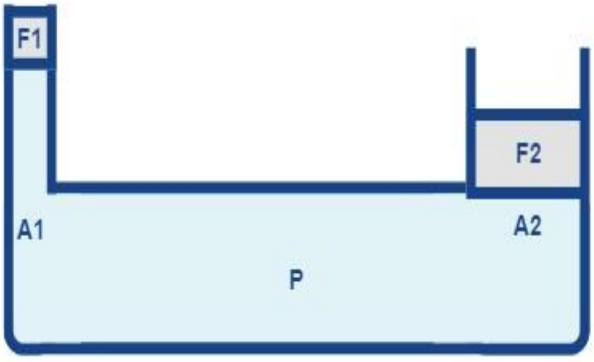
Hydraulic Press

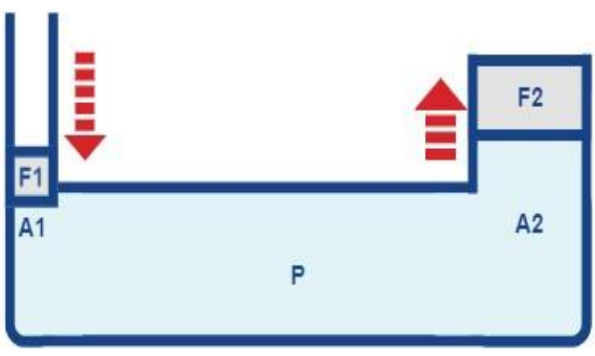
Introduction:

A hydraulic press is a compression device that makes use of an exerted force placed upon a fluid, to create a resulting force according to Pascal's Law. It was actually invented by Joseph Bramah, so is also known as the Bramah Press.

Pascal's Law:

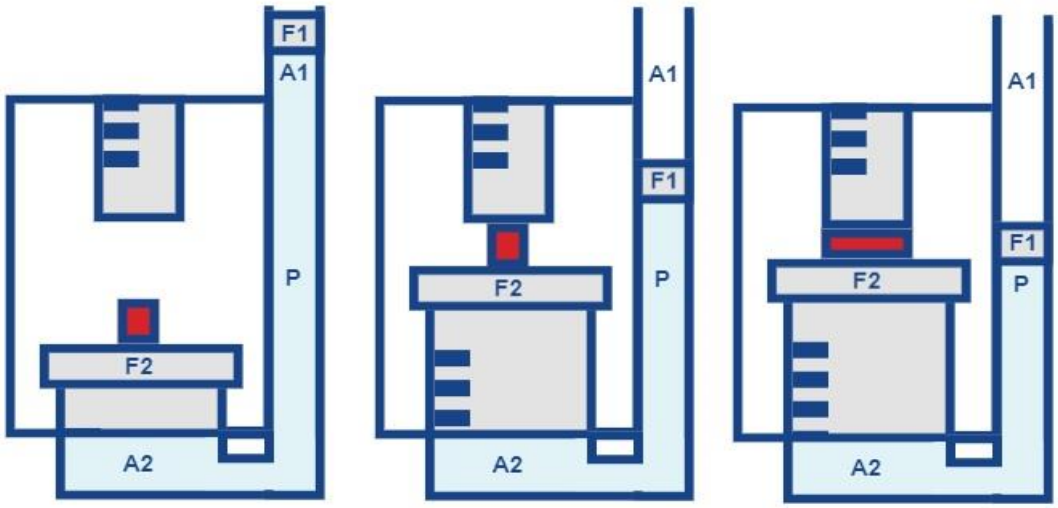
Pascal's Law is a theory which states that the pressure (P) in a confined fluid, caused by a force (F_1), over an area (A_1), is transmitted undiminished, causing a force (F_2), over the area (A_2). This law can be applied to magnify a small force by the ratio of the areas to give a larger force – $F_2 = F_1 (A_2/A_1)$.





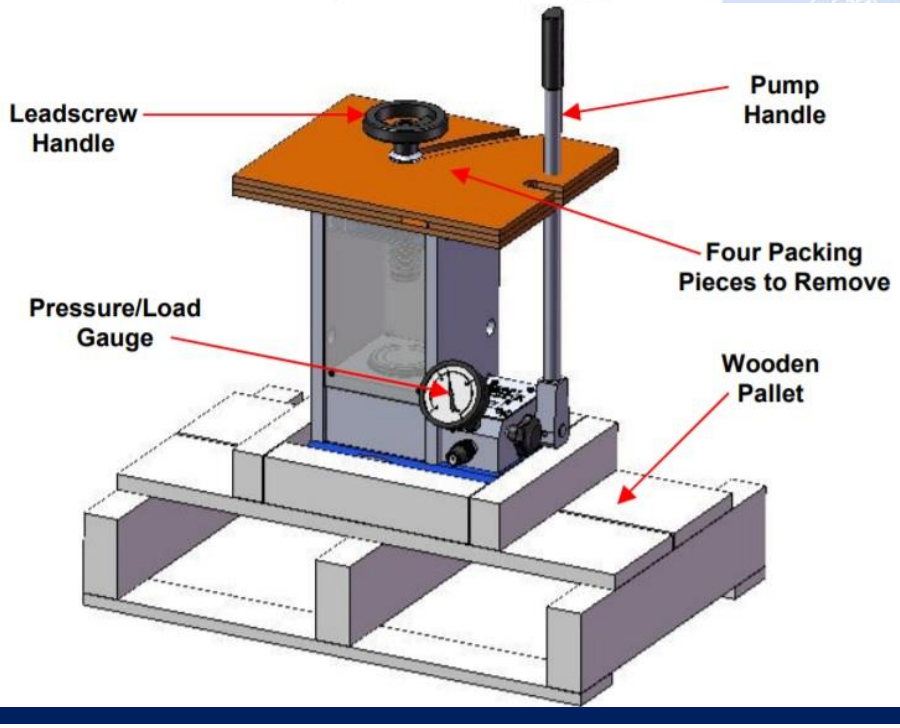
How does a hydraulic press work?

In a hydraulic press, a modest mechanical force (F1) is applied to a small area (A1). As the fluid is moved in one location, it inevitably moves elsewhere within that channel. Then a larger area (A2) generates a magnified mechanical force (F2). The force is transmitted via hydraulic pressure generated by the initial effort, F1.

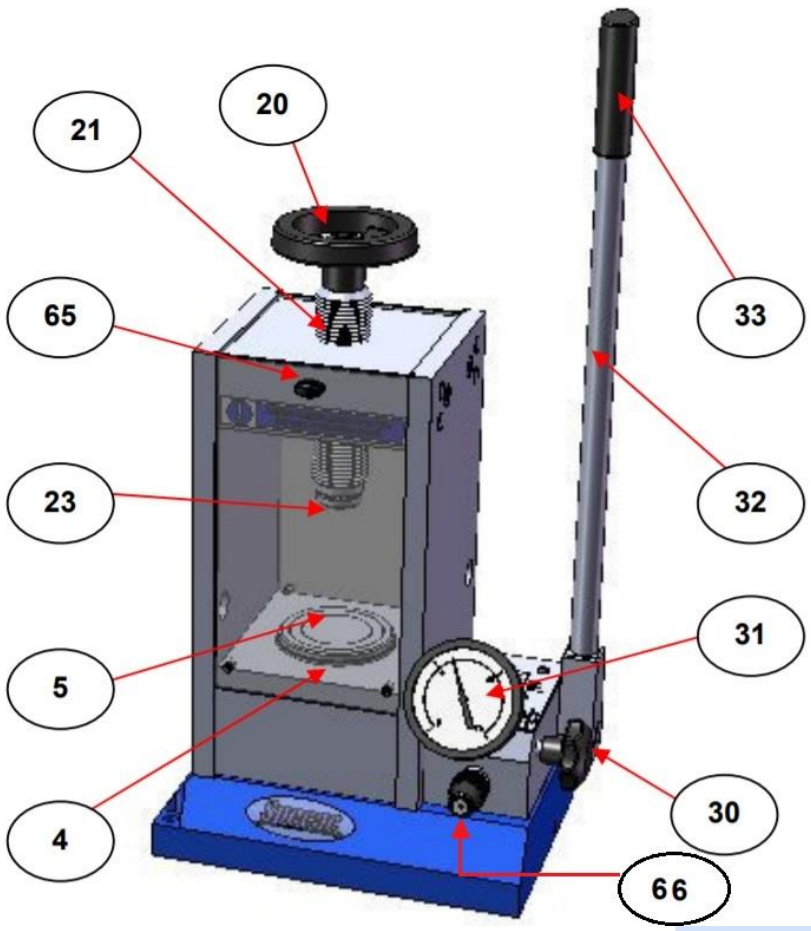


Application areas are almost limitless. Usually, a laboratory hydraulic press will be used to prepare samples for analysis by compressing them into pellets or thin films. The particles are forced together, creating a homogenous sample ideal for spectroscopic examination.

Structure:



Components:



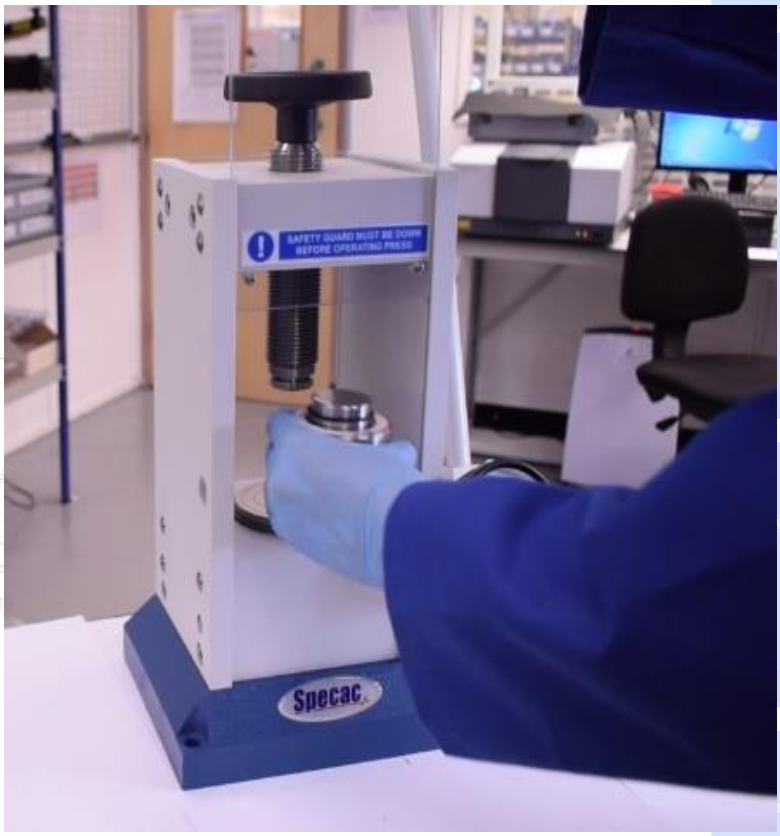
Part Number	Description
4	Piston
5	Piston Lower Bolster
20	Lead Screw Handle
21	Lead Screw
23	Lead Screw Top Bolster
30	Pressure Release Handle
31	Load Gauge
32	Pump Handle
33	Pump Handle Grip
65	Safety Guard
66	Relief Valve Set Knop System

How to Operate?

Raise the front safety guard, place the work to be pressed centrally on the lower bolster pressing face and lower the safety guard.

The safety guard must be kept closed at all times when work (usually a die set) is being pressed.

You may need to rotate the pressure release handle clockwise until it has tightened firmly, to close the pumping system before building up pressure. You will be able to calibrate your tonnage limit using this release handle.



Lower top bolster pressing face, by turning the lead screw handle clockwise. It is important that you ensure all the components of the work to be pressed have been squeezed tightly together before starting to pump a pressure.

However, leave a 1 mm gap between the top of the work and the top bolster pressing surface, to allow for some initial travel of the pressing piston.

Pull and push the pump handle to smoothly build up pressure. Once the work inside the press resists the pump pressure, the load will be indicated on the gauge. Continue until the required load is achieved on the gauge. Ensure the safety guard is fully lowered before pumping. The correct leverage and force may be applied by holding the pump handle at its rubber grip.

It should only take a few strokes to build up pressure in the hydraulic oil of the manual press. There is a maximum piston travel of 25 mm. There is a red ring around the piston showing when the limit has been reached. Do not continue pumping when this red ring shows, otherwise you could cause damage to the press mechanism.

To release the pressure load, turn the pressure release handle anticlockwise by one turn. The pressure and applied tonnage load against the work will be held for as long as required. You may observe a slight decrease in the pressure applied, indicated at the load gauge, as the work being pressed relaxes over time. You can bring the pressure back up to the required load if desired, by pulling gently on the pump handle.

Turn the lead screw handle anticlockwise to raise the pressing face, open the front safety guard and remove the work from inside.

There is no need to turn this handle completely open. Turning this lead screw drops the pressure of oil inside the manual hydraulic press and drains the oil back into the reservoir.