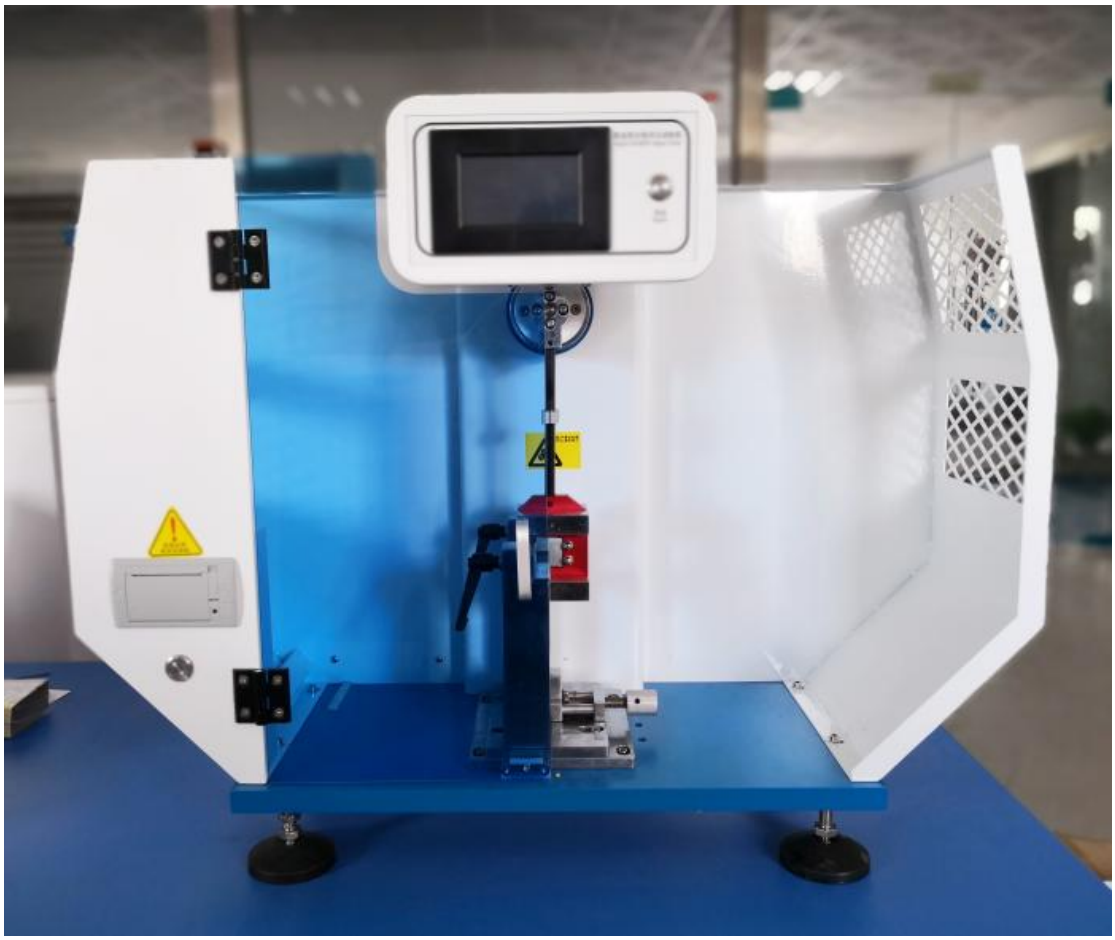
Impact tester

Operating instruction



The picture is for reference only, and the specific object shall prevail

Foreword

Thank you for your chosen our company's products, we not only provide your company good quality products, and will provide reliable service.

To ensure the use of personnel safety and equipment integrity, before using this instrument ,please fully view this operation manual.

For the manual, do pay attention to the precautions on its use. This manual details the design principles of this instrument,according to the standard, construction, operation specifications, calibration, maintenance, possible faults and remedy the situation, electrical plans, etc.

If in the manual mentioned in the various "test rule ", the standards are for reference only, if you have any objection please review standards or information by your own.

Please kindly note : sometimes we improve on some mechanical parts for better performance of equipment , which may have operating system not consistent with the usage guidelines in some detail. At the time of writing of this manual, we may have mistakes and omissions, please be more inclusion and welcome all of your comments and suggestions.

Special notes:

● This manual can not be the basis for any requirements.

● We reserve the right for this operating manual.

●customer specific requirements are different, specific configurations, see the packing list.

Safety note

Safety marks:

● In the course, pendulum on the raised swinging is not yet hang on , staff members shall not work in scope of pendulum swings, so as to avoid danger from accidental power outage

●Only professional or authorized officer can remove the machine, if so, the person need to be responsible .

●Unplug the power cord when not use the machine

NOTE:

This mark shows that the test result and quality may be effected.

DANGER:

This mark shows that the operator fails to comply may be harmed.

I. Summary

Product Introduction

Digital Charpy/Izod Impact Tester is used to test the impact toughness of the non-metallic materials such as rigid plastic, reinforced nylon, glass fiber reinforced plastic, ceramics, cast stone, plastic appliance and insulation materials. It is widely used in the scientific research institutes, universities and chemical industry as the common quality test equipment.

Main Features

A. High-precision intelligent controller equipped with LCD display which you can read the data intuitively and accurately;

B. China's first carbon fiber lever (It has been patented); it succeeds in doing experiments without shaking involving the impact direction, improving the rigidity of materials, and concentrating impacting strength on the centroid of the pendulum, and using life increases.

C. Imported high-resolution digital encoders, higher and more stable angle measurement accuracy;

D. Aerodynamic impact hammer and imported ball bearings greatly reduce mechanical friction losses

E.Automatic calculation of the final result, 12 sets of the test data can be stored and averaged;

F. Optional interface of Chinese and English; units (J / m, KJ / m2, kg-cm / cm, ft-ib / in)can be customized according to customers' requirements.

G. Built-in mini printer to print the test data

Performance Standards

ISO179—2000(Determination of Plastics - Hard Materials Charpy Impact Strength)
ISO180—2000(Determination of Plastics - Hard Materials Izod Impact Strength)

GB/T1043—2008 (Rigid Plastic Charpy Impact Test Method)

JB/T8762—1998 (Plastics Charpy Impact Testing Machine)

GB/T 18743-2002(Charpy Impact Test Method for Fluid Transport Via Thermoplastic

Pipe (Suitable for pipe pieces))

ASTM D256-2010

II.Main Parameters

Item	**Charpy Impact**	**Izod Impact**
Pendulum energy	1J,2J,4J,5J,7.5J,15J,25J,50J （The specific specifications of pendulum shall be based on the contract）	2.75J,5.5J,11J,22J （The specific specifications of pendulum shall be based on the contract）
Pendulum angle	150°	
Impact speed	(2.9m/s,3.8m/s)	3.5m/s
Impact center distance	230mm、395mm	335mm
blade angle	30°	70°
Blade filleted radius	R=2mm±0.5m	0.8mm
Seat filleted radius	R=1m	
Blade front angle	5°	
Blade back angle	10°	
Sample type& dimension (L x W x T)mm^3	(ISO180-2000 or GB/T 1843-2008) Type-1:80×10×4 Type-2: 63.5×12.7×6.4 Type-3: 63.5×12.7×3.2	

Energy loss	0.5J ≤4.0J 1.0J ≤2.0J 2.0J ≤1.0J ≥4.0J≤0.5J	2.75J ≤0.06J 5.5J ≤0.12J 11J ≤0.24J
Pendulum torque	2J=1.07180Nm 4J=2.14359Nm 5J=2.67949Nm 7.5J=4.01929Nm 15J=8.0385Nm 25J=13.3976Nm 50J=26.7952Nm	2.75J=1.47372 N·m 5.5J=2.9474 N·m 11J=5.8949 22J=11.7897

If the value of pendulum nominal energy is not mensioned on table above, please calculate by following formula :

$M_N = E_N/[1+\sin(\pi/3)] \backsimeq 0.535898E_N$

(M_N：Pendulum torque（N·m） E_N：endulum nominal energy（J）)

Working Conditions:

● Temperature control range: 10℃～35℃

● Relative humidity 80%

● Device securely installed on a solid base, quality on the basis of quality of the pendulum should be at least 40 times, its level for 0.2:1000

● The environment without vibration, without corrosive medium, ● No strong electromagnetic interference.

III.Product Structure

1 the controller
2 shield plate
3 printer
4 power switch
5 anchor
6 pendulum weight
7 start-impact button
8 shield
9 fixture

1, the "controller": the instrument part of the operating system, touch-screen control.

2, "shield plate": prevent the impact after flying out of harm.

3, "printer"： print results.

4, "power switch": controlling the electrical parts of the machine, main power switch, power on then connected.

5, "anchor": a device for supporting machine body.

6, "the pendulum weight": energy-producing device, formed by the impact edge and the weights can be chosen by energy, removable.

7, "start-impact button": releasing the electro-magnet

8, "shield": safty shield

9, "fixture ": clamping device

IV Control Panel Set-up

Control Panel Interface

1, real-time angle, perspective changes with the pendulum swings

2, the maximum angle after impacting

3, test energy loss of equipment

4, current mode

5, zero angle

6, print a test result

7,to set the parameters as per user requeired

8, average value of impact strength

9, impact strength Unit

10, number

11, every impact strength values

12, switch impact modes between sample testing(LOAD) and before sample testing(FRICTION).

13 page turning.

》》》click “CONFIG”, to set up parameters user required.

Clicking on a data entry (single entry) can delete a record and automatically recalculate the average

The sample size information and test type in the right half area are obtained from the system parameters during the last impact. The sample information and test types of different recording groups were not related.

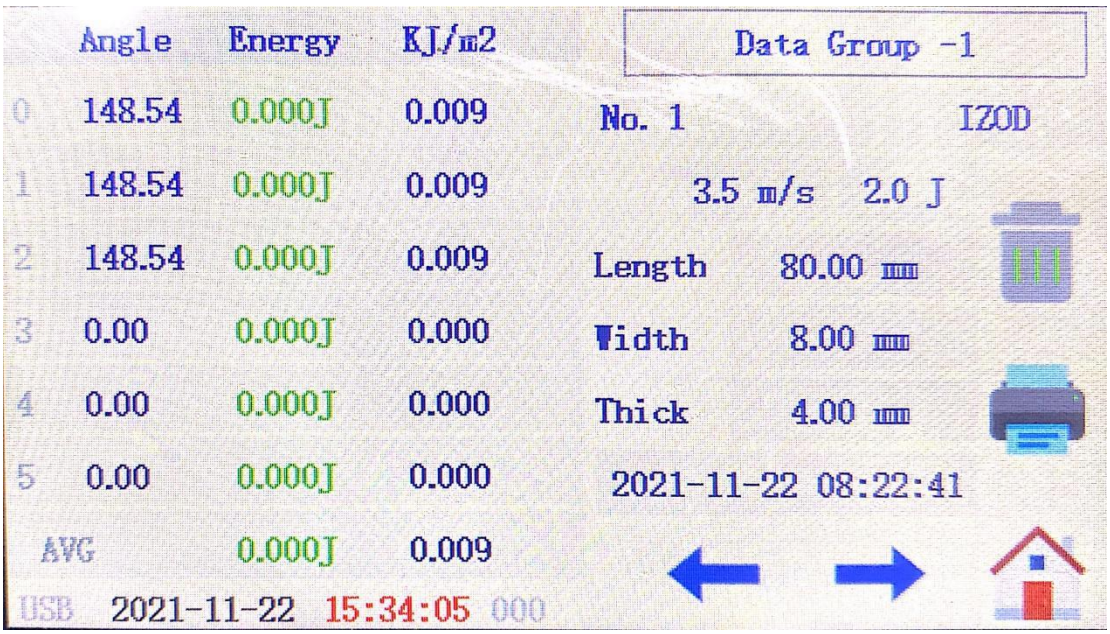
Garbage bin icon : used to clarify the whole content of the group

Printer icon : used for rapid printing data group content (if the U disk has been inserted and identified, a data file will be saved to the U disk synchronously)

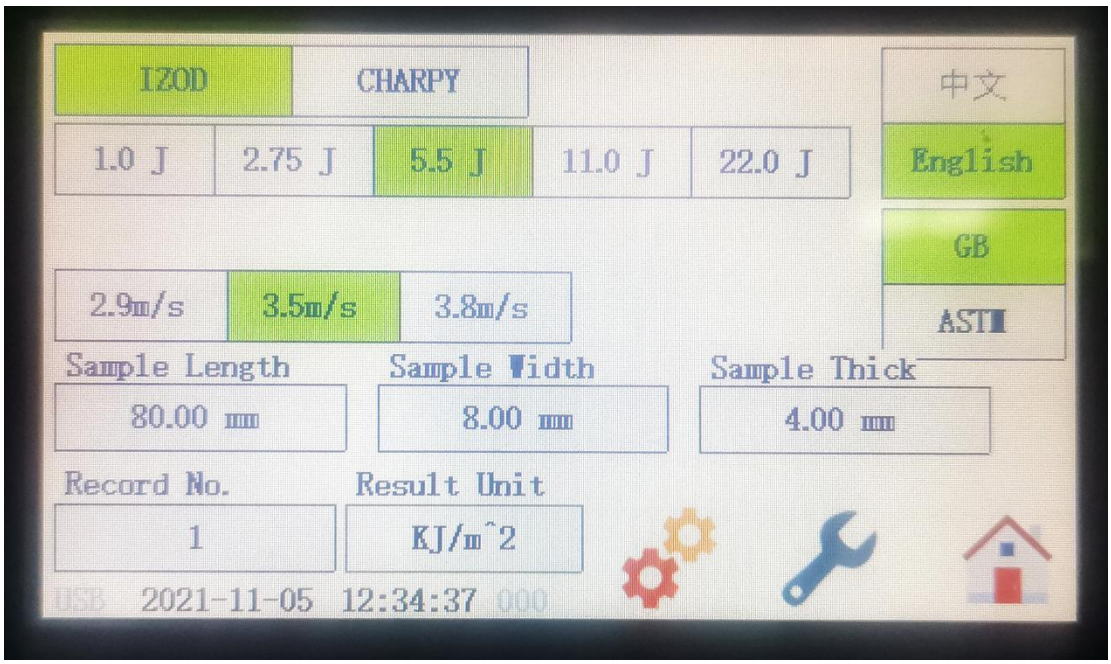
HOME icon : Used to return home page

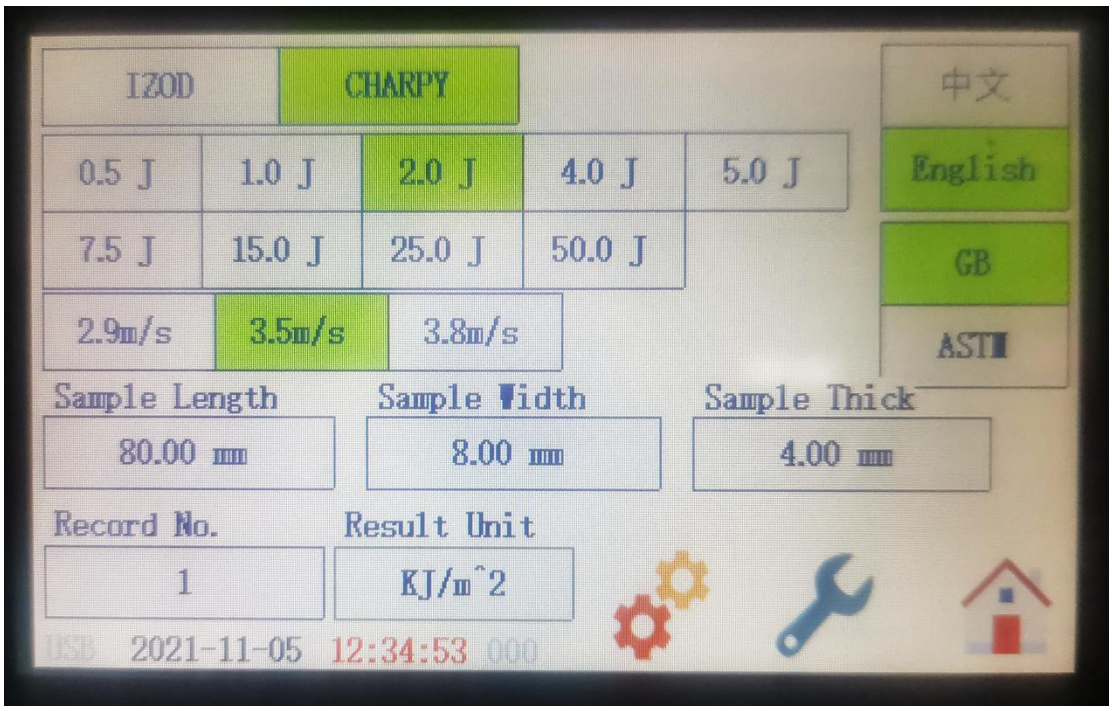
Left arrow : Select the previous record group

Right arrow : Select the next record group



System Settings Page:





(With the version may be updated, the actual product screen may be different)

The screen is used to select test types, input sample information, and select screen display language.

Test number is manual input.

Gear icon : click enter system parameter settings

Wrench icon : click into the system tool page

Operation Process

For excample__Izod impact testing:

Impact energy 5.5J

Unit: KJ/M2

Sample L:80mm,W:10 mm, T:4mm

Gap depth:2mm

Step-1: Connect power, open controller.

Step-2: “CONFIG”,then set up(Energy: “6”=5.5J, Speed: “1”=3.5m/s, Structure: “0”=cantiliver(Izod)

Step-3: Click“  ”, come to sample details setting page. Then set up(L:80mm,W:8mm, T:4mm; Unit: KJ/㎡)

Step-4: Before the test, put the pendulum down naturely, when the pendulum does not move, return to the main screen click on "zero set" zero angle, and then hang the pendulum up, placed in a 150 degree position and hold by shift lever , determining the pendulum running scope without a shade and others.

Step-5: Click the "MODE", impact mode for "FRICTION" and press on the panel "Imapct" button, at the same time electromagnet suction, pendulum move freedomly . on the screen "loss" column, there will be a maximum angle value and energy value, record machine own angle of friction loss and loss of energy.

Remember that this step must be taken before sample testing.

Step-6: Finished testing loss of energy of machine , then place the sample into fixture below, using the right model to determine gaps in position. Pendulum up, placed in a 150 degree position and hold by shift lever block, determining the pendulum running scope without a sutrax and others. Click the "MODE" impact mode to "LOAD", then click on the right side of the Panel "impact" button, pendulum hem naturally . Upon

completion of the action, at the top left of the screen "MAX" appears after impact the maximum angle value, then in the right list number "1", angle and the end result will be displayed, that is xxxKJ/㎡.

Step-7: As did several tests,remove the sample residues, back in new sample, as shown in step 6, pendulum drop, the test results will appear automatically in the number 1~24 (and so on), after the impact testing, result averages will appear in the bottom of the screen

Step-8: If you want delete one piece of results, first click on "impact allowed" state to "shocks/impact prohibited", then select the result you want to delete, click, that ok. the average value will automatically calculates again.

Step-9: Completed all tests, then print out the report.

Step-10: Power off

V Operation norm

1)Before Test

● preparing samples, measure and record the data

No notched samples:

h——thinkness of sample(mm)

b——width of sample(mm)

L——length of sample(mm)

Notched samples:

h——thinkness of sample(mm)

b_N——the remaining width of the Notched samples(mm)

L——length of sample(mm)

Power on:

Sure power wire and signal wire connections are correct, press the power switch, allowing the system to power on, power-on for about 2 seconds and displayed on the LCD screen should be normal, if so, you should check if the electrical system is malfunctioning.

Installation Sample:

Izod Impact Testing

One：

Check the sample, sure samples with no apparent signs of cracks, and uniform, no obvious depression, loss, and so on.

Two--Installation

First sample gap right in the Middle Groove, hold test sample by left hand and hold sample model by right hand. sample model parallel insert on the right side of the sample, let the sample in to the parts in blocks in conformity with the sample gap, equivalent to gap the center point on the fixture on the plane in a plane, and then fixed with right hand rotation handle, clamping the sample.

Izod impact testing:

Impact Strength

σ_{iU} , KJ/㎡(full sample)

σ_{iN} , KJ/㎡(notched sample)

$\sigma_{iU} = W/(h*b)$ $\sigma_{iN} = W/(h*b_N)$

W——Joules in sample damaged(read from display)

h——width of sample(mm)

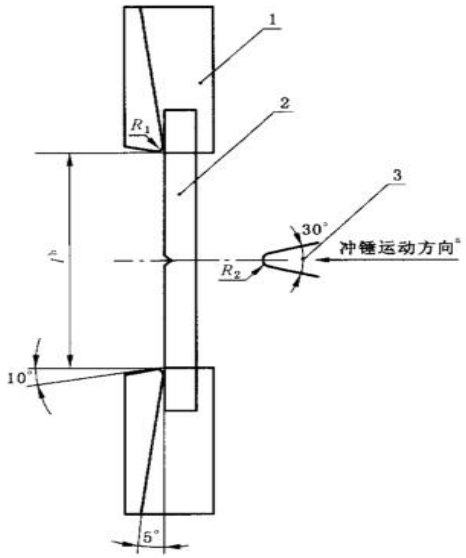
b——length of sample(mm)

b_N——the remaining width of the notched sample(mm)

Note: software programs that will automatically calculate the results.

Charpy impact testing:

First sample gap against the strut right on both ends of the fixture, and then simply supported beam under the pendulum hammer, move the sample, gaps in the center line and hit blades and the contact surface of the spline in a straight line, as can be seen:



Charpy impact testing:

Impact Strength σ_{iU} , KJ/㎡(full sample)

σ_{iN} , KJ/㎡ (notched sample)

$\sigma_{iU} = W/(h*b)$ $\sigma_{iN} = W/(h*b_N)$

W——Joules in sample damaged(read from display)

h——width of sample(mm)

b——length of sample(mm)

b_N——the remaining width of the notched samples(mm)

Note: software programs that will automatically calculate the results.

2) Start testing

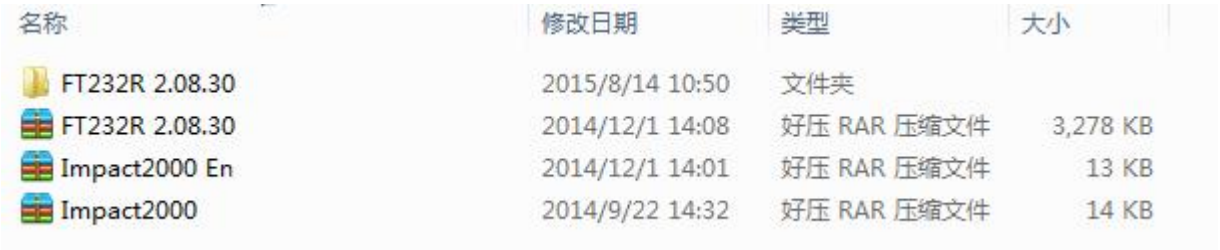
Pendulum hold up his right hand, hanging above the shift lever, press the

"shock" pendulum falls against specimen. If the specimen is not to be thrust right back into play, rebounding to the highest point the pendulum speed minimum, the kinetic energy is close to zero, and quickly put hand caught in the upper right of the pendulum swing to prevent secondary impact specimen.

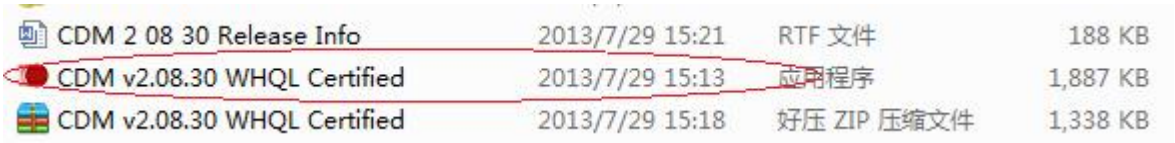
★ Note: there is dangerous in this process, the operator must be sure to master the skills to prevent accidents, sure no person untrained use machine!!!

VI Installation and use of computer sof tware (selection)

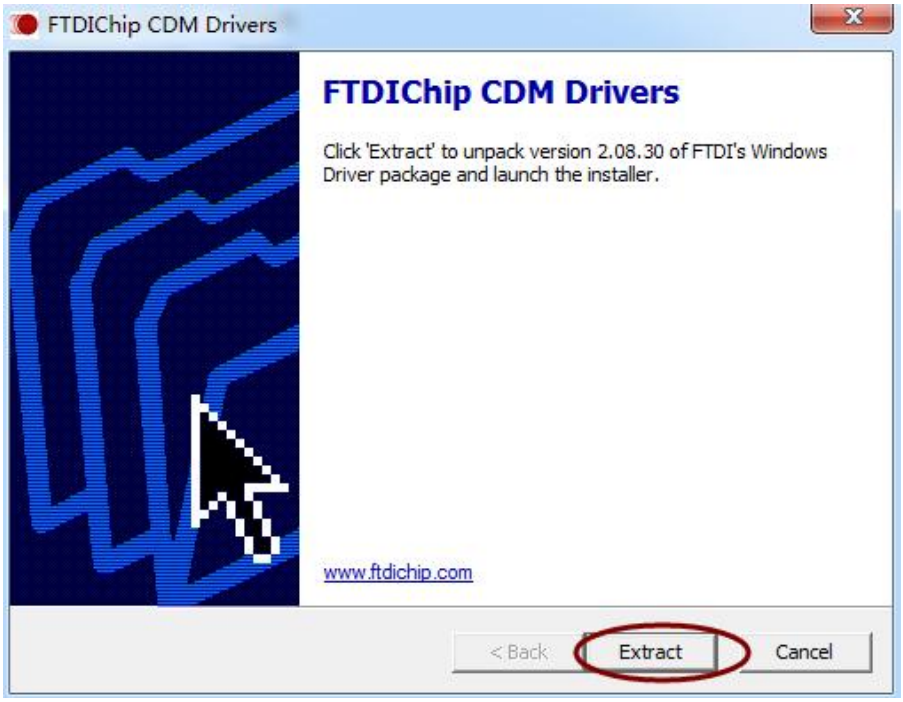
1, insert the computer software disc into the computer optical drive, read the folder content, as follows :



2, First install the ' CDM ' file in the ' FT232R ' folder, as follows :

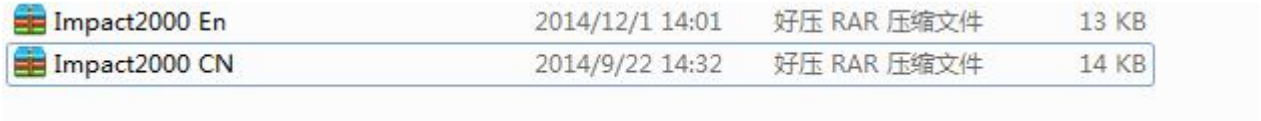


3. Extract was selected according to the prompt :



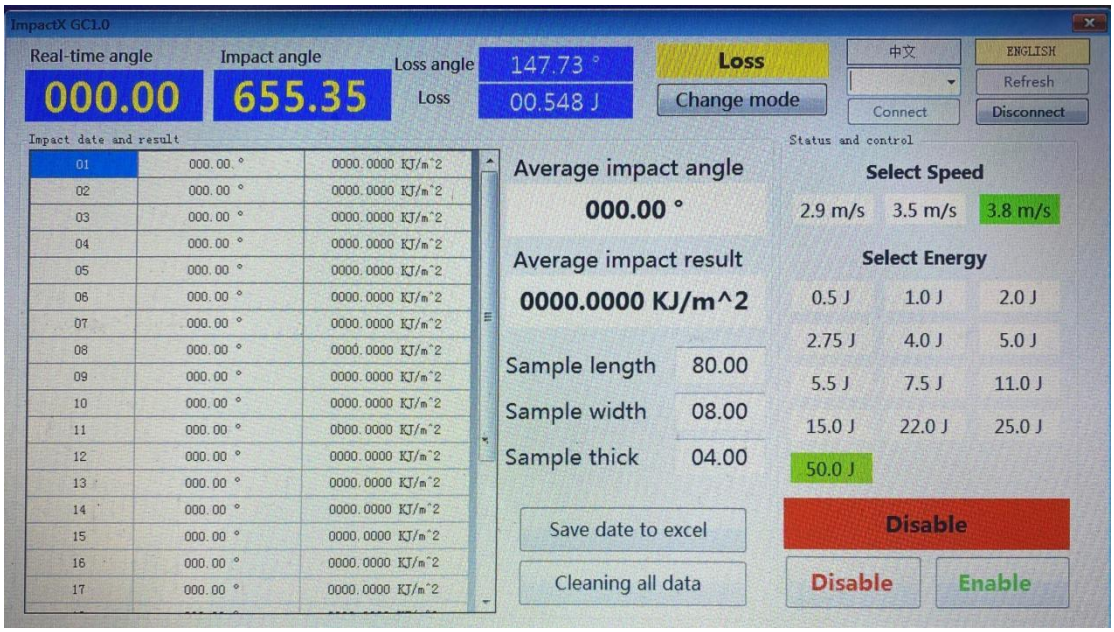
4, according to the prompt ’ next step ’, until the installation is completed, the installation is successful :

5, then open the folder selection software, the software is divided into ' EN ' and ' CN ', representing English and Chinese respectively.



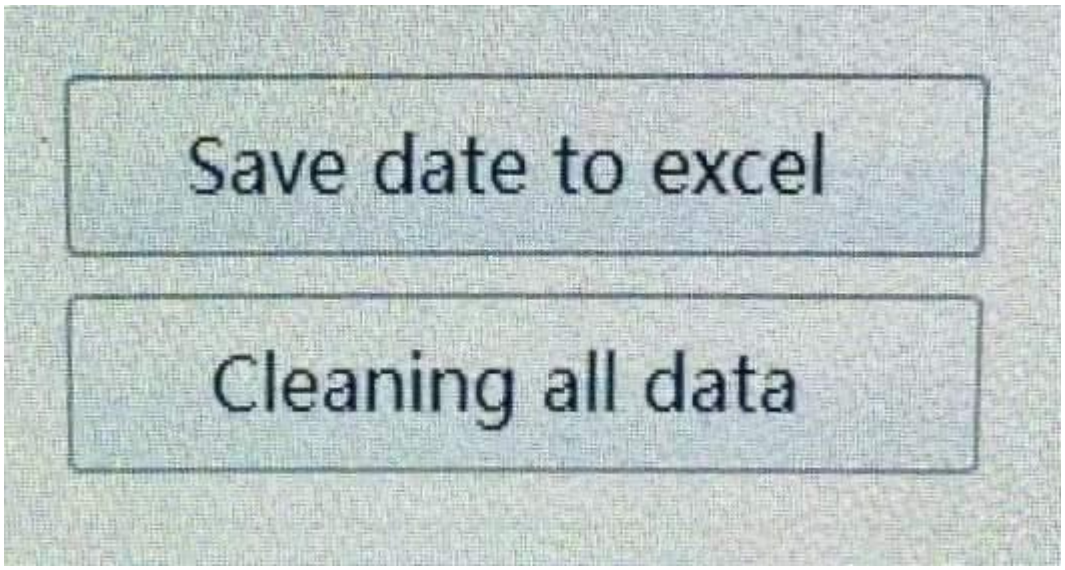
6, open into the folder, select PC software, double-click open, appear the

following picture :

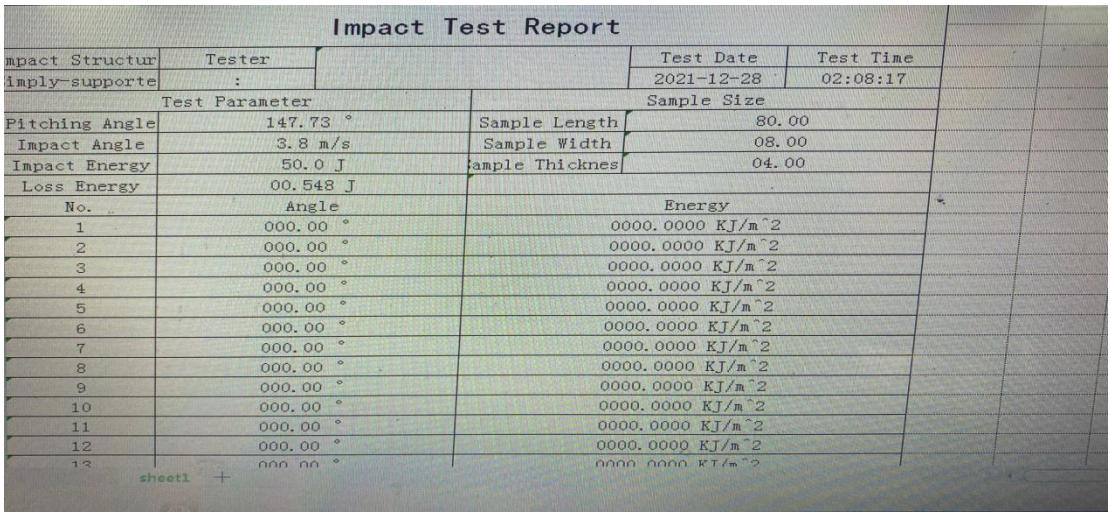


7, Click the refresh port in the upper right corner, the COM port position will appear, and then click the connection device.

8, the test according to the normal operation, to be completed, the test results can be saved to the computer desktop :



9. Save the results as follows :



Impact Test Report

mpact Structur	Tester		Test Date	Test Time
imply-supporte	:		2021-12-28	02:08:17
Test Parameter		Sample Size		
Pitching Angle	147.73 °	Sample Length	80.00	
Impact Angle	3.8 m/s	Sample Width	08.00	
Impact Energy	50.0 J	ample Thicknes	04.00	
Loss Energy	00.548 J			
No.	Angle	Energy		
1	000.00 °	0000.0000 KJ/m^2		
2	000.00 °	0000.0000 KJ/m^2		
3	000.00 °	0000.0000 KJ/m^2		
4	000.00 °	0000.0000 KJ/m^2		
5	000.00 °	0000.0000 KJ/m^2		
6	000.00 °	0000.0000 KJ/m^2		
7	000.00 °	0000.0000 KJ/m^2		
8	000.00 °	0000.0000 KJ/m^2		
9	000.00 °	0000.0000 KJ/m^2		
10	000.00 °	0000.0000 KJ/m^2		
11	000.00 °	0000.0000 KJ/m^2		
12	000.00 °	0000.0000 KJ/m^2		
13	000.00 °	0000.0000 KJ/m^2		

sheet1

VII:Trouble Analysis and Treatment

1. LCD display is not normal

A: Check the LCD control panel connection is secure and no loosening.

2. Results quiret deffer from same samples

A: 1)some samples with raw edges

2)sample clamped is not correct.

3)caused by instability in the process of manufacture of samples for testing physical properties of its own instability. In the manufacturing process of the sample must be strictly controlled samples of manufacturing processes, plastic samples go first few modes of specimens is essential for stability of injection molding machine can be sampled.

4)depth of sample gap is not uniform. Please check the gap system prototype.

5)select the sample with appropriate width and thickness , so that centers of sample and pendulum do not coincide.

6)check the pendulum if damage or deformation.

3. Machine result can not be inconsistent with manual calculation result.

A: specimen thickness and specimen width, reversed on input.

Basis on ISO179-2000 & ISO180-2000, Set up: the remaining width of the notched samples = width of sample - notched depth .

4. Impact test results are quite different from samples result of known

A: Wrong select measuring range

Sample placed orientation do not correct,

5. Unable to use printer

A:1)check the LCD is connected properly

2)check whether the printer correctly.

VIII Maintenance procedure

1- keep cleaning equipment and LCD control system.

2- to prevent high temperatures, humidity, dust, corrosive media, water immerse LCD internal control system and machine.

3- regularly check and maintain the integrity of parts and components.

4- Easy stainless parts coated with antirust oil.

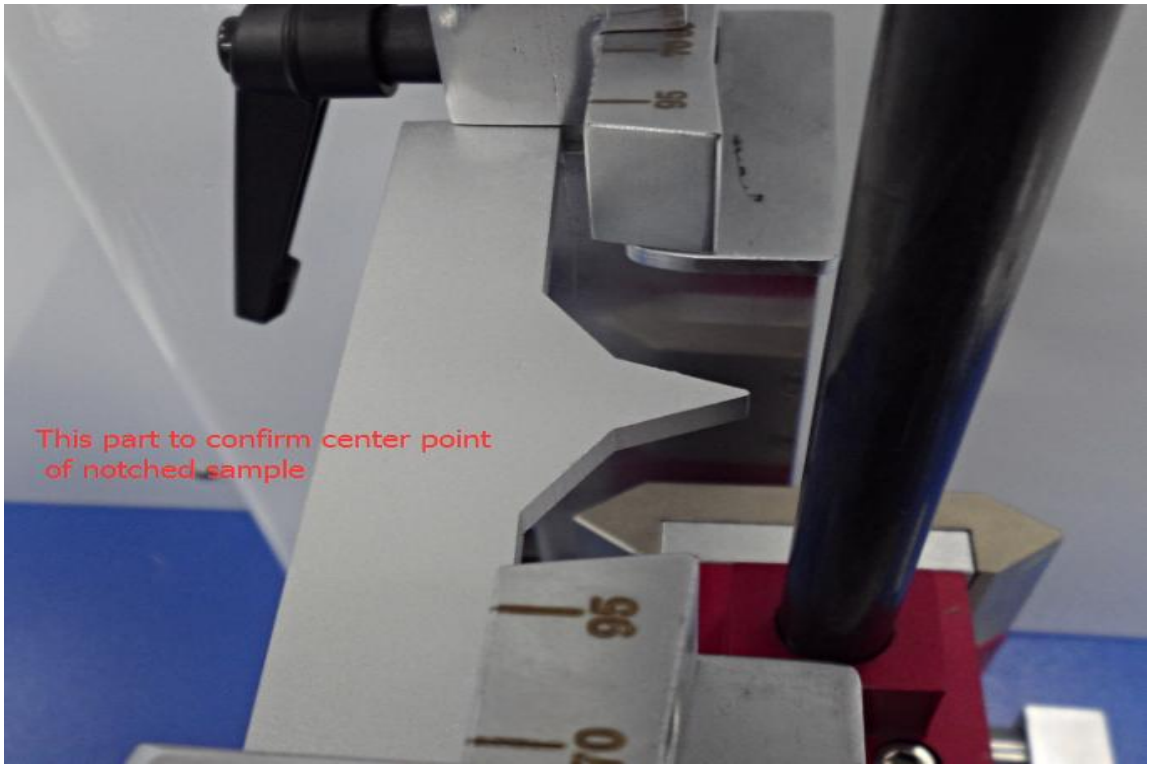
5- Sliding parts, turned parts coated with lubricating oil.

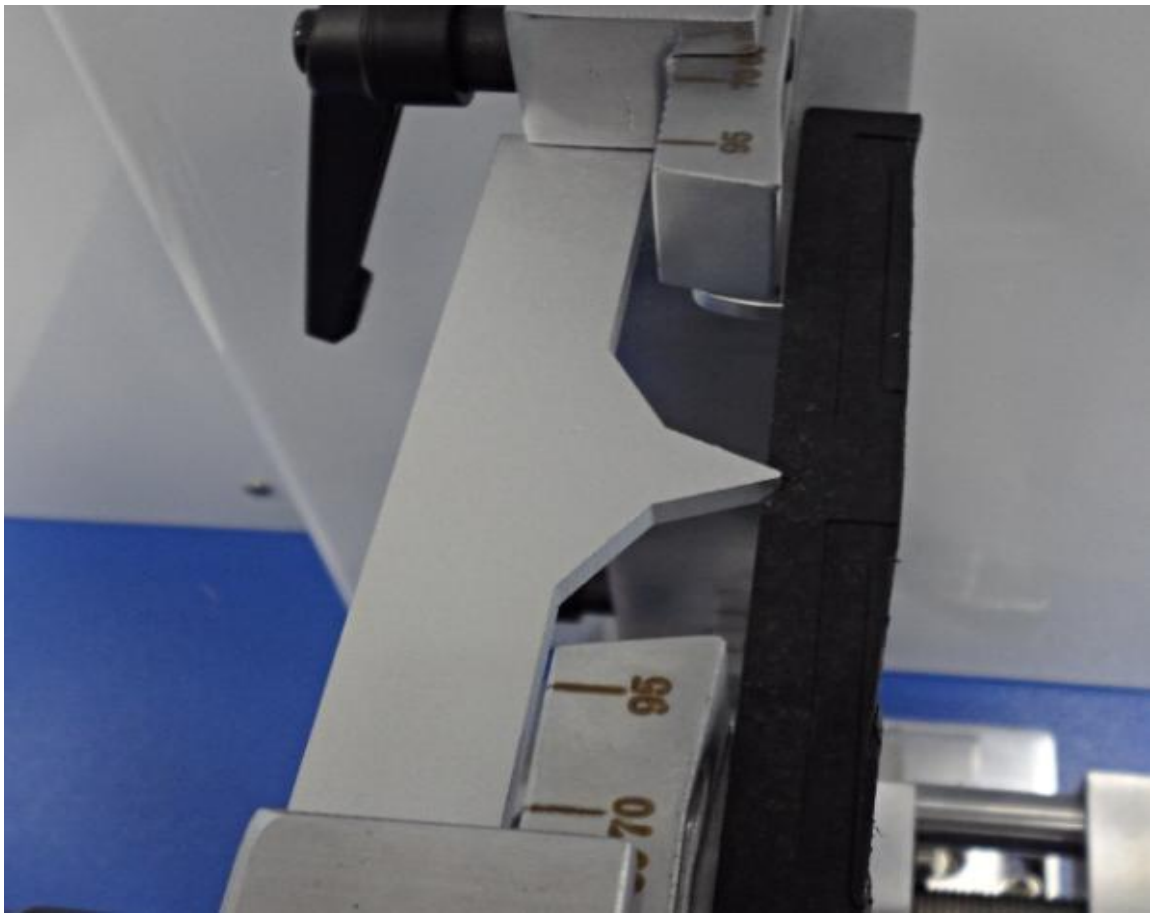
IX.Accessories List:

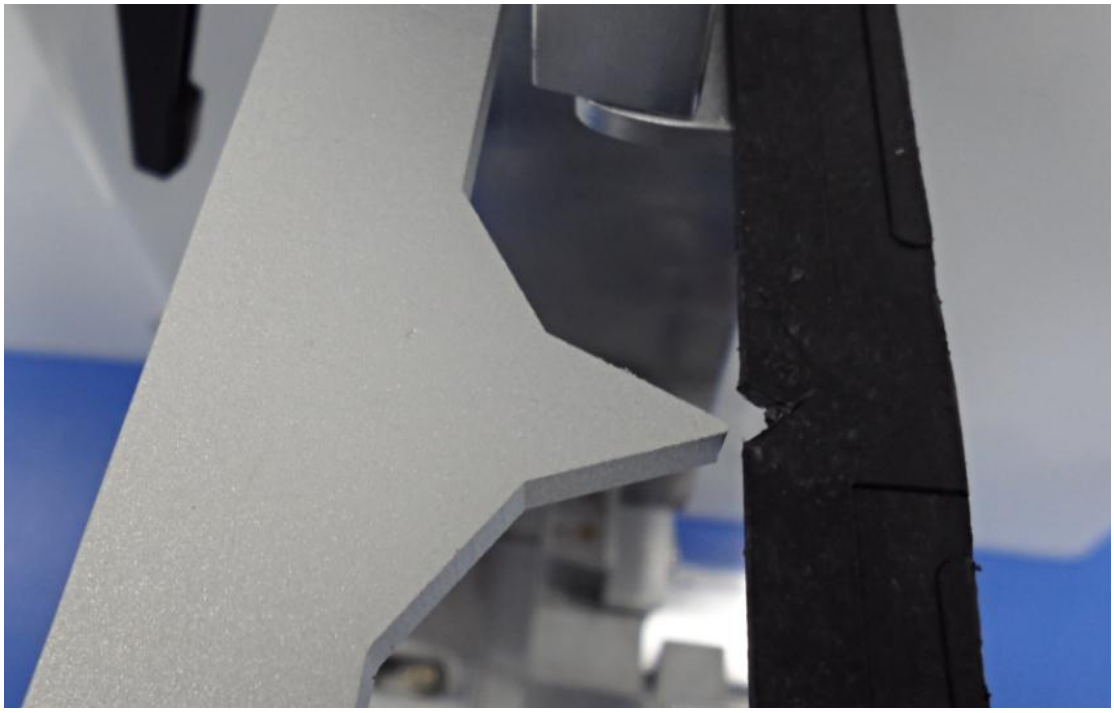
Class	Name	Qty	Unit	Remark
Mainframe	Impact Tester	1	set	
Accessory	2.75J Impact pendulum	1	Pair	IZOD（1J Pendulum with energy, not used alone）
	5.5J Impact weight	1	Pair	
	11J Impact weight	1	Pair	
	22J Impact weight	1	Pair	
	1J Impact pendulum	1	Pair	simply supported beam
	2J 4J 5J Impact weight	3	Pair	
	7.5J Impact pendulum	1	Pair	
	15J Impact weight	1	Pair	
	25J Impact pendulum	1	Pair	
	50J Impact weight	1	Pair	
	Pair model	1	Piece	
	Wrench	1	A set of	
	Printer	1	set	Installed on the machine
	Printing paper	2	Reel	

Attach notice：

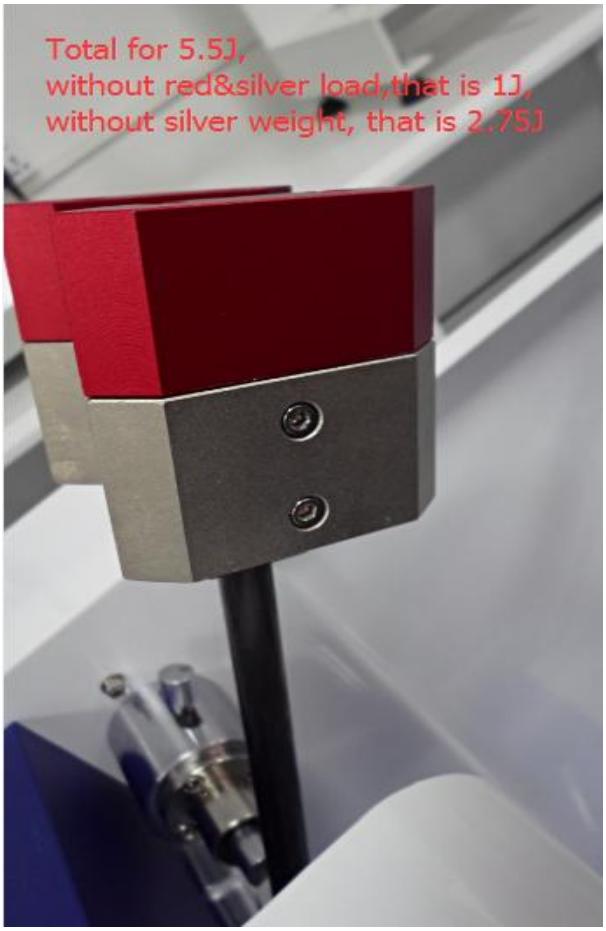
1. Charpy pendulum weight

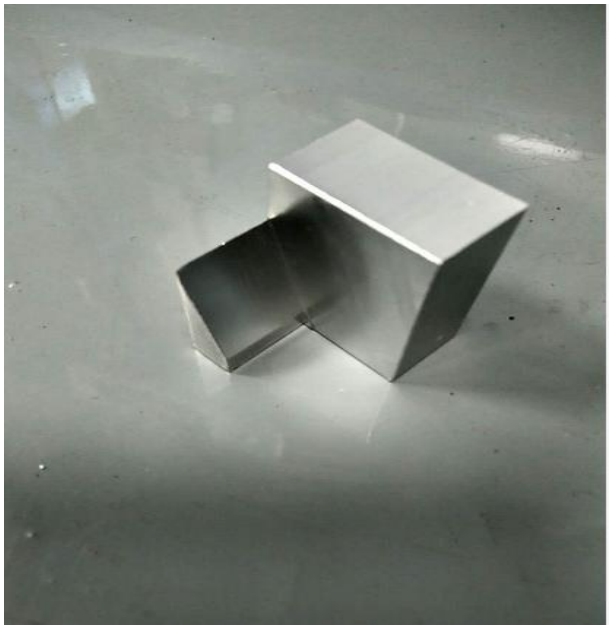

This part to confirm center point
of notched sample
95
70

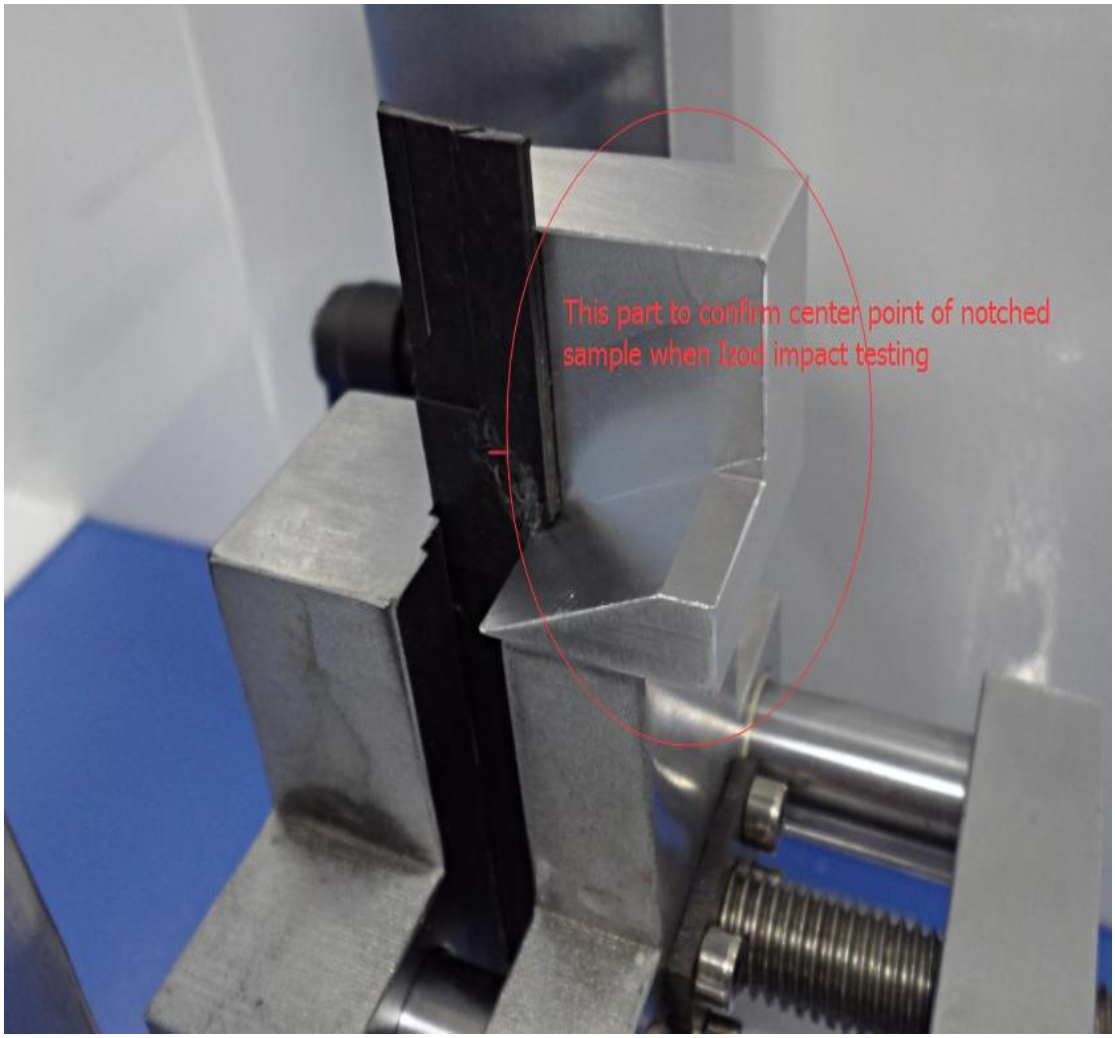

95
70



2.Izod pendulum weight






This part to confirm center point of notched
sample when Izod impact testing