



Functions

This type of machine is especially designed for drop-weight tear tests of ferritic steels

Standards

GB/T 8363, ASTM E436, API RP 5L3

Features

1. SIMENS PLC controls and touch screen provide high reliability and versatility.
2. Automatic specimen feeding and automatic positing
3. Frame structure is made of solid steel plate with high stability under impact
4. Striker is made of high strength steel plate with high impact resistance
5. Use chain to lift striker with high precision in height
6. Self-lock design for striker clamping
7. Full-closed safety shield
8. Special design tools for support change

Description

This machine is constructed by main frame, striker, striker lifting system, striker release/clamp device, specimen feeding system, damping device, specimen collecting device, guard screen, and control system.

Main frame

The bottom plate is made of solid steel plate, mass is up to 2100kg. Anvil is located onto the center of the bottom plate. Impact force onto the frame will rapidly transmit to the ground. As the impact force applies to the center of the main frame which is at the center of the foundation, foundation area is not so big (3mx3m), after long use, foundation will not decline by vibration, and horizontal level of the main frame will not change too.

The main frame is supported by four columns. Each column is divided by upper and lower part. The lower part of the columns is cone-shape cast iron; the upper part is high strength steel pipe. Cone-shape of lower part has higher anti-decline ability than cylinder-shape. Cast iron has stronger vibration resistance and isolation, the vibration caused by impact force will not transmit to the top plate, therefore, the main frame has not apparent vibration for each impact test.

Striker

Striker consists of a few parts, which are made of separately machined steel plate. It features high impact resistance ability. Junction between each part is fixed by pin, jointed by high strength screw bolt. Top is made of alloy steel with good impact resistance, little abrasion, long service life, and simple to change. The weights are separate, easy to change. Connection between weights is alignment pin with reliability.

Striker lifting system

Imported servo motor is used for the lifting system, with small size, light weight, high efficiency, low noise, and high stability. Compared with common motor, servo motor is better in accuracy, response characteristic, over-load resistance, speed change performance, and torque characteristic. Use chain to lift striker with smaller elasticity and higher accuracy than wire rope. Chain has higher strength, higher abrasion resistance and safer than wire rope. The lifting motor is located at the bottom of the frame, easy to mount and maintain.

Striker release/clamp device

It is specially design and will automatically lock after clamping the striker. This device won't open caused by gravity even when the power is off. It is equipped with approach switch to detect the position. If striker is not clamped, crosshead won't move. It uses AC electromagnet for release of striker, no need of air supply, easy to mount and operate.

Specimen feeding device

Use motor to feed specimen within 5 seconds, fast, reliable and easy to operate. The frame is one body machined, without welding, with high strength. The frame tightly fits to the support, reducing the force on motor and extending the life of motor.

Damping device

As the test standard requires only one drop can tear the specimen, there is big residual energy after impact. Sometimes, the residual energy may reach several thousand or even more than ten thousand joules. Under low temperature impact test, the residual energy may be much higher. In this case a damping device is necessary and it will affect the service life of the impact machine. We specially design one kind of hydraulic damping device. Its structure especially the damping hole is strictly calculated and proofed after plenty of tests. Single damper can absorb up to ten thousand joules. The whole process is very stable, minimizing the impact to the machine. Both dampers have the same performance, extending the service life of the equipment.

Specimen collecting device

This device uses motor to drive rubber belt for sample collection after impact test. There I protection shield around the belt. After finishing test, broken specimen will drop onto the belt. After finishing each test, the collection device will run automatically and bring the specimen out, which improves the work efficiency and safety of operators.

Guard screen

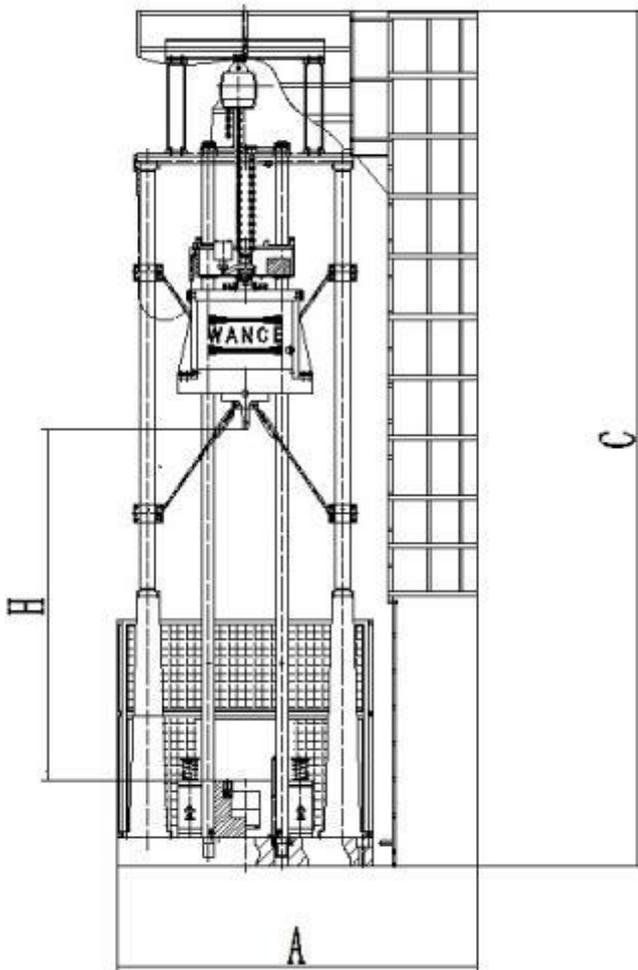
There are full closed guard screen around the main frame to prevent broken specimen from splitting, also prevent operators from entry to the frame inside. Guard screen has door limit switch. When the door is open, the machine will lock automatically. Therefore it will avoid wrong operation and guarantee the safety of operator.

Control system

Control system in this machine provides automatic operations for striker lifting, zero positioning, specimen auto-feeding, impact, and striker clamping, which greatly reduces labor intensity and improves working efficiency and operating safety. Simens PLC programmable controller is used for the whole control system, touch screen is used for terminal operating interface, rotary encoder is used for sampling and controlling the height. PLC features high stability and reliability and strong anti-interference ability, avoiding any fault operation and improving safety of operators. Meanwhile this control system has alarm functions for such errors: specimen is not in the right position, striker is not locked, and guard screen is wrong, striker is not lifted to the correct position.

Parameters

Model	DIT304	DIT504	DIT804	DIT105
Type	C			
Maximum energy (J)	30000	50000	80000	100000
Minimum energy(J)	8000	15000	20000	20000
Tup mass (kg)	630	1180	1620	1620
Tup mass accuracy	±1%			
Weight mass	390	780	780	1020
Weight mass accuracy	±0.5%			
Total weight of tup	1020	1960	2400	3000
Drop height(mm)	1275~3000	1275~2600	1275~3400	1275~3400
Velocity of drop (m/s)	5~7.67	5~7.14	5~8.16	5~8.16
Height resolution	0.1			
Height accuracy(mm)	≤±10			
Hardness of tup nose	HRC58~62			
Radius of tup nose(mm)	R25±0.1			
Hardness of support anvil	HRC58~62			
Alignment accuracy of center of tup nose, specimen and anvil center (mm)	≤±1.5			
Support anvil span (mm)	254±1.5			
Specimen dimension (mm) (length x width x thickness)	(305±0.5) ×(76.2±1.5) ×(3-4)mm			
Frame dimension (mm) (length x width x thickness)	2300×1300× 5100	2300×1550 ×5200	2300×2700×6300	
Weight	10000	15000	19800	20000
Power requirements	3-phase, 5-line, AC 380V, 20A, 4kW, 50Hz	3-phase, 5-line, AC 380V, 20A, 5kW, 50Hz		



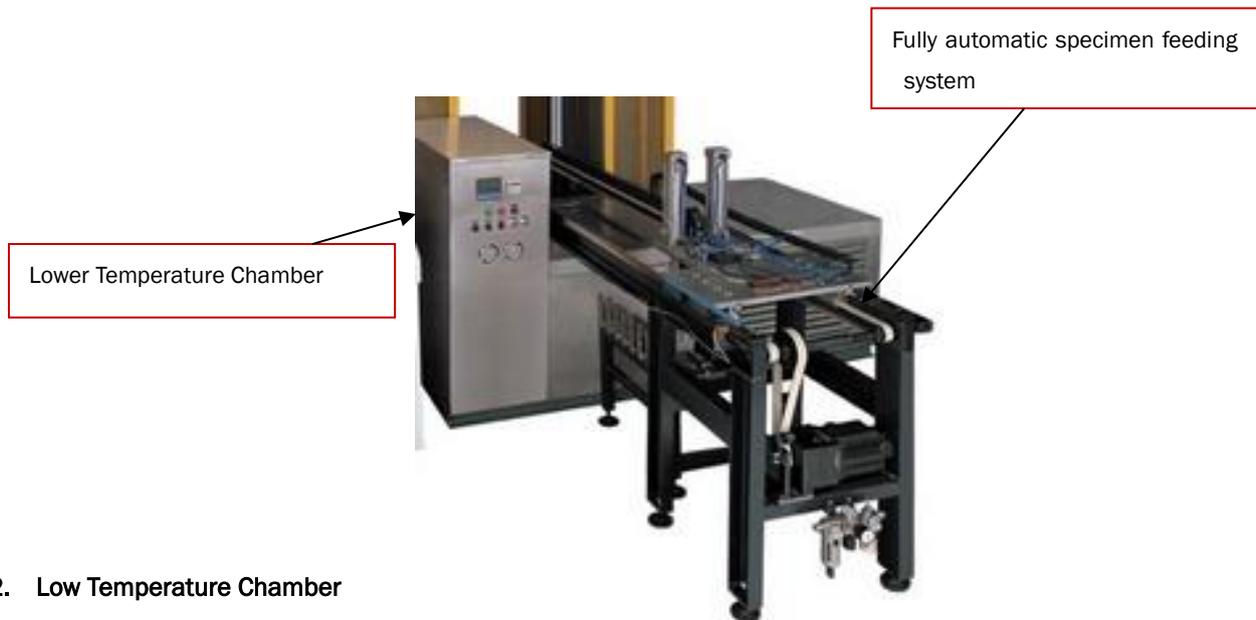
Model	Frame (A×B×C) mm	Drop height H(mm)
DIT304C	1900×1300×5100	3000
DIT504C	2300×1550×5200	2600
DIT804C	3000×2700×6300	3400
DIT105C	3000×2700×6300	3400

Standard accessories

Description	Quantity
Main frame	1 set
Control system	1 set
Touch screen	1 set
Striker	1 set
Tup	2 sets (one is for space use)
Weights	1 set
Striker lifting device	1 set
Striker release/clamp device	1 set
Guard screen	1 set
Specimen semi-automatic feeding device	1 set
Anvil	1 set
Foundation bolt	4 sets
Inner hexagon spanner	1 set

Optional accessory:**1. Fully automatic specimen feeding system**

This system can do all the jobs, sending the samples to cold temperature chamber, fetching the samples from the cold temperature chamber, sending the samples to the testing supporter, and collect the impacted samples out after the tests, it is fully automatic operation, which can maximally guarantee the safety of operators.

**2. Low Temperature Chamber**

Model: ZYD2102

Temperature range: ambient ~ -100°C

Temperature accuracy: 1°C

Sample size: 305mm x 75mm x 40mm

Chamber space (Length x Width x deep): 690mm × 380mm × 198mm

Sample capacity: 8 pieces (sample rack can place 10 pieces of sample)

Cooling method: liquid nitrogen

Cooling medium: absolute ethyl alcohol (purity≥99.7%)

Ethyl alcohol needed: 100L (prepared by the customer)

Power supply: VAC220±10%, 50Hz, 1kW

Dimension (L x W x H): 1255mm x 1040mm x 705mm

Weight: 100kg

Standard accessories:

- Main machine: 1 set
- Temperature controlling system: 1 set
- agitation equipment: 1 set
- Sample rack: 4 sets
- 160L nitrogen cylinder: 1 set

3. DWTT specimen notching machine

Model: NSM401C

Description: This machine is specially designed for notch making of DWTT sample. It is driven by hydraulic system and controlled by electronics. The press knife uses hard alloy material CW6Mo5Cr4V2, with long life to use.

Comply with:

- ASTM E436-03<Standard Test Method for Drop-Weight Tear Tests of Ferritic Steels>
- API RP*5L3-96<Conducting Drop-Weight Tear Tests on Line Pipe>

Parameters:

- **Max press force:** 1000kN
- **Sample size:** (300±5) x (75±1.5) x (3~40)mm
- **Notch type:** V type, depth 5mm, angle 45°±2 °, arc radius r=0.025mm
- **Piston travel:** 120mm
- **Clearance between columns:** 410mm
- **Column diameter:** φ100mm
- **Compression space height:** 230mm
- **Loading method:** hydraulic
- **Max hydraulic pressure:** 16Mpa
- **Hydraulic oil:** L-HM46 or equal
- **Hydraulic oil volume:** 38L (prepared by the customer)
- **Machine dimension (L x W x H):** 1300mm x 420mm x 1460mm
- **Power supply:** 3-phase, VAC380V±10%, 50Hz, 2kW
- **Weight:** 400kg

Standard accessories:

- 1) **Main machine:** 1 set
- 2) **Press knife:** 2 sets (one is spare part)
- 3) **Packing block:** 3 sets

