

Impact Coatings AB (publ)

Interim Report January-March 2024

SEK million	2024 Q1	2023 Q1	2023 Jan-Dec
Net sales	4.0	20.0	98.4
Net sales, excluding metals for electrolysis ¹⁾	4.0	17.3	88.8
Total revenue	7.5	20.1	89.0
Operating profit	-15.9	-9.1	-33.9
Operating profit after financial items	-15.9	-9.1	-32.0 ²⁾
Cash flow	-22.5	132.2	60.5
Net cash, end of period	97.2	193.6	119.8
Liquidity ratio	151%	303%	2.0
Order backlog coating systems at period end	4.8	22.0	4.7
Order backlog Coating Services, excl. metals for electrolysis ¹⁾	2.0	7.4	1.0
Order backlog Coating Services, incl. metals for electrolysis ¹⁾	2.0	16.8	1.0

Business highlights during the first quarter 2024

- Production line for metallization of waveguide antennas installed at the Coating Service Center China, in accordance with five-year leasing agreement with Waveland Technology Co., Ltd. from November 2023

Business highlights after the period

- Official approval as volume supplier of Coating Services from fuel cell manufacturer in China, relating to Premium FC coating for heavy duty fuel cell vehicles

1) Metals for electrolysis are invoiced in a cost-neutral manner and do not affect operating profit.

2) Includes severance pay for the departing CEO of SEK 3.0 million.

CEO's Commentary

A time of challenges and exciting opportunities

We are now a bit into 2024, a time of both challenges and exciting opportunities. Impact Coatings continues to be affected by delayed orders in electrolysis, and as a result of the strategic decision to deliver what we had in the order backlog at the end of last year, Q1 2024 shows an expected decline in sales. We are not satisfied with the outcome but have maintained a high pace in sales development and have increased our presence in the market. During the quarter, we strengthened existing relationships and welcomed seven new customers into our entry-stage business, Coating Services.

As expected, the first quarter was weaker than the corresponding period last year. The quarter was partly affected by the strategic decision to deliver the system orders we had in the order backlog at the end of 2023, which meant that we entered the new year with a nearly empty order backlog, with some effects from delayed orders for electrolysis within Coating Services. Net sales during the first quarter amounted to SEK 4.0 million (20.0). Excluding metals for electrolysis, net sales amounted to SEK 4.0 million (17.3). First quarter net income after financial items amounted to -15.9 MSEK.



Jonas Nilsson, CEO

No system deliveries were completed during the quarter. The slower pace in Coating Services from Q4 2023 remains unchanged. We are getting indications that planned electrolysis volumes are still expected and we are ready to resume full production capacity as soon as we see volumes return. Such uncertainty is one of the challenges of being at the forefront of an emerging market. However, we are well adapted to the market's conditions and, thanks to the composition of our production team, we can adapt the business to the prevailing order flow. Continuous tactical operational decisions as the market changes, and quickly ramping up and down the production rate help ensure cost control and adaptation to increased demand. Aftermarket has had a stable development and is in line with the previous year.

Seven new paying customers in entry-stage business

We developed a strong sales pipeline during the quarter with a continued sharp commercial focus. We have started the year with many customer visits and other sales activities in our prioritized growth markets. There is pace and energy in the sales organization, and during

the quarter we welcomed seven new paying customers to our entry-stage business, Coating Services.

All seven are serious players in the hydrogen space with potential to become machine customers or Coating Service volume customers. We are proud that several of the new customers come to us due to our market position. We are well-known in the field of noble metal coatings for electrolysis and for the fact that our fuel cell coatings are qualified at major stack manufacturers. Impact Coatings is a reliable supplier choice for plate manufacturers.

Our business model, with delivery of Coating Services, coating systems, or combinations of these, has proven effective. Coating Services works as an attractive first-stage offering for new customers. Through Coating Services, new customers can test coating samples and initial volumes and then increase volumes or purchase and install INLINECOATER™ systems in their own factories. We regard on-boarding each new customer in Coating Services as an important step towards building a long-term business relationship.

Expansion and increased presence

Coating Service Center China has been in full operation since summer 2023 and demonstrates how Coating Services and system sales complement each other and meet customers' flexibility needs. In terms of revenue, China is our single largest geographic market and accounted for 27 percent of the company's total revenue in 2023.

The Waveland production line described in a press release on November 14, 2023, is now installed in the Coating Service Center China and commissioning is in process.

In the fourth quarter 2023 we added six new paying customers, of which two in China. After the end of the first quarter 2024, we received approval from one of these new customers in China for volume production with Coating Services using our new Premium FC coating for heavy duty fuel cell vehicles. This approval

shows we are advancing our position in the growing fuel cell market. It also shows that our combined business model offering Coating Services as an entry stage business is working as intended.

As part of our strategy to increase our global presence and meet the growing demand in the green hydrogen market, we are planning, as previously communicated, a Coating Service Center in the USA. Considering the historical fluctuations in the market, we are keen to time correctly the start-up of planned operations in the USA. We have prepared well. With a registered subsidiary, an identified location and a machine ready to ship, we are ready to start up our third Coating Service Center as soon as the market need is there.

Our head office and Coating Service Center Sweden in Linköping will be relocated later this year. We are moving into completely new premises with the advantage that we can influence the facility design according to our business needs with, among other things, cleanroom and other adapted production spaces. The move is required due to the residential conversion of the area where our current facility is located. The current facility is not going to be rented out again, which facilitates a flexible and smooth transition to the new facility.

Standardized modules for increased efficiency

We are starting to see the results of increasingly standardized coating system production. A reorganization during the fourth quarter laid a good foundation for the work and is now bearing fruit. We

have work to do still to set the new production routines and adapt standardized modules, but are well on our way to improved working methods and shortened delivery times.

We are developing the modular platform on which our INLINECOATER™ models are based in order to start producing systems according to market forecasts. The systems generally consist of machine bodies, electrical cabinets and coating sources. By producing the parts of the system as standardized building blocks, we achieve a flexible and efficient production while we can offer upgrade possibilities and adaptation according to new coating needs, for example upgrading to Premium FC coating.

Outlook

As expected, the first quarter saw negative growth that was a departure from the positive growth rate of 2023. We are not satisfied with the outcome, but have a clear plan for increased net sales, which is our most important metric.

Full focus is now on customer-facing activities, the transition to standardized coating system production, and development of our offering. We are convinced that our hard work and a strong customer focus will create the long-term relationships and growing pipeline of new customers that will help us reach profitable growth.

Jonas Nilsson, CEO

Financial Result

FIRST QUARTER 2024

Net sales for the first quarter amounted to SEK 4.0 million (20.0), including Coating Services revenue of SEK 1.6 million (7.3) and aftermarket sales of SEK 2.4 million (2.7). No coating system revenue was recognized during the period (10).

Revenue for Coating Services during the first quarter does not include any metals for electrolysis coatings (2.7). When metals for electrolysis are part of the coating service, they are invoiced in a cost-neutral manner for Impact Coatings in agreement with relevant customers and are reported as revenue and raw material cost and do not affect operating profit.

The subsidiary in China generated aftermarket sales of SEK 1.5 million (1.5) and Coating Services sales of SEK 0.3 million (0).

Total revenue amounted to SEK 7.5 million (20.1). The difference between net sales and total revenue is mainly the change of work in progress in the amount of SEK 2.8 million (-0.3).

Operating expenses excluding raw materials amounted to SEK -19.2 million (-17.6), reflecting higher personnel costs and other external costs – mainly for our new Coating Service Center in China – in line with the growth strategy.

Currency translation gain amounted to SEK 2.2 million (-0.1), a result of changed exchange rates of SEK against EUR and USD, as well as CNY against EUR and USD. The financial net was SEK 0 million (0).

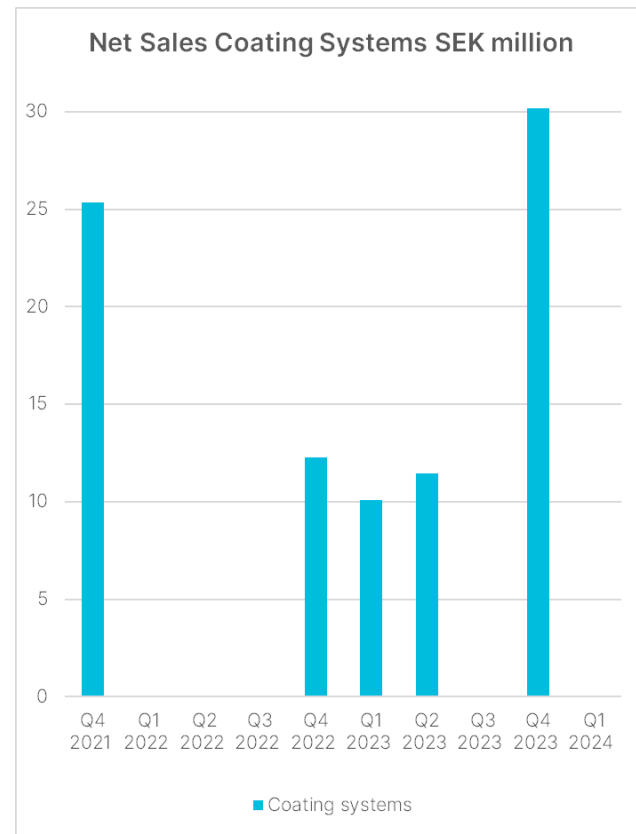
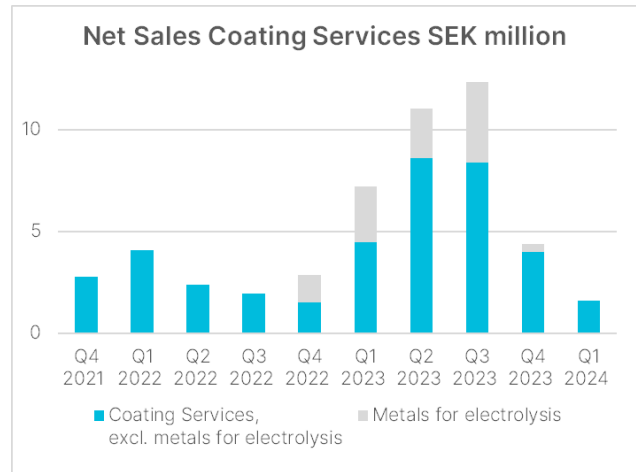
Operating profit after financial items was SEK -15.9 million (-9.1).

FINANCIAL POSITION AND LIQUIDITY

Cash and liquid assets at period-end amounted to SEK 97.2 million (193.6). The liquidity ratio amounted to 151% (303%). The company has no interest-bearing debt.

Cash flow from operations for the period amounted to SEK -12.1 million (3.5). The increase in raw materials is largely financed by advances from Coating Services customers, reported as customer pre-payments.

Cash flow from investments amounted to SEK -10.4 million (-1.2), which mainly refers to investments to complete our new Coating Service Center in China including an INLINECOATER™ IC2000 system.



Cash flow from financing activities amounted to SEK 0 million (129.8). Total cash flow for the period was SEK -22.5 million (132.2).

The company estimates that it has the liquidity needed for at least the next 12 months.

ORDER BACKLOG FOR COATING SYSTEMS AND COATING SERVICES

The order backlog for coating systems was at the end of the period EUR 0.4 million (2), corresponding to SEK 4.8 million (22) based on the period-end exchange rate.

The order backlog for Coating Services was at the end of the period SEK 2.0 million (7.4), excluding metals for electrolysis, based on the period-end exchange rate.

The order backlog for aftermarket services is not reported.

TRANSACTIONS WITH RELATED PARTIES

Of the parent company's total purchases and sales, SEK 0 million (0) of the purchases and SEK 1 million (0.2) of the sales refer to the subsidiary in China for the first quarter. There are no financial receivables or liabilities between the parent company and the subsidiary. Transactions with related parties are priced according to market terms.

During the period, a write-down of shares in the subsidiary was made corresponding to the running costs in China. The write-down is matched by contributions from the parent company to cover these costs.

Business Highlights During the Fourth Quarter

In November 2023, the company signed a five-year agreement with Waveland Technology Co., Ltd. (China) concerning the rental of a production line to the customer, for coating of plastic waveguide antennas, which was described in a press release on November 14, 2023 and in the Year-End Report for 2023. The production line would be set up at Impact Coatings' facility in Shanghai and used for Coating Services to the

customer. To establish the production line, Impact Coatings would transfer a coating system from its Swedish Coating Service Center. During the first quarter of 2024, the coating system has been shipped from Sweden and installed at the Coating Service Center China, together with other equipment for production. Qualification with the customer to put the production line into operation has been initiated.



The coating system transferred from Sweden installed at the Coating Service Center China, for coating of waveguide antennas for Waveland Technology.

Business Highlights After the Period

On April 18, the company announced that it received official approval to be a volume supplier of Coating Services to a Chinese manufacturer of fuel cell systems and stacks for automotive and other fuel cell applications. Initially, subject to coming purchase orders, Impact Coatings will provide production capacity from its Coating Service Center in Shanghai, up to a volume

corresponding to CNY 9 million in revenue. The coating qualified for the manufacturer's fuel cell products is Premium FC, Impact Coatings' new coating for heavy-duty fuel cell vehicles. Premium FC was launched in September 2023. Initially offered as a coating service from the Coating Service Center China, it is now also offered as part of the sale of INLINECOATER™ systems.

Other Information

AUDIT AND ACCOUNTING POLICIES

The report has been prepared in accordance with the Annual Accounts Act and with the application of the Swedish Accounting Standards Board's general advice BFNAR 2012: 1 Annual Report and consolidated accounts (K3).

This interim report has not been subject to auditor review.

Principles for consolidated accounting

The accounting principles are unchanged from those mentioned in the annual report for 2022.

UPCOMING FINANCIAL EVENTS

Release of Annual Report 2023	April 26, 2024
Interim report for the second quarter 2024	August 23, 2024
Interim report for the third quarter 2024	October 18, 2024
Year-end report for 2024	February 14, 2025

ANNUAL GENERAL MEETING OF SHAREHOLDERS

The Annual General Meeting will be held in Linköping on Wednesday, May 22, 2024.

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This and other Interim reports and Annual reports are available on the company's website at www.impactcoatings.com/finansiella-rapporter-arkiv/.

Consolidated Income Statement - Impact Coatings Group

<i>(All amounts in SEK million)</i>	Jan-Mar 2024	Jan-Mar 2023	Jan-Dec 2023
Net sales	4.0	20.0	98.4
Capitalized work for own account	0.4	0.1	18.9
Change of work in progress	2.8	-0.3	-29.0
Other operating income	0.3	0.3	0.7
Total revenue	7.5	20.1	89.0
Raw materials	-4.7	-10.6	-31.4
Gross profit	2.9	9.5	57.6
Gross margin %	38%	48%	65%
Other external costs	-5.5	-4.9	-35.2
Personnel costs	-13.7	-12.6	-48.4
Write off and depreciation of tangible and intangible assets	-1.7	-1.0	-4.8
Profit / Loss on Exchange rate	2.2	-0.1	-2.5
Other operating expenses	0.0	0.0	-0.6
Operating profit	-15.9	-9.1	-33.9
Interest income and similar items	0.0	0.0	1.8
Operating profit after financial items	-15.9	-9.1	-32.0
Tax expenses on profit in the period	0.0	0.0	0.0
Net income for the period	-15.9	-9.1	-32.0
Earnings per share (kr)	-0.18	-0.16	-0.41
Average shares outstanding during the period	87 486 713	56 609 051	78 857 887 ¹⁾
Shares outstanding at period end	87 486 713	56 609 051	87 486 713

¹⁾ Share issuance of 30,877,662 shares, subscribed March 23, 2023, and registered April 12, 2023.

Consolidated Balance Sheet - Impact Coatings Group

<i>(All amounts in SEK million)</i>	2024-03-31	2023-03-31	2023-12-31
Assets			
Long term assets			
Intangible assets	2.0	0.4	2.1
Machines and technical equipment	42.0	25.7	43.2
Assets under construction	21.0	8.0	11.1
Total fixed assets	65.0	34.1	56.4
Short term assets			
Raw materials	86.3	31.4	80.5
Work in progress	1.3	12.4	0
Other short term receivables	23.8	40.1	25.8
Cash and liquid assets	0.0		
Unrestricted cash	97.2	193.6	119.8
Restricted cash	0.0	0.0	0.0
Total short term assets	208.6	277.6	226.0
Total assets	273.7	311.7	282.4
Shareholder equity and liabilities			
Shareholder equity	193.6	234.6	209.5
Pre-payment from customers			
Paid	55.2	29.5	52.4
Short-term liabilities	24.9	47.7	20.5
Total shareholder equity and liabilities	273.7	311.7	282.4

Consolidated Changes in Shareholder Equity - Impact Coatings Group

<i>(All amounts in SEK million)</i>	2024-03-31	2023-03-31	2023-12-31
Opening balance	209.5	113.9	113.9
Share issuance / warrants (after emission costs)	0.0	129.8	129.8
Period result	-15.9	-9.1	-32.0
Translation difference	-0.1	0.0	-2.1
Closing balance	193.6	234.6	209.5

Consolidated Statement of Cash Flows - Impact Coatings Group

<i>(All amounts in SEK million)</i>	Jan-Mar 2024	Jan-Mar 2023	Jan-Dec 2023
Operating profit after depreciation	-15.9	-9.1	-33.9
Financial items (net)	0.0	0.0	1.8
Adjustments for non cash items	1.7	1.0	5.6
Cash flow operations before change in working flow	-14.2	-8.2	-26.4
Change in working capital	2.1	11.7	-15.7
Cash flow from operations	-12.1	3.5	-42.1
Cash flow from investments	-10.4	-1.2	-27.2
Rights issue	0.0	148.2	148.2
Rights issue costs paid	0.0	-18.4	-18.4
Cash flow from financing activities	0.0	129.8	129.8
Cash flow for the period	-22.5	132.2	60.5
Liquid assets, opening balance	119.8	61.4	61.4
Translations differences	-0.1	0.0	-2.1
Liquid assets, ending balance	97.2	193.6	119.8
Liquidity ratio, %	151	303	200

Income Statement - Parent Company

<i>(All amounts in SEK million)</i>	Jan-Mar 2024	Jan-Mar 2023	Jan-Dec 2023
Net sales	3.2	18.5	106.5
Capitalized work for own account	0.0	0.1	0.1
Change of work in progress	2.8	-0.3	-17.9
Other operating income	0.2	0.3	0.4
Total revenue	6.3	18.6	89.1
Raw materials	-3.9	-10.3	-32.2
Gross profit	2.4	8.3	56.9
Gross margin %	38%	44%	64%
Other external costs	-4.4	-4.0	-30.3
Personnel costs	-11.7	-11.1	-41.1
Write off and depreciation of tangible and intangible assets	-1.2	-0.9	-4.2
Profit / Loss on Exchange rate	2.3	-0.1	-2.6
Other operating expenses	0.0	0.0	-0.6
Operating profit	-12.7	-7.9	-22.0
Impairment of shares in group companies	-2.8	-1.3	-6.1
Interest income and similar items	0.0	0.0	1.8
Operating profit after financial items	-15.5	-9.1	-26.3
Tax expenses on profit in the period	0.0	0.0	0.0
Net income for the period	-15.5	-9.1	-26.3

Balance Sheet - Parent Company

<i>(All amounts in SEK million)</i>	2024-03-31	2023-03-31	2023-12-31
Assets			
Long term assets			
Intangible assets	1.3	0.4	1.3
Machines and technical equipment	24.0	25.6	25.1
Assets under construction	0.0	1.8	0.0
Financial assets			
Shares in subsidiary	31.2	25.4	34.0
Total long term assets	56.4	53.1	60.4
Short term assets			
Raw materials	81.4	31.3	76.1
Work in progress	22.2	12.4	11.1
Other short term receivables	23.1	33.3	23.3
Cash and liquid assets			
Unrestricted cash	97.1	180.9	116.5
Restricted cash	0.0	0.0	0.0
Total short term assets	223.7	257.9	227.0
Total assets	280.1	311.1	287.4
Shareholder equity and liabilities			
Shareholder equity	201.7	234.3	217.2
Pre-payment from customers			
Paid	55.7	29.5	52.4
Short-term liabilities	22.8	47.3	17.8
Total shareholder equity and liabilities	280.1	311.1	287.4

Summary of Financial Development

The financial development of Impact Coatings AB (publ) for the full years 2020-2023 and the group's consolidated financial development for the period January-March 2024 are summarized below.

All figures related to the operating years 2020-2023 are based on material from previously published annual reports.

<i>(All amounts in SEK million)</i>		2024	2023	2022	2021	2020
		Jan-Mar	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec
Net sales		4.0	98.4	32.0	57.2	39.5
Revenue		7.5	89.0	57.0	54.5	54.4
Operating profit		-15.9	-33.9	-47.0	-32.1	-23.0
Result after financial items (net)		-15.9	-32.0	-47.0	-32.1	-23.0
Operating margin	%	Neg	Neg	Neg	Neg	Neg
Intangible assets		2.0	2.1	0.4	1.4	2.2
Tangible assets		65.0	54.3	33.5	9.5	8.8
Financial assets		0.0	0.0	0.0	0.0	0.0
Inventory		86.3	80.5	41.0	18.5	27.4
Pre payment from customers		55.2	52.4	20.1	0.0	5.6
Short term assets		23.8	25.8	15.8	14.6	7.8
Cash and liquid assets		97.2	119.8	61.4	129.5	49.6
Shareholder equity		193.6	209.5	113.9	160.6	79.0
Long term liabilities		0.0	0.0	0.0	0.0	0.0
Short term liabilities		24.9	20.5	18.2	12.8	11.1
Total assets		273.7	282.4	152.1	173.4	95.8
Return on assets	%	Neg	Neg	Neg	Neg	Neg
Return on equity		Neg	Neg	Neg	Neg	Neg
Equity/asset ratio		71%	74	74.9%	92.6%	82.5%
Debt ratio	time	0	0	0	0	0
Interest coverage ratio	s	Neg	Neg	Neg	Neg	Neg
Liquidity ratio	%	151	200	201	1 124	343
Employees		57	56	45	37	30
Investments						
Intangible assets		0.0	1.8	0.0	0.4 ¹⁾	0.0
Tangible assets		10.4	14.3	25.9	1.7	-0.1
Financial assets		0.0	0.0	0.0	0.0	0.0
Earnings per share	SEK	-0.18	-0.41	-0.83	-0.58	-0.44
Average shares outstanding during the period		87 486 713.0	78 857 887 ²⁾	56 609 051	55 809 051 ³⁾	51 809 051
Shares outstanding at period end		87 486 713.0	87 486 713	56 609 051	56 609 051	51 809 051

¹⁾ Investment of SEK 424 thousand represents a re-classification from development expenses to intangible assets.

²⁾ Share issuance of 30,877,662 shares, subscribed March 23, 2023, and registered April 12, 2023.

³⁾ Share issuance of 4,800,000 shares, subscribed February 24, 2021, and registered February 26, 2021.

Definition of terms:

Operating margin	Operating profit after financial items divided by revenue
Shareholder equity	Sum total of shareholder equity, restricted reserves and non-restricted equity
Return on assets	Operating profit before interest divided by average capital employed
Return on equity	Net income after tax divided by average shareholder equity
Equity / assets ratio	Shareholder equity divided by balance sheet total
Debt ratio	Interest bearing debts divided by shareholder equity
Interest coverage ratio	Operating profit before interest expenses divided by interest expenses
Earnings per share	Net income after tax divided by average number of shares
Liquidity ratio	Cash and short-term assets excl. inventory divided by short term liabilities

Impact Coatings in brief

At the forefront globally in PVD coating for hydrogen and metallization on plastic

With more than 25 years of experience in general PVD technology for thin film coating, and many years of strategic focus, Impact Coatings is today at the forefront globally in two growing market segments. The company supplies coating solutions for critical components to the hydrogen industry - both for fuel cells and electrolyzers - and for the metallization of advanced plastic parts, especially in automotive applications.

Impact Coatings is a high-tech industrial company that manufactures and sells machines for PVD coating (physical vapor deposition), offers coating as a service ("Coating Services"), and provides aftermarket services and other customer services.

The head office is in Linköping, Sweden, with development department, production of PVD machines and the company's European Coating Service Center. The group has a subsidiary in China, where a second Coating Service Center was put into operation in 2023, as well as a subsidiary in the USA, where another Coating Service Center is planned. The company also has sales personnel in Germany and South Korea.

EFFICIENT PVD TECHNOLOGY FOR INDUSTRIAL APPLICATIONS

Impact Coatings' PVD system INLINECOATER™ is based on a modular machine platform that can be equipped for many applications. It features a unique circular architecture with object loading hatch and multiple coating chambers positioned around a common vacuum pump. It is a design that provides short cycle times, while multiple coating chambers enable advanced multi-layer coatings.

One INLINECOATER system provides, given price and floor space, a significant production capacity that is easily scaled up through multiple systems. It gives customers the opportunity to develop and scale up their production without changing technology solution.



Competing PVD suppliers usually offer so-called batch systems with only one chamber for development and trial series and large multi-chamber PVD lines with accompanying large capital investments for volume production.

The PVD systems are equipped for different types of coatings, especially metals, metal alloys and ceramic coatings. Depending on the application and customer needs, both standard materials and coatings developed by Impact Coatings are used. Examples of the latter are cost-effective ceramic coatings used for metal plates for fuel cells.

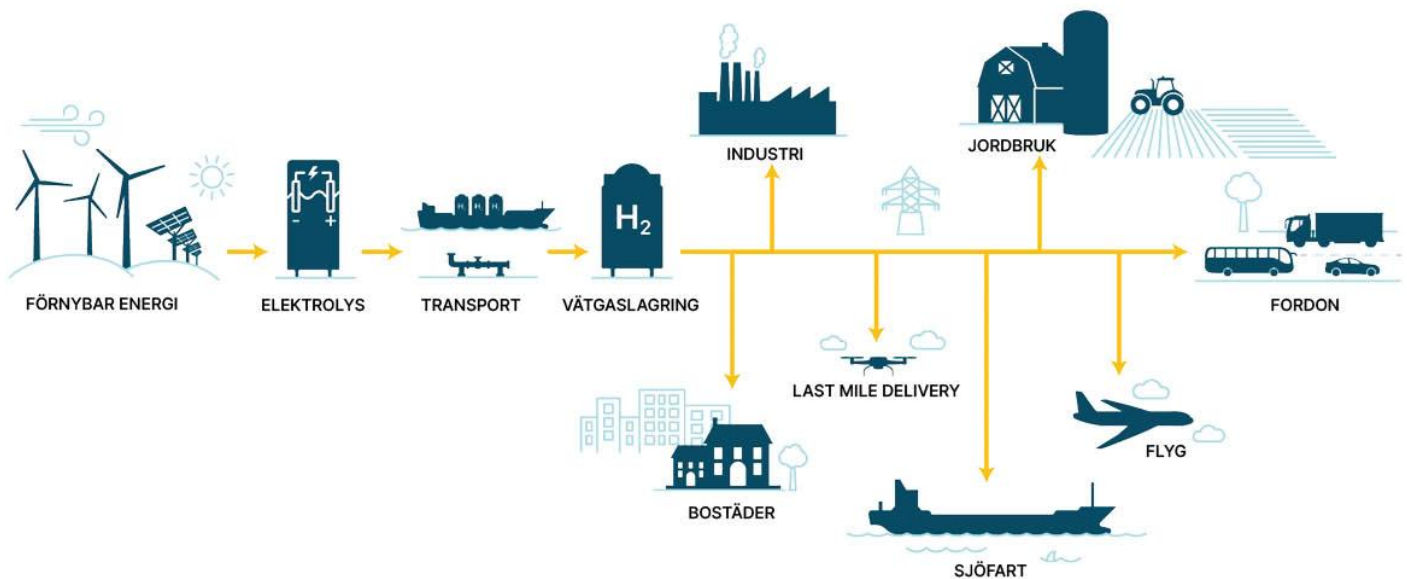
For metal electrolyzer plates, today's industry demands noble metal coatings. The INLINECOATER design with relatively small coating chambers and coating sources close to the objects provides more efficient utilization of noble metals than with other PVD systems.

Short cycle times and compact size allow the systems to be integrated with other production steps, for example with plastic injection molding and industrial robots in efficient automated production cells for metallized plastic components.

FLEXIBLE BUSINESS MODEL WITH THE CUSTOMER AT THE CENTER

The starting point in Impact Coatings' business is the customer. Placing the customer at the center gives Impact Coatings competitive advantages – especially in developing markets. The company's offerings enable a close interaction already in the development stage. Impact Coatings meets customers with high flexibility, which means they can choose freely between using Coating Services, buying or renting PVD systems, and using an Impact Coatings team on site to manage initial production.

The expansion of Coating Service Centers generates several advantages for customers and for the company. Coating Services offers a low entry barrier, shortens time-to-market, and reduces technical and financial risk. The same technical solution can be used for testing,



verification, and volume production, first in Coating Services and later at the customers' facilities, when they choose to invest in their own production. In addition, Coating Service Centers can act as a second source for future volume peaks.

Through Coating Services, the company's coating solutions are also qualified in the early stages, which gives a favorable position in the sale of PVD systems.

VERSATILE COATING TECHNOLOGY – FOCUS ON TWO GROWTH MARKETS

PVD is widely used in large industrial segments and the pursuit of a more sustainable industry means that the technology is constantly finding new areas of use. Unlike traditional wet chemical plating, PVD is a dry and clean surface coating technology, without hazardous chemicals and emissions.

During its more than 25 years, Impact Coatings has been active in general PVD technology and various application areas, such as consumer products, electrical contacts and medical technology, and the company continues to sell Coating Services and PVD systems in these areas. The many years of experience are also the basis for the strategic focus that Impact Coatings has adopted in two growth markets: Hydrogen and Metallization on plastic.

Hydrogen

Hydrogen is a cornerstone in the development of a fossil-free energy system and society. Major investments are being made in all the world's leading regions to scale up the production and use of hydrogen,

above all so-called green hydrogen from renewable energy sources.

Impact Coatings' technology is directly involved in the manufacture of critical components for both production and use of hydrogen. The company provides solutions for electrically conductive and protective PVD coatings on metal plates that are found in both fuel cells and electrolyzers.

Fuel cells

In a fuel cell, hydrogen and oxygen (from the air) are converted into electricity, with water vapor as the only emission. There are different types, with PEM (proton-exchange membrane) fuel cells being the most suitable for applications with many starts and stops, for example for vehicle applications.

Impact Coatings started developing coating solutions for PEM fuel cells in 2007 and has since supplied both Coating Services and coating machines to the fuel cell industry. Much of the development today focuses on fuel cells for heavy vehicles and Impact Coatings therefore, in 2023, launched a newly developed coating for PEM fuel cells for heavy vehicle applications – Premium FC. The company already also has a coating for PEM fuel cells for mid-end applications – Ceramic MAXPHASE™.

Electrolyzers

In an electrolyzer, hydrogen is produced by splitting water using electricity. PEM electrolyzers are particularly effective for small and medium-sized installations and where the electrical power varies, for example from solar and wind farms. Other techniques, such as alkaline and

solid oxide electrolysis, are mainly used for industrial applications.

Put simply, a PEM electrolyzer is a PEM fuel cell that runs backwards and contains corresponding components. The electrolyzer is normally larger, which means larger metal plates to be coated. Unlike most fuel cells, noble metals are required for electrolysis plates to achieve the expected high performance and lifetime.

Much of Impact Coatings' machine technology and fuel cell application know-how can be applied to PEM electrolyzers, which has given the company a technology and market edge for the new application. This applies to the ability to cost-effectively handle noble metal coatings.

The company has been producing electrolysis coatings within Coating Services since the end of 2022 and the type of system used, INLINECOATER™ IC2000, is available for electrolysis and fuel cell customers.

The hydrogen market and customers

The hydrogen market is growing through political incentives and an expansion of commercial players in North America, Europe and Asia. In Asia, Japan and South Korea were early adopters and are still at the forefront of hydrogen development, but today they are partly overtaken by China, which is investing heavily in hydrogen in its energy transition.

Simplified, there are three levels in the value chain within the hydrogen industries. At the top are end users, such as vehicle manufacturers for fuel cells and energy companies for electrolyzers. Below these are manufacturers of stacks and systems, sometimes with their own component manufacturing, and at the bottom pure component manufacturers.

Impact Coatings' sales at this early market stage are mainly to the stack and system manufacturers, who own the design, and who dare to make larger investments. However, the Chinese market is one step ahead, where component manufacturers are increasingly ready to build their own production capacity, which is also reflected in Impact Coatings' system sales for fuel cell applications to China.

Metallization on plastic

The most common method of giving plastic components a metal layer is through chrome plating, a highly problematic technique that usually involves health-hazardous hexavalent chromium. Where it is possible to replace plating and where materials other than chrome are required, other coating methods are used, including PVD technology from Impact Coatings.

Automated production cells with plastic injection molding and INLINECOATER metallization enable quality control of finished metallized plastic parts only minutes after injection molding, hence the possibility of rapid process adjustments that maximize the customer's production yields. An example where this is used is the manufacture of radomes for vehicle radars, where Impact Coatings' technology is used by leading manufacturers in the European automotive industry. Metallized plastic waveguide antennas are another critical component under development for automotive radar, where the company's technology has the potential to become a solution for volume production.

Radar is used for autonomous vehicle and traffic solutions, a market that is expected to grow as more functions are integrated into vehicle and the more connected traffic becomes. Thus, the need for metallization solutions in applications where the company currently has a strong position is expected to increase. PVD metallization in other areas is also expected to grow when health-hazardous chrome plating on plastics is to be phased out of the industry.

Metallization is a competitive market with many suppliers of PVD equipment. Impact Coating's strength lies in specific applications and for customers who need integrated production solutions.

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