



TJ HOLDINGS SDN. BHD.

SCALE REMOVAL DEVICE

*ADVANCED WATER TREATMENT TECHNOLOGY FOR
RELIABLE INDUSTRIAL PERFORMANCE*



ELIMINATE SCALE.
RESTORE SYSTEM EFFICIENCY.

2025/2026



What is eco-friendly scale removal device?

The **Scale Removal Device (SRD) Series** is an advanced, **eco-friendly cooling water scale removal solution** designed to prevent and remove mineral scale deposits in industrial cooling water systems, heat exchanger or steam boiler.

Utilizing electrolytic decomposition technology, the SRD Series **eliminates scale without the use of chemicals**, ensuring stable operation, improved heat exchange efficiency, and reduced maintenance costs.





Problems.

Scale: A costly enemy & silent efficiency killer

Scale formation inside cooling water pipelines and heat exchange equipment is a major contributor to:

- **Reduced heat transfer efficiency**
- **Increased energy consumption** (up to 15% with only 0.5 mm scale buildup)
- **Frequent equipment breakdown and unplanned downtime**
- **Higher operational and maintenance costs**

The SRD Series addresses these challenges by continuously controlling scale formation at the source, ensuring long-term system reliability.

< The rate of increase in required power of the compressor due to the contamination (Thickness of the scale) >

Gravity(%)	Contamination index (m ³ h ² /Kcal)	Contamination thickness (mm)	Gravity(%)	Contamination index (m ³ h ² /Kcal)	Contamination thickness (mm)
0.0	0.00000	0.000	22.2	0.00040	0.610
3.0	0.00005	0.076	24.2	0.00045	0.671
5.5	0.00010	0.152	27.5	0.00050	0.782
8.8	0.00015	0.244	29.7	0.00055	0.823
11.0	0.00020	0.305	33.0	0.00060	0.914
13.2	0.00025	0.366	35.2	0.00065	0.975
16.5	0.00030	0.457	39.6	0.00070	1.097
18.7	0.00035	0.518	42.9	0.00075	1.189

ENERGY LOSS RATE DUE TO THE SCALE THICKNESS OF THE HEAT EXCHANGE UNIT (USA CARRIER)

When the scale thickness of the heat exchange is 0.5mm, approximately 18% additional use on compressor power

- Contamination index based on refrigerating machine manufacturer design: 0.0001

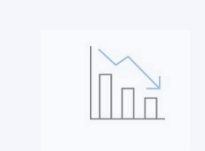
- Actual pollution coefficient of operating facilities on-site: Range of 0.0004 ~ 0.0006



Increased Operating Costs

Scale buildup can cause frequent equipment shutdowns and reduced production output.

As a result, operating costs increase and overall business competitiveness is reduced.



Shortened Equipment Lifespan

Poor cooling forces compressors and cooling equipment to work harder under higher pressure.

This increases electricity consumption and accelerates wear and tear, shortening the lifespan of major equipment.



Reduced Cooling Efficiency

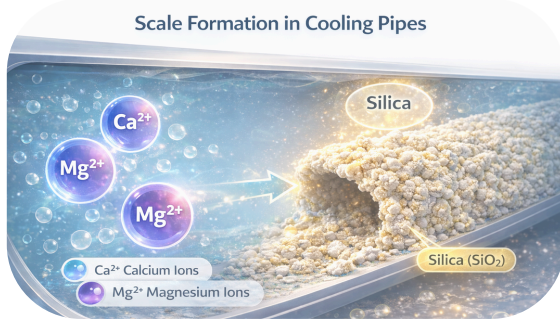
Scale acts as an insulating layer inside pipes and heat exchangers.

This reduces heat transfer efficiency and prevents the system from achieving optimal cooling performance.

Solutions. Scale Removable Principle

Scale refers to a material attached to the heat transferring surface in solid form from any kind of precipitate deposits in the water, and the scale generating material in the low-pressure boiler mostly is a hardness component (Ca&Mg) and a silica (SiO₂) component.

Low-pressure boilers usually bring water supply from the water that has gone through softening devices, but the hardness and components leaked by incomplete management of softening devices are mainly scaled. Scale disability refers to the malfunction of the original heat transfer in the boiler by any component attached to the heat transfer surface.

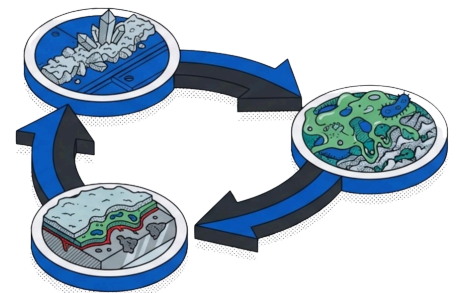


The formation of hard properties scale occurs by adhesion to the boiler tube wall due to high temperature after combining the hardness components (Ca²⁺, Mg²⁺) dissolved in the precipitate with bicarbonate

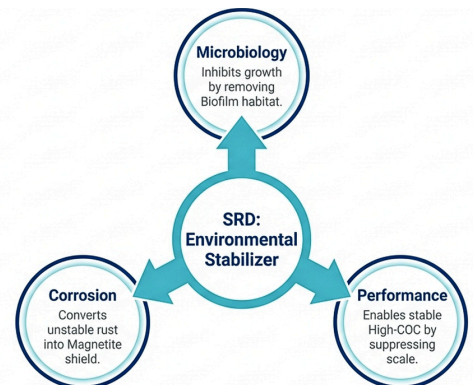
The **SRD system** is installed in parallel with existing cooling water lines, allowing continuous operation without disrupting current processes.

Operating Process:

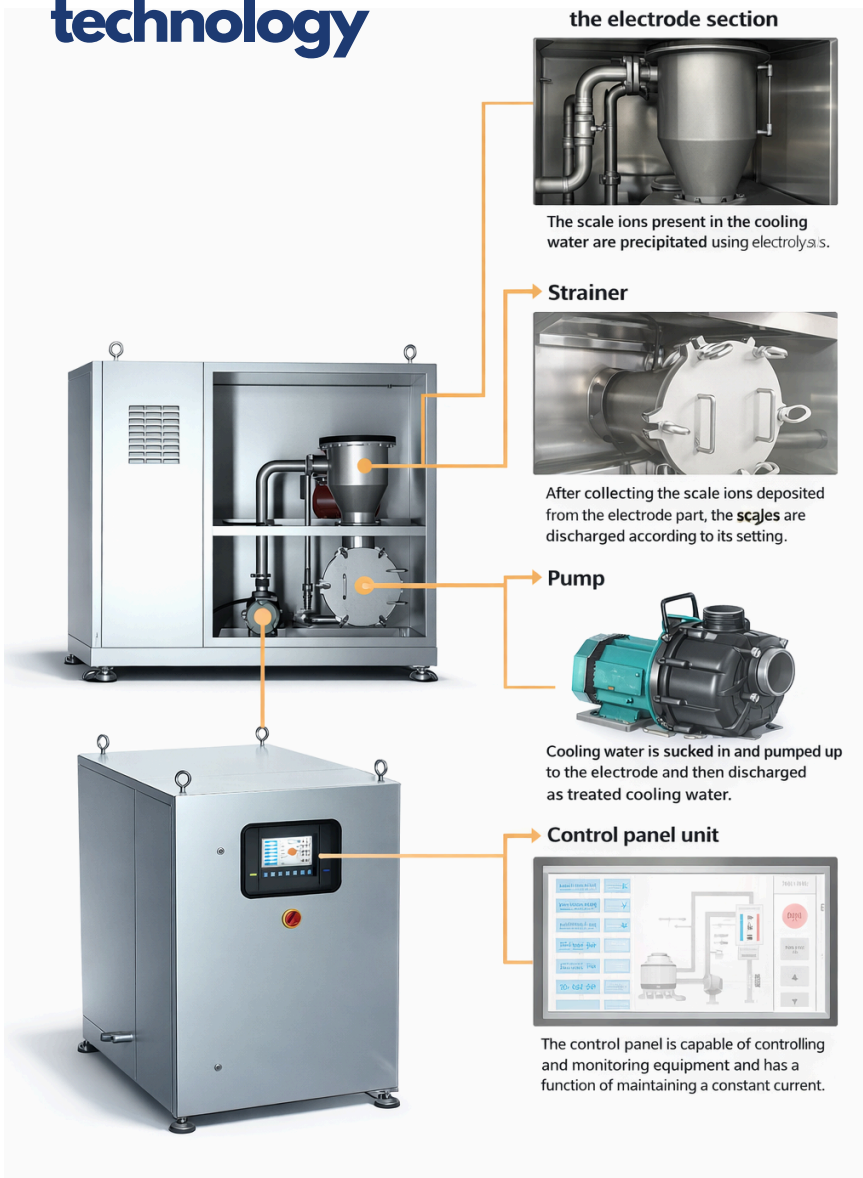
1. Cooling water is circulated through the SRD unit using an internal pump.
2. Dissolved scale-forming ions such as Ca²⁺, Mg²⁺, and SiO₂ are electrolytically converted into insoluble particles. The precipitated scale particles are captured in an internal strainer.
3. Treated water is returned to the cooling system, restoring balance and preventing further scale adhesion.
4. Collected scale residues are automatically discharged according to system settings.



Triangle of Failure : Scale, Biofouling, Corrosion



Introducing our product technology

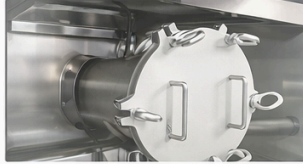


the electrode section



The scale ions present in the cooling water are precipitated using electrolysis.

Strainer



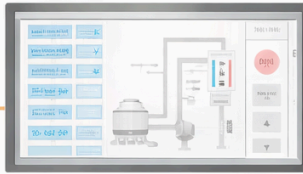
After collecting the scale ions deposited from the electrode part, the scales are discharged according to its setting.

Pump



Cooling water is sucked in and pumped up to the electrode and then discharged as treated cooling water.

Control panel unit



The control panel is capable of controlling and monitoring equipment and has a function of maintaining a constant current.

System Composition

The SRD Series consists of:

- **Electrode Section**

Converts dissolved scale ions through electrolysis.

- **Internal Strainer**

Collects precipitated scale particles for discharge.

- **High-Efficiency Pump**

Circulates cooling water through the treatment process.

- **Control Panel Unit**

Provides real-time monitoring, operational control, and stable current management.

Key Advantages

- **Chemical-Free Operation**

Eliminates the need for chemical dosing, ensuring environmental compliance and workplace safety.

- **Energy Efficiency Improvement**

Maintains optimal heat exchange performance and reduces power consumption.

- **Extended Equipment Lifespan**

Protects chillers, heat exchangers, cooling towers, and compressors from scale-related damage.

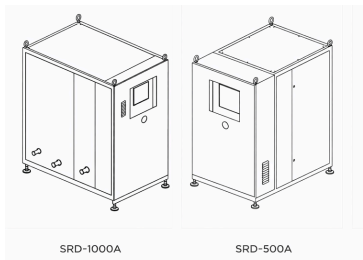
- **Low Maintenance Design**

Automated scale collection and discharge minimize manual intervention.

- **Stable & Continuous Operation**

Designed for 24/7 industrial use with consistent performance.

Standard product model and specification



SRD-1000A

SRD-500A

Target facility

Processing capacity

Pressure Absorption

Input power

Power consumption

Electrode expectancy

Pipe diameter

Dimension

Weight

Dimension

Weight

SRD-500A

Cooling water
400~600RT

10m³/hr

8m / 13m (MAX)

Single Phase AC220V,
50/60Hz

2.7kW (MAX)

3 years(5A, 365days 24hr)
24hr)

Inlet-40A, Outlet-40A,
Drain-25A

W:940, L:1500, H:1250

370kg

W:940, L:1500, H:1250

370kg

SRD-1000A

Cooling water
700~1200RT

20m³/hr

8m / 19m (MAX)

Single Phase AC220V,
50/60Hz

3.6kW (MAX)

3 years(5A, 365days 24hr)
24hr)

Inlet-50A, Outlet-50A,
Drain-25A

W:940, L:1640, H:1440

445kg

W:940, L:1640, H:1440

445kg

Applicable Industries

The SRD Series is widely applied across various industries, including:

- Semiconductor manufacturing
- Injection molding facilities
- Data centers and commercial buildings
- Power plants
- Automotive manufacturing
- HVAC systems
- Hospitals, resort, malls & universities

Applicable equipment includes cooling towers, chillers, heat exchangers, steam boiler system, water-cooled compressors, and related cooling water systems.



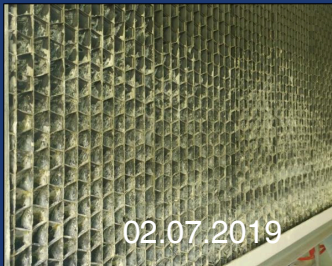
SRD-series Increase Energy Efficiency

By implementing the SRD Series, customers can achieve:

- Reduced operating costs
- Lower energy consumption
- Extended equipment life
- Environmentally responsible operation
- Improved system reliability and uptime



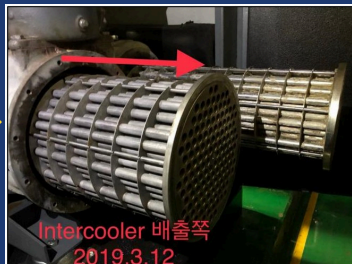
Actual on-site descaling case



As a result of comparison before and after the operation of the cooling tower eliminator in the bottled water plant in Korea, it can be seen that the scale of the surface was removed 35 days after operation



Scale collected in the inner strainer after 15days of operation.



This is a comparison of before and after SRD operation of the heat exchanger intercooler. It can be seen that the surface scale and slime were removed.

References



SRD series delivery performance

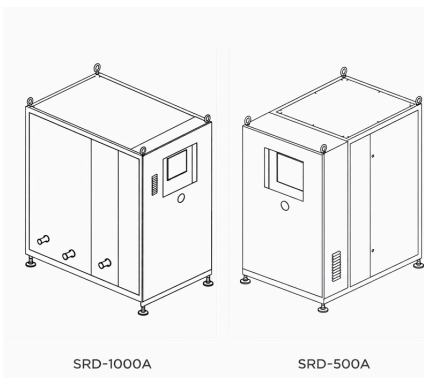
NO	Client company	Location	Model	Quantity	Delivery date	비고
1	Lotte Nestle Korea	Cheongju	SRD-500	2	2017-05-18	Unit 1-2
2	LG Chem	Cheongju	SRD-500	3	2017-10-23	Unit 1-3
3	CJ	Suwon	SRD-500	1	2018-04-15	Unit 1
4	Pulmuone	Pocheon-si	SRD-500	1	2018-06-01	Unit 1
5	Kofco (Korea Flange)	Ulsan	SRD-500	1	2018-06-28	Unit 1
6	LX Hausys	Ulsan	SRD-500	1	2018-08-31	Unit 1
7	YUJIN TECHNOLOGY	Cheongju	SRD-500	1	2018-09-20	Unit 1
8	Kofco (Korea Flange)	Ulsan	SRD-500	1	2018-12-06	Unit 2
9	HAI TAI htb	Pyeongchang	SRD-500	1	2019-02-26	Unit 1
10	LG Chem	Cheongju	SRD-500	2	2019-05-23	Unit 4-5
11	TORAY	Gunsan-si	SRD-1000	2	2019-06-14	Unit 1-2
12	LG Chem	Iksan-si	SRD-1000	2	2019-06-20	Unit 1-2
13	HAI TAI htb	Pyeongchang	SRD-500	1	2019-06-20	Unit 2
14	gotech	Bucheon-si	SRD-500	1	2019-07-18	Unit 1
15	JW Life Science	Dangjin-si	SRD-1000	2	2019-08-05	Unit 1-2
16	협진PL	Gimhae-si	SRD-500	1	2019-08-09	Unit 1
17	Oriental Brewery Co.	icheon-si	SRD-500	1	2019-11-26	Unit 1
18	GC Biooharma	Cheongju	SRD-500	1	2019-11-29	Unit 1
19	LG Chem	Iksan-si	SRD-1000	2	2019-12-05	Unit 3-4
20	Kyung il tech	Jincheon	SRD-500	1	2019-12-25	Unit 1
21	Eil Industrial Co.	Yeosu-si	SRD-500	1	2020-01-03	Unit 1
22	BUMJIN	Vietnam	SRD-500	1	2020-01-21	Unit 1
23	Oriental Brewery Co.	icheon-si	SRD-500	4	2020-02-05	Unit 2-5
24	doosung industry	Gimpo-si	SRD-200	1	2020-02-29	Unit 1
25	NVH Poland	Poland	SRD-500	1	2020-03-27	Unit 1
26	LG Chem	Cheongju	SRD-500	1	2020-04-01	Unit 1
27	Soulbrain	Gongju	SRD-500	1	2020-06-09	Unit 1
28	NITTO DENKO CORPORATION.	Pyeongtaek-si	SRD-500	1	2020-07-23	Unit 1
29	OTTOGI CORPORATION.	Eumseong	SRD-500	1	2020-07-29	Unit 1
30	Hanmi Fine Chemical Co.	Siheung-si	SRD-500	1	2020-08-19	Unit 1
31	OTTOGI CORPORATION.	Eumseong	SRD-500	2	2020-09-19	Unit 2-3
32	ORION CORP	Cheongju	SRD-500	1	2020-10-12	Unit 1
33	Eil Industrial Co.	Yeosu-si	SRD-200	1	2020-10-16	Unit 2
34	C&P KOREA	Gwangju-si	SRD-1000	2	2020-10-23	Unit 1-2
35	MPNICS CO.	Gwangju-si	SRD-200	1	2020-11-07	Unit 1
36	Soulbrain	Gongju	SRD-1000	1	2020-11-10	Unit 2
37	BAEKHAK BEVERAGE CO.	Yeoncheon-gun	SRD-1000	1	2020-11-18	Unit 1
38	JEJU PROVINCE DEVELOPMENT CO.	Jeju	SRD-200	1	2020-11-27	Unit 1
39	LG Chem	Iksan-si	SRD-500	2	2020-12-15	Unit 5-6
40	LG Chem	Iksan-si	SRD-200	1	2020-12-15	Unit 7
41	SAMYANG CO.	Asan-si	SRD-200	1	2020-12-23	Unit 1
42	ORION CORP	Iksan-si	SRD-200	1	2021-01-11	Unit 1
43	NITTO DENKO CORPORATION.	Pyeongtaek-si	SRD-1000	2	2021-02-18	Unit 2-3
44	Soulbrain	Gongju	SRD-1000	1	2021-02-24	Unit 3
45	JEONJU ONEPOWER	Junju-si	SRD-500	1	2021-03-02	Unit 1
46	WOOJIN	Wonju-si	SRD-200	1	2021-03-06	Unit 1
47	Eil Industrial Co.	Yeosu-si	SRD-200	1	2021-03-08	Unit 3
48	SPC	Cheongju	SRD-1000	1	2021-04-02	Unit 1
49	Oriental Brewery Co.	Cheongju	SRD-1000	2	2021-04-05	Unit 1-2
50	HANDOK	Eumseong	SRD-500	1	2021-04-09	Unit 1
51	SAMSUNG	Suwon	SRD-200	1	2021-04-15	Unit 1
52	DAEWONG PHARMACEUTICAL CO.	Hwaseong-si	SRD-200	1	2021-04-27	Unit 1
53	LG Chem	Cheongju	SRD-500	1	2021-05-06	Unit 1
54	Incheon chemical co.	Incheon	SRD-1000	1	2021-05-13	Unit 1
55	OTTOGI CORPORATION.	Eumseong	SRD-500	1	2021-06-02	Unit 4
56	GOLDSTAR	Pyeongtaek-si	SRD-200	1	2021-06-17	Unit 1
57	Soulbrain	Gongju	SRD-1000	1	2021-07-06	Unit 4
58	LOTTE CHILSUNG BEVERAGE CO.	Anseong-si	SRD-200	1	2021-09-15	Unit 1
59	SAEHAN	Gimpo-si	SRD-200	1	2021-09-23	Unit 1
60	SPC	Cheongju	SRD-500	1	2021-09-27	Unit 2
61	Soulbrain	Gongju	SRD-1000	1	2021-09-28	Unit 5
62	Heesung Chemical	Cheongju	SRD-1000	1	2021-10-19	Unit 1
63	SAMA	Pyeongtaek-si	SRD-500	2	2021-10-28	Unit 1-2
64	LOTTE ALUMINIUM	Jincheon	SRD-500	1	2021-11-02	Unit 1
65	KIB	Daegu	SRD-500	1	2021-11-15	Unit 1
66	LG Chem	Cheongju	SRD-1000	1	2021-12-02	Unit 2
67	TCK	Anseong-si	SRD-200	1	2021-12-09	Unit 1
68	Lotte Nestle Korea	Cheongju	SRD-200	1	2021-12-11	Unit 3
69	KIA	Hwaseong-si	SRD-500	1	2021-12-18	Unit 1
70	Advantest Korea	Cheonan-si	SRD-500	2	2021-12-21	Unit 1-2
71	Binggrae	Nonsan-si	SRD-500	1	2022-02-28	Unit 1
72	TCK	Anseong-si	SRD-200	1	2022-03-23	Unit 2
73	DAEJOO ELECTRONIC MATERIALS	Siheung-si	SRD-1000	2	2022-03-23	Unit 1-2
74	OTTOGI CORPORATION.	Paju	SRD-500	1	2022-04-08	Unit 1
75	NAMUGA CO.	Vietnam	SRD-200	1	2022-04-15	Unit 1
76	DONG-A PHARM	Cheonan-si	SRD-1000	2	2022-04-16	Unit 1-2
77	LG Chem	Cheongju	SRD-1000	2	2022-04-27	Unit 6-7
78	LG Chem	Cheongju	SRD-1000	2	2022-05-31	Unit 1-2
79	Soulbrain	Gongju	SRD-1000	1	2022-05-31	Unit 6
80	Soulbrain	Gongju	SRD-500	1	2022-06-17	Unit 7
81	FiberTech	Paju	SRD-500	1	2022-06-22	Unit 1
82	SK Telecom Co.	Seoul	SRD-500	1	2022-07-15	Unit 1
83	NEK	Haman-gun	SRD-200	1	2022-07-18	Unit 1

84	Yousung C&F	Wonju-si	SRD-500	1	2022-07-18	Unit 1
85	SUNGWOO HITECH	Yangsan-si	SRD-500	1	2022-08-01	Unit 1
86	SUNGWOO HITECH	Yangsan-si	SRD-1000	1	2022-08-01	Unit 2
87	SUNHGO POLYTECH	Eumseong	SRD-500	1	2022-08-31	Unit 1
88	KCC GLASS	Yeosu-si	SRD-1000	1	2022-09-26	Unit 1
89	GOLDSTAR	Yangsan-si	SRD-300	1	2022-10-17	Unit 2
90	MBIT	Anseong-si	SRD-200	1	2022-10-19	Unit 1
91	Samyang Fisheries Co	Seosan-si	SRD-200	4	2022-10-24	Unit 1-4
92	NVH	Gyeongju-si	SRD-200	1	2022-11-08	Unit 1
93	National ES Jangseong	gun	SRD-200	1	2022-12-14	Unit 1
94	LG Chem	Cheongju	SRD-500	1	2022-12-28	Unit 3
95	APACT	Jincheon-gun	SRD-1000	1	2023-01-12	Unit 1
96	SAMSUNG	Poland	SRD-500	1	2023-02-02	Unit 1
97	SHINHWA AUTO USA	USA	SRD-1000	1	2023-02-03	Unit 1
98	TCK	Anseong-si	SRD-200	2	2023-02-16	Unit 3-4
99	SUNGWOO HITECH	Yangsan-si	SRD-500	1	2023-02-26	Unit 3
100	GOLDSTAR	Pyeongtaek-si	SRD-200	1	2023-03-06	Unit 3
101	ECOPROBM	Pohang	SRD-1000	3	2023-03-22	Unit 1-3
102	KYUNG CHANG INDUSTRIAL	Daegu	SRD-300	1	2023-03-24	Unit 1
103	TCK	Anseong-si	SRD-500	5	2023-03-29	Unit 5-9
104	Sehwa	Hwaseong-si	SRD-200	1	2023-04-06	Unit 1
105	LG Chem	Cheongju	SRD-1000	1	2023-04-12	Unit 4
106	ECOPROBM	Cheongju	SRD-500	1	2023-04-14	Unit 1
107	NEK	Haman-gun	SRD-200	1	2023-04-21	Unit 2
108	TCK	Anseong-si	SRD-200	1	2023-04-28	Unit 10
109	LG Chem	Cheongju	SRD-1000	3	2023-05-09	Unit 5-7
110	KCC GLASS	Sejong-si	SRD-1000	1	2023-05-10	Unit 2
111	SAMSUNG SDI	Cheonan-si	SRD-1000	1	2023-06-15	Unit 1
112	Soulbrain	Gongju	SRD-1000	1	2023-06-15	Unit 8
113	GreenWorld	Pyeongtaek-si	SRD-300	1	2023-06-16	Unit 1
114	JK Materials	Gwangju	SRD-200	1	2023-06-20	Unit 1
115	JKN	Anseong-si	SRD-200	1	2023-06-27	Unit 1
116	JKN	Anseong-si	SRD-300	1	2023-06-27	Unit 2
117	Yeonhui Chem	Gimpo-si	SRD-300	2	2023-06-28	Unit 1-2
118	POSCO	Gwangyang-si	SRD-1000	5	2023-06-28	Unit 1-5
119	Nara Pla Tech	Changwon-si	SRD-200	1	2023-07-16	Unit 1
120	ABIMAN	CHINA	SRD-1000	3	2023-07-07	Shipped as material
121	ABIMAN	CHINA	SRD-200	1	2023-07-07	Shipped as material
122	ABIMAN	CHINA	SRD-300	3	2023-07-07	Shipped as material
123	ABIMAN	CHINA	SRD-500	3	2023-07-07	Shipped as material
124	Woojeon Vina	Vietnam	SRD-200	2	2023-07-17	Unit 4-5
125	DAEYONG	Siheung-si	SRD-500	1	2023-07-18	Unit 1
126	GHS	Vietnam	SRD-200	1	2023-07-26	Unit 1
127	UNIENCE	Cheongju	SRD-200	1	2023-07-26	Unit 1
128	Woojeon,Tejin Vina	Vietnam	SRD-200	3	2023-08-02	Unit 1-3
129	GreenWorld	Pyeongtaek-si	SRD-500	1	2023-09-15	Unit 2
130	NVH USA	USA	SRD-500	1	2023-09-20	Unit 1
131	SUNGWOO HITECH	Yangsan-si	SRD-300	1	2023-09-23	Unit 4
132	OTTOGI CORPORATION.	Paju	SRD-300	1	2023-10-05	Unit 2
133	ABIMAN	Hwaseong-si	SRD-200	2	2023-10-06	Unit 1-2
134	Lotte Nestle Korea	Cheongju	SRD-200	1	2023-10-07	Unit 4
135	Woonpoo	Cheongju	SRD-1000	1	2023-10-20	Unit 1
136	KoSan	Cheonan-si	SRD-500	1	2023-11-29	Unit 1
137	SUNGWOO HITECH	Yangsan-si	SRD-300	1	2023-12-05	Unit 5
138	SAMSUNG SDI	Ulsan	SRD-1000	15	2023-12-26	Unit 1-15
139	SAMBOMOTORS	USA	SRD-200	1	2024-01-15	Unit 1
140	Eco-plastic	USA	SRD-200	3	2024-01-05	Unit 1-3
141	Eco-plastic	USA	SRD-500	1	2024-01-15	Unit 4
142	KIRIN	USA	SRD-500	2	2024-01-12	Unit 1-2
143	Binggrae	Nonsan-si	SRD-500	1	2024-01-15	Unit 2
144	ABIMAN	CHINA	SRD-1000	3	2024-01-19	Shipped as material
145	ABIMAN	CHINA	SRD-200	3	2024-01-19	Shipped as material
146	ABIMAN	CHINA	SRD-300	3	2024-01-19	Shipped as material
147	ABIMAN	CHINA	SRD-500	1	2024-01-19	Shipped as material
148	SK Materials	Ulsan	SRD-1000	2	2024-01-15	Unit 1-2
149	TurboMann	Philippines	SRD-1000	1	2024-04-01	Unit 1
150	SHINHWA AUTO USA	USA	SRD-1000	2	2024-04-03	Unit 2-3
151	LOTTE WORLD TOWER	SEOUL	SRD-1000	1	2024-04-03	Unit 1
152	Vietnam_GHS	Vietnam	SRD-200	1	2024-05-07	Unit 2
153	SUNGWOO HITECH	Mexico	SRD-1000	4	2024-05-30	Unit 2-5
154	SUNGWOO HITECH	Mexico	SRD-500	3	2024-05-30	Unit 6-8
155	KCC GLASS	Yeosu-si	SRD-1000	3	2024-06-04	Unit 2-4
156	Daero System	Vietnam	SRD-200	1	2024-06-17	Unit 1
157	PLAKO_TurboMann	Cheonan-si	SRD-300	1	2024-06-20	Unit 1
158	TENERGY	Hwaseong-si	SRD-500	1	2024-07-01	Unit 1
159	SAMSUNG SDI	CHN_xi'an	SRD-1000	8	2024-09-11	Unit 1-8
160	Pulmuone	Pocheon	SRD-500	1	2024-10-21	Unit 2
161	Unience_USA	USA	SRD-200	1	2024-10-21	Unit 2
162	LG Chem	Cheongju	SRD-300	3	2024-11-25	Unit 8-10
163	Moderntec	Ulsan	SRD-200	1	2025-01-10	Unit 1
164	YUHAN PROTECH	Incheon	SRD-200	2	2025-01-20	Unit 1-2
165	YUIL ROBOTICS	Slovakia	SRD-500	2	2025-01-23	Unit 1-2
166	GT AUTO	Incheon	SRD-300	1	2025-01-24	Unit 1
167	YUIL ROBOTICS	USA	SRD-200	1	2025-02-06	Unit 3
168	SAMSUNG SDI	Ulsan	SRD-1000	15	2025-03-10	Unit 16-30
169	CELLTRION	Cheongju	SRD-1000	2	2025-03-18	Unit 1-2
170	Unitechno	Mexico	SRD-200	1	2025-04-23	Unit 1
171	SamIENG	USA	SRD-300	2	2025-05-07	Unit 1-2
172	SHINHWA AUTO USA	USA	SRD-1000	3	2025-05-13	Unit 4-6
173	DONGJIN TECHWIN	Mexico	SRD-1000	1	2025-06-12	Unit 1
174	US military base	Pyeongtaek-si	SRD-500	1	2025-06-17	Unit 1
175	DHS_Bumyang	Gyeongju-si	SRD-300	1	2025-	

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