

The World Leading Provider of High Pressure Equipment for Research and Industry since 1945!

50 ml Micro Robinson-Mahoney Catalytic Packless Reactor

At a Glance

Free Basket Volume: 7.15 ml

Volume: 50 ml

Material of

Construction: Hastelloy[®] C-276

Design Pressure: 5,000 psi @ 650° F
(34.5 MPa @ 343° C) or 1000° F (538° C)

Applications: The multiphase reactor design is used for time based, laboratory, high temperature and high pressure heterogeneous catalysis experiments with gas/solid phase reactants. Use internal recycle reactors and vary reaction time for catalyst studies in activation, regeneration and durability.



The 50 ml Micro Robinson-Mahoney Catalytic Packless Reactor is designed to provide all the benefits of small scale chemical research. It allows the research scientist to work with small quantities of catalyst and feedstocks which may be expensive and/or limited in availability. Reduced volumes are safer to work with and minimize waste disposal. In addition, the reactor has reduced dead volume, which minimizes side thermal reactions. The role of the catalyst thus may be more clearly tested.

The catalyst basket design lends itself to easy loading and discharge of catalyst pellets. It is patterned after the larger proven Robinson/Mahoney basket currently available in 300 ml and 1000 ml capacity vessels.

Principle of Operation

Features

- Reduced catalyst and dead volumes.
- Operating pressures as high as 5000 psi (346 bar) and temperatures as high as 1000° F (538° C)
- Mixer speeds as high as 5000 rpm
- Available worldwide to meet codes such as ASME, CE (PED) and CRN
- Hydrostatic test pressure: 8,000 psig (55.2 MPa)

**Autoclave
Engineers**

Division of Snap-tite, Inc.

Standard Equipment

Micro Reactor Vessel: Confined gasket closure employs flange nut to lock body and cover together. Vessel body outside diameter has helical groove to accept cooling coil. Body, cover and flange nut are Hastelloy C.

Sealing Gasket: Confined gasket of gold-plated Inconel-X is designed for repeated use.

Cover: Cover is integral with the MagneDrive II housing. All external body/cover openings, except thermowell, have SW125 connections (650° F units) or SF250CX connections (1000° F units).

Cover Openings:

- Safety head/pressure gauge connection
- Thermowell opening
- Sample tube
- Inlet and outlet connections

Body bottom openings:

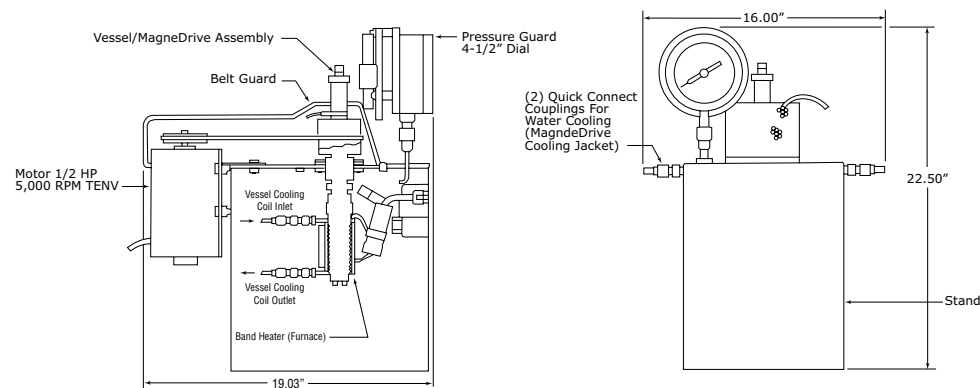
- Thermocouple connections (internal bottom temperature)
- Process connection

Purge Connection: 1/8" (SW-125) gas connection at top of MagneDrive allows for introduction of gas into the vessel.

Pressure Gauge: Constant reading gauges has 4-1/2" diameter dial with K-Monel Bourdon tube. Dual face dial reads 0-7500 psi and 0-527 Kg/cm².

Safety Head Assembly: Hastelloy-C safety head uses 3/16" flat Inconel rupture disc, 1/8" NPT female vent connection through top of bench stand to atmosphere.

Electric Motor (Air Motor Available)



Heaters: External ceramic electric band heater is rated 700 watt (1000° F unit). They are available in 120 or 240 VAC. It is clamped onto the vessel body/cooling coil.

Thermocouples: Sheathed thermocouples for direct temperature measurement at the following locations:

- Basket (catalyst) temperature
- Process temperature above basket
- Body OD (over temperature)

Thermowell: Hastelloy-C tubing thermowell is located inside vessel for direct response to process reactant temperatures. Designed for easy removal.

MagneDrive II Packless Drive System

The new AE Microclave features a miniaturized MagneDrive II packless drive system. Rare earth magnetics provide high torque mixing capability. Packless magnetic-drive system eliminates leakage, contamination and packing heat generation problems of conventional mixers. It provides continuous high speed rotary agitation without the danger of leakage or the downtime to change worn packing.

Mixing System: MagneDrive II rotary impeller system. Static torque 6 in. lbs; net mixing horsepower 0.5 @ 5,000 rpm. Special impeller for maximum dispersion.

Available with electric or air motor.

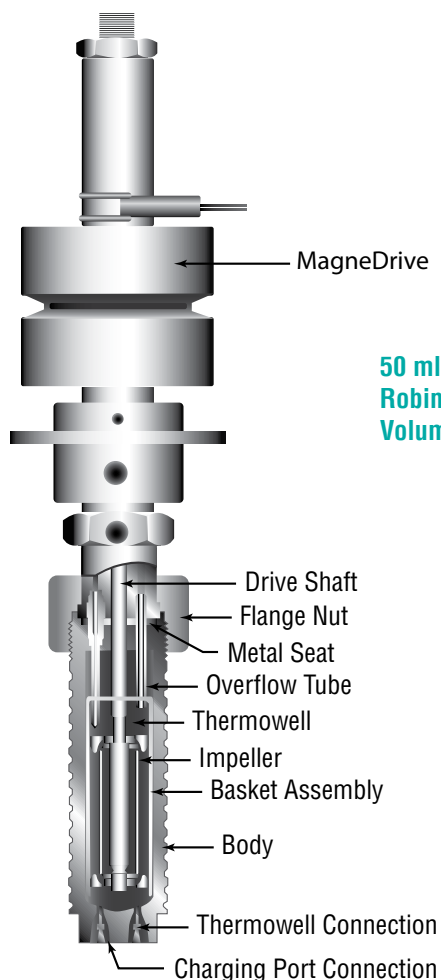
Electric: Variable speed rated 0.5 HP @ 5,000 rpm. Type TENV with 120 V or 240 V.

Air: HP to 0.5 @ 6,000 rpm. Required air pressure 80 psig @ 27 cfm maximum.

Approximate shipping weights:

With air motor: 47 lbs. (21.3 Kg)

With electric motor: 62 lbs. (28.1 Kg)



50 ml Catalytic Packless Reactor with Robinson/Mahoney Basket
Volume 7.15 cc

Technical Specifications

Description: The fixed annular catalyst basket has baffles inside and outside to control vortexes. The rotating shaft is equipped with two impellers that draw fluid into the center of the annulus at the top and bottom and outward through the catalyst bed. The gradient-free design and a long duration circulation capability for the multiple phases has made the Robinson-Mahoney the most widely used design for supported catalyst research with liquids.

Reactants: Liquid/Solids, Gas/Liquid/Solids, Vapor/Liquid/Solids.

Typical Reactions: Liquification, hydro-treating, catalyst testing.

Basket Screen: 50x50 mesh, 0.009" (0.23 mm) wire and a nominal opening size of 0.011" (0.28 mm)

Inside Diameter: 1" (25.4 mm)

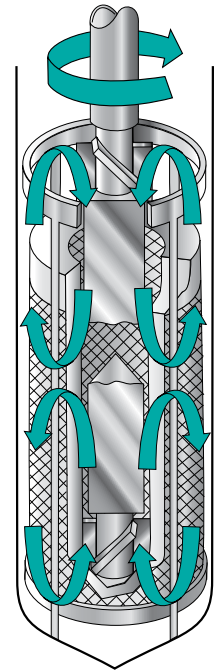
Basket Volume: 0.436 in.³ (7.15 cm³)

Free Volume: 3.05 in.³ (50 cm³)

Design Pressure: 5000 psig (345 Bar)

Max. Operating Pressure (MOP): 4061 psig (280 Bar) based on rupture disc

Maximum Blower Speed: 5,000 RPM



Version:	Standard	High Temperature
Temperature	650°F (343°C)	1,000°F (538°C)
Catalog Number Prefix	CRA5HC...	CRAHT...

Common Customizations: Special wire mesh size, special materials, specific pressure/temperature ratings. ASME code stamp (or CE mark for Pressure Equipment Directive)

Standard Material: Hastelloy® C-276

Ordering Guide

The following reactor assemblies INCLUDE motor, thermocouples and electrically heated 1,400°F (760°C) maximum furnace (for the voltage specified in the table). Be advised, motor controls, tachometer display, furnace controls and the display for the thermocouple are purchased as separate items. Consult factory for more information.

Catalog Number	Description SS=ANSI 316 Stainless Steel HC=Hastelloy® C-276	Motor	Power Source	Temperature Rating	General Arrangement Drawing Number	Reactor Subassembly Drawing Number	Weight lb.
CRA5HC05ZH16A	Micro Robinson 50cc HC	Air	120V	650°F (343°C)	40A-3159	40A-3158	47
CRA5HC05ZH16D	Micro Robinson 50cc HC	DC	120V	650°F (343°C)	40A-3160	40A-3158	62
CRAHT5HC05ZH16D	Micro Robinson 50cc HC	DC	120V	1,000°F (538°C)	TBD	TBD	62
CRA5HC05ZH26A	Micro Robinson 50cc HC	Air	240V	650°F (343°C)	40A-3159	40A-3158	47
CRA5HC05ZH26D	Micro Robinson 50cc HC	DC	240V	650°F (343°C)	40A-3160	40A-3158	62
CRAHT5HC05ZH26D	Micro Robinson 50cc HC	DC	240V	1,000°F (538°C)	TBD	TBD	62

NOTE: The circulating pressure generated by the impellers in the "Micro Series" reactors is low. Autoclave Engineers makes no claims about the ability to scale-up or correlate "Micro Series" catalytic reactors with any other process equipment.

! WARNING !

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE.

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