

고압반응기 BR: Complete solution

High Pressure Reactor. Berghof Reactor. 실험실용반응기. 수열합성기. 재료시험기

소개: Introduction

고온, 고압을 이용하여 수열합성, 용매열합성, 수소화, 재료연구, 재질시험 등 실험용 및 pilot 생산용으로 사용한다.
본체는 고품질의 스테인레스스틸(316Ti) 또는 Hastelloy C22로 구성되어 있다.
부식성 물질의 실험을 위해 고품질 PTFE insert 및 lining 을 포함한다.
운용: 200bar/300°C (230°C with PTFE)

특성: Features

• 유연성 및 개별성: Flexibility and individuality

Screw connection 이 공통적용되어 upgrade 를 유연하게 할 수 있음.
모듈화 되어 있어 쉽게 PTFE insert 를 넣고 뺄 수 있음.
다양한 용량의 PTFE 선택 가능.

• 사용이 쉽다: Easy handling

신속체결시스템(Quick tensioning system) 으로 손으로 쉽게 결합 및 분해.
빠르고 안전하게 체결하여 실험 시간을 줄일 수 있음.

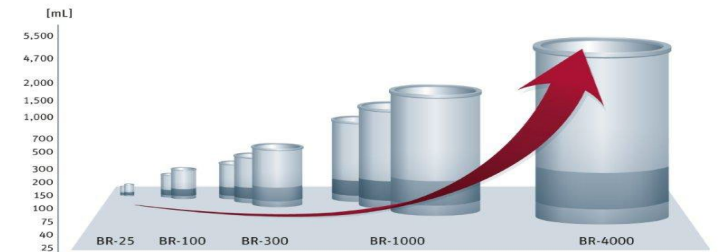
• 안전성: Safety

열 때 자동으로 압력이 해제되는 구조
과압(over pressure) 일 경우 rupture disk가 지켜 줌
압력용기 규정준수: AD 2000 and Pressure Equipment Directive 2014/68/E



Reactor capacities and PTFE

Overview of Highpreactor capacities (with PTFE insert)									
BR-25		BR-100		BR-300		BR-1000		BR-4000	
25 mL	(25 mL)	170 mL	(50 mL) (75 mL) (100 mL) (150 mL)	350 mL	(300 mL)	1.100 mL	(1.000 mL)	5.500 mL	(4.700 mL)
40 mL	(40 mL)	230 mL	(200 mL)	600 mL	(500 mL) (700 mL)	1.700 mL	(1.500 mL) (2.000 mL)		



- **재질: Material. Metal vessel**

300°C, 200bar 사용이 가능하게 설계되어 있음.

두꺼운 316Ti 또는 Hastelloy C22 선택 가능.

부식성 물질을 사용할 경우 316Ti + PTFE lining 이 경제적.

- **재질: Material. PTFE lining for effective corrosion protection**

고품질 TFM-PTFE 로 부식성이 강한 물질을 실험할 수 있음.

분리되는 PTFE insert 로 미리 실험을 준비할 수 있음.

교차오염(cross contamination)을 줄일 수 있게 전용 PTFE 사용.

- **가열 시스템: Heating system**

BHM : Heating only. 전기로 heating

BTM : Heating and cooling. Circulator 로 heating 과 cooling

- **교반 시스템: Stirring**

25~300 ml: Magnetic stirrer

300 ~ 4000ml: Overhead stirrer

- **컨트롤러: Controller**

BRC: 온도 및 RPM 조절. 터치스크린으로 직관적으로 사용

BRHS: 25~300ml 의 소규모 통합시스템. 온도(가열, 냉각), rpm 조절

BRTR-88: 온도조절. Ramp, hold time 설정. Auto-tuning 포함

RPM controller: RPM 조절

- **Stand**

BRS(수동식): BR-300~ BR-1000

BRL(전기식): BR-1500 ~ BR-4000 모델



• 시스템 구성



본체

Metal: SS316Ti
PTFE insert
BR-25/45
BR-100/200/300
BR-300/500/700
BR-1000/2000/4000



Heating & Stirring

Heating: BHM
Heating and Cooling: BTM
Overhead stirrer: BRM, RV-GL
일체형 컨트롤러: BR-HS:
Hot plate stirrer: 경제형



Control

BRC: 터치형. 온도, rpm
BR-HS: 일체형. ~300ml
BRTR-88: 온도



기타

Stand: Table / Floor
Sample Holders
Catalyst basket

<https://www.berghof-instruments.com/en/products/high-pressure-reactors/>

<https://blog.naver.com/ybcokr/223318312397>

사양: Specification

• BR-25/40

		BR-25	BR-25	BR-40	BR-40
General information	Material	Stainless Steel 316Ti (1.4571) or Hastelloy C-22 (2.4602)			
	Temperature max.	300° C	300° C	300° C	300° C
	Pressure max.	200 bar	200 bar	200 bar	200 bar
Reactor vessel	Volume	approx. 30 ml	approx. 47 ml	approx. 45 ml	approx. 68 ml
	Inner Diameter	22 mm	27 mm	24 mm	29 mm
	Inner Height	83 mm	83 mm	99.6 mm	104 mm
	Weight	approx. 0.6 kg	approx. 0.6 kg	approx. 0.7 kg	approx. 0.7 kg
TFM™-PTFE Insert	Volume	-	approx. 29 ml	-	approx. 45 ml
(optional)	Inner diameter	-	22 mm	-	24 mm
	Inner height	-	77 mm	-	98 mm
Armatures	Standard Armatures	Rupture Disc, Dip Tube, Valve			
	Pressure Measurement	analog and/or digital			
	Ports (total)	6	6	6	6
	Ports (free)	3	3	3	3
	Type of connection	1/8" Tube Connection			
Heating Systems	Electrical (Hot Plate)	✓	✓	✓	✓
(optional)	Via Fluid	-	-	-	-
Stirring	Via Hot Plate	✓	✓	✓	✓
	Via Magnetic Drive	-	-	-	-

• **BR-100/200**

		BR-100	BR-100	BR-200	BR-200
General information	Material	Stainless Steel 316Ti (1.4571) or Hastelloy C-22 (2.4602)			
	Temperature max.	300° C	230° C	300° C	230° C
	Pressure max.	200 bar	200 bar	200 bar	200 bar
Reactor vessel	Volume	approx. 170 ml	approx. 190 ml	approx. 225 ml	approx. 250 ml
	Inner Diameter	42 mm	44 mm	42 mm	44 mm
	Inner Height	126 mm	127.7 mm	165 mm	166.7 mm
	Weight	approx. 1.8 kg	approx. 1.8 kg	approx. 2.1 kg	approx. 2.1 kg
TFM™-PTFE Insert	Volume	-	approx. 95 ml	-	approx. 195 ml
(optional)	Inner diameter	-	32 mm	-	40 mm
	Inner height	-	121 mm	-	158,7 mm
Armatures	Standard Armatures	Rupture Disc, Dip Tube, Valve			
	Pressure Measurement	analog and/or digital			
	Ports (total)	5	5	5	5
	Ports (free)	1	1	1	1
	Type of connection	8 mm Tube Connection			
Heating Systems	Electrical (Hot Plate)	✓	✓	✓	✓
(optional)	Via Fluid	-	-	-	-
Stirring	Via Hot Plate	✓	✓	✓	✓
	Via Magnetic Drive	-	-	-	-

• **BR-300/500/700**

		BR-300	BR-500	BR-700
General information	Material	Stainless Steel 316Ti (1.4571) or Hastelloy C-22 (2.4602)		
	Temperature max.	300° C	300° C	300° C
	Pressure max.	200 bar	200 bar	200 bar
Reactor vessel	Volume	approx. 390 ml	approx. 630 ml	approx. 980 ml
	Inner Diameter	68 mm	68 mm	68 mm
	Inner Height	108 mm	175 mm	271 mm
	Weight	approx. 4 kg	approx. 6 kg	approx. 8.5 kg
TFM™-PTFE Insert	Volume	approx. 310 ml	approx. 500 ml	approx. 800 ml
	Inner diameter	62.5 mm	62.5 mm	62.5 mm
	Inner height	98 mm	165 mm	261 mm
Armatures	Standard Armatures	Rupture Disc, Dip Tube, Valve, Tool		
	Pressure Measurement	analog and/or digital		
	Ports (total)	6	6	6
	Ports (free)	2	2	2
	Type of connection	8 mm Tube Connection		
Heating Systems (optional)	Electrical (Hot Plate)	✓	-	-
	Electrical (Heating Jacket)	✓	✓	✓
	Via Fluid (Double Jacket)	✓	✓	✓
	Via Fluid (Heating Coil)	✓	✓	✓
Stirring	Via Hot Plate	✓	-	-
	RV-GL	✓	✓	✓

• **BR-1000/2000/4000**

		BR-1000	BR-2000	BR-4000
General information	Material	Stainless Steel 316Ti (1.4571) or Hastelloy C-22 (2.4602)		
	Temperature max.	300° C		
	Pressure max.	200 bar		150 bar
Reactor vessel	Volume	approx. 1,220 ml	approx. 2,230 ml	5.7 L
	Inner Diameter	90 mm	90 mm	136
	Inner Height	193 mm	352 mm	393
	Weight	approx. 10.5 kg	approx. 16 kg	approx. 30 kg
TFM™-PTFE Insert	Volume	approx. 1,000 ml	approx. 1,880 ml	4.7 L
	Inner diameter	84 mm	84 mm	126 mm
	Inner height	182.5 mm	340 mm	379 mm
Armatures	Standard Armatures	Rupture Disc, Dip Tube, Valve, Tool		
	Pressure Measurement	analog and/or digital		
	Ports (total)	6		7
	Ports (free)	2		2
	Type of connection	8 mm Tube Connection		
Heating Systems	Electrical (Hot Plate)	-	-	-
(optional)	Electrical (Heating Jacket)	✓	✓	✓
	Via Fluid (Double Jacket)	✓	✓	✓
	Via Fluid (Heating Coil)	✓	✓	✓
Stirring	Via Hot Plate	-	-	-
	RV-GL	✓	✓	✓