



TruForce

Pendulum Impact Testing Machine | TF-PIT-D



Impact energy:

150J, 300J, 450J, 600J, 750J

Functions:

This machine is used for measuring the Charpy impact resistance of metal and other materials

Standards:

ISO 148, EN10045, ASTM E23, GB/T 229, GB/T 12778

Features:

- One-body cast frame design of seat and column provide high stability and rigidity
- Front and rear columns are symmetrical. Pendulum arm is designed of cantilever beam support, with simple structure and high machined precision
- Apply high precision bearing with small friction. Absorbing energy without loading is less than 0.3%
- Double reduction gear system replaces old style drive system with high efficiency and avoiding transmission failure
- Round pendulum head design reduces windage losses to the most
- High rigid pendulum arm prevents axial and transverse vibrations
- Exchangeable pendulum is simple to change to satisfy impact energy of 150J, 300J, 450J, 600J, 750J
- Electromagnetic release of pendulum hammer and electromagnetic clutch for locking the pendulum and raising it to its initial position. A damper is equipped to prevent strong bump when clutching
- Full-closed enclosure with high safety to prevent broken sample from splitting. Protective screening has interlock door. When the door opens, most operations can't work to avoid any wrong operation
- Apply SIEMENS industrial PLC to control pendulum, and high precision Japanese made NEMICON rotary encoder to measure striker real time position. The whole system is stable, reliable and accurate
- A big touch screen monitor may real-time displays striker angle, impact energy, toughness, and other parameters. User can input specimen data and other information such as company information into this monitor. When connected to a printer, user input information and test results will be printed
- Optional computer with software control is available to realize semiautomatic operation. Operator only need charge specimens. Others can be controlled by software
- Optional specimen feeding system is available. Combined with computer and software, fully automatic operation can be realized
- Optional cooling system is available to satisfy cold specimen test down to -100°C

Specimen collection and filtering device

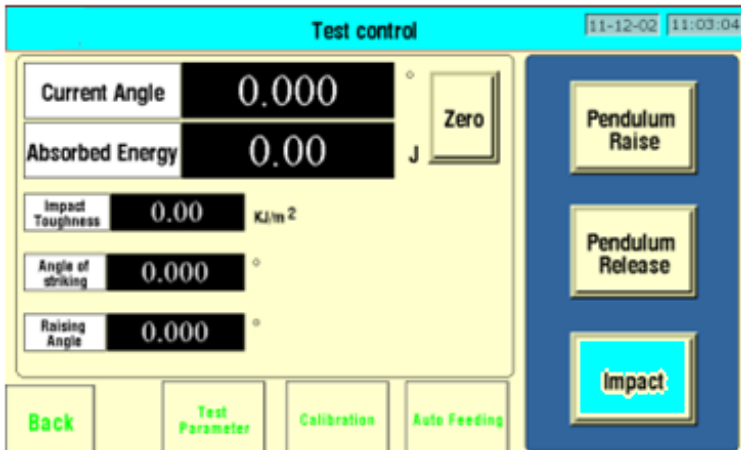
- Motorized device is used for collecting broken specimens after impact, instead of manual cleaning, which fully prevents striker from getting stuck
- Unique specimen filtering function: automatically judge and transport qualified and unqualified specimens to different collecting box



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Wide view touch screen display



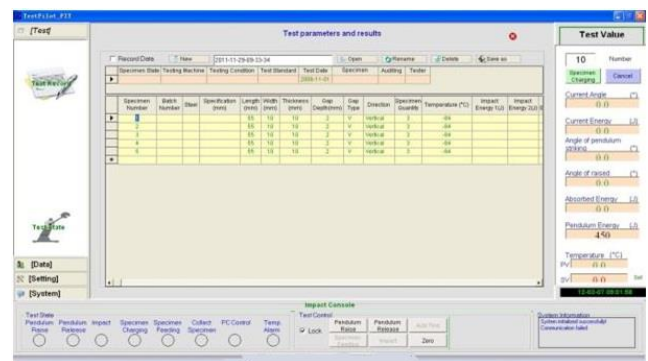
Wide view touch screen display

Professional test software

This software is designed specifically for testing metals to Charpy standards. Software provides an easy-to-use method for gathering, calculating and storing impact test results. The test result can be printed and exported to EXCEL for review.

Display Features

- Status of system limits
- Real-time display of hammer status
- Hammer set up and verification allows for hammer weight input
- Displays potential/impact energy
- Displays theoretical velocity
- Encoder resolution of 0.025°



Test report

- Template can be customized according to requirements
- The report can be exported to EXCEL for review

Report of Impact Test															
RR															
Sample No	Material			Test Piece				Clap Type	Direction	Temperature (°C)	Absorbed Energy (J)			Intending energy (J)	Remark
	Lot code	Cylinder type	spec	Length (mm)	Width (mm)	Thickness (mm)	Clap length (mm)				1	2	3		
1				55	10	10	2	U	Vertical	-84	0.09	0.09	0.09	0.09	150
2				55	10	10	2	V	Vertical	-84	0.09	0.09	0.09	0.09	0
3	E4	F4	T5	55	10	10	2	None	Horizontal	-84	0.09	0.09	0.09	0.09	150
4	E4	F4	T5	55	10	10	2	U	Horizontal	-84	0.09	0.09	0.09	0.09	150
5	E4	F4	T5	55	10	10	2	V	Horizontal	-84	0.09	0.09	0.09	0.09	150
6	E4	F4	T5	55	10	10	2	V	Horizontal	-84	0.09	0.09	0.09	0.09	150
Piece type										Source of piece					
Testing machine										Date					

Optional instrument data measuring, sampling and processing system

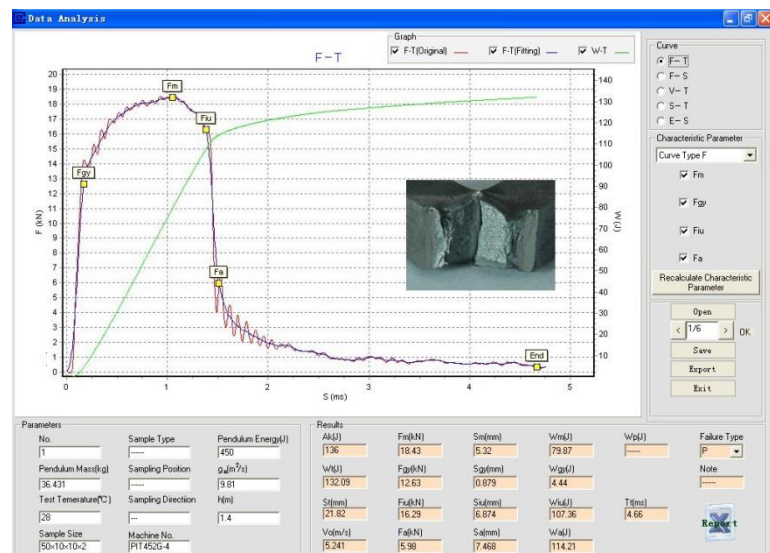
Instantaneous force signal from transducer assembled on the striker is transferred to and enlarged by high speed signal conditioner. Enlarged signal is A/D converted by high speed data sampling card, then transferred to computer for storage and analysis. After calculating and analyzing original force vs. displacement curve, more characteristic parameters could be determined, furthermore specimen deformation and fracture property could be precisely judged.

- Force transducer: Bridge strain gauge type force transducer with various energy is available, ranging 0.1J to 100,000J in energy and 1,000N~1,000,000N in force. It provides high frequency, high linearity and durability.
- High speed signal conditioner: enlarge the strain signal to match the analog signal input range required by high speed data sampling card, improving measurement resolution and sensibility. 500kHz band width ensures high frequency signal without attenuation.
- High speed data sampling card: 16bits A/D conversion and 1.25MHz high speed data sampling permit reproduction of instantaneous force changing with good fidelity.

A/D sampling resolution	16bits
Maximum sampling frequency	1.25MHz
Frequency response	500kHz
Dynamic error	<2%

Instrument data analysis system - Software

- Automatic curve fitting of force vs. displacements
- Automatically determine F_{gy} , F_m , F_{iu} , F_a , and other characteristic parameter, further determine after calculation S_{gy} , S_m , S_{iu} , S_a , S_t , W_m , W_{iu} , W_a , W_t and others.
- Fully automatic data processing permits to get test results and report after each test immediately.
- Curve and raw data can be exported



Optional specimen auto feeding system with cooling chamber

➤ Feeding specimens into the cooling chamber

Specimen rack can accommodate 40 pieces specimen, U type or V type. Pneumatic cylinder B will push the specimen into the entrance of cooling chamber; pneumatic cylinder A will push the specimen inside the cooling chamber

➤ Cooling the specimen inside the chamber (must connect to cooling system)

The chamber will cool down the specimen to the preset temperature, then maintain. The chamber is divided with upper and lower parts. The middle is space for specimen. Upper and lower parts are made of aluminum plate with good thermo conduction. There are snake-like grooves on the aluminum, that cooling medium flows through the grooves to absorb heat to realize cooling. The temperature sensor is located at the specimen outlet of cooling chamber, ensuring the specimen temperature is constant with the control temperature.

➤ Feeding specimens to anvil for striking

After reaching preset cooling time, pneumatic cylinder C will push out the specimen from the chamber to anvil for striking. Specimen centering on the anvil is automatic. After striking, the pendulum will automatically rise to the initial height for next impact and broken specimen will be carried out by the collection and filtering device. One cycle impact is finished then. The duration between specimens pushed out from the chamber to finish striking, is around 4-5 seconds.

One specimen impact cycle takes around 10 seconds, which is mostly suitable for steel companies and test labs.

Remark: specimen is positioned on the anvil by the specimen end surface, to minimize effects on the notch temperature. But surface finish must be good. Specimen width should be $\leq 10.1\text{mm}$, the distance between notch to one end surface should be $27.5 \pm 0.1\text{mm}$, free of burr.

Cooling system

- Model: TF-LTC102B-2
- Cooling medium: liquid nitrogen
- Temperature range: ambient~ -100°C
- Temperature accuracy: $\pm 1^{\circ}\text{C}$
- Temperature uniformity: $\pm 2^{\circ}\text{C}$
- Equipped with 160L liquid nitrogen cylinder
- American brand: TAYLOR-WHARTON, model: XL160
- Used with specimen auto feeding system



Specifications

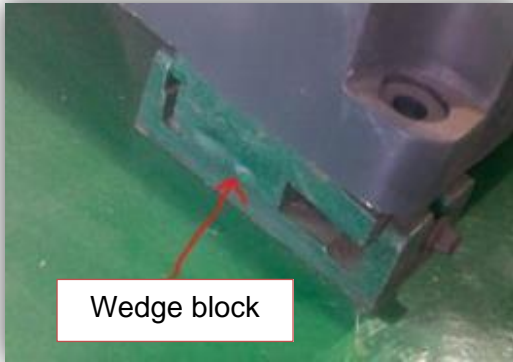
Model	TF-PIT-452D	TF-PIT-752D
Maximum energy	450J	750J
Optional pendulum	150J, 300J	300J, 450J, 600J
Angle of striking	150°±1°	
Angle measurement resolution	0.025°	
Distance from the axis of support to the center of percussion	750mm	
Velocity of striking	5.24m/s	
Support span	40mm	
Radius of curvature of supports	1mm	
Angle of taper of supports	11°±1°	
Radius of striking edge	2mm	
Angle of striking tip	30°	
Thickness of striker	16mm	
Specimen dimension	55mm×10mm×10mm 55mm×10mm×7.5mm 55mm×10mm×5mm	
Weight	900kg	
Power requirements	3-phase, AC 415V±10% 50Hz 800W 10A	

Standard Configurations

Name	Description	Model		
		Type D-2	Type D-3	Type D-4
Framework	Frame	✓	✓	✓
	Pendulum lock/release system	✓	✓	✓
	Driving system	✓	✓	✓
	Angle measurement system	✓	✓	✓
	SIMENS PLC control	✓	✓	✓
	Dial gauge display	✓	✓	✓
	Touch screen	✓	✓	✓
	Protection shield	✓	✓	✓
Software			✓	✓
Interface to PC	RS232		✓	✓
Accessories	Span block			
	Specimen centering block			
	Centering tongs			
	inside-hexagonal spanner	✓	✓	✓
	Anchor bolts			
	wedge block			
Instrumented impact system (model: IIS105)	Data sampling card			
	Data Conditioner			
	Instrumented test software			✓

Shipping information

Description	Crated dimension (mm)	Crated weight (kg)
Main machine	1220x1080x1860	850
Full-closed protection shield	2060x550x1250	150
Main machine with specimen feeding system	1700x1600x1860	900
Nitrogen cylinder	660x660x1790	100



Wedge block



Pendulum



Anvil & support



Foundation bolt



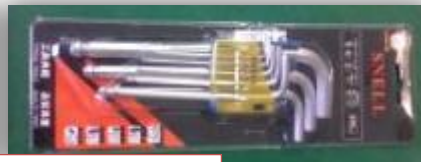
Span block



Specimen centering block



Centering tongs



Inside-hexagonal