

# 1 Technical Specification IM1C-15

## 1-1 System

Drop height	Range 25mm to 1500mm
Standard drop mass	Linearly guided Ensures perpendicular specimen contact and resistant to side-load effects Fixed mass of 5.0kg Accuracy $\pm 0.5\%$
Variable drop mass (option)	Range 3.0kg to 8.0kg Increments 0.5kg Accuracy $\pm 0.5\%$
Striker (standard)	Titanium striker extension and hardened steel tip ( $\geq 60$ HRC) Wide range of standard and custom interchangeable strikers
Mass arrest	In the event of total specimen failure by pair of shock absorbers
Mass arrest SIPS (option)	Secondary specimen impact prevented by Second Impact Prevention system, rebounding mass arrested using pneumatically activated actuators
Velocity range	0.7m/s to 5.42m/s
Standard energy range	1.2J to 73J using standard fixed mass
Optional energy range	0.75J to 117J using variable mass
Base	Free standing on isolation mounts T-slotted, with datum location for various anvils and supports Width 600mm, Depth 560mm, Thickness 25mm
Tower assembly	Enclosed by panels with front access door Secured to bridge section spanning specimen area Supported on aluminium base-plate
Specimen area	Versatile specimen support chamber with internal dimensions Width 500mm, Depth 450mm, Height 360mm
Access	Impact resistance polycarbonate doors front and rear
Gross Weight	550kg approximately
Overall dimensions	Width 600mm, Depth 600mm, Height 2700mm
Control systems	Imatek C3008 (machine interface) ImpAcqt V3 control software (on PC for impact test sequencing)
Mass positioning	Manual positioning using hand wheel operated catcher Moveable catcher sets release height by digital indicator
Release	Manual release of mass
Safety	Safety is compliant with the European CE machinery safety directive (89/392/EEC & 91/368/EEC - machinery safety EN60204-1:1992). Release of mass prevented when access doors open

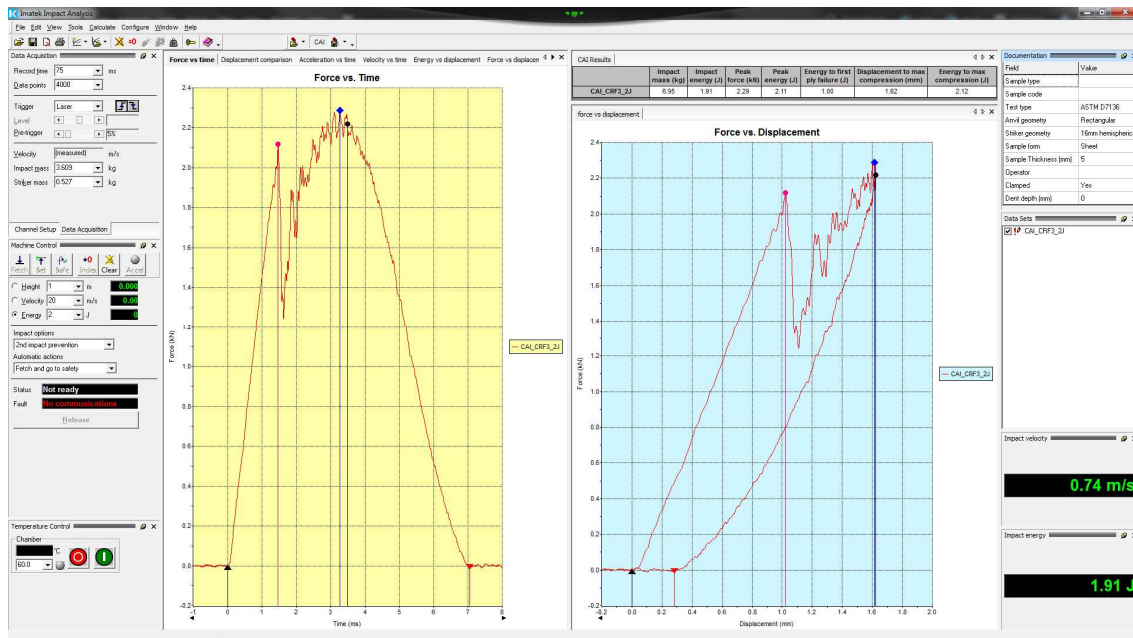


Instrumentation – Force	Impact force measured by Kistler force transducer, mounted immediately behind striker Dynamic rated capacity: 30kN Linearity: <0.1% of rated output. Operating temperature range: -20°C +120°C Safe overload: ±150%
Signal conditioning – Force	By matched charge amplifier Bandwidth: DC – 50KHz, –3dB Range: ±100 to 999,000pC Output voltage: ±10V Linearity: <±0.1% Accuracy: ±0.1% Auto-zero function: automatic zero of force signal output applied as part of test cycle
Data acquisition – Force	Sample rate: 3,000,000 samples per second. Resolution: 16 bits Data points captured per impact: 32,000 Calibrated accuracy: ±0.1% Timebase accuracy: ±0.01% Triggering: from force signal, laser/photodiode detector or external trigger
Data acquisition – Auxiliary	Three additional channels with the same specification, simultaneously sampled
Instrumentation – Velocity	Impact velocity measured immediately prior to impact Rebound velocity measured the same Method: time of flight of target through laser/photo-diode detector Timing resolution: 25ns Target dimensions accuracy <0.1% Overall accuracy: ±0.1%
Displacement measurement (option)	Non-contact optical encoder Range: 25mm Resolution: 10µm Sampling rate: 3,000,000 samples per second
Supplies	Electricity: 230VAC ±10%, 16Amp, 50/60Hz ±1%, 1-phase, Neutral and Protective Earth.
Emissions	Noise: site dependent Vibration: site dependent Dust: none Radiation: none
Operating environment	Temperature: +5C to +30°C Humidity: 0% to 90% non-condensing Electrical immunity: to EN 50 082 All main electrical control systems rated at, or housed in enclosures, with protection category IP55 (to EN 60 529/10.91)

## 1-2 Software specification

Platform	PC running Microsoft Windows OS
Environment	Compatible with MS Office (supports export in native Excel format files, and Windows MetaFiles for graphics)
Purpose	Control of impact testing sequence and analysis of impact data
Access control	<p>Three, password protected levels:</p> <ul style="list-style-type: none"> <li>(a) limited access, to perform pre-defined impact tests</li> <li>(b) supervisor access, to control the type of test performed and the required documentation information etc</li> <li>(c) engineering access, for sensitive configuration and calibration functions</li> </ul> <p>Access is controlled by passwords. The user ID forms part of the test information that has to be entered</p>
Data security	<p>All calibration and configuration information is held as data files on the hard drive of the control PC</p> <p>Password protection of the configuration mechanism provides protection from accidental or malicious modification</p> <p>Standard operating system features provide integrity checking (CRC checksum)</p>
Test information	As standard, the Impact software allows for configuration of what information is stored with each test

## 1-3 Graphical user interface



The GUI provides both control of the impact test (test setup and data acquisition parameters) and analysis of the resulting data.



Control	Data acquisition parameters (sample rate, sweep length) Impact sequence
Indication	Data capture status
Data capture	Force vs time Initial impact velocity Rebound velocity Displacement vs time (option)
Calculations	Acceleration Velocity Displacement Energy User-defined curves User-defined numerical results
Units	Fully configurable units for any requirements Default units: SI, cgs and US
Markers	Configurable system of markers to identify specific points on curve, including: <ul style="list-style-type: none"> <li>▪ start of impact</li> <li>▪ yield load</li> <li>▪ maximum load</li> <li>▪ maximum compression</li> <li>▪ first-ply failure</li> <li>▪ initiation of crack propagation</li> <li>▪ end of crack propagation/test</li> </ul>
Data presentation	Graphs of any standard calculated or measured quantity against any other, including user-defined curves. Appearance of graphs very flexible Tables of numerical results and documentation information Hard copy of graphs and tables User-definable report layout
Other features	Test results database Automatic save of test results Three configurable levels of user access User-configurable documentation fields Frequency analysis of captured data (FFT) and very flexible filtering (Butterworth, Bessel and FFT filter types) Configuration back-up restore mechanism for securing apparatus configuration and calibration information Configurable screen layout Export of test data to Microsoft Excel, Windows Metafile and "comma separated value" (.CSV) file.

## 1.4 Standard options

Raised base frame	Improved ergonomics for specimen loading/recovery
CAI test	Compression After Impact testing to requirements of ASTM D7136 (for 4inch x 6inch coupons or metric equivalent) Striker and support fixture as defined by ASTM D7136
Plaque test	Multi-axial impact test of polymers and films to standard methods such as ISO6603, ASTM D3763, ASTM D5268, ASTM D1709

# Imatek Impact Test Systems

## Drop Weight Impact Testers



Charpy test	Testing to standard test methods such as ISO179, ASTM D6110
Izod test	Testing to standard test methods such as ISO180, ASTM D256
Temperature chamber	For pre-conditioning specimens at high/low temperature
Additional DAQ Channels	Additional DAQ channels, up to 16 in total, with synchronous sampling at 5ms/s
Integrated High Speed Video	Visual recording of impact event Full control using systems software Captured images linked to graph markers Measurements can be taken direct from images.
Motion analysis	Automatic 2-D tracking of unlimited number of points Automatic 1-D tracking of edges Extraction of velocity, angular and displacement data Lens calibration Data export in Excel, DIAdem, Matlab

