Coflore® ACR
Agitated Cell Reactor Accessories

Laboratory-Scale Flow Reactor

AM Technology
Engineering Chemistry

www.amt.uk

Company Overview

Founded in 2000, AM Technology is a chemical engineering company based in Cheshire, England that designs and manufactures the Coflore® range of actively-mixed continuous flow reactors for the chemical manufacturing industry.

Whether for laboratory, pilot or industrial scale chemical production, our range of flow reactors offer a unique scope of capabilities suited towards a wide range of processes, with wide-ranging reaction times and reaction mixture types. We also offer development services in our well-equipped laboratories to carry out feasibility and scale-up studies on client-specific chemical processes.

The Coflore® flow reactor range: the **Realistic Alternative** to Batch Chemical Manufacturing

Versatile. Productive. Efficient.

ISOQAR REGISTERED

UKAS MANAGEMENT SYSTEMS

Certificate No: 12073
ISO 9001: 2015

Introduction

Coflore® flow reactors are designed for flexibility & scalability, for processes with reaction times ranging from seconds to many hours. The unique method of active mixing enables the processing of a wide and versatile range of reaction mixtures, including liquids, gases and slurries.

The **Coflore® ACR** is an actively-mixed ten-stage system for efficient mixing and a high degree of orderly flow, irrespective of residence time. The **Coflore® ACR** is a low volume reactor which delivers comparable performance to the larger **Coflore® ATR and RTR** reactors.

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Coflore® ACR Reactor Blocks

Reactor Block Assembly: Hastelloy (ACR-100-Ha)

Operating Range:
Pressure: Up to 10 Bar
Temperature: -40 to +140°C

Wetted Material:
Cell Block: Hastelloy C276
Gasket: PTFE, O-ring: FFKM
Glass Window: Borosilicate Glass
Heat Exchange plate: Hastelloy C276

Dimensions:
300mm H x 100mm W x 55mm D
Mass: 9 Kg
Cell diameter: 25mm
Inter-stage Channel: 4mm x 4mm x 30mm

Capacity: 100 mL Nominal

Connections:
Inlet/Outlet: 1/8" BSPP Female
Side port: 1/4" BSPP Female

Components Include:
1 x Process flange
1 x Reactor Cell Block: Hastelloy
1 x HTF Flange
1 x Mounting plate
10 x Glass Window
10 x Window Gasket
1 x Process Gasket
2 x Process connection gasket
2 x Process connection
10 x ¼" BSP Blank plug
1 x Process O-ring
1 x HTF O-ring
10 x HTF Agitator

Reactor Block Assembly: PTFE (ACR-100-PTFE)

Operating Range:
Pressure: Up to 4 Bar
Temperature: -40 to +140°C

Wetted Material:
Cell Block: PTFE 25% GF
Gasket: PTFE, O-ring: FFKM
Glass Window: Borosilicate Glass
Heat Exchange plate: Hastelloy C276

Dimensions:
300mm H x 100mm W x 55mm D
Mass: 4 Kg
Cell diameter: 25mm
Inter-stage Channel: 4mm x 4mm x 30mm

Capacity: 100 mL Nominal

Connections:
Inlet/Outlet: 1/8" BSPP Female
Side port: 1/4" BSPP Female

Components Include:
1 x Process flange
1 x Reactor Cell Block: PTFE
1 x HTF Flange
1 x Mounting plate
10 x Glass Window
10 x Window Gasket
1 x Process Gasket
2 x Process connection gasket
2 x Process connection
10 x ¼" BSP Blank plug
1 x Process O-ring
1 x HTF O-ring
10 x HTF Agitator

Coflore® ACR Reactor and Cell Blocks

Reactor Block Assembly: Extractor (ACR-100-ACX)

Operating Range:
Pressure: Up to 4 Bar
Temperature: -40 to +140°C

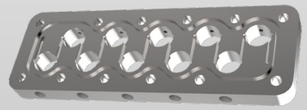
Wetted Material:
Cell Block: PTFE 25% GF
Gasket: PTFE, O-ring: FFKM
Glass Window: Borosilicate Glass
Heat Exchange plate: Hastelloy C276

Dimensions:
300mm H x 100mm W x 55mm D
Mass: 4 Kg
Cell diameter: 25mm
Inter-stage Channel: 4mm x 4mm x 30mm; 6mm x 15mm x 30mm

Capacity: 100 mL Nominal

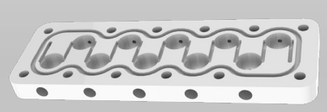
Connections:
Inlet/Outlet: 1/8" BSPP Female
Side port: 1/4" BSPP Female

Components Include:
1 x Process flange
1 x Reactor Cell Block: ACX
1 x HTF Flange
1 x Mounting plate
10 x Glass Window
10 x Window Gasket
1 x Process Gasket
2 x Process connection gasket
2 x Process connection
10 x ¼" BSP Blank plug
1 x Process O-ring
1 x HTF O-ring
10 x HTF Agitator



Reactor Cell Block: Hastelloy (ACR-RB-Ha)

Material: Hastelloy C276
Dimensions: 300mm H x 100mm W x 20mm D; Cell diameter: 25mm; Interstage channel: 4mm x 4mm x 30mm
Connections: Side port: 1/4" BSPP female



Reactor Cell Block: PTFE (ACR-RB-PTFE)

Material: PTFE 25% GF
Dimensions: 300mm H x 100mm W x 20mm D; Cell diameter: 25mm; Interstage channel: 4mm x 4mm x 30mm
Connections: Side port: 1/4" BSPP female

Extractor Cell Block: PTFE (ACR-RB-ACX)

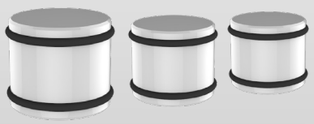
Material: PTFE 25% GF
Dimensions: 300mm H x 100mm W x 20mm D; Cell diameter: 25mm; Interstage channel: 4mm x 4mm x 30mm; 6mm x 15mm x 30mm
Connections: Side port: 1/4" BSPP female

Coflore® ACR Agitators

Different agitators can be used to suit different types of chemistry; **Variable Volume, High Shear** and **Catalyst Basket. Agitator Sizes** determine overall reactor volume of between 30mL to 100mL.

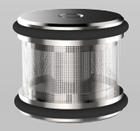
Variable Volume Agitators: Hastelloy (ACR-70%-Ha; ACR-50%-Ha; ACR-30%-Ha)

Material: Body: Hastelloy C276; O-ring: FFKM
70% Volume agitator: Occupies 70% cell volume (7mL approx.), diameter: 22mm; **50% Volume agitator:** Occupies 50% cell volume (5mL approx.), diameter: 18.6mm; **30% Volume agitator:** Occupies 30% cell volume (3mL approx.), diameter: 14.5mm



Variable Volume Agitators: Ceramic (ACR-70%-C; ACR-50%-C; ACR-30%-C)

Material: Body: Technox 2000; O-ring: FFKM
70% Volume agitator: Occupies 70% cell volume (7mL approx.), diameter: 22mm; **50% Volume agitator:** Occupies 50% cell volume (5mL approx.), diameter: 18.6mm; **30% Volume agitator:** Occupies 30% cell volume (3mL approx.), diameter: 14.5mm



Catalyst Basket Agitator: Hastelloy (ACR-CB-Ha)

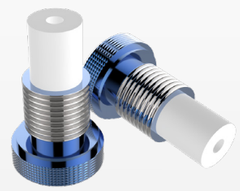
Material: Body: Hastelloy C276; O-ring: FFKM
Diameter: 18mm

High Shear Agitator: Hastelloy (ACR-HS-Ha)

Material: Body: Hastelloy C276; End sleeve: PTFE
Diameter: 19mm, occupies 10% cell volume (1mL approx.)

Coflore® ACR Accessories

Accessories are available to meet your process requirements.

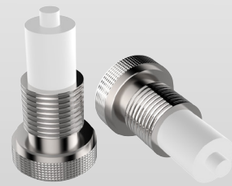


¼" BSP Injection Plug (ACR-PLUG-INJ)

For use with 4mm triclover adaptor. Adapts from ¼" BSP to ¼-28 UNF
Operating pressure range: up to 10 Bar
Material: PTFE, 316 Stainless Steel (non-wetted)
Connections: ¼" BSPP male, ¼-28 UNF female

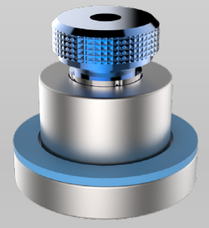
¼" BSP Thermocouple Plug (ACR-PLUG-TC)

For holding thermocouple in ACR side port.
Adapts from ¼" BSP to ¼-28 UNF
Operating pressure range: up to 10 Bar
Material: PTFE, 316 Stainless Steel (non-wetted)
Connections: ¼" BSPP male, ¼-28 UNF female



¼" BSP Blank Plug (ACR-PLUG-B)

For blanking ACR side ports
Operating range: up to 10 Bar; -40 to 140 °C
Material: PTFE, 316 Stainless Steel (non-wetted)
Connections: ¼" BSPP male



Injection Nozzle Assembly (ACR-WIN-Ha)

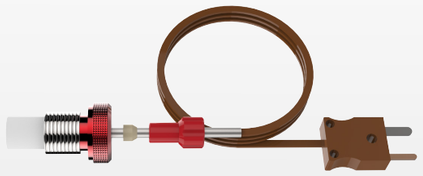
Replaces glass window for extra addition point
Operating pressure range: up to 10 Bar
Wetted Material: Body: Hastelloy C276; ¼" BSP injection plug seal: PTFE; Window gasket: PTFE
Connections: Injection nozzle body: ¼" BSP female; ¼" BSP injection plug: 1/4" BSPP male, ¼-28 UNF female
Components Include: 1 x injection nozzle body, 1 x ¼" BSP injection plug, 1 x window gasket

Glass Window (ACR-GW)

Window assembly for ACR Reactor Block Assembly
Material: Borosilicate Glass
Dimensions: 34mm OD x 6.5mm

Coflore® ACR Accessories

Accessories are available to meet your process requirements.

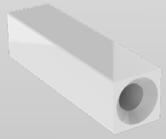


Temperature Probe Assembly: Hastelloy (ACR-TP-Ha)

T-Type thermocouple, measures process temperature at cell wall
Probe Diameter: 1/8" OD.
Operating Range: up to 10 Bar; -40 to 140 °C
Wetted Material: Thermocouple: Hastelloy C276; Seal: PTFE; Thermocouple gripper olive: PTFE
Connections: Thermocouple plug: 1/4" BSPP male; Thermocouple gripper: ¼-28 UNF; Thermocouple: IEC miniature TC plug
Components Include: 1 x T-Type thermocouple, 1 x 1/4" BSP thermocouple plug, 1 x 1/8" omnifit gripper

¼-28 UNF Adaptor (ACR-1/4-28-P)

For adapting ACR inlet/outlet to ¼-28 UNF
Material: Body: PEEK; Gasket: PTFE
Connections: 1/8" BSPP male, ¼-28 UNF female
Components Include: 1 x ¼-28 UNF adaptor, 1 x 1/8" BSP PTFE gasket, 1 x 5 mm OD PTFE gasket



Channel Restrictor (ACR-CR)

For adding restriction in ACR interstage channel
Material: PTFE
Dimensions: 3.8mm x 3.8mm x 15mm; through hole: 0.2mm, 1mm, 2mm. To be specified on order

Insulation Jacket (ACR-INS)

For insulating the reactor block assembly
Material: Insulation jacket: silicone sponge insulation; O-rings: silicone
Dimensions: 420mm x 220mm x 5mm
Components Include: 1 x insulation jacket front, 1 x insulation jacket back, 1 x insulation jacket wrap, 1 x large O-ring, 3 x small O-ring

ACR tool kit (ACR-Tools)

Components include: 1 x tool bag, 1 x allen key set, 1 x 17mm ratchet spanner, 2 x 13mm spanners, 2 x adjustable spanners, 1 x pliers

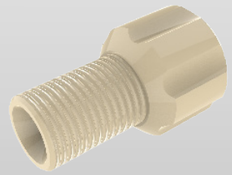
Coflore® ACR Tube Fittings

Tube fittings are used as process connections.

Soft Tubing Connector

Soft tubing connectors for use with peristaltic pump tubing and ¼" BSP injection plug (ATR-PLUG-INJ)
Material: PTFE
Connection: 1/4 -28 UNF male

Master flex tubing size	Tubing ID (mm)	Barb size (mm)	Part number
L/S 13	0.8	1.6	**P-646**
L/S 14	1.6	1.6	**P-646**
L/S 16	3.1	3.2	**P-647**
L/S 25	4.8	4.8	**P-648**



Omnifit Tube Connectors

Omnifit tube connectors for use with PTFE tubing and ¼" BSP injection plug (ATR-PLUG-INJ)
Material: Gripper body: PEEK. Ferrule: PTFE
Connections: ¼-28 UNF male

Tubing size (OD)	Part number
1/16"	**XP-283**
1/8"	**XP-335**

Swagelok Tube Connectors

Swagelok tube connectors for use with PTFE/Stainless Steel tubing. For use with 9.5mm triclover adaptor (ATR-BSP9.5)
Material: Fitting: 316 Stainless Steel. Washer: Stainless Steel, viton
Components include: Compression fitting, bonded washer

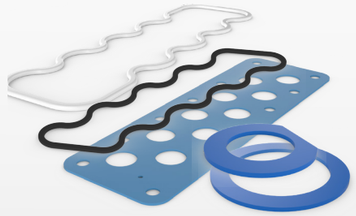
Tubing size (OD)	Part number
1/8"	**SS-200-1-4RP**
1/4"	**SS-400-1-4RP**

Coflore® ACR Gaskets & Seals

AM Technology recommends **Gaskets** be replaced after each use; **O-rings** should be inspected after each use, and replaced intermittently.

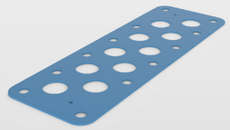
Seal Kit for ACR Reactor Block Assembly (ACR-SEAL KIT)

4 sets of gaskets & O-ring set for ACR Reactor Block Assembly
Material: Gaskets: PTFE; Process O-ring (ACR-OR-FFKM): FFKM; HTF O-ring: viton
Components Include: 4 x process gasket ACR-PG, 4 x window gasket set ACR-WG, 1 x process O-ring ACR-OR-FFKM, 1 x HTF O-ring ACR-OR-HTF



Process Gasket (ACR-PG)

Gasket for ACR Reactor Block Assembly
Material: PTFE
Dimensions: 300mm x 100mm x 1.5mm

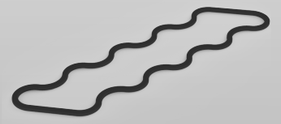


PTFE Window Gasket Set (ACR-WG)

Window Gasket Set for ACR Reactor Block Assembly
Material: PTFE
Components Include: 10 x window gasket, 2 x process connection gasket

HTF O-Ring (ACR-OR-HTF)

O-ring for ACR Reactor Block Assembly
Material: Viton

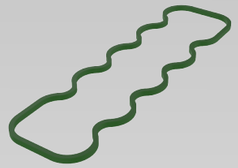


Process O-Ring (ACR-OR-FFKM)

O-ring for ACR Reactor Block Assembly
Temperature Range: 0 °C to 140 °C
Material: FFKM (FDA approved)

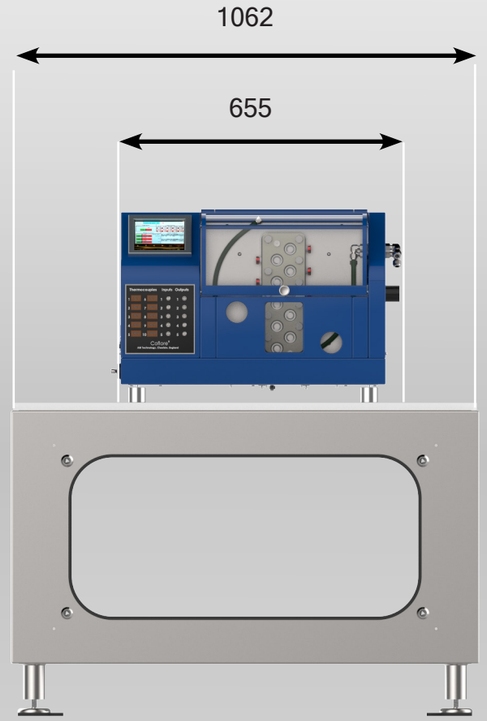
Low Temp Process O-Ring (ACR-OR-FFKMLT)

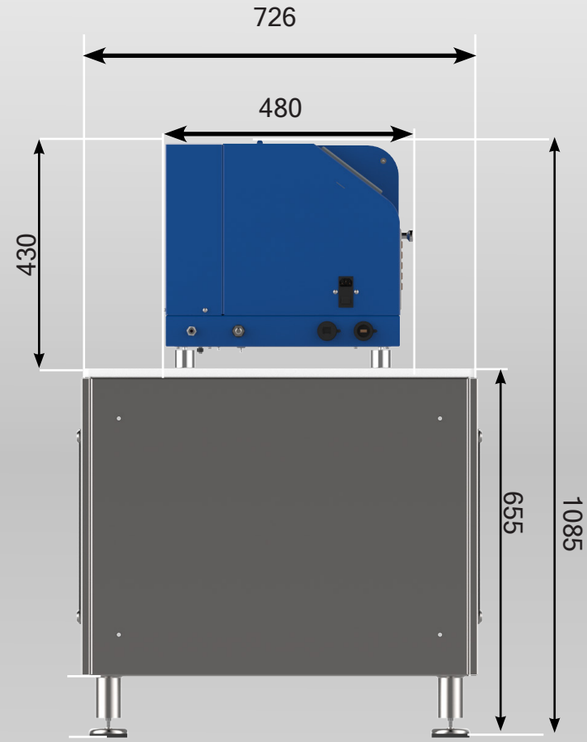
O-ring for ACR Reactor Block Assembly
Temperature Range: -40 °C to 140 °C
Material: FFKM (non-FDA approved)



Technical Details

Maximum reactor mass	9 Kg
Agitating platform mass	130 Kg
Noise	< 70 dBA
Requirements;	
Compressed air	3 Bar (g), 3.2 CFM oil-free clean air
Maximum air pressure	6 Bar (g)
Power supply	100-240 VAC, 50/60 Hz, 2 A max
Compressed air connection	6mm push fit
Heat transfer fluid connections	M16 x 1.0 Huber



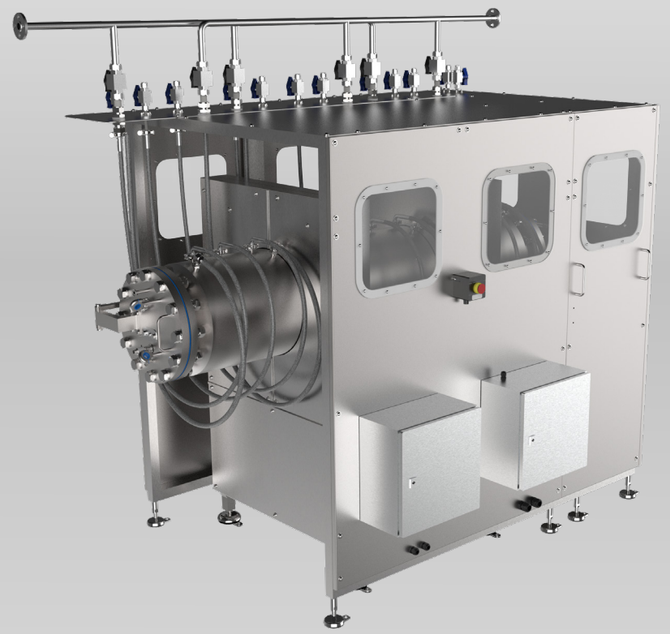


The Coflore® Flow Reactor Range

The range of **Coflore® Flow Reactors** consists of the **Agitated Cell Reactor (ACR)**, **Agitated Tube Reactor (ATR)** and the **Rotating Tube Reactor (RTR)**. Facilitates laboratory-scale to full industrial-scale chemical production.

The **Coflore® ACR** is an actively-mixed ten-stage system for efficient mixing and a high degree of orderly flow, irrespective of residence time. The **Coflore® ACR** is a low volume reactor (30mL to 100mL), which delivers comparable performance to the larger **Coflore® ATR/RTR** reactors

The **Coflore® ATR** is an actively-mixed, multi-stage, tubular reactor (0.35L to 10L reactor volume), achieving efficient mixing with a high degree of orderly flow, irrespective of residence time



The **Coflore® RTR** operates as a ten stage, actively-mixed continuous flow reactor with a 100L capacity that is capable of processing theoretically limitless reactor volumes without interruption

Contact AM Technology

We welcome enquiries from across the globe. If you require more information about our reactors, or to find out whether our reactors are suitable for any applications you have in mind, we would be very interested in hearing from you.

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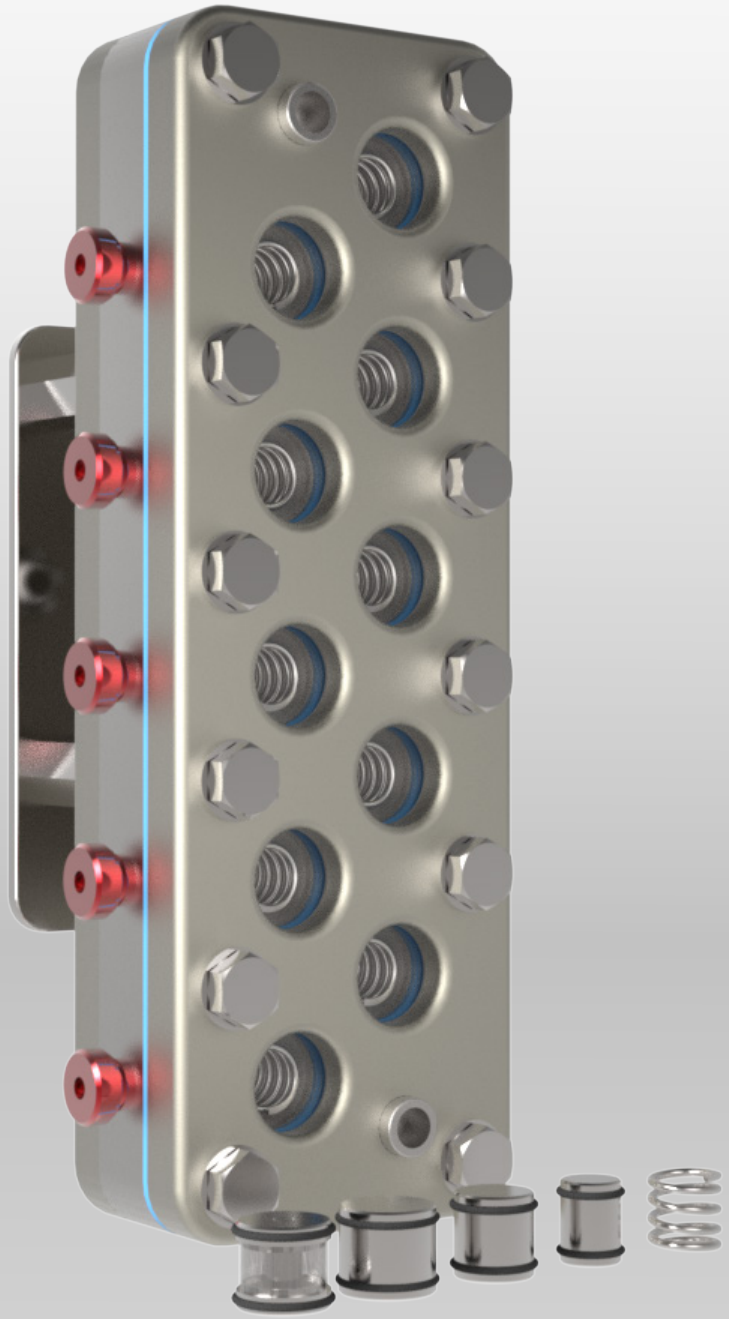

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