DSM Resins & Functional Materials

Sustainability drives our growth
Safe harbor statement

- This factbook may contain forward-looking statements with respect to DSM’s future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this factbook, unless required by law.

- A more comprehensive discussion of the risk factors affecting DSM’s business can be found in the company’s latest Annual Report, which can be found on the company's corporate website, www.dsm.com.
Resins & Functional Materials
A global specialty coating producer with an unmatched technology portfolio

• DSM Resins & Functional Materials is a global leader of sustainable, plant-based, waterborne coating and powder coating resins that are used in a wide range of applications, while its UV-curable fiber-optic coatings are recognized worldwide as the standard for fiber protection and identification (€1,053m sales in 2018)

• DSM is leading the trend to shift from traditional solvent-based coatings that contain hazardous materials to the use of more sustainable coating technologies such as waterborne and plant-based

• Expanding the field of properties to enlarge the range of applications in which waterborne, powder and UV coatings can be used remains key
# Resins & Functional Materials

*Business lines overview sustainable coating resins*

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Sustainable Coating Resins - Products & Solutions

What's in the toolbox?

- Solid Acrylics
- Waterborne
- Solventborne
- Powder
- Plant-based
- UV

Markets & Applications

- Furniture
- Building & Construction
- Packaging
- Industrial General
- Telecom – 5G
- Consumer Goods
- Vehicle

Making a material difference

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<td>Coating resins that bring out the beauty of natural and engineered wood</td>
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<td>Metal</td>
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<td>VOC-free waterborne coatings and breathable coatings perfect for outdoor wear, come rain or shine</td>
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Sustainable Coating Resins - Products & Solutions

Our resin technology for solid acrylics is used in both coatings and inks for high-speed packaging lines. Our technical team at DSM has excellent particle size control in acrylics, with an intimate knowledge of how to control the chemistry and processes.

Despite society's clear need to move toward more sustainable coating technologies, the reality is that there's still a place for solventborne systems in the coating industry – for example in ink resins for flexible food packaging, where only solventborne technologies are currently capable of meeting the necessary drying requirements.

Plant-based paint existed long before DSM – in fact, it's been around for 17,000 years. In more recent times, we've seen a move from solventborne to waterborne resin and coating technology. But now, a new plant-based revolution is being ushered in by our bright minds at DSM.

Waterborne resin technology has gained real momentum in the coatings industry, and we're proud to have been there from the start. Waterborne coatings contain around eight times fewer VOCs than traditional solventborne equivalents.
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Sustainable Coating Resins - Products & Solutions

We invented powder coating technology over 60 years ago. For years, our resin technology toolbox has enabled metal and other man-made substrates to be cured faster and more efficiently, at lower temperatures and with less waste – all while delivering outstanding durability and aesthetics across a wide range of market segments.

Our growing technology toolbox for UV and energy curable resins is based on our conviction that this technology has the potential to revolutionize the coatings industry. In addition to their instantaneous drying times and zero volatile organic compounds (VOC) content, our UV resins are delivering outstanding performance across a range of markets – from boosting adhesion in labels and foils for food packaging to increasing the efficiency and safety of paper and board printing, to providing a viable alternative to traditional urethanes in the growing flex flooring sector and connecting the world via fast internet, coated by our energy curable solutions.
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Value chain

Resins - ~€30bn

Customer base

Impression of end market

Solvent-based resins

Powder resins

Water-based resins

UV curing resins

Ideally positioned as the industry continues to move to more sustainable coatings
Resins & Functional Materials markets by technology & DSM’s position

€130bn global paints & coatings market, €30bn global resins market (2018)

Market Growth 3-4%

Growth

DSM Growth above market

DSM Sales by Technology

Specialty Resins (water)

Energy Curing

Powder

Other

~€1,1bn (2018)

~€30bn (2018)

Solvent

Waterborne

Plant

UV

4%

10%

4%

5%
Resins & Functional Materials – DSM’s position

Sustainable Coating Resins - Products & Solutions

DSM Sales by Markets

- Others
- Furniture
- General & consumer goods
- Packaging
- Telecom
- Building & Construction
- Vehicle

~€1,1bn

DSM Sales by Geography

- North America
- Europe
- China
- Rest of Asia Pacific
- RoW

~€1,1bn
Resins & Functional Materials - Strategy

Well-positioned in the Materials portfolio, focusing on higher-value, more sustainable specialty products
Resins & Functional Materials - Strategy

Improving growth and earnings by focusing on sustainable solutions

Increased growth
- Accelerated Growth in Functional Materials
- Grow in Specialty Coating Resins
- Maximize Returns in Powder Coating Resins

Efficiency Capital discipline
- Commercial excellence
- Cost and efficiency improvements
- Prudent growth-focused capex
- Working capital discipline

Functional Materials (Energy Curable Solutions)
- Grow customer base facilitating Fiber-to-Home trend
- Transfer 4G -5G
- Innovation platform

Specialty Coating Resins
- Drive substitution of Solvent-based
- New innovations focusing on sustainability

Powder Coating Resins
- Drive substitution of Solvent-based
- Leverage asset base and optimize
Resins & Functional Materials – Continuous sustainable Innovations

**Niaga®** is outsmarting complex combinations of toxic and non-recyclable intermediates in everyday stuff. Niaga® share a non-negotiable product design philosophy, to make products healthier and fully recyclable.

**DeCovery®** plant-based resins are based on a novel process of converting renewable materials. Free of Volatile Organic Compounds, it has an extremely low odor and offers many additional benefits to the end-products.

**Transforming the Chinese sea freight container industry.** To mobilize industry support for the switch from solventborne to waterborne coatings in China, DSM founded the Waterborne China Platform in 2010. In 2016, the Chinese container industry decided to sign a convention to introduce waterborne coatings.

**DeSolite® Supercoatings** is the industry leading coating solution for fiber protection worldwide. Helping assure signal reliability and protecting fibers from harsh environmental conditions.
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Driving Sustainability In Decorative Coatings

A strong demand for cleaner paint

- Regulators, professional painters and consumers are increasingly sensitive to the health hazards of solventborne paints, and there is a strong demand throughout the value chain for cleaner and more sustainable decorative paint solutions.
- DSM Resins & Functional Materials is driving the coatings industry by delivering innovative coating resins that outperform market alternatives and enable higher levels of sustainability and help to reduce climate change.
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Niaga: Redesigning everyday products from scratch

- Niaga® Technology: a 100% recyclable carpet, produced with up to 90% less energy.

- Technology is for instance also applicable for production of fully recyclable green mattresses (Auping’s “Bedzzzy”) or circular panels in furniture (ECOR)
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*Desolite – Fiber-optic coatings*

- Without **fiber-optic** cable there is no fast internet connecting the world. And without UV-curable coatings, there is no fiber-optic cable.
- DSM is the world’s leading supplier of fiber-optic coatings, which help assure signal reliability and protect fibers from harsh environmental conditions.
- DeSolite® Supercoatings made by DSM is the industry leading coating solution for fiber protection worldwide.
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Tackling volatile organic compounds (VOC) emissions

Solventborne coatings: a significant source of VOC emissions
- 95% of the world’s sea freight containers are made in China, almost all are painted with solventborne coatings

Potential market: ~165,000 tons of waterborne coatings a year
- (if all new containers were painted with waterborne coatings, i.e. 60-70kg of paint per container)

- In 2010, DSM founded the Waterborne China Platform to mobilize industry support for the switch to waterborne coatings in China:
- Since 2014, the Chinese government has been focused on environmental protection, including introducing more stringent regulations on VOC emissions from solvent-based coatings
- In 2016, the Chinese container industry decided to sign a convention to introduce waterborne coatings (Guangdong Province switched in 2016, followed by the rest of the country in 2017)
- DSM has recorded considerable growth in its business with paint & coatings customers such as Valspar/Sherwin Williams
- Further growth driven by other industries and governing bodies changes:
  - The Chinese furniture industry is switching to waterborne coatings
  - The Shenzhen Municipality has forbidden the use of solventborne coatings for external wall applications
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Plant-based coatings

- Discovery® plant-based resins are based on a novel process of converting renewable materials
- Free of Volatile Organic Compounds, Discovery® has an extremely low odor and offers many additional benefits to the end-products
- Praxis, one of the largest Dutch hardware chains, was looking for a sustainable solution for its premium range of private label decorative paints
- In close cooperation with DSM, Praxis was able to further improve quality and sustainability using Discovery®
- In 2016, DSM and ICA Group together announced a new water-based coatings line for interiors called IRIDEA BIO
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Leading the way in environmental friendly materials

- Changing the value chain actively with lower carbon footprint products
- Creating demand for lower carbon footprint products
- Reducing the use of solventborne paints where possible
- Exploring in bio-based/renewable value chains
- Lower emissions (GHG, VOC)
- Phase-out all Chemicals of High Concern from our finished products
- Step-up sourcing of bio-based recycled raw materials
- Zero Land field