



MOTORIZED CHARPY PENDULUM IMPACT TESTING MACHINES



Mastering the fine art of testing



(Analogue, Digital & Analogue cum Digital Versions) :

- ASTM Models : AIT-300-ASTM-MA / MD / MAD Series
- ISO Models : AIT-300-ISO-MA / MD / MAD Series
- Combined ASTM / ISO Models : AIT-300-ASTM/ISO-MA / MD / MAD Series.

MA = Motorized Analogue version

MD = Motorized Digital version

MAD = Motorized Analogue cum Digital version

Introduction :

FSA Make Motorized Impact Testing Machines are widely recognized as the most accurate with super and sturdy design, testing accuracy and repeatability. Now FSA has already introduced & sold these machines to reputed Companies.

Motorized Pendulum Impact Testing Machine of various capacities like 300 Joules, 450 Joules, 600 Joules & 750 Joules are available. This machine is indigenously designed and developed by Fine Spavy Associates & Engineers Private Limited (FSA) by our export team. The machine comply with combination of all current standards i.e. ASTM-E-23 and BSEN ISO-148-2 : 2008.

Machine works on pendulum principal. Difference between height of drop of pendulum before rupture and height of rise after rupture of specimen is directly proportional to impact energy absorbed by specimen and is indicated by a pointer on large dial (for Analogue version) & on digital display (for digital version) & on a large dial cum digital display (for Analogue cum Digital versions).

Features :

- Suitable for Charpy tests on various metallic materials
- Rigid design of machine frame and other parts assure minimum energy absorption during fracture with results in improved test accuracies.
- Single stand design which facilitates fast and easy positioning and centering of specimen which is a basic requirement of Sub-Zero testing.
- One single operator can carry out the test.
- Impact Machine is user friendly, easy operations by push buttons, easy fixing of samples, easy closing and opening of doors.
- Analogue or Digital or Analogue cum Digital readout is available.
- End user need not to buy separate machine for each standard. Combined ASTM & ISO standard Machine Models are available.
- The highly stressed and wearing parts like support blocks and strikers are of special alloy steels duly heat treated.
- Easy insertion of interchangeable of ASTM Charpy Striker (8 mm radius) or ISO Charpy Striker (2 mm radius)
- The entire machine is encased in an attractive enclosure with aluminium frame work and bullet proof pocarbonate covers. This arrangement protects the operator and others from flying pieces of the broken samples and is very essential for the entire safety.
- There are total 3 doors provided for machine settings and sample settings.
- Safety interlock (inductive proximity switch is fitted for every door as a safety precaution) are provided for all the 3 doors. And unless all the doors are closed the machine does not start. To operate the machine all the 3 doors should be always in closed condition.
- Since the machine is fully enclosed there is a constant fixed air resistance to the hammer during working. Due to this the windage losses are constant and so the machine repeatability and accuracy is better.
- To prevent accident during test, machine is fully covered with large safety guard with interlocking doors.
- Automatic lifting of pendulum hammer with the help of motor and gear box with clutch and torque limiter in between. The provision reduces the operator fatigue of manual lifting and also increases the safety in the machine operation.

- The release of pendulum is also through push button operation with the help of a solenoid operated latch
- The braking of the pendulum is also automatic through the electromagnetic clutch and torque limiter system.
- The operator can pre-select the next operation i.e. either brake and stop the pendulum at the center after the test or lift it and latch it to the required energy level for the next test.
- Calibration Mode is also provided for checking the functions of individual systems and friction checking of the pendulum shaft.
- We have a separate gear box and motor so that in case of any problem only that particular item can be repaired / replaced. The gear box is Bonfiglioli (Italian) & the motor is Rotomotive make.
- We have a torque limiter in the drive system between load and the gear box which absorbs all shocks of the hammer and safeguards the gear box and motor.
- We have non-contact type frictionless rotary encoder.
- For maintenance purpose we have provided an additional mode (check-up) in this mode all operations are out of programme and can be individually checked for its operation.
- For digital machine a contactless high resolution encoder is provided for correct angle measurement.
- Electromagnetic brake and motorized return of pendulum for latch.
- Initial Zero setting of the analogue version pointer OR digital version is very easy.
- Certification of all three energy levels can be carried out at extra cost by using NIST or ISO Charpy standard samples.
- Machines are strictly conforms to respective standard specifications i.e. ASTM-E-23-2007 for ASTM Standard machine & BSEN-ISO-148-2 for ISO standard machine.
- NIST approval of machine with samples from NIST – USA and ISO approval of machine with samples from ISO – Brussels (Belgium) can be arranged at extra cost.
- Safety Doors - As per ASTM-E-23 & ISO-148-3 Standards, Charpy test has to be carried out within 5 seconds at (-) 40° C. In such critical rapid test, once the specimen is transferred to anvil and door is closed operator can press the door switch which is provided at door handle. Instantly pendulum hammer will be released from latch and hit to the specimen. If this door is operated no other switches will be operated due to interlocking system.

Standard Accessories :

Models	AIT-300-ASTM-MA	AIT-300-ASTM-MD	AIT-300-ASTM-MAD	AIT-300-ISO-MA	AIT-300-ISO-MD	AIT-300-ISO-MAD	AIT-300-ASTM/ISO-MA	AIT-300-ASTM/ISO-MD	AIT-300-ASTM/ISO-MAD
Versions	Motorized Analogue	Motorized Digital	Motorized Analogue cum Digital	Motorized Analogue	Motorized Digital	Motorized Analogue cum Digital	Motorized Analogue	Motorized Digital	Motorized Analogue cum Digital
Charpy Striker	1 No	1 No	1 No	1 No	1 No	1 No	2 Nos (1 for ASTM & 1 for ISO)	2 Nos (1 for ASTM & 1 for ISO)	2 Nos (1 for ASTM & 1 for ISO)
Charpy support block (Fixed to Machine)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
Specimen setting gauge (For Charpy)	1 No	1 No	1 No	1 No	1 No	1 No	1 No	1 No	1 No
Set of Spanners	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
Foundation bracket with Nuts & Washers (This will be supplied before dispatch of machine for making proper civil foundation)	1 No	1 No	1 No	1 No	1 No	1 No	1 No	1 No	1 No
Digital panel with cable (For digital versions)	---	1 No	1 No	---	1 No	1 No	---	1 No	1 No
Pointer and pointer carrier (for analogue version)	1 No	---	1 No	1 No	---	1 No	1 No	---	1 No

Suitable for	Charpy Tests								
Initial potential energy (Joules)	300								
Range with Least count (Joules)	0 - 20 J is 1 20 - 300 J is 2	0 - 20 J is 0.25 20 - 300 J is 0.5	0 - 20 J is 1 20 - 300 J is 2 (For Analogue Version) AND 0 - 20 J is 0.25 20 - 300 J is 0.5 (For Digital Version)	0 - 20 J is 1 20 - 300 J is 2	0 - 20 J is 0.25 20 - 300 J is 0.5	0 - 20 J is 1 20 - 300 J is 2 (For Analogue Version) AND 0 - 20 J is 0.25 20 - 300 J is 0.5 (For Digital Version)	0 - 20 J is 1 20 - 300 J is 2	0 - 20 J is 0.25 20 - 300 J is 0.5	0 - 20 J is 1 20 - 300 J is 2 (For Analogue Version) AND 0 - 20 J is 0.25 20 - 300 J is 0.5 (For Digital Version)
Pendulum drop angle (degree)	140								
Striking velocity of pendulum (m/sec)	5.182								
Distance between axis of rotation & center of striker (i.e. length of pendulum) (mm)	775								
Effective weight of pendulum (kg)	22.35								
Total frictions & windage losses of maximum impact energy (mm)	0.75 Max		0.5 Max			0.75 Max (For ASTM Machine) & 0.5 Max (For ISO Machine)			
Distance between physical percussion center of pendulum center of pendulum & center of Charpy specimen (mm)	± 7.75 Max		+ 0.00 ; - 7.75			± 7.75 Max (For ASTM Machine) & + 0.00 ; - 7.75 (For ISO Machine)			
Striking Edge									
Angle of striking edge (Degree)	30 ± 2		30 ± 1			30 ± 2 (For ASTM Machine) & 30 ± 1 (For ISO Machine)			
Radius of striking edge (mm)	8 ± 0.05		2 + 0.5			8 ± 0.05 (For ASTM Machine) & 2 ± 0.5 (For ISO Machine)			
Width of tip (mm)	4		2			4 (For ASTM Machine) & 2 (For ISO Machine)			

Specimen anvils & supports			
Suitable for specimen size (mm)	10 x 10 x 55		
Distance between anvils (mm)	40 ± 0.05	40 (+ 0.02) (- 0.00)	40 ± 0.05 (For ASTM Machine) & 40 (+ 0.02) (- 0.00) (For ISO Machine)
Angle of Anvil (Degree)	80 ± 2	79 ± 1	80 ± 2 (For ASTM Machine) & 79 ± 1 (For ISO Machine)
Radius of Supports (mm)	1 ± 0.05	1 (+ 0.50) (+0.00)	1 ± 0.05 (For ASTM Machine) & 1 (+ 0.50) (+0.00) (For ISO Machine)
Overall size (mm) approx	1900 (L) x 800 (W) x 2000 (H)		
Net weight (kg) approx	625		

Optional Accessories :

- Self centering tong for Charpy test specimen (useful particularly for carrying out tests at sub zero temperature).
- Sub Zero temperature bath with digital temperature indicator.
- Dry Ice Maker unit for making dry ice by using CO2 gas from cylinder.
- Go : No-Go gauges for confirming the following parameters of specimen within the limits specified by the standard
 - a) Center line of notch from both ends
 - b) Angle of V Notch
 - c) Depth below standard V Notch
 - d) Cross section of 10 x 10 mm specimen
- Milling Cutter for V Notch
- Broaching Machines (Manual or Motorized) for Charpy specimen "V" Notch cutting
- Profile Projector to check the accuracy of "V" & "U" Notch as per standard
- Lateral expansion gauge as per ASTM-E-23
- Standard Impact specimen for verification of machine from NIST-USA & Standard Charpy specimen for verification of machine for ISO Standard
- We also undertake calibration of the machine as per ASTM-E-23 (including approval from NIST-USA & ISO-148-3)
- Data Analysis Software for Digital versions
- Machine Cover.

We can also supply - Universal Testing Machine, Tensile Testing Machine, Spring Testing Machine, Horizontal Chain and Rope Testing Machine, Hardness Testers (Brinell, Rockwell, Vickers), Digital Rockwell Hardness Testers, Dynamic Balancing Machine, Impact Testing Machine, Digital Torsion Testing Machine, Dynamic Hardness Tester, Portable Hardness Tester, Compression Testing Machine & Special purpose Material Testing Machines, etc

We reserve the rights to change the above specifications without any notice due to constant improvements in design.



Manufactured by -

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A) Technical Specifications of Analogue (Dial Type) ASTM Pendulum Charpy Impact Testing Machine, 450 Joules Capacity, Model : AIT-450-ASTM :

Sr. No.	Parameters	Charpy Test
1.	Initial Potential Energy (Joules)	450
2.	Least Count of Dial (Joules)	3
3.	Pendulum Drop Angle (Degree)	140
4.	Impact Velocity (m/sec)	5.182
5.	Distance between axis of rotation and centre of strike (i.e. length of pendulum) (mm)	775
6.	Effective weight of pendulum (kg)	33.525
7.	Max. total friction and windage losses (% of Initial Potential energy)	0.75 %
8.	Striking Edge :	
	Angle of tip (Degree)	30 ± 2°
	Radius of Curvature (mm)	2
	Width of tip (mm)	18
9.	Test Piece Supports :	
	Suitable for specimen size (mm)	10 x 10
	Distance between supports (Degree)	40 (+ 0.5, -0.0)
	Tip Radius of curvature (mm)	8 ± 0.05
10.	Overall size (mm) approx.	2150 (L) x 850 (W) x 2000 (H)
11.	Net weight (kg) approx)	700 kg

B) Technical Specifications of Digital ASTM Pendulum Charpy Impact Testing Machine, 450 Joules Capacity, Model : AIT-450-ASTM (D) :

Sr. No.	Parameters	Charpy Test
1.	Initial Potential Energy (Joules)	450
2.	Resolution on Digital Indicator (Joules)	1
3.	Pendulum Drop Angle (Degree)	140
4.	Impact Velocity (m/sec)	5.182
5.	Distance between axis of rotation and center of strike (i.e. length of pendulum) (mm)	775
6.	Effective weight of pendulum (kg)	33.525
7.	Max. total friction and windage losses (% of Initial Potential energy)	0.75 %
8.	Striking Edge :	
	Angle of tip (Degree)	30 ± 2°
	Radius of Curvature (mm)	2
	Width of tip (mm)	18
9.	Test Piece Supports :	
	Suitable for specimen size (mm)	10 x 10
	Distance between supports (Degree)	40 (+ 0.5, -0.0)
	Tip Radius of curvature (mm)	8 ± 0.05
10.	Overall size (mm) approx.	2150 (L) x 850 (W) x 2000 (H)
11.	Net weight (kg) approx	700 kg

Computer Software Specifications of Digital Impact Testing Machine

1) USING RS232 PORT FOLLOWING DATA WILL BE TRANSFERRED TO PC FROM ELECTRONIC PANEL OF DIGITAL IMPACT TESTING MACHINE. THE SOFTWARE ON PC IS .NET(DOT NET) BASED.

- A) Sr. No.
- B) Test Type
- C) Stricking Energy
- D) Specimen Size
- E) Absorbed Energy
- F) Impact Strength
- G) Remark (High / Ok /Low)
- H) Higher Limit
- I) Lower Limit

2) USER CAN ADD FOLLOWING

- A) Customer Name
- B) User for Login
- C) Material Type

3) ADVANCED SEARCH OPTION FOR OLD DATA USING

- A) File name
- B) Customer Name
- C) Test from Date to To Date.
- D) Heat No.
- E) Type of Material

4) ALL THE TESTS ARE STORED IN THE DATA BASE OF THE SOFTWARE. USER CAN VIEW THE OLD FILES AT ANY TIME USING

Open Test option

A) User can select the Statistical Analysis for the current tests or view the Statistical Analysis of the Old Files with following parameters

a) Minimum Value

b) Maximum Value

c) Mean Value

d) Median Value

e) Variance Value

f) Standard Deviation

g) Mean Deviation

h) Skewness Value

i) Karl Pearson Skewness

i) Pearson Mode Value

ii) Pearson's Median Values

iii) Mode value

B) Also User can view Following graphs for the Statistical Analysis

a) Frequency Distribution Chart

1) Line Chart

2) Bar Chart

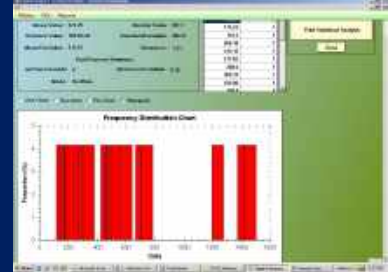
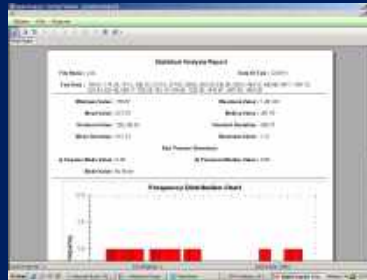
3) Pie Chart

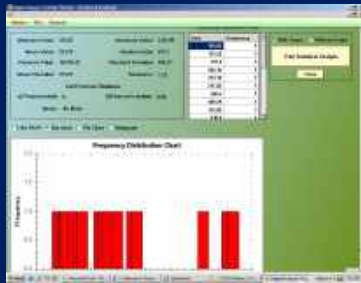
4) Histogram

5) USER CAN GENERATE THE TEST REPORT & TAKE PRINTS OF THE SAME.

We are attaching the screen shots of the Statistical Analysis Charts and the Test Reports generated after testing .

6) SCREEN SHOTS OF SOFTWARE





This screenshot shows a software interface with a table containing test results. The table has columns for 'Test Type', 'Frequency', and 'Percentage'.

Test Type	Frequency	Percentage
Test Type 1	10	20%
Test Type 2	15	30%
Test Type 3	20	40%
Test Type 4	10	20%
Test Type 5	5	10%

This screenshot shows a software interface with a table containing test results. The table has columns for 'Test Type', 'Frequency', and 'Percentage'.

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