

Bomb shell hydraulic pressure testing machine upto 1800 bar



A bomb shell hydraulic pressure testing machine capable of handling pressures up to 1800 bar is an essential tool in industries where high-pressure systems are common, such as aerospace, defense, and industrial manufacturing. This machine is designed to test the integrity and performance of components, ensuring they can withstand extreme conditions without failure. The testing process involves subjecting the bomb shell or other components to controlled, high-pressure environments, allowing engineers to observe their behavior under stress and identify any potential weaknesses. Safety is paramount, so these machines are equipped with robust safety features and built to withstand the intense forces involved. Precision and reliability are key, as the data gathered can inform design improvements and ensure compliance with stringent safety standards. Overall, this type of testing machine plays a critical role in advancing technology and ensuring the safety and effectiveness of high-pressure systems.

Description:

- Special purpose Automatic single head vertical Hydraulic Pressure Testing equipment for Pressure Testing of Hollow Steel Bodies equipped with Automatic component Handling ROBOT and Automatic Maximum Expansion and Permanent Deformation Measuring System.
- The Hollow Steel Bodies are subjected to internal Hydraulic Pressure of 250 to 1800 kg per square cm. for a period of maximum 20 seconds to ascertain that the bodies withstand the specified hydraulic pressure during the specified dwell time.

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- Pressure is being applied on the Fluid inside the Hollow Body's cavity after suitable sealing of the mouth (open end of the hollow body), so as to achieve the set magnitude of hydraulic Pressure for specified duration/ Dwell Time.
- The Hydraulic Pressure Testing Equipment is being equipped with (a) The Component Handling Automation including handling Robot and (b) Automatic Measurement System for measurement of maximum expansion (during the application of specified Pressure) and permanent deformation (immediately after the release of the specified pressure) on the specified component.

Duty:

- The Hydraulic Pressure Testing Equipment is suitable for carrying out the Pressure Testing operation on the internal cavity of the Three types of specified Hollow Steel Bodies, with handling automation and with automatic measurement of expansion and permanent set values of each specified components, on mass production basis.
- Production Rate is 40-55 nos. of Hollow Bodies per hour. The cycle time with Complete Handling Automation Including Handling Robot and with Automatic Measurement of Maximum Expansion & Permanent Deformation Measurement System of the specified component.
- Proving the Automatic Measurement of maximum expansion and Permanent Deformation system interfaced with the equipment for the specified component



Component Description:

- The components to be pressure tested are heat treated Hollow Steel Bodies of nominal Outside Diameters ranging from 100 mm to 200 mm. Length ranging from 400 mm to 1000 mm. The Pressure Testing Equipment, Handling Robot, in-feed and out-feed conveyors and the accessories should have capacities to handle Maximum outside diameter of 200 mm and maximum Length: 1000 mm. of Hollow Bodies

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- Specified Components to be pressure tested: 1) Hollow Body as per drawing no. SM-XXXX. 2) Hollow body as per drawing no. XXXXX (with automatic measurement & recording of expansion & permanent deformation values). & 3) Hollow Body as per Drawing no.SM-XXX.
- Shape of Hollow bodies: Ogive shaped. The Hollow Steel Body has a narrow opening at the mouth end and a heavy closed end at the base.
- The weight of the Hollow Bodies : 15 Kgs. to 50 Kgs. The Pressure Testing Equipment, Handling Robot, Conveyors and accessories should have capacities to handle Maximum Component Weight: 100 Kg.

Pressure Testing Parameters:

- Adjustable Testing Pressure: 250 to 1800 Kg. / Square Cm.
- Adjustable Timer: For Dwell time of pressure testing from 05 seconds to 20 seconds.

Salient features:

- Main frame Structural Section: The frame, columns, crown, base, is fabricated from the structural steel as per IS : 2062-2011 and stress relieved. Mounting surfaces of the fabricated structure shall be machined square with respect to vertical axis so that the moving parts such as ram, shall be perfectly aligned with the Sealing-Cum-Pressure Testing Head of Equipment, as per prevailing machine tool manufacturing standard.
- The Pressure Testing Equipment is equipped with two nos. of VFD gear motor driven Conveyors; i.e. one In-Feed Conveyor placed at the input end of the Equipment. Other is the Out- Feed Conveyor, placed at the output end of the equipment.

Main Features of the Hydraulic Pressure Testing Equipment:

- The Pressure Testing Equipment consists of a Heavy Duty Steel Top Beam and Bottom Cross Beam /base linked to each other by two columns.
- The Bottom Cross Beam incorporates the Pressure Cylinder.
- The Top Cross Beam carries the Sealing -Cum- Pressure Testing Cylinder which seals the mouth of Hollow Body and functions to intensify the pressure
- The Testing Station is properly aligned and coincides with the Sealing-Cum- Testing Head of the Equipment, so as to maintain the verticality of Hollow Body under test and required sealing is achieved (of the mouth of Hollow Body) during the complete Dwell Time/ Testing Period.

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- The water available in the cavity and the hydro-emulsion pressure intensifier generates the high pressure for desired magnitude for specified duration.
- The equipment is provided with the suitable capacity of Hydraulic Pump and centrifugal water pump with drive motor and tank, water filters etc.
- The power pack is designed to operate at working pressure & Volume 1.50 Times of Normal Operating Pressure and Volume. All valves, Pumps, Pipelines & accessories should be designed accordingly.
- To amplify the Hydraulic Pressure into coolant pressure for Pressure Testing, hydraulic intensifier / pressure multiplier to be provided, which increases the hydraulic pressure into coolant/ emulsion pressure by 4 to 6 times.
- The equipment is provided with all safety devices, guards and controls for safety of operators and Equipments.

Electrical Power System and Automation:

- Hydraulic pressure testing Equipment is equipped with Power Panel, Control panel and Operator Panel. (Make Rittal only)
- All Panels is of IP54 protected, made up of 14/16 SWG CRCA sheet and powder coated peddle gray in color. It shall be mounted near the equipment The panel(s) shall be equipped with all standard switchgear like MCB, MPCB, isolators, LE D Indication lamps, panel lighting. (Make: Siemens/ABB/L&T).
- Power panel is equipped with (1) MCCB for incoming supply of suitable capacity. (Make: ABB/L&T/Schneider/Siemens/Havells) (2) MCCBs for feeder of all drive motors. (3) All power connections is routed through copper bus-bars of suitable size and current.(4) complete with its internal wiring through copper cables, with Digital energy meter along with calibration certificate (Make : L&T quaser, HPL, Siemens, Conzerv.), selector switches, indicating lamps, etc. It have adequate capacity of panel AC for cooling Make Kelvin / Rittal / Olaer / Hyfra / Texa only.(Ambient temperature 50 Deg. Centigrade)
- Switching Surge Protection Device is used for incoming AC supply & for 12/24 V DC control supply of suitable class.(Make: OBO Bettermann, Phoenix contact).
- Control Panel is equip with Complete PLC system i.e CPU, Digital IOs and Analog IOs (Make: Siemens). It shall have all necessary switch gears.
- ELECTRICAL MOTORS: All Electrical motors used in the band press have EFF2 efficiency ratings & suitable protection MPCB protection. (Make of motor: Siemens/ABB/CG/ WEG/Kirloskar & Sew Eurodrive/Siemens Flender/ Bonfiglioli/E lecon in case of geared motor).
- PLC : Complete Hydraulic pressure testing equipment is controlled, using latest PLC of Siemens S-7 1200 make.
- PLC program is in Ladder programming with all the flags / bits, Rung / Network shall be given a logical name according to their function.
- Production Rate: 40 Nos. to 55 Nos. per hour for each type of component in Auto Mode.

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Artillery Suitable for Testing in our machine:

1. **155 mm M107(USA, India)**
2. **155 mm L15 (UK)**
3. **155 mm M795 (USA)**
4. **155 mm ERFB (Extended Range Full Bore) Shells**
5. **155 mm LU211 (France)**
6. **155 mm OF-29 (Russia)**
7. **DM121 (Germany)**
8. **105 mm and 155 mm ERCA Ammunition (USA)**
9. **155 mm M171A1 (South Korea)**
10. **155 mm M864 DPICM (Dual-Purpose Improved Conventional Munition) (USA)**
11. **NORINCO 155 mm HE Shells (China)**
12. **155 mm BONUS and SMArt 155 (France/Germany)**
13. **155 mm Assegai Family (South Africa)**



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