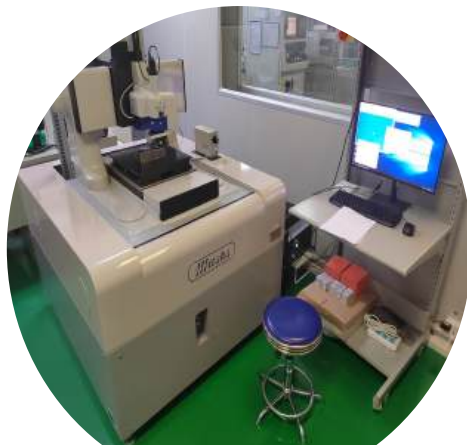




- Equipment: ARBURG LSR Precision Injection Moulding Machine& SUMITOMO Plastic Injection Molding Machine
- System: 2KM
- Workshop: 100,000 Cleanroom to ensure production stability and cleanliness
- Maintenance: Mold Cleaning Experience



**Panasonic UA3P
3D Profilometer**



**Mitaka Non-contact
Measuring Instrument**



Luceo STRAINEYE



**Trioptics HR Image
Quality Testing**



**Zeiss O-Inspect 3D
Optical Metrology**



**Mitoyo 2D Measuring
Equipment**



25 Meters Darkroom



**EVERFINE
Goniophotometer**

Key Elements for Silicone Lens Testing

Hôpewell 合和硅塑

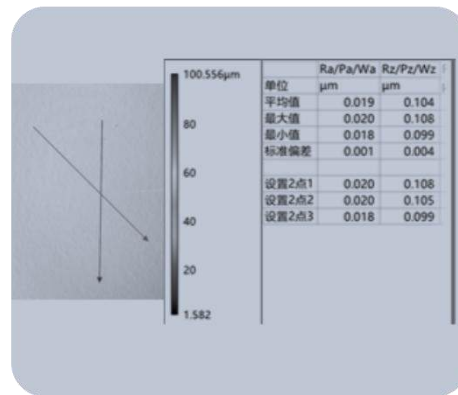
Roughness Tester

**UV-Vis
Spectrophotometer**

**Product Surface
Roughness**

**Precision Blue Light
Scanner**

Goniphotometer



**Mold Finish
Guaranteed**

**Material Light
Transmission
Guaranteed**

**Surface Finish
Guaranteed**

**Shape& Dimension
Guaranteed**

**Light Performance
Guaranteed**

※ Quality assurance systems for the entire manufacturing process that allow products to meet design requirements.

Silicone Lens Manufacturing Process

Hôpewell 合和硅塑



Company Certifications

Hôpewell 合和硅塑

ISO9001

ISO14001

ISO13485

IATF16949

ISO45001



Silicone Lens Introduction

High Light
Transmittance

UV
Resistance

Heat
Resistance

Shock
Resistance



- **Optical silicone material is a bi-component ultra-transparent liquid silicone rubber material, it's flame resistance and with good optical properties.**

Under longtime harsh environment, its color keeps stable and optical clarity maintains.

It's an excellent material for outdoor and flame resistant applications, except for special lighting, it's suitable for high temperature and UV radiation environments.

In addition, the excellent processing properties enable it to be manufactured to complex micro-structure optical parts.

It brings new possibilities for cutting-edge technology in LED high-power automotive lighting and electronic devices.





**DOW CORNING: DOWSIL™ MS-1002 (74 Shore A)
/1003/4002 (84 Shore A)**



**MOMENTIVE: LSR7180
5/ 30/ 60/ 70/ 80/ 90 Shore A**



**WACKER: LUMISIL® LR 7601/50 (50 Shore A) /60 (60
Shore A) /70 (70 Shore A) /80 (78 Shore A)**



**DONESON: DSA-7000
30/ 40/ 50/ 60/ 70/ 80 Shore A**

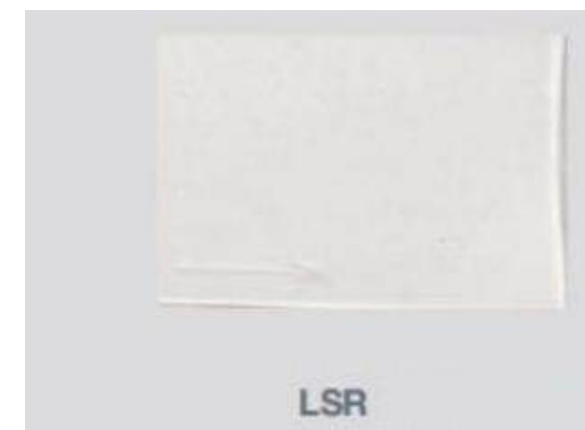
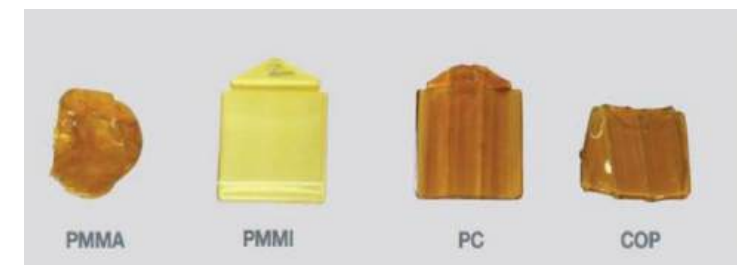
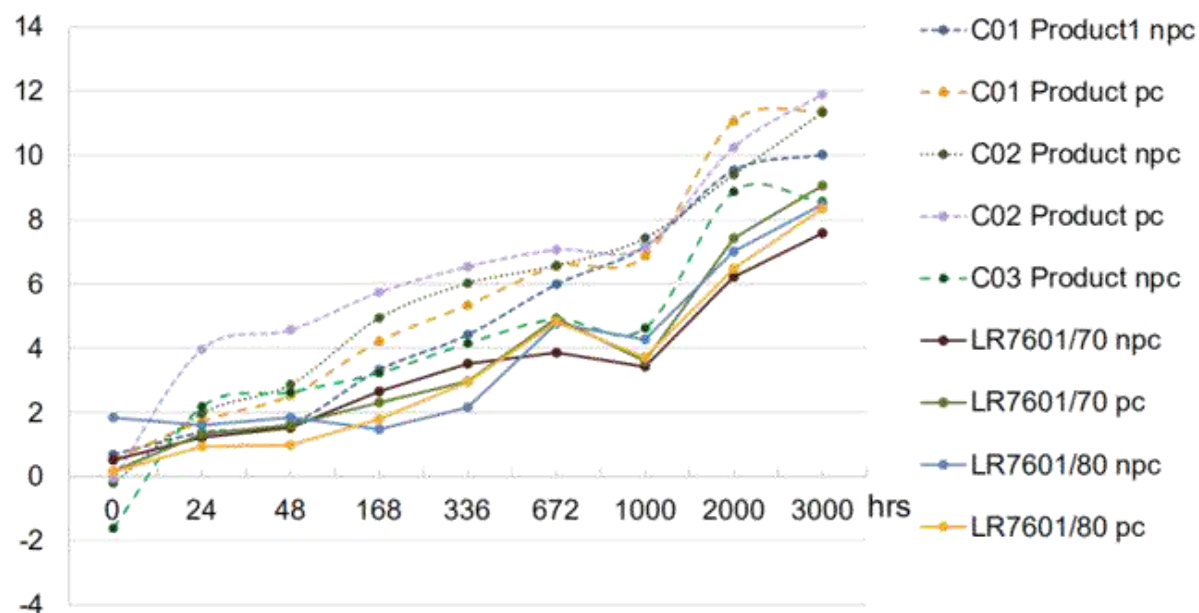
1. Plastic& Silicone Optical Comparison

Optical Property	Dow Corning MS4002	Momentive LSR7180	Wacker LR7601/80	Doneson DSA-7180	PC	PMMA	Glass
Light Transmittance	94	94	94	94	86-89	89-92	92
Refractive Index	1.41	1.41	1.41	1.41	1.59	1.49	1.5-1.6
Abbe	48	50	50	49-51	34	57	35-59
Yellowing Index	-	< 1	-	-	1-3	1-3	-
Temperature Resistance (°C)	-40~200	-40~200	-40~200	-40~200	-40~120	-40~90	-40-150

※ Above values are testing data offered by material suppliers, for reference only.

在3000小时双八五测试之后，仍然能展现出较好的耐黄变性能

Yellowness Index after 85°C / 85% Aging



Yellowing Comparison after 6480H/ 150°C

※ 以上数值为材料厂家测试数值，仅供参考。 Above values are testing data offered by material supplier, for reference only.

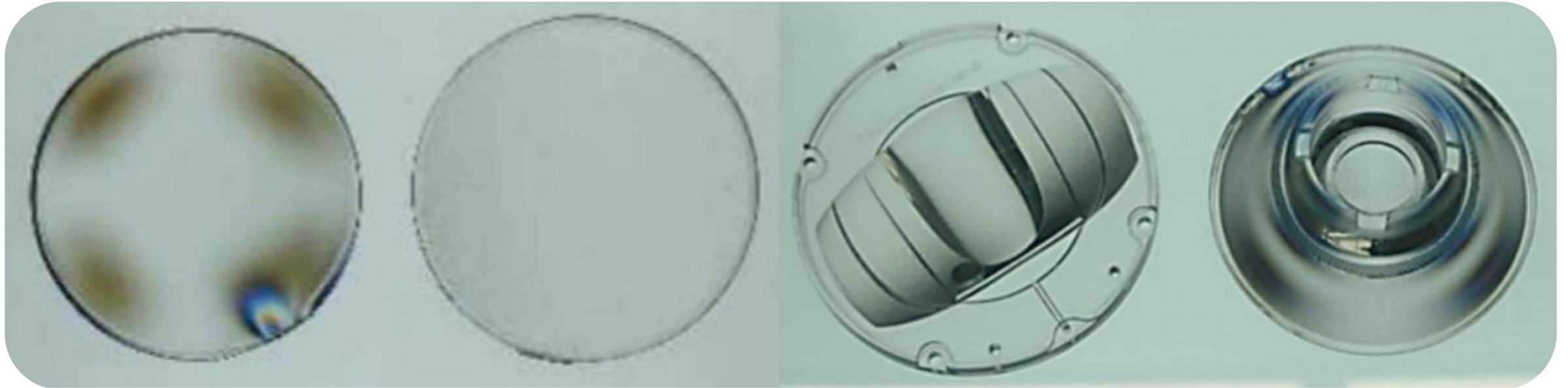
3. Plastic& Silicone Stress Comparison

Plastic

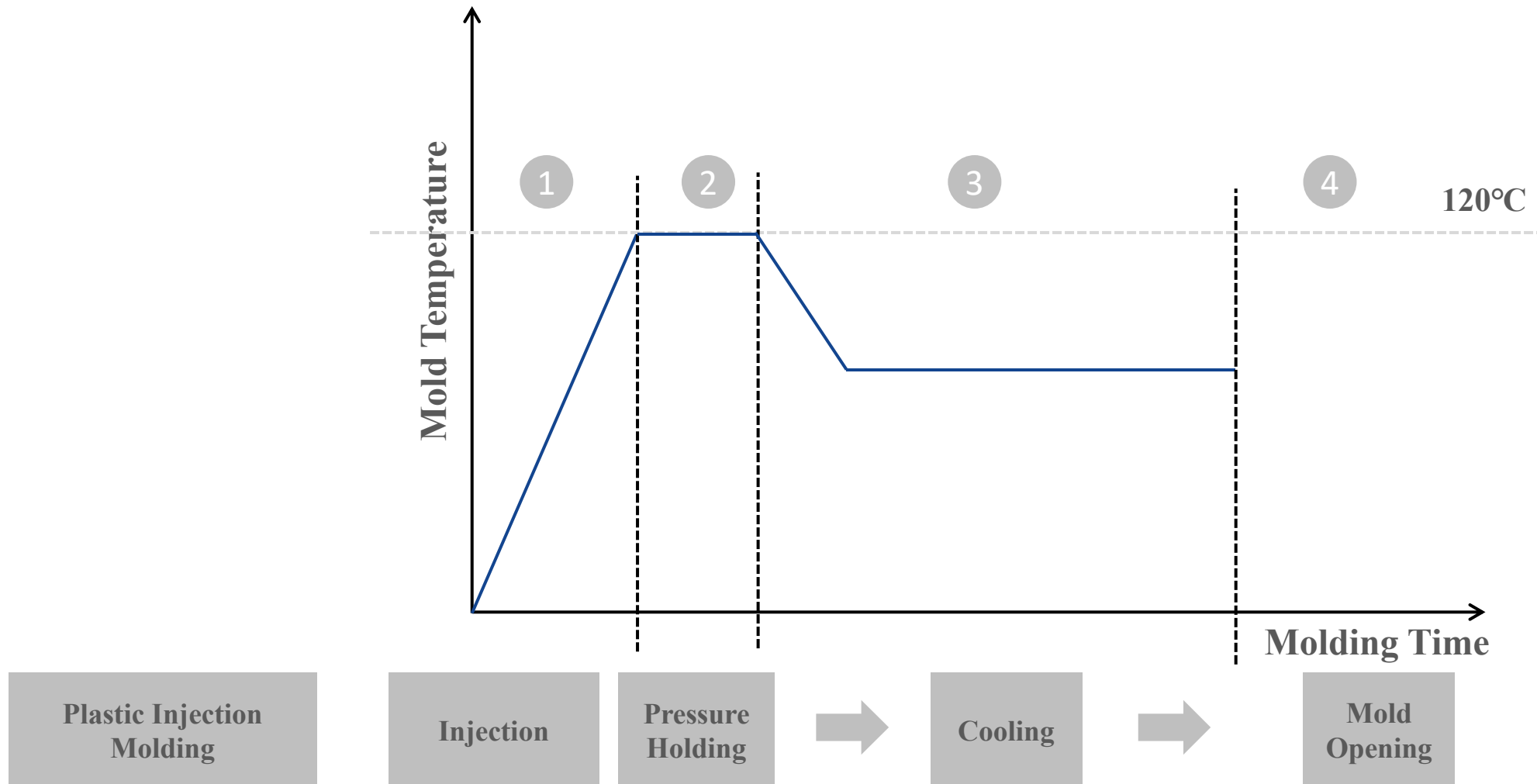
Silicone

Silicone

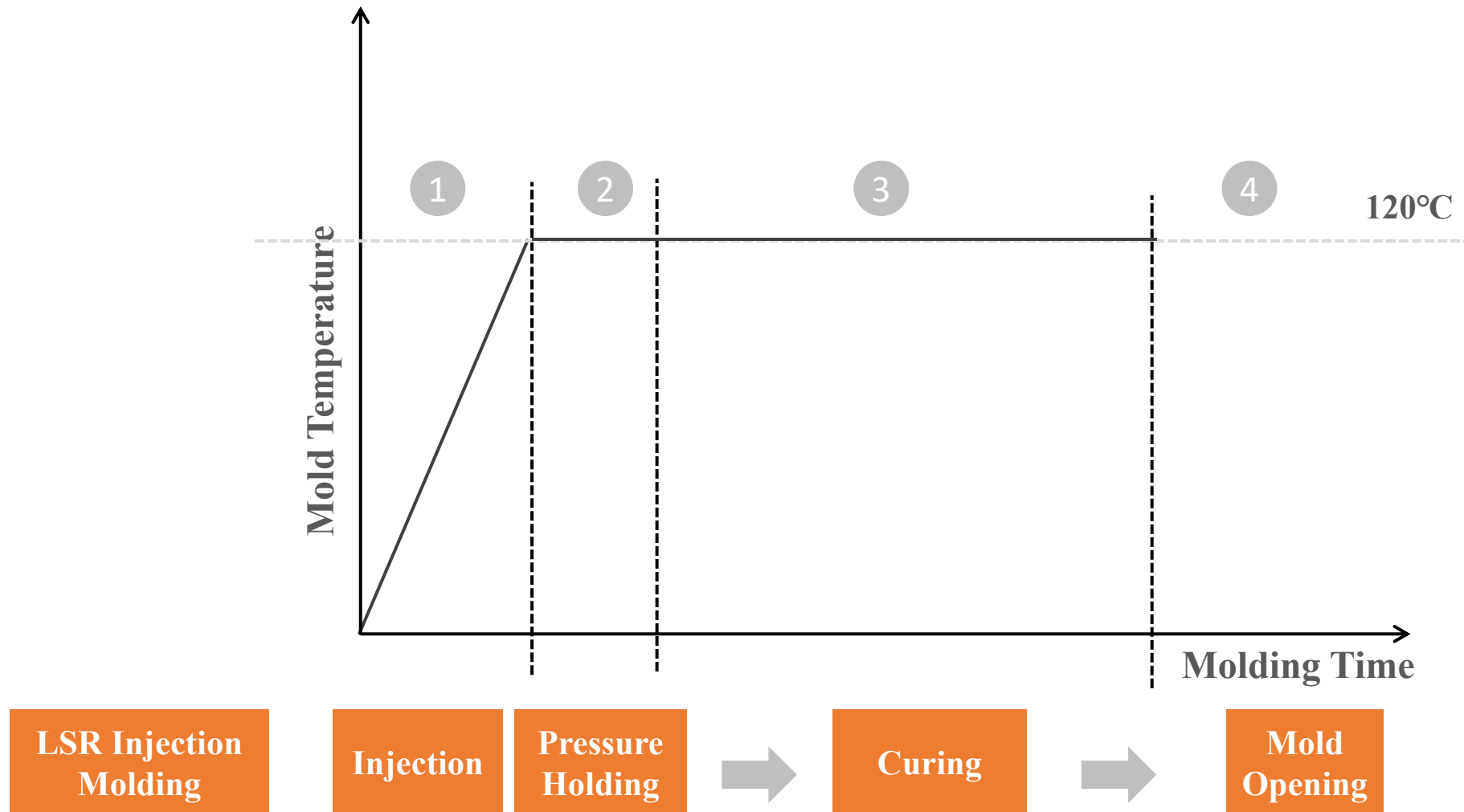
Plastic



4. Plastic& Silicone Molding Curves Comparison



4. Plastic& Silicone Molding Curves Comparison



Optical Properties

Comparing to plastic, better transparency& dispersibility

- 94% light transmittance
- Abbe about 50
- Color durability

Weather Resistance

Maintains optical properties under harsh conditions, can meet requirements for higher applications.

- High temperature stability, even above 200°C
- UV resistance
- Micro-cracking resistance
- Flame resistance, equal to UL 94 V-1

Structual Design

LSR is a material with excellent processing properties, esp., in the field of LED lights and optical lenses.

- Design freedom of lighting optics
- High mobility helps achieve complex mico-sctructure designs
- Intergrated design overmolding with other materials
- Product lightweight design

LED Lighting



**Outdoor& Indoor Lighting
Building Decoration
Showroow Lighting**

Automotive Lights



**ADB High Beam Matrix Lens
Floor Light Lens**

LED Display



LED TV Lens

Thanks for Your Time!

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