

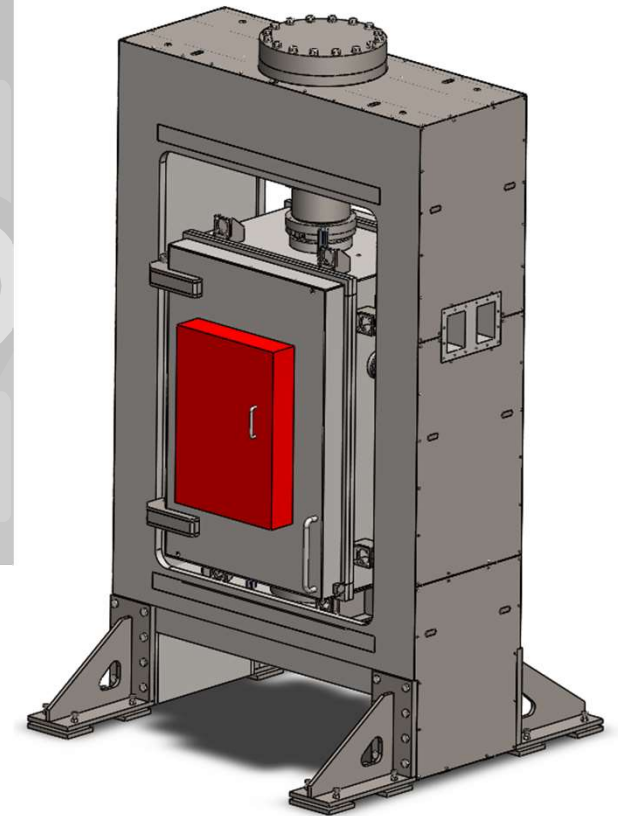
PRODUCT INTRODUCTION

Hot Press Furnace

Dynamic **ThermVac**

in pursuit of

the Best Vacuum Furnace



[Features of ThermVac Hot Press]



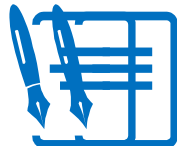
Full line-up from the diffusion bonding type of normal temperature to the ceramics sintering type of high temperature



Horizontal chamber or vertical chamber all available depending on product shape, loading conditions and space layout



Hot zone structure of easy sample loading and maintenance



Responding to production needs, either 'Multi chamber of single press' model or 'multi press of single chamber' model all available



Integrated control of gas flow, temperature and pressure by time signal or by program event

[Application of ThermVac Hot Press]



Process

- ① Powder Sintering
- ② Diffusion Bonding



Chamber Type

- ① Vertical
- ② Horizontal

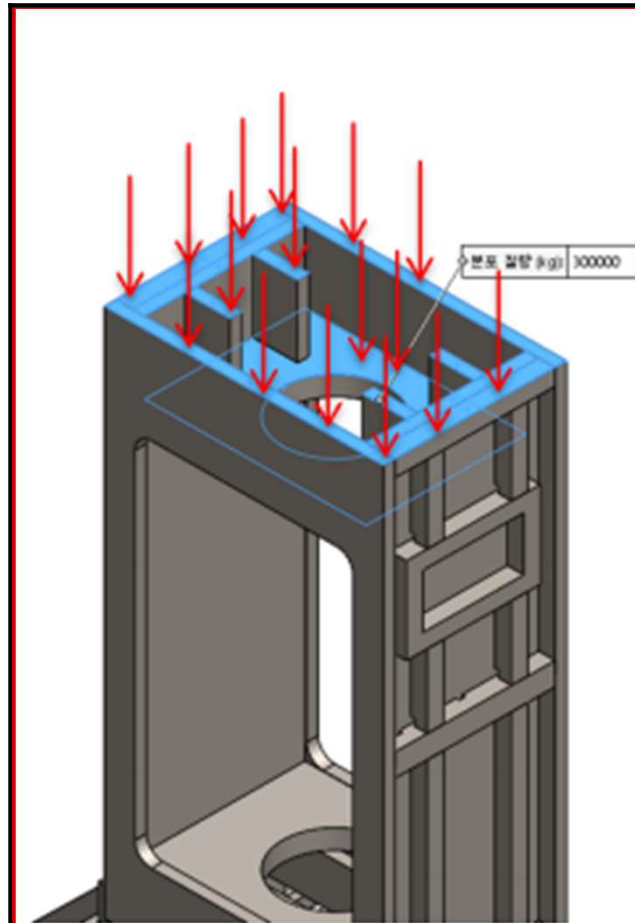


Sample Materials

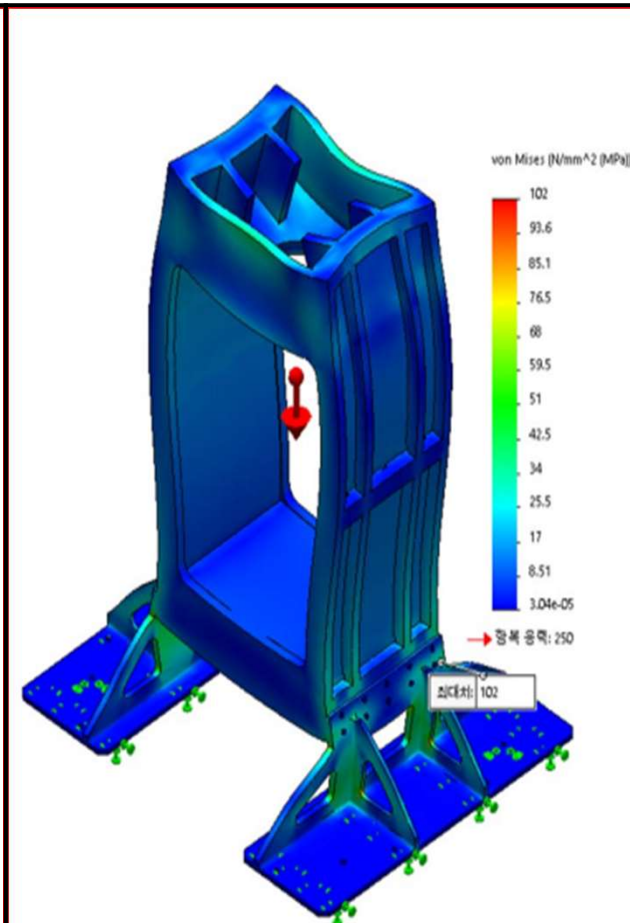
- ① Metal
- ② Ceramics
- ③ Dissimilar Materials



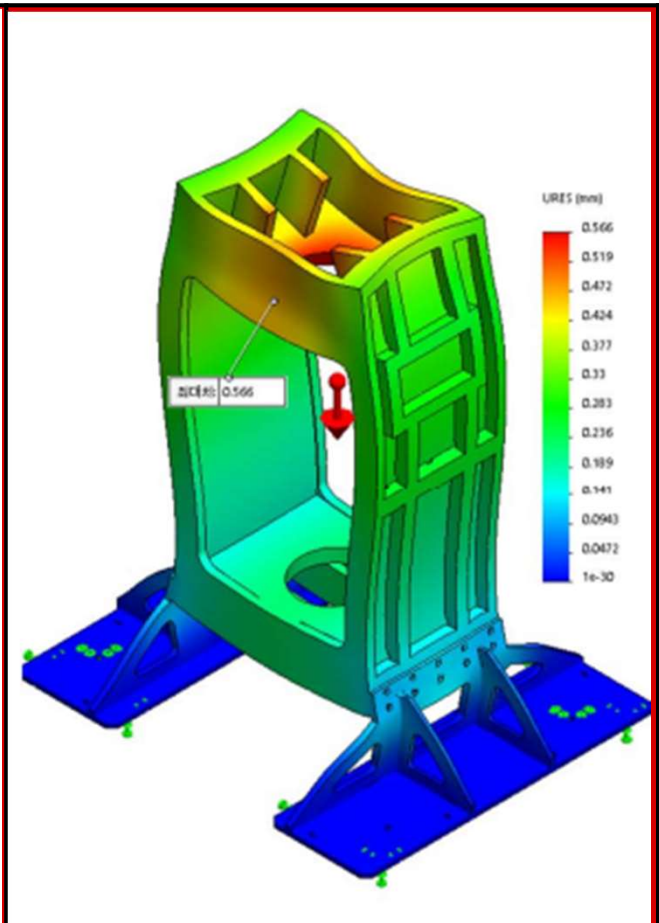
[Simulation _ Strength of Frame]



Pressure Orientation



Maximum Stress



Maximum Deformation



[Standard Specifications of Diffusion Bonding HP]



Item	Specification
Furnace type	Vertical vacuum furnace with hydraulic press
Application	Diffusion bonding of metal parts
Temperature	1100 ~ 1300°C [max. 1500°C]
Pressing dimension	□700 ~ □1000 mm
Uniformity	±6°C [1000°C, no load, vacuum]
Heat-up rate	2 ~ 10°C/min
Pressing tonnage	300 ~ 500 Ton
Ram diameter	Φ300 ~ Φ450 mm
Stroke	250 ~ 400 mm
Pressing orientation	Downward only or Downward & upward
Hot zone materials	Graphite
Evacuation	Diffusion pump + MBP & Rotary oil pump
Sample Loading	Front door opening & loading by the lifter
Forced cooling	Insulation shutter, Heat exchanger & Blower
System control	PLC control, Touch or PC interface



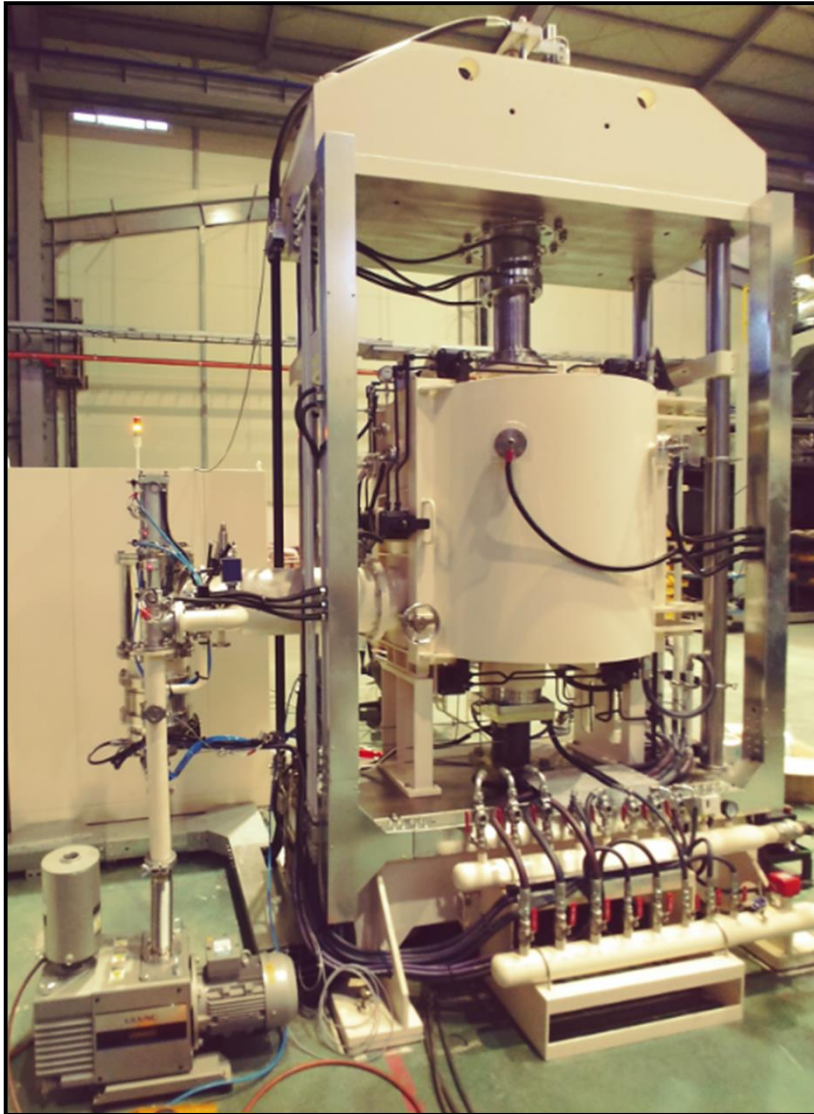
[Standard Specifications of Powder Sintering HP]



Item	Specification
Furnace type	Cram shell vacuum fce with hydraulic press
Application	Pressurized sintering of ceramics powder
Temperature	1500 ~ 2200°C [max. 2500°C]
Hot zone dimension	φ800 ~ φ1200 × 500H ~ 1200H
Uniformity	±6°C [1000°C, no load, vacuum]
Pressing tonnage	300 ~ 500 Ton
Ram diameter	Φ300 ~ Φ450 mm
Punch diameter	Φ300 ~ Φ600 mm
Stroke	250 ~ 400 mm
Pressing orientation	Downward only or Downward & upward
Hot zone materials	Graphite
Evacuation	Diffusion pump + MBP & Rotary oil pump
Sample Loading	Front and/or rear door opening
Forced cooling	Insulation shutter, Heat exchanger & Blower
System control	PLC control, Touch or PC interface



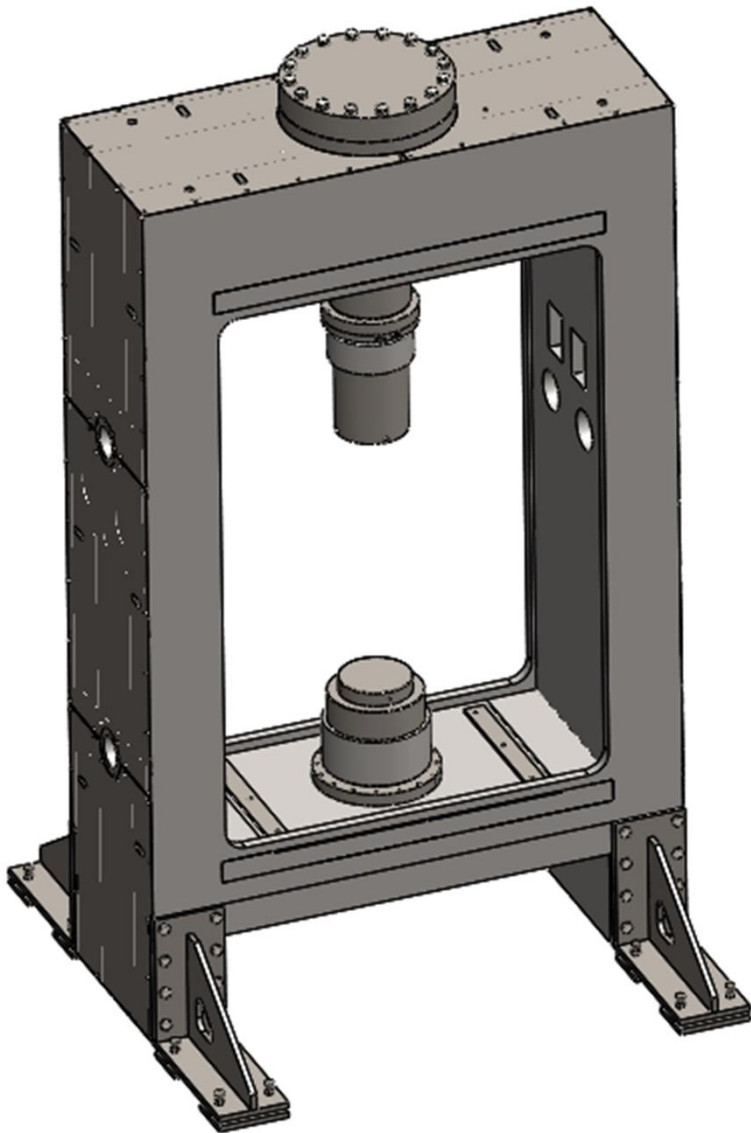
[Standard Specifications of Oxygen Hot Press]



Item	Specification
Fce type	Cram shell vacuum fce with hydraulic press
Application	Sintering of ceramics under oxygen gas
Temperature	600 ~ 1400°C [max. 1450°C]
Process atmosphere	Oxygen, nitrogen, argon or vacuum
Uniformity	±5°C [1000°C, no load, vacuum]
Heat-up rate	10°C/min
Pressing tonnage	50 ~ 100 Ton
Ram diameter	Φ100 mm [SiC Rod]
Punch diameter	Φ100 mm [SiC Disc]
Stroke	100 ~ 250 mm
Pressing orientation	Downward only or Downward & upward
Hot zone materials	Heater – MoSi ₂ , Insulation – porous alumina
Evacuation	Diffusion pump + MBP & Rotary oil pump
Sample Loading	Front door opening
System control	PLC control, Touch or PC interface



[Details _ Frame of Diffusion Bonding HP]



Boundary Conditions

STEP1

- ▶ Max pressing tonnage : 500 ton
- ▶ Tensile strength : Outward orientation
- ▶ Compression strength : Rebound inward
- ▶ Calculation method : Linear static analysis

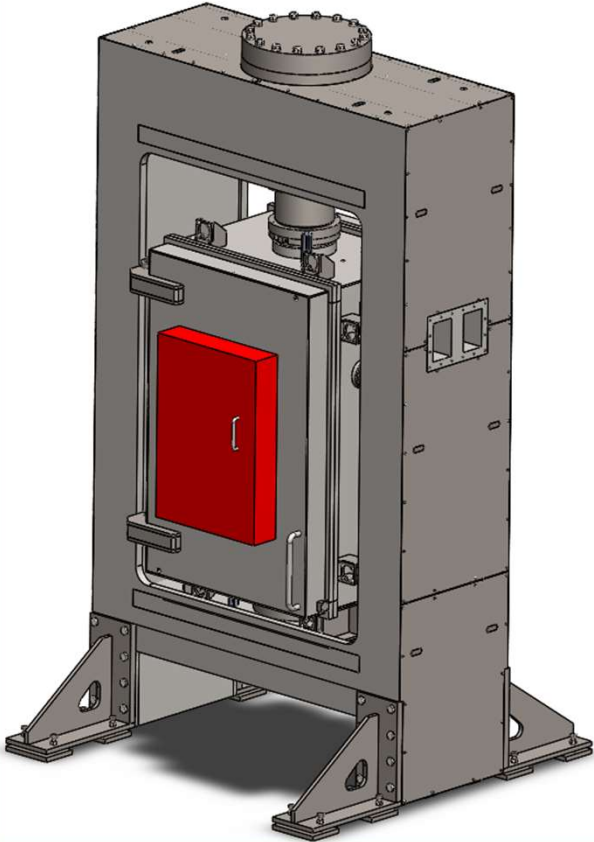
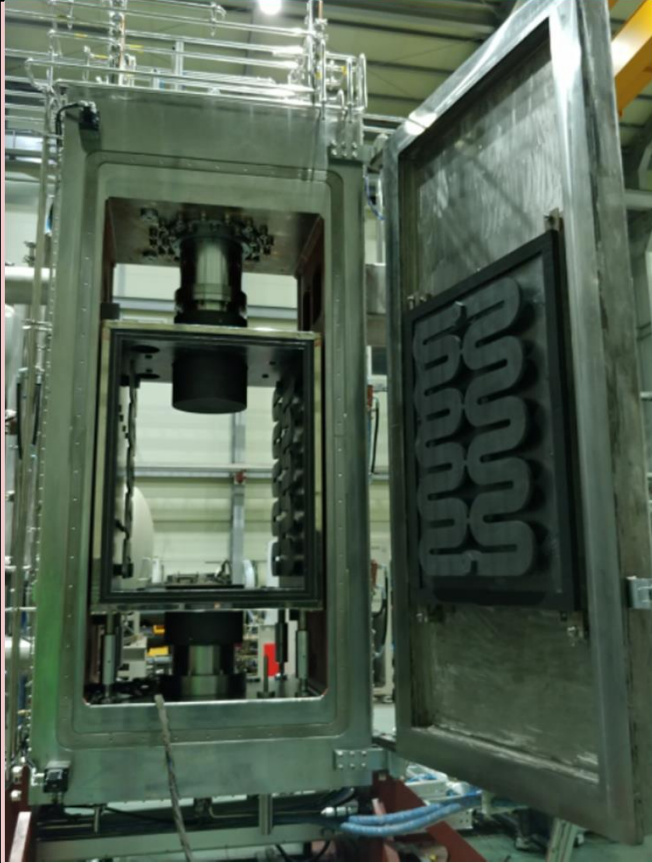
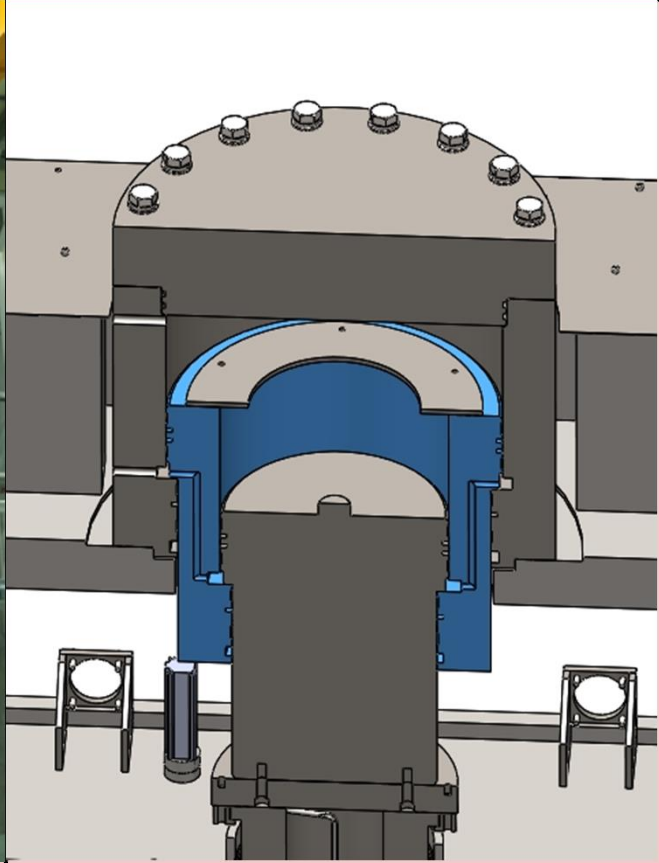
Fabrication

STEP2

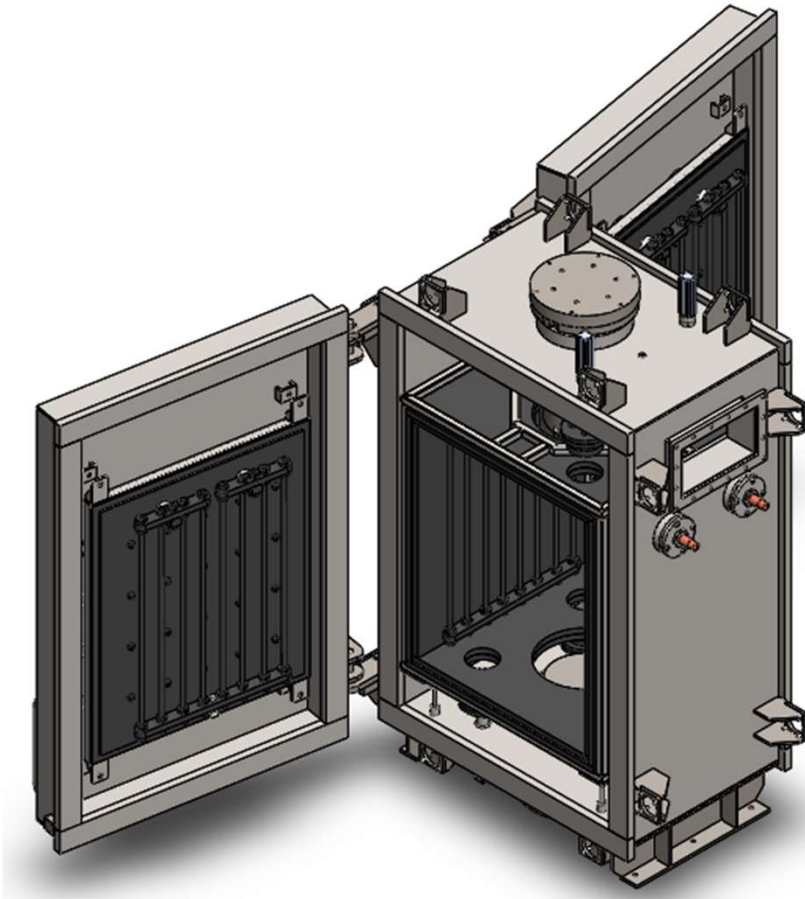
- ▶ Type : Monolithic frame [heavy duty] or 4 column tie rod frame [light duty]
- ▶ Materials : ASTM A36
- ▶ Deformation allowance : 5/10~5/100 mm



[Details _ Press of Diffusion Bonding HP]

Chamber vs. frame separated	Chamber & frame one body	Double stage cylinder
		
Low load of evacuation/heating/cooling Energy saving Materials of vacuum chamber : STS304	Simple appearance & low materials cost High load of evacuation/heating/cooling Materials of vacuum chamber : mild steel	Under conditions of limited height, stroke distance can be increased

[Details _ Vacuum Chamber of Diffusion Bonding HP]



Boundary Conditions

STEP1

- ▶ Max Temp. of inner surface : 300°C
- ▶ Internal pressure : Vacuum
- ▶ External pressure : Atmospheric
- ▶ Water pressure of cooling jacket : 3Kgf/cm²

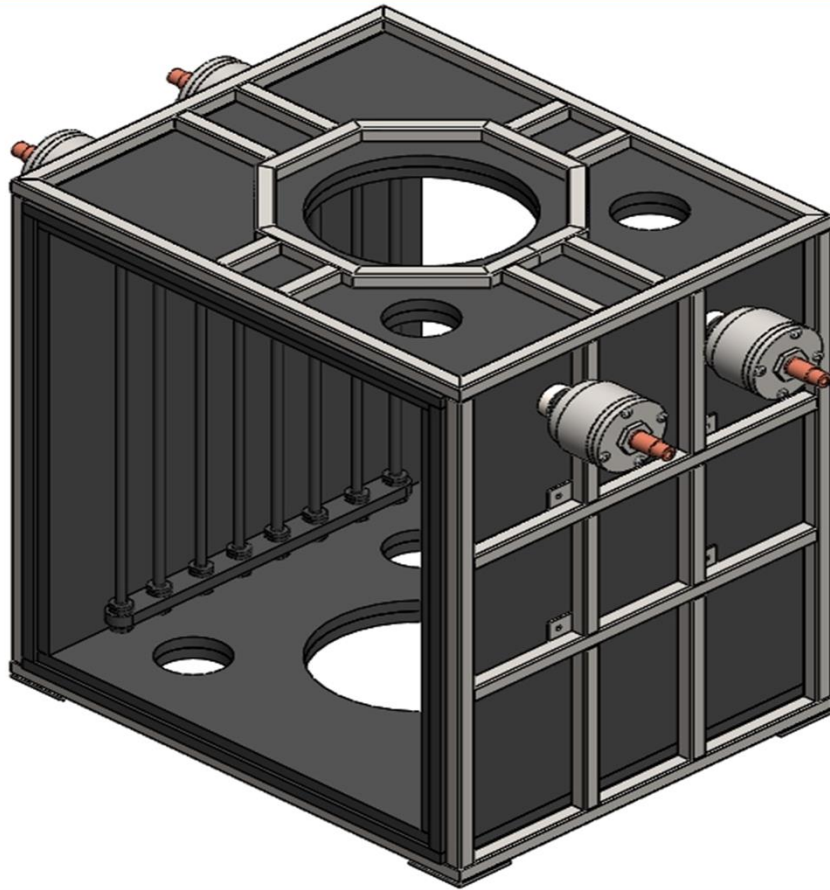
Fabrication

STEP2

- ▶ Type : Vertical rectangular chamber
- ▶ Double wall water cooled jacket
- ▶ Materials : Stainless steel 304
- ▶ Inside surface : Buffing #300

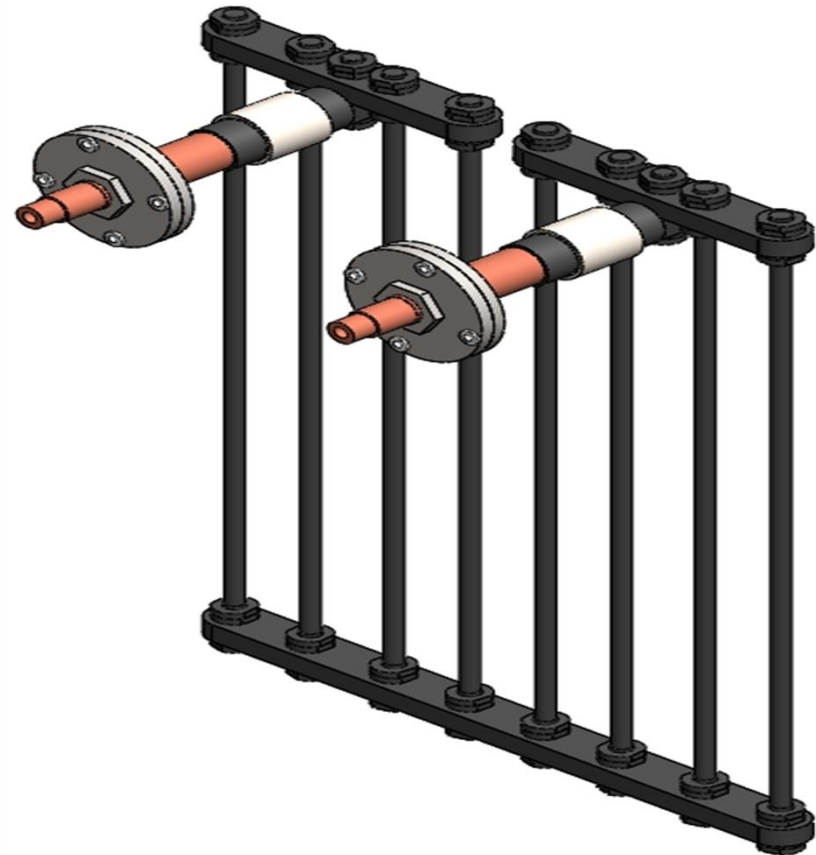


[Details _ Hot Zone of Diffusion Bonding HP]



Insulation

Materials : Graphite rigid felt
Inside treatment : Graphite foil coating
Fixing : Carbon composite screw



Heating system

Materials : Graphite block
Configuration : Heater rod & connector assembly
Power connection : Copper & graphite electrodes



[Details _ Accessories of Diffusion Bonding HP]



Evacuation

Rotary oil pump

Mechanical booster pump

Oil diffusion pump



Hydraulic unit

Servo hybrid pump

Proportional control valve

Digital pressure sensor



Forced cooling

Heat resistant blower

Counter flow heat exchanger

Insulation shutter



Sample loading

Hydraulic lift car

Up/down, back and forth

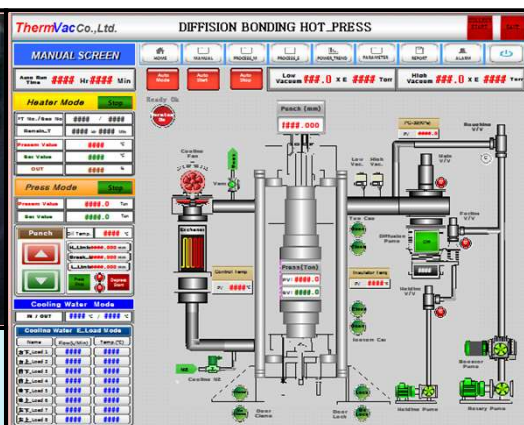
Electric remote controller



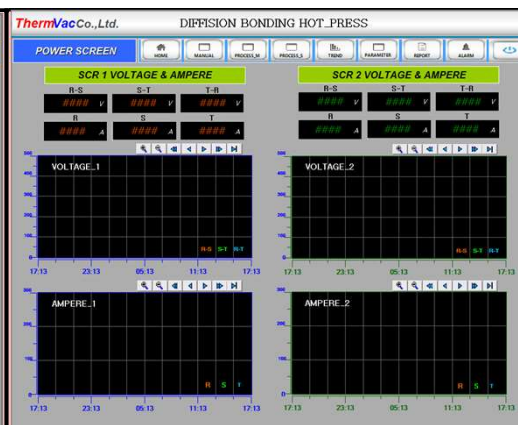
[Details _ Control Panel of Diffusion Bonding HP]



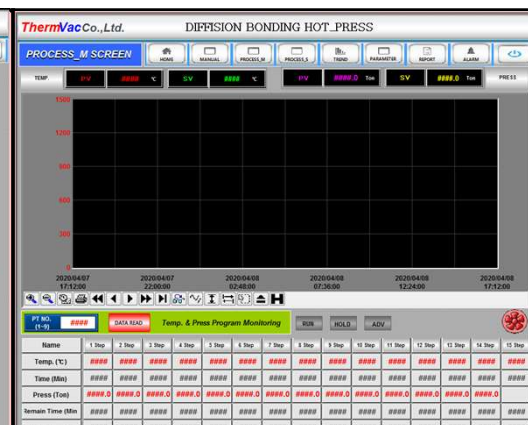
In-situ operation



Main screen



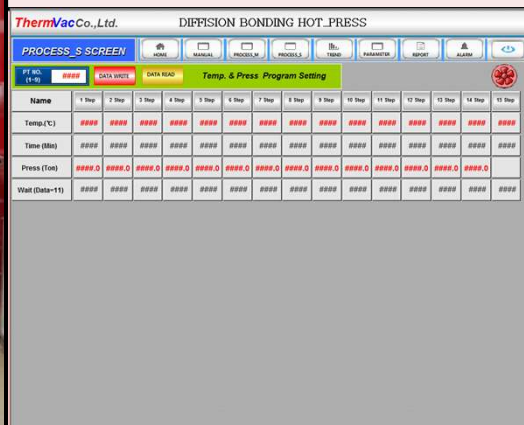
Trend screen



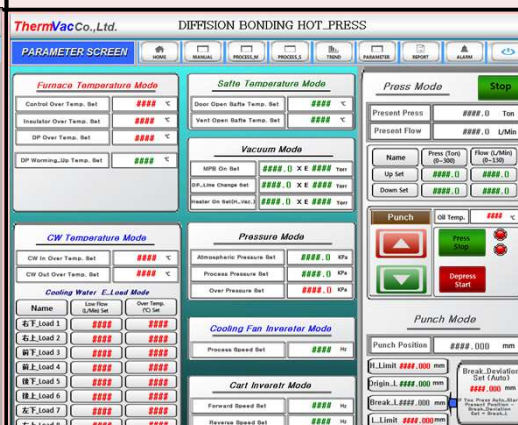
Process monitor



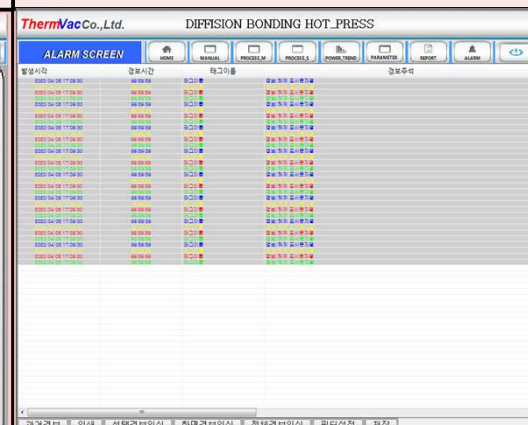
Panel view



Process setting



Parameter setting



Alarm history



[Details _ Site View of Diffusion Bonding HP]



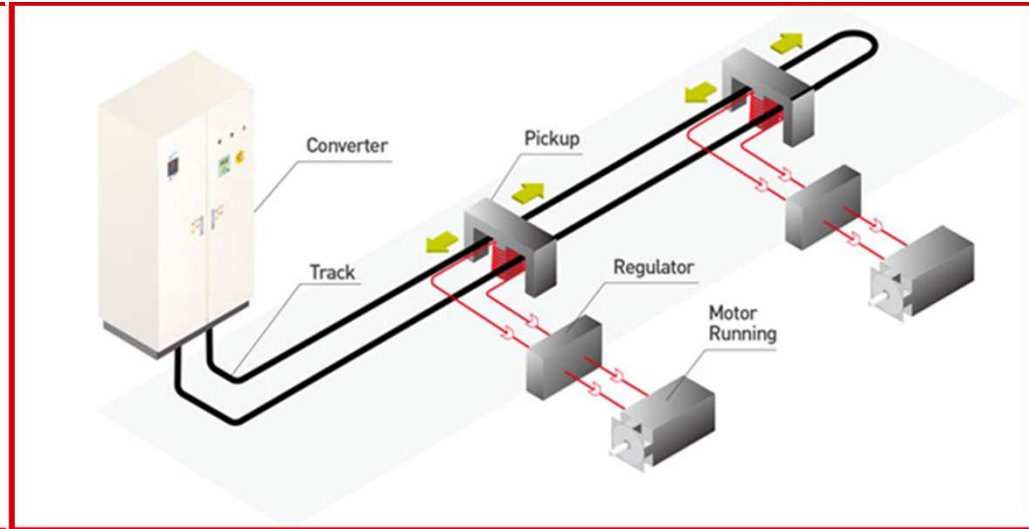
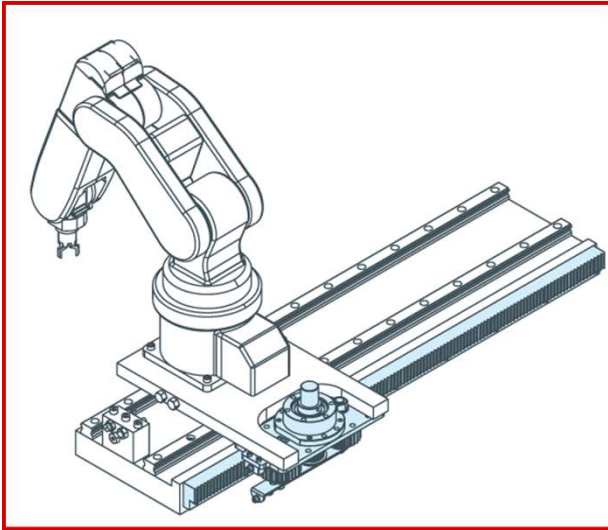
Frame• chamber one body(China, Germany)



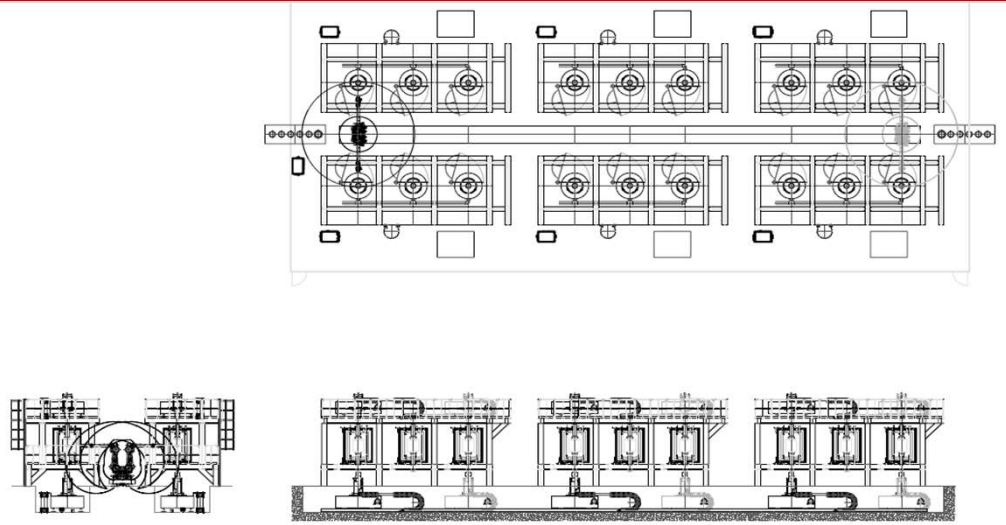
Chamber vs. Frame separated(Domestic)



[Single Press & Multi Chamber Model]

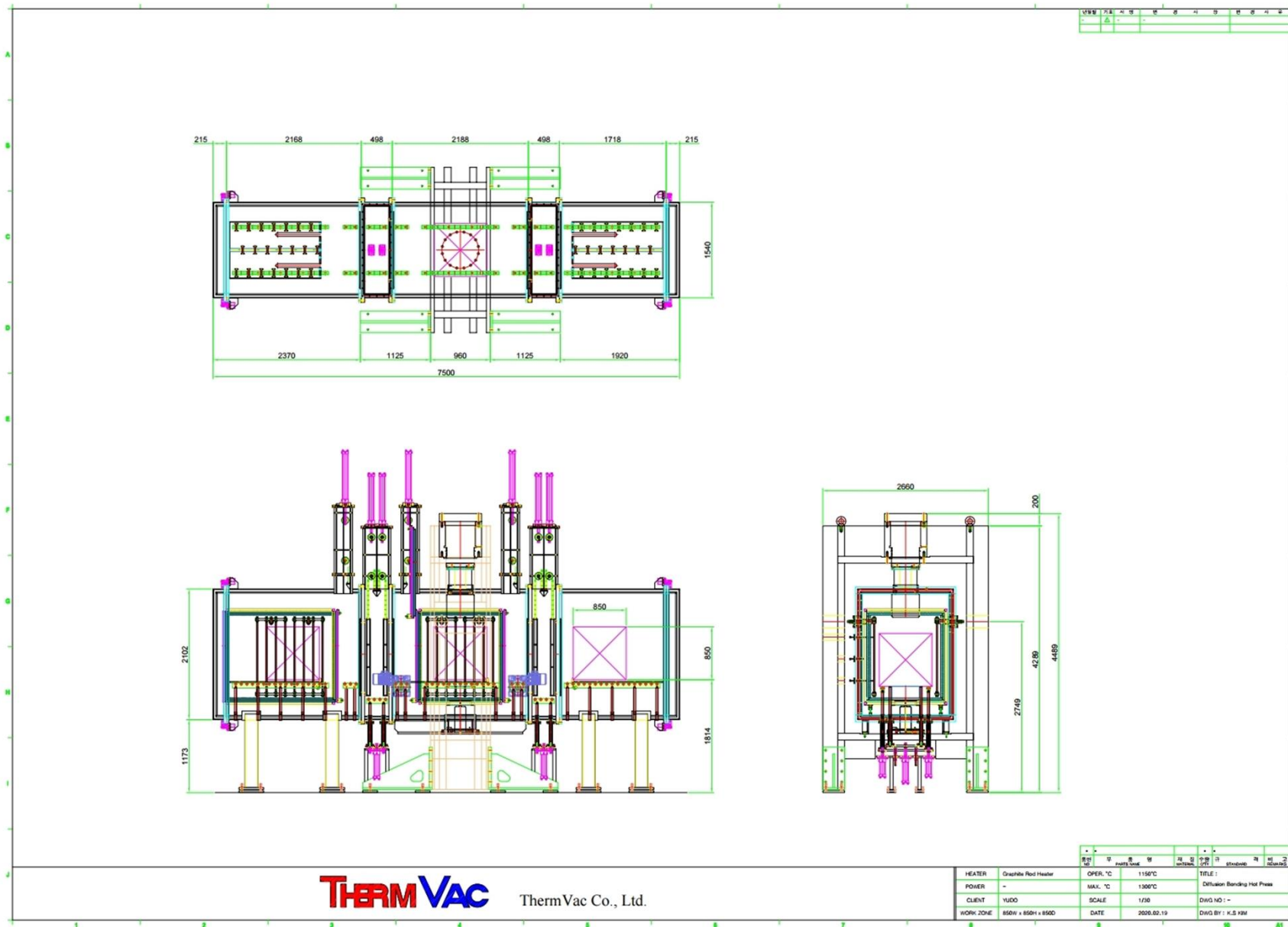


- **Press traveling**
 - Rack & Gear drive
- **NPS power source**
 - Non-contact supply





[Three Room Continuous Model]



THERM VAC

ThermVac Co., Ltd.