

# 1 Technical Specification IM1-P

## 1-1 System

Drop height	Set by mechanical top stop Range variable from 250mm to 1200mm
Drop mass	Fixed, 10Kg Accuracy $\pm 0.5\%$ Range of standard and custom interchangeable strikers
Mass arrest	By pair of self compensating shock absorbers
Velocity range	2.2m/s to 4.85m/s
Energy range	24J to 118J
Overall dimensions	Free standing on isolation mounts Width 1000mm, Depth 800mm, Height 3000mm
Tower assembly	Enclosed by panels with electro-mechanical interlocked front access door
Test geometry	Strikers anvil and clamp arrangement to ISO6603 Alternative geometry available to ASTM D3763 and D5628
Access	Impact resistance polycarbonate doors to front with electro-mechanical interlocks
Drop parameter control	Drop height set by position of top stop cross-bar
Gross Weight	800kg approximately
Control systems	Pneumatic Imatek C3008 (machine interface) ImpAcqt V3 control software (on PC for impact test sequencing)
Release	By pneumatic actuator
Safety	Safety is compliant with the European CE machinery safety directive (89/392/EEC & 91/368/EEC – machinery safety EN60204-1:1992). Access to sample area protected by solenoid-locked doors when the impact mass is in an unsafe position. Release mechanism electrically and pneumatically isolated when access doors are open. All safety systems dual circuit and fail-safe. No unsafe release of the impact mass possible under any of the following conditions: <ul style="list-style-type: none"><li>(a) failure of mains power supply</li><li>(b) failure of compressed air supply</li><li>(c) failure of control software</li></ul>
Instrumentation – Force	Impact force measured by Kistler force link, mounted immediately behind striker Dynamic rated capacity: $\pm 30\text{kN}$ . Linearity: $<0.5\%$ of rated output.

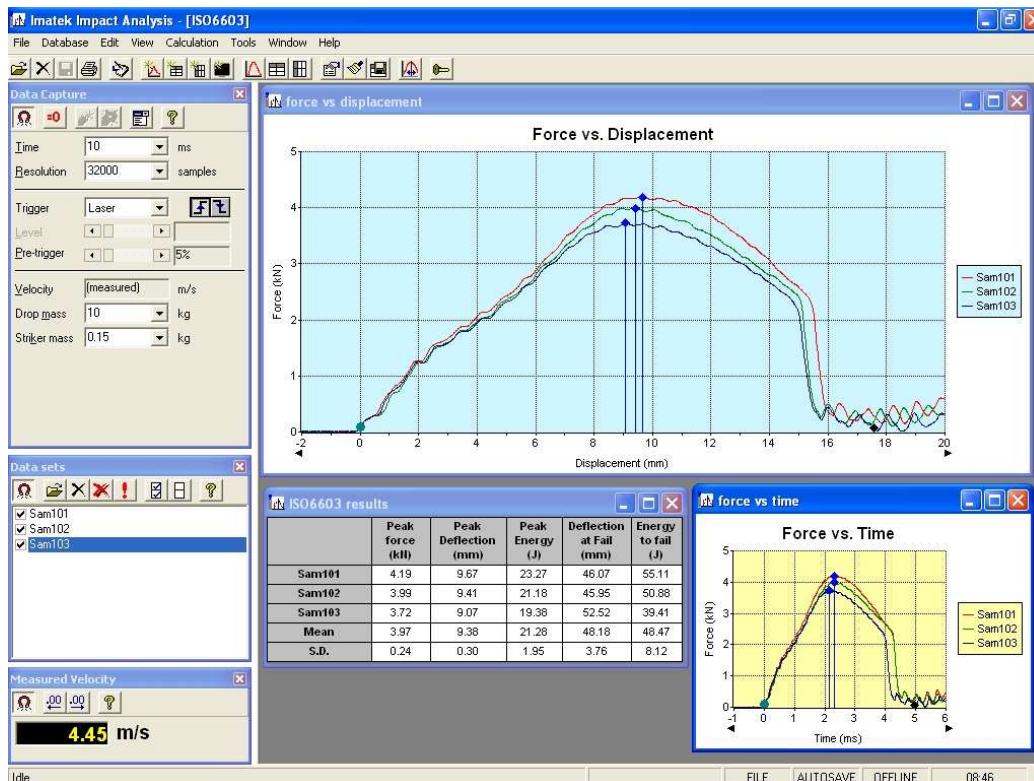


	<p>Hysteresis: &lt;0.5% of rated output. Operating temperature range: -20°C to +120°C. Safe overload: ±150%.</p>
Signal conditioning – Force	<p>By matched charge amplifier Bandwidth: DC – 50KHz, –3dB Range: ±100 to 999,000pC Output voltage: ±10V Linearity: &lt;±0.1% Accuracy: ±0.5% Auto-zero function: automatic zero of force signal output applied as part of test cycle</p>
Data acquisition – Force	<p>Sample rate: 3,000,000 samples per second. Resolution: 16 bits Data points captured per impact: 50,000 Calibrated accuracy: ±0.1% Timebase accuracy: ±0.01% Triggering: from force signal, laser/photodiode detector or external trigger</p>
Data acquisition – Auxiliary	<p>Three additional channels with the same specification, simultaneously sampled</p>
Instrumentation – Velocity	<p>Impact velocity measured immediately prior to impact Method: time of flight of target through laser/photo-diode detector Timing resolution: 25ns Target dimensions accuracy &lt;0.1% Overall accuracy: ±0.1%</p>
Performance	<p>Overall accuracy of force measurement: ±0.75% Overall accuracy of absorbed energy: ±1.5%</p>
Supplies	<p>Electricity: 230VAC ±10%, 5Amp, 50/60Hz ±1%, 1-phase, Neutral and Protective Earth. Air: 0.5Mpa to 0.8Mpa clean non-lubricated air</p>
Emissions	<p>Noise: site dependent Vibration: site dependent Dust: none Radiation: none</p>
Operating environment	<p>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 IP61 (to EN 60 529/10.91)</p>

## 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 Impactqt 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 (impact tester and data acquisition parameters) and analysis of the resulting data.



Control	Specimen clamp/unclamp/stripper Mass release Data acquisition parameters (sample rate, sweep length) Impact sequence
Indication	Machine status Current impact mass position
Data capture	Force vs time Initial impact velocity
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>▪ 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.