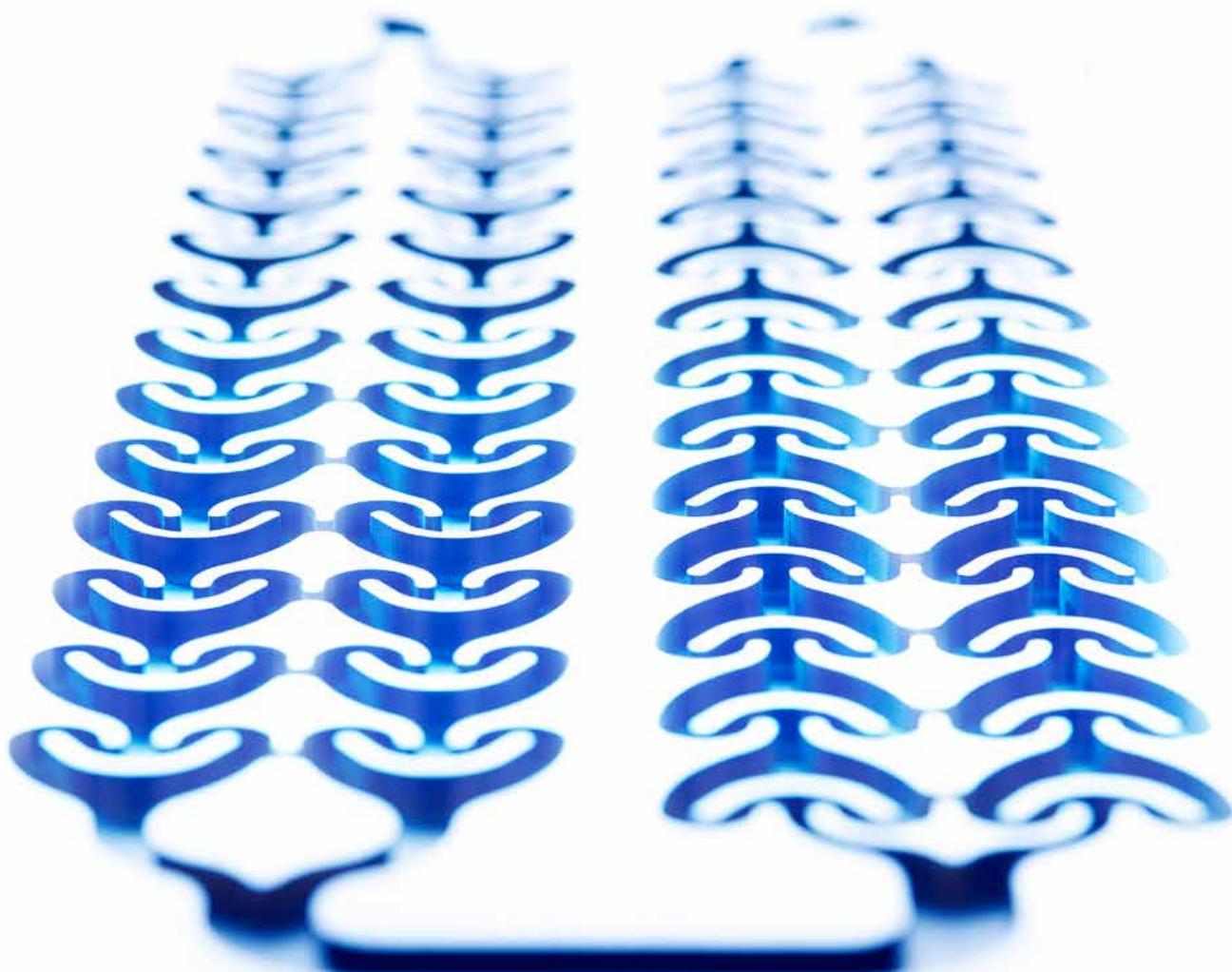


CORNING

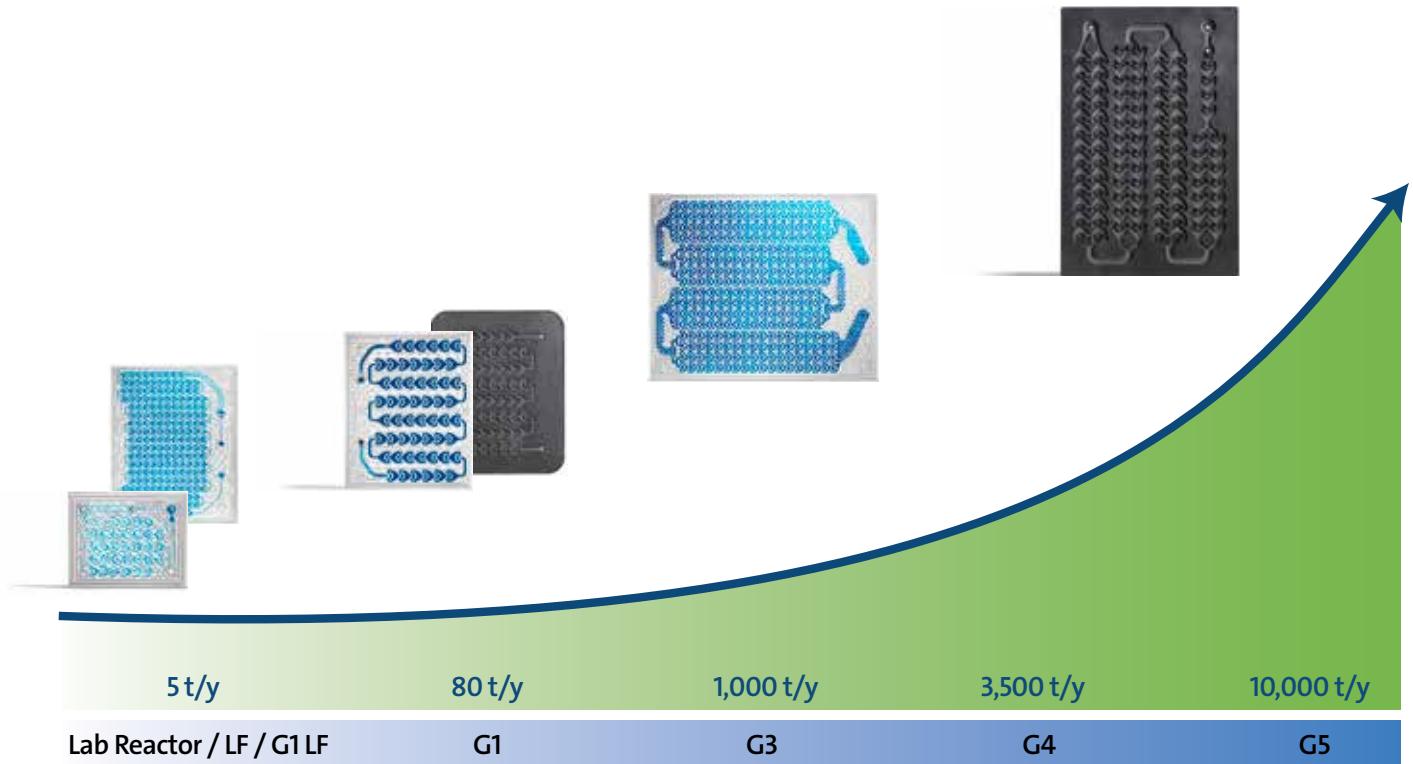
Advanced-Flow™ Reactors

The future flows through  
Corning® Advanced-Flow™ Reactors



# Seamless scale-up

from laboratory to production  
with impressive corrosion resistance



## Boundary Conditions

Temperature (°C)

- 60 to 200

Pressure (barg)

0 to 18

Mass Transfer 100x better \*

Heat Transfer 1000 x better \*

# Made for Industrial Production

## Integrated Production System



Corning's Advanced-Flow™ Reactor auxiliaries for the G4 reactor provide customers with complete turnkey solutions for chemical production.

Our high performance auxiliaries feature an optimized design specifically manufactured for industrial environments. AFR's customized solutions meet industrial recommendations and guidelines including pharmaceutical compliance, standard industrial automation, and explosive atmosphere regulations.

Reaction Volume 1000 x lower \*

Residence Time Distribution 50x better \*

\* compared to batch reactors

# Higher yields, lower cost

Corning innovation brings significant performance benefits to the chemical processing industry through Corning® Advanced-Flow™ Reactors - a full range of reactor products suited to meet the needs of a particular reaction or a wide portfolio of reactions.

Continuous flow chemical production utilizing Corning Advanced-Flow Reactors can provide:

- seamless scale-up
- increased production yields
- lower overall production costs
- enhanced plant safety
- higher product quality
- decreased waste generation and energy consumption
- faster product time to market

Corning's reactors can be effectively run on reactions with miscible and immiscible liquids, and gases and liquids containing some amounts of small solids particles.

Many different types of reactions are well suited for Corning's reactor equipment, including:

- nitrations
- oxidations
- brominations
- chlorinations
- grignards
- alkylations
- organo-metallics
- hydrogenations
- polymerizations
- ...and others.

Corning Advanced-Flow Reactors can be integrated into existing chemical processing infrastructures and designed upon request to ATEX and cGMP standards. Corning's reactors can be easily incorporated into industrial systems via standard connectors, helping customers migrate to Corning's technology with little to no downtime.

## A full range of services to suit your needs

Corning Advanced-Flow Reactors include a full range of services to enhance customers' projects from development through to implementation and operation, including:

- workshops and trainings
- basic and detailed auxiliary systems engineering
- customized turnkey solutions
- technical support
- FAT/SAT and industrial startup
- assistance for equipment qualification following cGMP/FDA requirements
- pre- and post-purchase technical support
- compliance with international standards (ATEX, ASME, PED, SELO, KGS, etc.)

# Product Portfolio



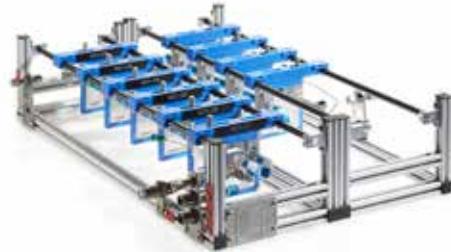
**Lab Reactor**  
Stepping into Flow Chemistry

FLOW RATE: 2 to 10 ml/min \*



**Lab Photo Reactor**  
Stepping into Flow Photo Chemistry

FLOW RATE: 2 to 10 ml/min \*



**Low-Flow Reactor**  
Laboratory scouting glass reactor

FLOW RATE: 2 to 10 ml/min \*



**G1 Reactor**  
Process development and small production  
glass reactor

FLOW RATE: 30 to 200 ml/min \*

\*recommended flow rate



### G1 Photo Reactor

Process development and small production  
Photo Reactor

FLOW RATE: 30 to 200 ml/min \*



### G1 SiC Reactor

Process development and small production  
silicon carbide reactor

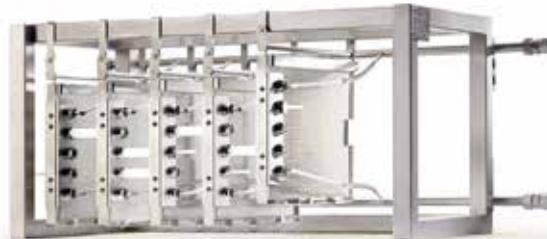
FLOW RATE: 30 to 200 ml/min \*



### G3 Photo Reactor

Photochemistry production reactor

FLOW RATE: 400 to 2000 ml/min \*



### G3 Reactor

Pilot and production glass reactor

FLOW RATE: 400 to 2000 ml/min \*

\*recommended flow rate



**G4 Reactor**  
Production silicon carbide reactor

FLOW RATE: 1000 to 8000 ml/min \*



**G5 Reactor**  
Large-scale Production silicon carbide reactor

FLOW RATE: 1000 to 10,000 ml/min \*

\*recommended flow rate

# Corning® Advanced-Flow™ Reactors - A Global Presence

## *Thinking global and acting local*

Corning® Advanced-Flow™ Reactors are specially designed for the seamless transition from lab feasibility to process development to industrial-scale to multi-ton production of chemicals. Corning reactors are designed to meet the needs of pharmaceutical, fine, and specialty chemicals companies who are seeking process optimization of a particular reaction or a wide portfolio of reactions. Corning reactors comprise highly engineered fluidic modules that integrate heat-transfer and mass-transfer in a single piece of equipment. These reactors are easily scalable and enable seamless, cost-effective solutions for fast scale-up and time to market. Corning reactors increase the efficiency, scalability, yields, and quality of chemical processing while reducing environmental impact, performance variability, and cost.



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