

# CATALYST AND ADSORBENT MANUFACTURING SERVICES FROM EVONIK

Increasing value by addressing your specific requirements

## TOLL PROCESSING & CUSTOM MANUFACTURING

### INCREASE PROFITABILITY AND MANUFACTURING FLEXIBILITY

Outsourcing some or all your company's catalyst or adsorbent production needs to an expert in manufacturing sophisticated materials can be an outstanding way to increase profits and concentrate on your core operations.

#### Your challenge:

- Lack of competitive equipment or inadequate capacity
- Need for flexibility / production prioritization
- Need for improved supply security
- Demand for regional production

#### Our solution:

Evonik offers a unique variety of services and capabilities from catalyst toll processing to custom manufacturing that make us the ideal partner for your contract manufacturing needs.

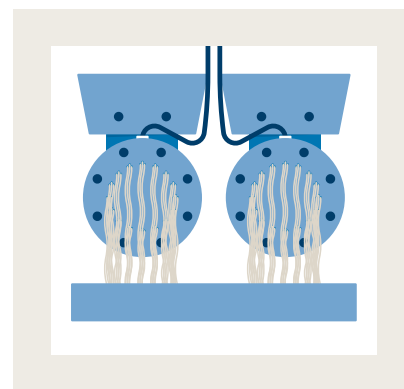
#### How your business benefits

- Fast production transfer and qualification times
- Avoidance of capital investment
- No additional personnel, floor space, analytics or permits required
- Competitive & predictable costs
- Spot or long-term contracts

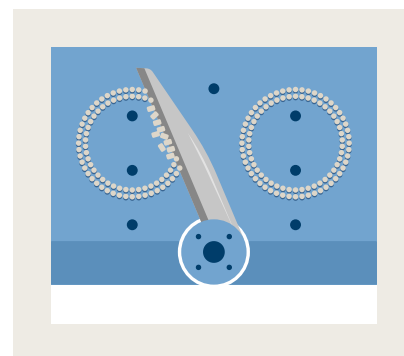
Evonik can create additional or tailored operations for your requirements based on our broad technical capabilities.

### CAPABILITIES OF OUR CATALYST AND ADSORBENT FINISHING AND FORMING LINES

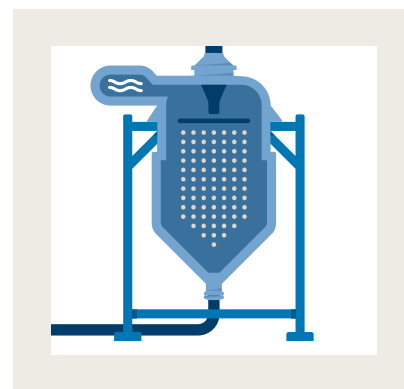
- Precipitation and hydrothermal treatment
- Drying of powders and pellets; spray drying of slurries
- Powder mixing / compacting / milling / dry blending
- Length grading
- Forming: extrusion, ball forming, tableting and granulation
- Base metal or precious metal impregnation or coating of extrudates, spheres or powders; uniform and thin shell impregnation
- Incipient wetness, uniform and thin shell impregnation
- Calcination up to 1000 °C of powders and pellets in air, N<sub>2</sub> and steam (stationary and continuous)
- Reduction with hydrogen (up to 50 vol.-% H<sub>2</sub> in N<sub>2</sub>) and optional passivation (e.g. Ni-catalysts)
- Regeneration (e.g. washing with water and acids, drying, removal of dust and VOC, coke combustion)
- Pilot/semi-works plant
- Transportation (truck or rail, bulk or packaged)
- Reactors for wet chemistry



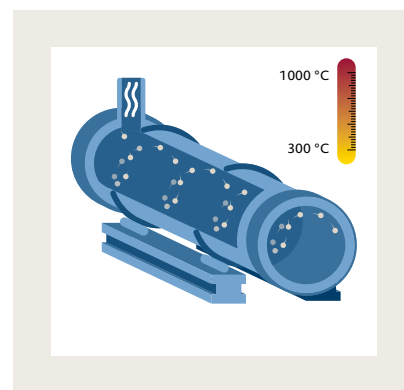
▲ Extrusion



▲ Cutting of extrudates



▲ Spray drying



▲ Calcination

## CUSTOM DESIGN & JOINT DEVELOPMENTS

### OPTIMIZE OPERATION EFFICIENCIES FOR SUSTAINED COMPETITIVENESS

A high-performance catalyst drives your process technology to maximum profitability, be it in specialty chemicals, petrochemicals or refining. A tailored catalyst can help you to remain or become a technology leader, maximizing your plant output, reducing by-products and emissions and saving raw materials over many years of operations.

#### Your challenge:

- Requirement for partner to (optionally) develop, scale-up and produce a customized catalyst
- Search for company with profound project management expertise, long-term and trust orientation
- Need for extensive catalyst & qualification expertise, consultancy on process interactions
- wish for customized supply scenarios of final commercial catalysts

#### Our solution:

Evonik provides more than 80 years of experience and expertise in catalyst and adsorbent development, scale-up and manufacturing. A close cooperation with Evonik's skilled experts is particularly valuable for:

- Developing a new, superior process
- Modifying a process to adapt to changes in feedstocks or market needs and to sustain competitiveness

Depending on required level of expertise and available resources, Evonik can support you in different development stages: From scale-up

of existing recipes to development of a completely new technology.

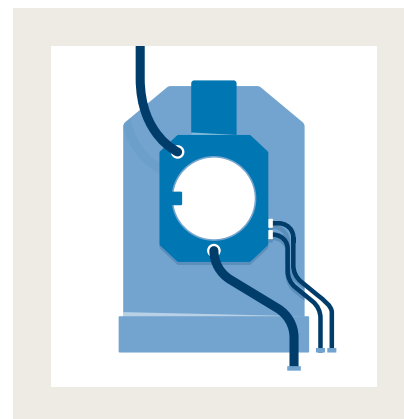
#### How your business benefits

- Get access to extensive and knowledgeable teams for research and development, reaction engineering and legal services.
- Make use of Evonik's global network of R&D labs, production sites and test facilities
- Choose between multiple carrier options from captively produced and / or tailored materials to commercially available grades
- Evonik's broad set of know-how, permits and analytics allows a speedy project execution
- Rely on competitive & predictable costs
- Enjoy highest standards in safety, development, scale-up, manufacturing, quality & project management, confidentiality, compliance
- Evonik takes care of clear IP management and is open for an exclusive cooperation

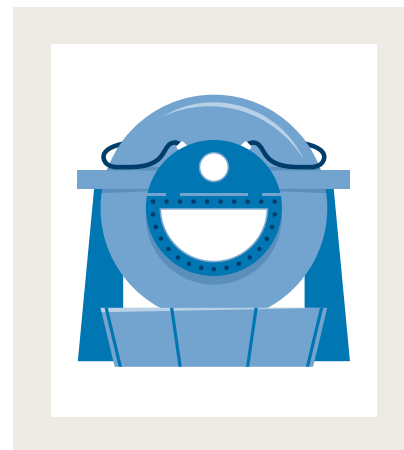
Evonik is your partner of choice for a trusting, long-term and confidential cooperation that addresses your individual needs and requirements and turns your challenges into success.

#### CAPABILITIES OF OUR CATALYST FINISHING AND FORMING LINES

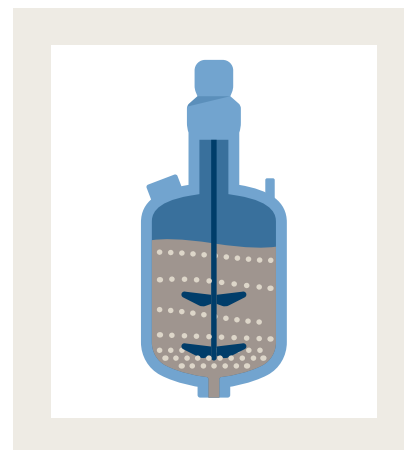
See front page.



▲ Impregnation coater



▲ Impregnation drum



▲ Precipitation unit

#### Contact

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