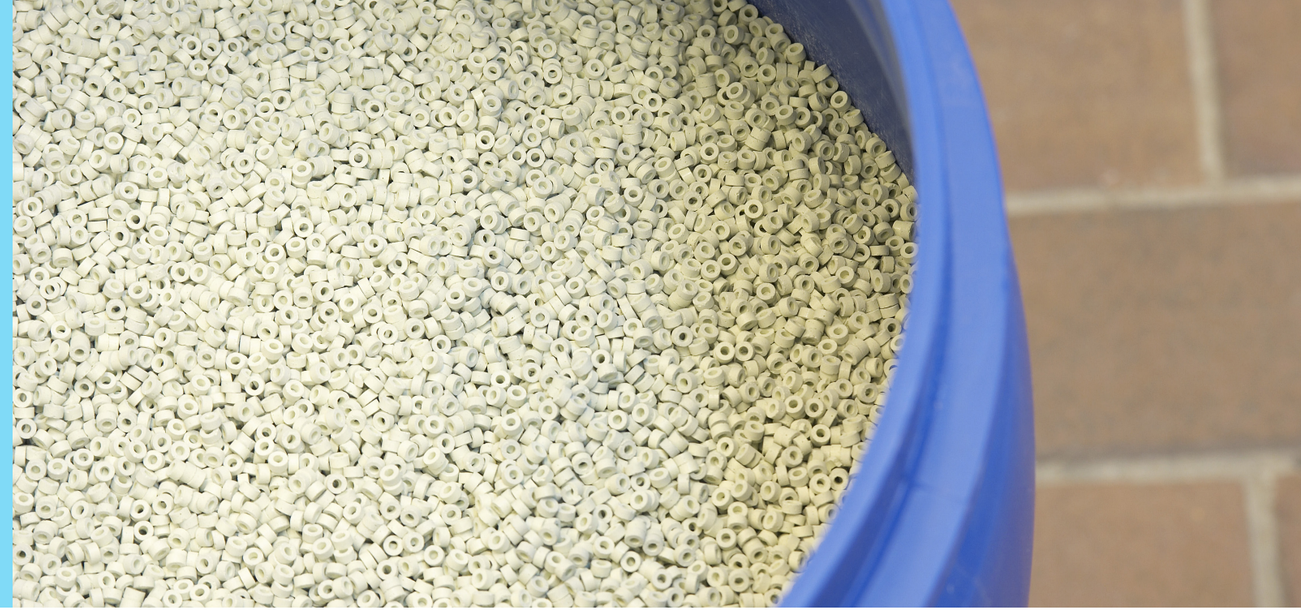
JM

# FORMOX 2.0
# High pressure plants and catalysts

Johnson Matthey
Inspiring science, enhancing life

# 30% higher capacity with **FORMOX 2.0**



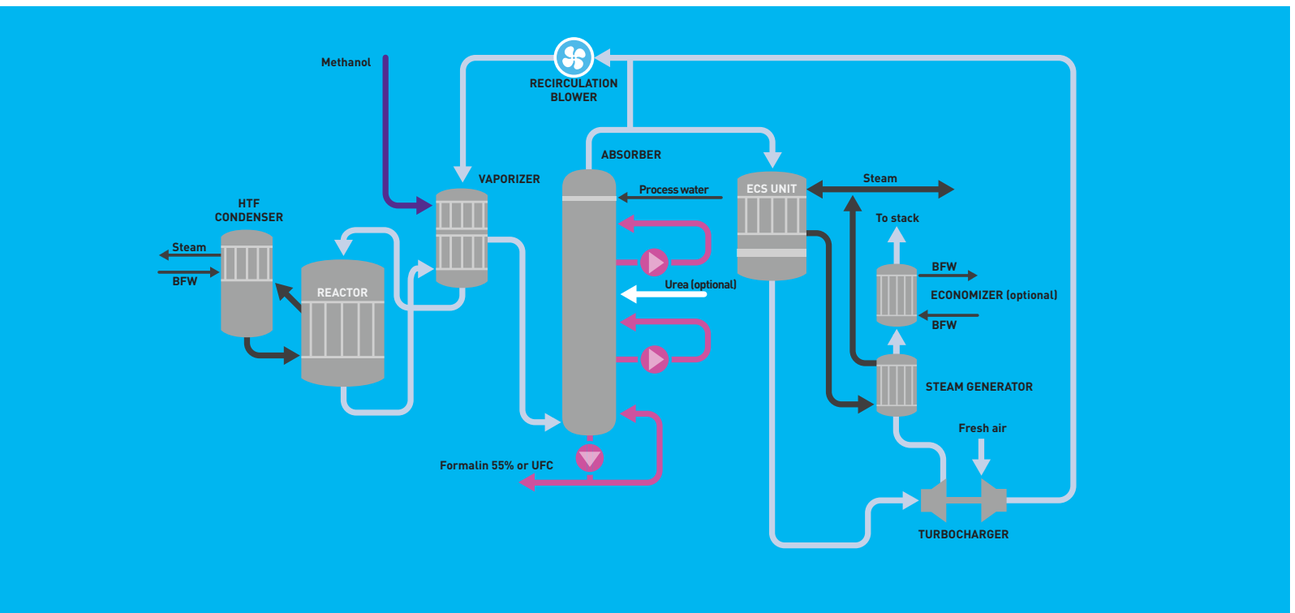
Once again, **FORMOX™** formaldehyde technology introduces another groundbreaking advancement in plant design and performance. Using unique turbocharger technology, our new range of **FORMOX 2.0** plants can be operated at higher pressure than previously possible. This next step in the evolution of formaldehyde technology is made possible thanks to close collaboration between specialists in the fields of plant design and catalyst development.

## Advantages with FORMOX 2.0

- **Reduced specific investment** – Capacity is 33% higher with only minor changes in equipment, so the price increase is moderate in relation to the increased capacity range.
- **More flexible operating range** – The new design makes it possible to optimize plant performance and to find new combinations beneficial for specific parameters. For example, inlet can be reduced in order to improve catalyst performance and lifetime.
- **Maintained performance at turndown** – Operates with same outstanding performance.
- **Reduced specific power consumption at peak capacity** – Improved pressure ratio means lower specific power consumption at high pressures.

**FORMOX 2.0** involves modifications made to our basic standard range that enables increased capacity. For example the reactor has been adjusted for a higher production rate, but without changing the number of reactor tubes. The ECS has been modified to reduce equipment dimensions, improving the layout and reducing the cost of the civil construction. And steam is now used to preheat the gases before entering the ECS reactor bed.

**FORMOX 1.0** is our basic standard range of plants utilizing electrical drive for pressurization blowers. These are slightly lower in investment cost.




## Plant range 2018

**FORMOX™ 1.0**

| | FS1:1 | FS2:1 | FS3:1 | FT2:1 | FT3:1 |
|---|---|---|---|---|---|
| Design capacity (MTPD 37 wt%) | 70-185 | 110-300 | 150-418 | 220-600 | 300-836 |

**FORMOX™ 2.0**

| | FS1:2 | FS2:2 | FS3:2 | FT2:12 | FT3:2 | FT4:2 |
|---|---|---|---|---|---|---|
| Design capacity (MTPD 37 wt%) | 70-246 | 110-400 | 150-556 | 220-800 | 300-1112 | 385-1423 |

## Performance FORMOX 2.0:

| At pressure/inlet | 1,5/10 | 2,0/10 | Bar a/ % |
|---|---|---|---|
| **Expected Perf.** | | | |
| Methanol cons. | 427 | 429 | Kg/MT 37% |
| Power cons. | 43 | 39 | kWh/MT 37% |
| Specific prod. | 20 | 18 | MT37%/kg cat. |
| Steam prod. | 700* | 700* | Kg/MT 37% |

* 750kg/MT 37% with economizer

## FORMOX catalysts – for greater flexibility

Since first introducing the Catalyst Activity Profile concept in 2003 with CAP 1, JM has worked continuously to push the boundaries even further. Our aim is always to increase flexibility, productivity, production availability, yield and lifetime, while at the same time reducing operating costs.

Now, with the introduction of **FORMOX 2.0** plant technology, we are proud to present our latest CAP HP catalyst system designed to handle the plant's higher productivity and system pressure. Thanks to the new **FORMOX** CAP HP1 system, the **FORMOX 2.0** plant offers extraordinary flexibility in productivity, ranging from 28 to 100 percent of full capacity.

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