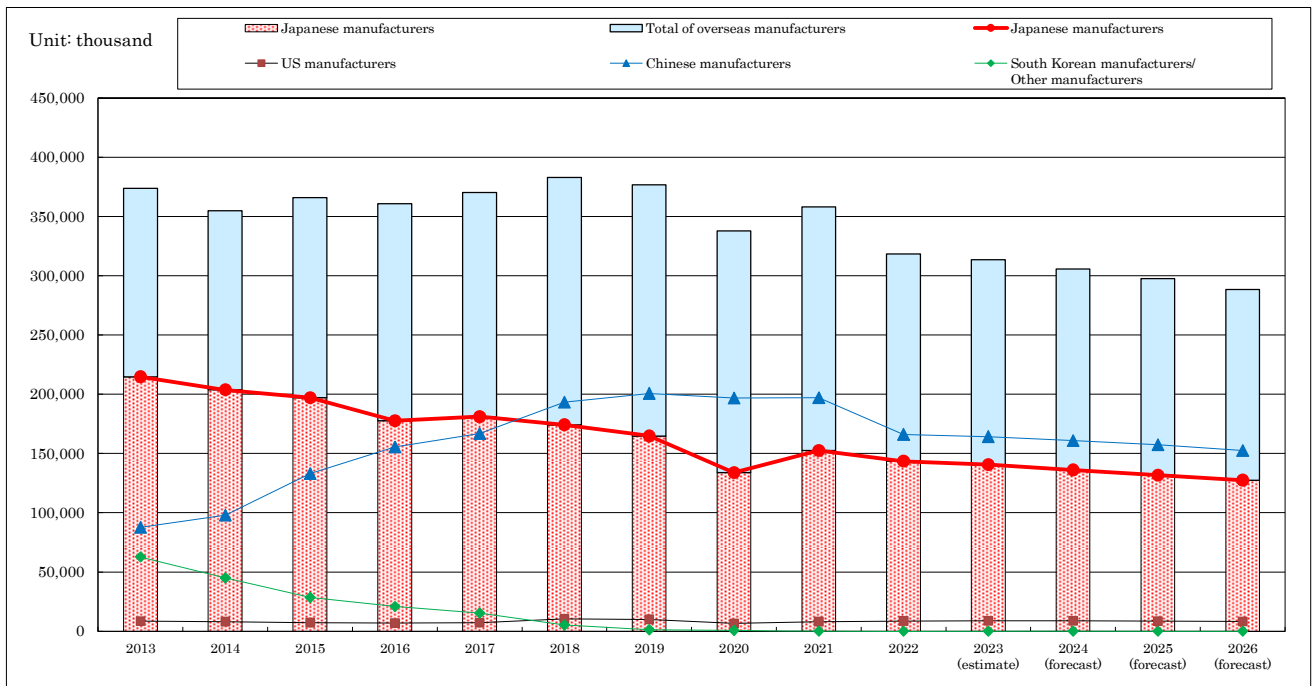


Market Report

[2023 version of Photoconductor Market Forecast]

“The Comprehensive Analysis of the Photoconductor Market: Its True Value Is Tested in Times of Change”

=Detailed analysis of market trends in photoconductors, substrates, and coating materials =



<Long-term history of the photoconductor market (2013-2026)>



April 2023

DATA SUPPLY INC.

<Overview>

I. Theme

[2023 version of Photoconductor Market Forecast]

“The Comprehensive Analysis of the Photoconductor Market: Its True Value Is Tested in Times of Change”

=Detailed analysis of market trends in photoconductors, substrates, and coating materials=

II. Abstract

This spring has marked three full years since the global outbreak of COVID-19. Although the pandemic is yet to be under control, the office attendance rates have been improving, and the supply chain once disrupted by material shortages is finally returning to normal.

As described in our previous report, the basic strategy of manufacturers in the MFP/printer industry is to fill the printing needs of the various workplaces as they expand from traditional centralized offices to remote offices such as homes and satellite offices. While the expanded telework practice temporarily contributed to an increase in demand for small printers, it has also made it clear that it has an aspect of promoting paperless workstyles to improve work efficiency and security, and that it is one of the factors pushing down print volume in office work.

Looking at the photoconductor as a component, more than 80% of its demand is filled as a consumable product (for devices distributed in the market), so a decrease in print volume would directly mean a decrease in demand for photoconductors. Therefore, major manufacturers are trying to figure out if they should maintain their market share by taking it from other companies or if they can reduce the manufacturing cost of photoconductors used in devices, as the overall demand for photoconductors will not likely return to the pre-pandemic level. To achieve cost reduction, each manufacturer is aiming to make replacement times of photoconductors less frequent by extending their service life, while in-house manufacturers are considering outsourcing the production; yet many are hesitant because they are not sure if they can assure the quality.

Even in China, a country grown into the largest market (in terms of shipment volume of hardware machines) in the MFP/printer industry, the situation is changing by the minute. 90% of the total third-party photoconductor market is covered by Chinese manufacturers, but it is certain that the market will be peaking out when the genuine product market starts to shrink, and this might lead to terminate some Chinese manufacturers that have maintained business by supplying ultra-low-priced products only to increase the supply volume.

As we have seen, the photoconductor market is in a severe situation, while the fact remains unchanged that the component is one of the key items essential to the electrophotographic process that could directly determine the image quality of printed products. As we have repeatedly stated in our various reports, we believe that manufacturers that can comprehensively achieve both quality and cost will ultimately attract demand.

Our "2023 version of Photoconductor Market Forecast" is the 33rd publication in its series. We will be surveying not only photoconductor manufacturers, but also a wide range of substrate and material manufacturers. We truly hope that our latest report will be helpful to all readers working to further thrive in their photoconductor business.

III. Target Items and Makers

1. Target items

- | | | | |
|-------------------|---|--|---|
| 1) Photoconductor | <div style="display: inline-block; vertical-align: middle;"> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 10px; width: 100%;"></div> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 10px; width: 100%;"></div> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 10px; width: 100%;"></div> </div> | OPC drum
Se-based drum
a-Si drum | 2) Aluminum substrate for photoconductors
3) Coating materials |
|-------------------|---|--|---|

2. Target makers

- 1) Photoconductor makers (9 in Japan, 18 overseas)
- 2) Photoconductor's substrate makers (extrusion, drawing, burnishing) (10 in Japan, 9 overseas)
- 3) Makers of photoconductor's coating materials (CTL/CGL/UCL/OCL) (15 in Japan, 4 overseas)
- 4) Hardware makers (MFP/LBP/PP) (10 in Japan, more than 10 overseas)

IV. Research Period and Methodology

1. Research period: 2020-2026 Regions: Japan, North America, Europe, South Korea, China, and others.
2. Methodology: 1) On-site and in-person interviews with target makers (some online interviews)
 2) Analysis and review of open literatures, materials, statistics, and other sources
 3) Analysis of Data Supply's own proprietary database

V. Format and Report Preparation Period

1. Study format: Multi-client study
2. Report preparation period: January and February 2023
3. Publication date: April 21, 2023
4. Report format: A4 size/PDF format
5. Price: \$5,200
6. Researchers: Mr. Yukio YAMAMOTO, Mr. Kosuke YOSHIDA, and Mr. Masafumi HARIU
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 Homepage: <http://www.datasupply.jp/>
7. How to Apply: Please send us an email with your name, company, department, and phone number included to Data Supply Inc. at infods@datasupply.jp or any researcher shown above.

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■ Common survey item ■

Overall production volume/value (2020-2026 forecast) · Present and future production volume by region, production base, type, and application (Japan and overseas) (2020-2026 forecast) · Trend in production bases (facility investment, changes in the number of production lines, and future production bases) · Production volume by diameter and application · Production volume/value and unit price by diameter and length (2022 results) · Product lineup by diameter and length · Production volume by positive and negative charge · Development and prospect of long-life photoconductors · Expanding outsourcing/external sales strategy · Status of small/large diameters · Development and purchase status of photoconductive layers and coating materials (UCL, CGL, CTL, OCL) · Coating methods · Measures by genuine makers against third-party photoconductors · Production ratio between genuine (OEM) and third-party products · Supply volume by destination (2021-2023 estimate) · Worldwide production bases · History of 25 years (2002-2022 results, 2023-2026 estimates) · SDGs initiatives (regulatory compliance, recycling, energy/manpower saving, etc.)

[1] Canon [2] Ricoh [3] FUJIFILM Business Innovation [4] Konica Minolta [5] Kyocera Group [5]-1. Kyocera [5]-2. Kyocera Document Solutions [6] Mitsubishi Chemical [7] Fuji Electric [8] Sharp

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■ Common survey item ■

Production volume (Japan and overseas) by region (by base) · Production volume by type, diameter (20 φ -260 φ), application, and length (A4-A0) · Production volume of non-burnished/burnished drum substrates · Photoconductor makers' supply volume by production base (worldwide) · Approach for color photoconductors (runout tolerance of drum substrates, roundness, surface roughness, etc.) · Relations between processing and drawing makers · Trend of production technology (burnished and non-burnished drum substrates) · Price trend, profitability · Present and future production bases

1. Resonac (formerly Showa Denko) 2. UACJ Extrusion Corporation 3. Nikkeikin ACT

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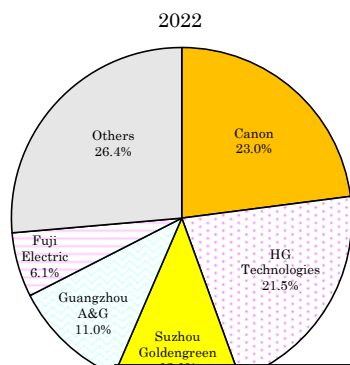
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2. World's top 10 photoconductor makers (production share)

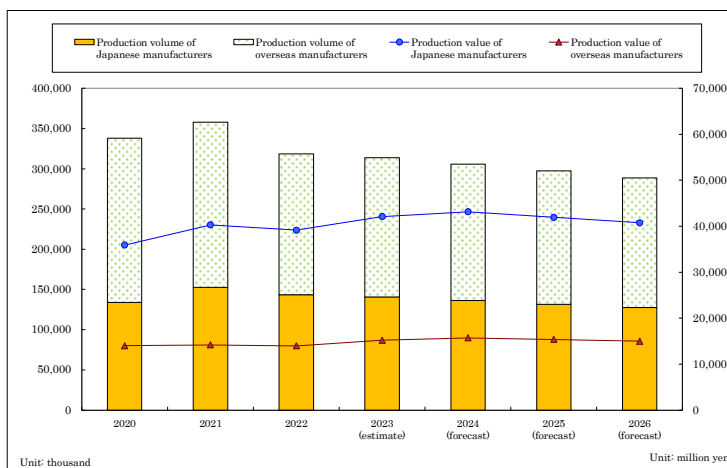


Canon led the market in terms of p
Chinese companies and Fuji Electric.

3. Worldwide volume of photoconductor
(ratio of production volume)

Executive Summary

1. Trend in worldwide production of photoconductors



Photoconductor production trends in 2022

- Global production volume: 318.34 million units (89% of the previous year)
- Global production value: 53.11 billion yen (97.4% of the previous year)
- Production volume by Japanese manufacturers: 143.52 million units (94.1% of the previous year)
- Production value by Japanese manufacturers: 39.135 billion yen (97.1% of the previous year)
- Production volume by overseas manufacturers: 174.82 million units (85.1% of the previous year)
- Production value by overseas manufacturers: 13.975 billion yen (98.5% of the previous year)

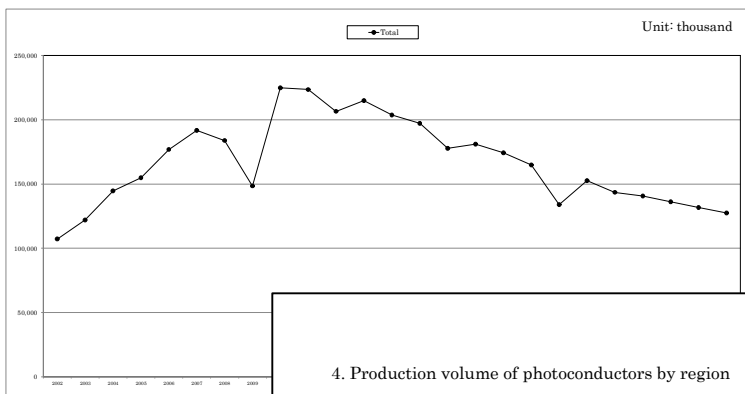
CAGR: Compound Average Growth Rate for 2022/2026

- Global production volume: -2.3%
- Global production value: +1.2%
- Production volume by Japanese manufacturers: -2.8%
- Production value by Japanese manufacturers: +1.0%
- Production volume by overseas manufacturers: -2.0%
- Production value by overseas manufacturers: +1.8%

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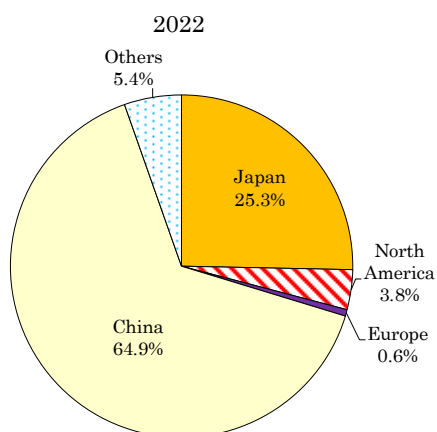
Excerpts from < Executive Summary >

6. Changes in production volume of photoconductors by Japanese manufacturers for a quarter century (2002-2026)



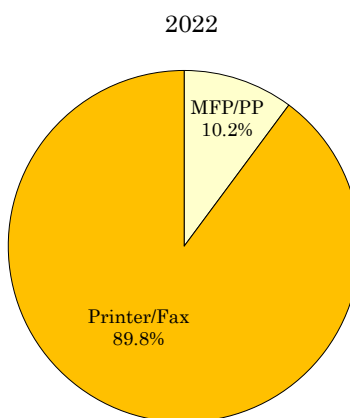
Photoconductor production by Japanese manufacturers peaked in 2010, but demand has been declining since then. As demand is expected to end eventually, the decline is expected to continue.

4. Production volume of photoconductors by region



China led the market in terms of production volume share by region in 2022 with 64.9% of the total, followed by Japan (25.3%).

5. Production volume of photoconductors by application



The share of production volume by application in 2022 was 10.2% for MFP/PP and 89.8% for printers/FAX.

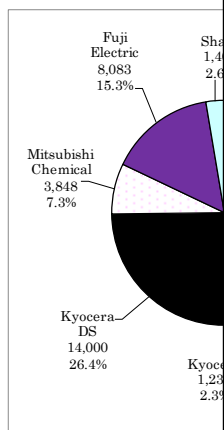
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Excerpts from < Comprehensive Analysis > and < Photoconductor Market >

*Charts are filled in the actual version.

3) 30 φ

Maker	Volume (thousand units)		Value (million yen)	
		%		%
Canon				
Ricoh				
FUJIFILM Business Innovation				
Konica Minolta				
Kyocera				
Kyocera Document Solutions				
Mitsubishi Chemical				
Fuji Electric				
Sharp				
Total				



Production volume

2) Production volume by region and maker

Region	Maker	Unit: thousand								
		Volume	%	Volume	%	Volume	%	Volume	%	
Japan	Canon		%		%		%		%	
	Ricoh		%		%		%		%	
	FUJIFILM Business Innovation		%		%		%		%	
	Konica Minolta		%		%		%		%	
	Kyocera		%		%		%		%	
	Kyocera Document Solutions		%		%		%		%	
	Mitsubishi Chemical		%		%		%		%	
	Sharp		%		%		%		%	
	Japan total			%		%		%		%
	North America	Canon Virginia		%		%		%		%
Canon Dalian			%		%		%		%	
China	Fuji Electric (Shenzhen)		%		%		%		%	
	Kyocera Document Technology (Dongguan)		%		%		%		%	
	Mitsubishi Chemical Infonics (Singapore)		%		%		%		%	
	Vina MC Infonics (Vietnam)		%		%		%		%	
Other regions	Yamanashi Electronics Thailand (Thailand)		%		%		%		%	
	Overseas total			%		%		%		%
	North America	Lexmark International		%		%		%		%
		Xerox Manufacturing (Nederland BV) (Netherlands)		%		%		%		%
Europe	Sindoh		%		%		%		%	
	Overseas total			%		%		%		%
China	APS Photoconductor (Shanghai)		%		%		%		%	
	Guangzhou A&G Optoelectronics Technology		%		%		%		%	
	HG Technologies		%		%		%		%	
	Huian Gantech Opto-Electronics		%		%		%		%	
	Suzhou Goldengreen Technologies		%		%		%		%	
	Others		%		%		%		%	
Overseas total			%		%		%		%	
Total			%		%		%		%	

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Excerpts from < Photoconductor Market >

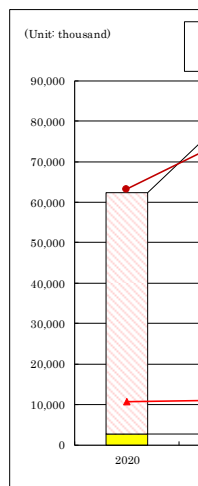
*Charts are filled in the actual version.

[8] HG Technologies (China)

1. Overall

1) Changes in production volume/production value (2020-2026)

Year		2020	2021	2022	2023 (estimate)	2024 (forecast)	2025 (forecast)	2026 (forecast)
Application		%	%	%	%	%	%	%
Production volume (Unit: thousand)	MFP/PP							
	%							
	Printer/FAX							
	%							
<i>Total</i>								
		%						
Production value (Unit: million yen)	MFP/PP							
	%							
	Printer/FAX							
	%							
<i>Total</i>								
		%						



HG Technologies' production value was 4.3 billion yen, or 101% increase from 2020. The company has grown and its financial strength new products and by expanding its production capacity.

			2020	2021	2022	2023 (estimate)	2024 (forecast)	2025 (forecast)	2026 (forecast)	
			Unit: thousand							
OPC	Toride Plant	MFP/PP								
		Printer/FAX								
		sub total								
			%							
	Canon Precision	MFP/PP								
		Printer/FAX								
		sub total								
			%							
	Canon Chemicals	MFP/PP								
		Printer/FAX								
		sub total								
			%							
Nagahama Canon	MFP/PP									
	Printer/FAX									
	sub total									
		%								
Oita Canon Materials	MFP/PP									
	Printer/FAX									
	sub total									
		%								
a-Si	Nagahama Canon	MFP/PP								
		Printer/FAX								
	sub total									
		%								
		MFP/PP								
		%								
		Printer/FAX								
		%								
Total										
		%								

① Canon has four domestic production sites at: Toride Plant (Ibaraki, Japan), Canon Precision (Aomori, Japan), Oita Canon Materials (Oita, Japan), and Nagahama Canon (Shiga, Japan). Canon Precision and Oita Canon Material are the core plants. a-Si drums are only produced at Nagahama Canon.

② Within Japan, Canon currently has four production sites, but they may be consolidated or reorganized over the medium to long term.

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Excerpts from and < Drum Substrate Market > and < Coating Material Market >

*Charts are filled in the actual version.

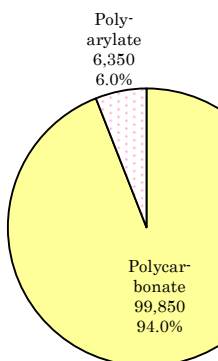
2. CTL (Charge Transport Layer)

2-1. Binder resin

1) Worldwide market (2020-2024)

Unit: kg

	2020	2021	2022	2023 (estimate)	2024 (Forecast)
	%	%	%	%	%
Mitsubishi Gas Chemical					
ratio (%)					
Teijin					
ratio (%)					
Idemitsu Kosan					
ratio (%)					
Mitsubishi Chemical					
ratio (%)					
Others					
ratio (%)					
Polycarbonate Total					
ratio(%)					
Unitika					
ratio (%)					
Polyarylate Total					
ratio (%)					
Total					
ratio (%)					



< Material ratio (2022) >

(1) Overall summary

Two types (polycarbonate and polyarylate) were used for 2022 with a total volume of polycarbonate (99,850 kg, 94.0% total).

Polycarbonate is mainly supplied from Japan and South Korea's IT companies. China's IT companies supply it to Chinese companies. The sales volumes continue to increase.

4. Production volume by drum substrate maker, diameter, and length

Unit: thousand

(φ)	Maker	Resonac	UACJ Extrusion Corporation	Nikkeikin ACT	Fuji Aluminum Tube Manufacturing	Total	
							%
A4	20						
	24						
	30						
	40						
	47						
	60						
	sub total						
A3	30						
	40						
	47						
	50						
	60						
	80						
	84						
	90						
	100						
	108						
	120						
	180						
	210						
sub total							
A2 and up	240						
	260						
	sub total						
Total							