

## Product Information

### Amsler HIT600F drop weight tester

CTA: 217141 217132



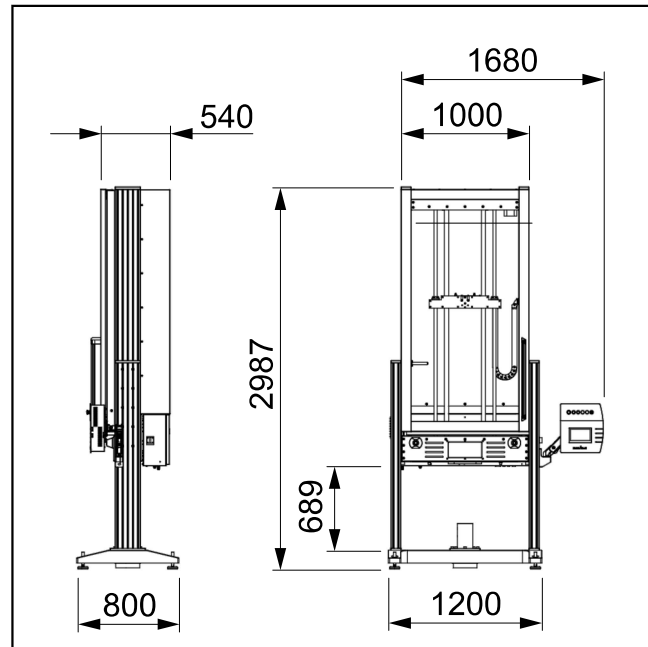
Amsler HIT600F

#### The universal drop weight tester for materials testing

This drop weight tester is the perfect measuring instrument for requirements imposed by many specification standards in the automotive industry. These require testing at different speeds. Testing at low impact speeds of 2.2 m/s requires a larger drop weight; if testing at 6.6 m/s is required, acceleration is necessary. The Amsler HIT600F provides this flexibility. The feed and safety concept is optimized for operator convenience and safety. With this drop weight tester, pre-conditioned test plates can be inserted and impacted in less than five seconds.

#### Application

- Puncture test on plastics to ISO 6603-2 and ASTM D3763
- Accelerated puncture test on plastics in accordance with various automotive standards
- Puncture test on films to ISO 7765-2
- Pre-damaging of fiber-reinforced composites (CAI) to ASTM D7136, DIN EN 6038 and AITM 1.0010, Boeing BSS 7260, SACMA SRM 2R-94, DIN 65561
- Charpy and Izod impact tests to ISO 179-2, ASTM D6110 and in accordance with ISO 180 and ASTM D256



Amsler HIT600F, dimensions

#### Advantages and features Amsler HIT600F

##### Ergonomics & efficiency

- Excellent test area accessibility, enabling rapid completion of test series.
- Easy, manual feeding of cooled specimens without installation of a temperature chamber.
- No need to manually open safety devices in the test area.
- Automatic series mode in testXpert III allows for series testing without operator interaction between individual specimens.
- Automatic lubrication of the impactor.

##### Flexibility

- Multiaxial puncture of plates and films
- CAI
- Low impact velocity of 2.2 m/s with large drop weight of 40 kg
- Higher impact velocity of 6.6 m/s due to acceleration
- Impact velocity 1 m/s with 40 kg to ISO 6603-2 for brittle plastics
- Charpy and Izod impact tests

The modular design allows for a wide variety of applications and the fulfillment of automotive industry requirements.

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#### Intuitive and workflow oriented touch operation

- All test-related settings are grouped logically and are separated from higher-level system settings. The operator is guided through test configuration step by step.
- Optimal coordination of testing and evaluations between drop weight tester and software.
- Display of measuring graphs on the instrument to allow for direct and timesaving selection of the type of damage.

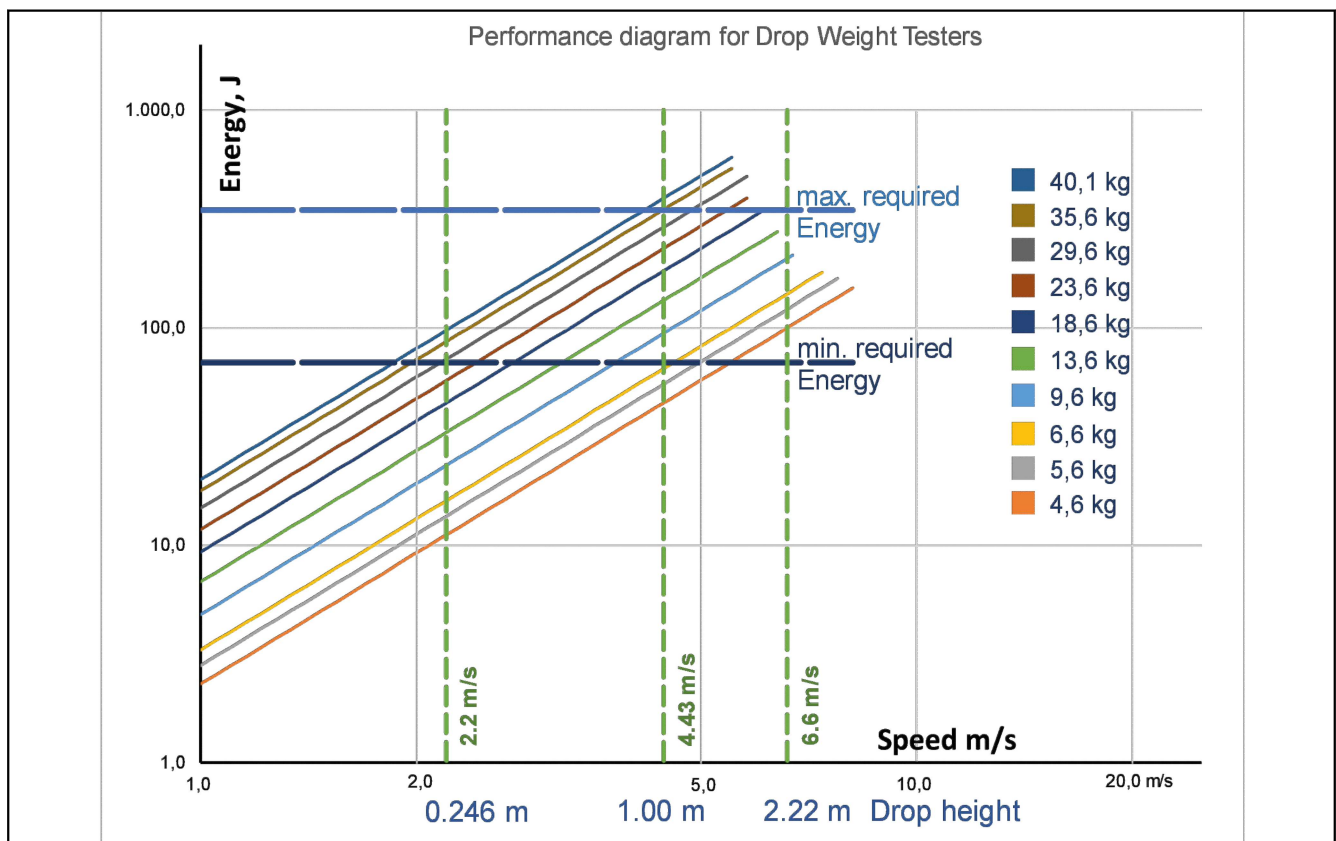
#### Reliable test results

- High natural frequency allows for accurate test results.
- High data acquisition rate of 4MHz for all measurement channels ensures measuring graphs at the best resolution.
- Large transient memory enables measurement values to be saved in full resolution for brittle and ductile materials.

#### Explanation of the performance diagrams

A drop weight tester is specified through the speed at the point of impact and the minimum required energy. These two variables can be represented in a performance diagram, thus showing the working range of the drop weight tester. The minimum required energy results from the specimen to be tested. It has to be at least 2.8 times as large as the energy absorbed by the specimen on impact.

CTA: 216475



Performance diagram Amsler HIT600F with mass carriage up to 40.1 kg. Minimum and maximum required energy for average plastics in a multiaxial puncture test.

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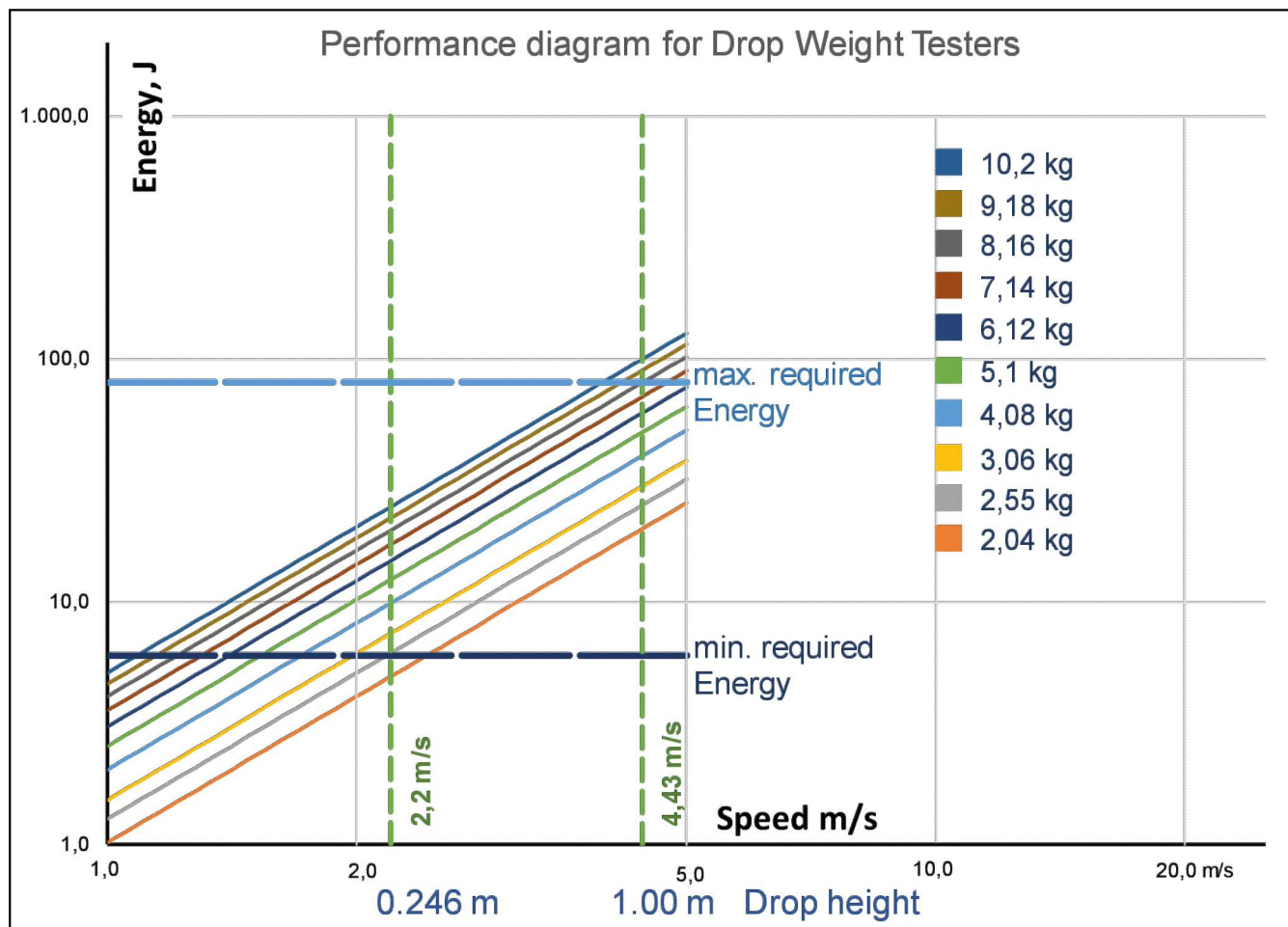
### Amsler HIT600F drop weight tester

#### Mass-energy-speed table

Amsler HIT600F with acceleration unit, standard-mass carriage and specimen thickness 2 mm

Mass [kg]	Speed [m/s]	Energy [J]
4,6	8,5	166,2
9,6	7,3	255,8
14,6	6,7	327,7
19,6	6,4	401,4
24,6	6,2	472,8
29,6	6,0	532,8
34,6	5,9	602,2
40,1	5,7	651,4

CTA: 217747



Performance diagram Amsler HIT600F with mass carriage up to 10.2 kg. Minimum and maximum required energy for average plastics in CAI.

## Product Information

### Amsler HIT600F drop weight tester

The Amsler HIT600F drop weight tester can be used for multiaxial puncture tests as well as pre-damaging of CAI plates. Depending on the application, corresponding accessories must be selected. The two sets of equipment can be easily converted, so that one drop weight tester can be used for both applications.

#### Accessories for multiaxial puncture test

Accessories for the multiaxial puncture test consist of a mass carriage with single masses, impactor, appropriate clamping rings and mountings, and lubricant for the impactor. Based on the application, there is an option to expand the speed and energy ranges with an acceleration unit.

#### Impactor

The innovative design of the entire force measurement chain delivers very low-noise measured values. This ensures reliable detection of characteristic material properties in the force-deformation curve. Every impactor is instrumented with a Piezoelectric sensor. It is used to measure the force and calculate the deformation of the specimen (travel). A separate travel measurement is not necessary. The impactor is selected according to standard or the expected maximum force, and must always be combined with the corresponding clamping ring. All impactors are manufactured with hardened steel.

of the specimen support, whereby reliable test results are achieved. In addition, the mounting collects the specimen remains in the inner free space. The mounting also provides a fixture for unclamped testing.



Impactor with clamping ring

#### Lubrication of the impactor

For testing to ISO 6603-2 it is necessary to lubricate the hemispherical surface of the impactor to reduce friction between the impactor and the specimen. The drop weight tester Amsler HIT600F allows for automatic lubrication of the impactor before every impact. The impactor is lowered into the oil impregnated foam element before the test, and after being lubricated it automatically returns to the set drop height.

#### Acceleration unit

The acceleration unit can be used for higher speeds and energies. The acceleration unit is mounted on the drop weight tester's top crosshead. The drop weight is additionally accelerated via spring force, covering common automotive industry requirements.

#### Accessories for Charpy and Izod impact tests

Accessories for Charpy and Izod impact tests include a mass carriage with single masses, an impactor and corresponding test tool with accessories. Properties of the mass carriage with single masses and of the impactor are more closely described with the multiaxial puncture test.



Impact body with sample

#### Mountings & clamping rings

Depending on the diameter of the impactor, a pair of clamping rings has to be selected, which includes a support ring (bottom) and a clamping ring (top). A specimen is securely gripped between the two clamping rings with use of the drop weight tester's pneumatic clamping mechanism. Depending on the test standard or the inner diameter of the clamping rings, a corresponding mounting is selected. The mounting has a solid structure to minimize deformation

All data at ambient temperature.

Subject to change in the course of further development.

CTA: 45580

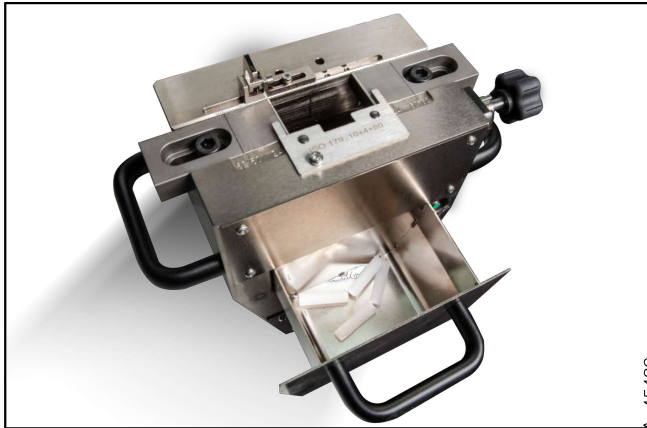
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## Product Information

### Amsler HIT600F drop weight tester

CTA: 243952



Charpy test tool with specimen tray

#### Charpy and Izod test tools

Test tools are selected according to the required test application. For Charpy tests, accessories for centering purposes and corresponding anvils are required. The Izod test also requires accessories for centering as well as clamping jaws and inserts for the test tool.

CTA: 243996



Izod test tool with specimen tray

#### Advantages of a temperature conditioning box relative to a temperature chamber for testing of plates

At low temperatures impact strength is a critical characteristic value of the material used. For cooling of the specimens, ZwickRoell offers a temperature conditioning box for the Amsler HIT230F and Amsler HIT600F.

All data at ambient temperature.

For testing at low temperatures the specimens are first conditioned in this temperature conditioning box.

The specimens are then placed one after the other directly from the temperature conditioning box into the drop weight tester and tested within a time period of 5 sec. (per specimen).

This method is significantly faster when compared to the installation of a temperature chamber. The temperature conditioning box can also be easily moved and used to cool other specimens.

CTA: 45489



Specimen cooling box

#### Accessories for pre-damaging of plates (CAI)

The accessories for pre-damaging of plates (CAI) consist of a mass carriage with single masses, anti-rebound device, impactor, CAI drawer unit and clamping device.

#### Mass carriage

The mass carriage with single masses of 2.04 kg to 10.2 kg in 0.5 kg increments and the variation in drop height enable accurate setting of the damage energy. The mass carriage also includes a single mass holder that is attached to the drop weight tester profile. It can be used for safe storage of single masses that are not installed.

Subject to change in the course of further development.

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CTA: 45563



CTA: 45542

Quick and easy change of the single masses

#### Anti-rebound device

A mechanical device stops the drop weight after first impact, preventing multiple impacts. This ensures that the defined damage energy is only applied once.

#### Impactor

The innovative design of the force measurement chain delivers very low-noise measured values. The targeted pre-damage application can thereby be monitored in detail.

#### Light barriers

The actual impact velocity is precisely determined shortly before the point of impact.

#### CAI drawer unit

The CAI drawer unit carries the clamping device. The clamping device can therefore be easily moved out of the test axis, allowing for quick and easy specimen gripping.

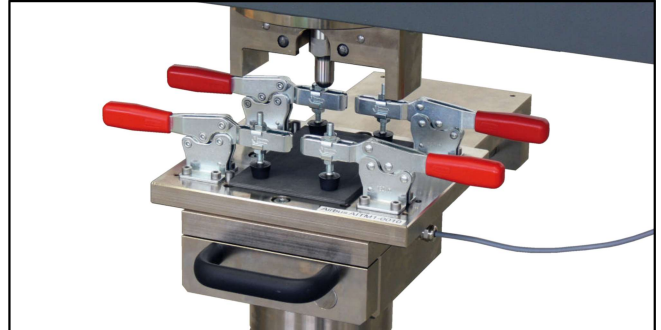
CTA: 233087



Amsler HIT230F, CAI drawer unit for CAI clamping device

#### Accessories

The appropriate clamping device must be selected based on the standard or specimen shape. A distinction is made between Boeing and Airbus.



CAI clamping device

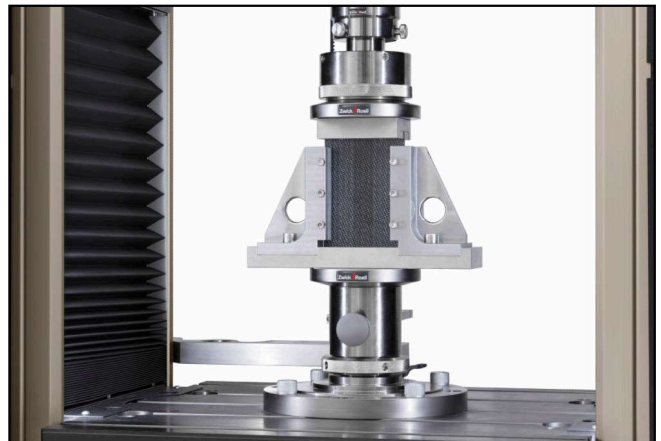
#### CAI Compression Test

The specimens that are pre-damaged in the drop weight tester are tested using a special compression test fixture in a static materials testing machine to determine residual strength. The compressive forces that arise are typically very high.

A special compression test fixture is used to load the test plates so they do not buckle. These test plates differ according to standard:

- ASTM, Boeing, SACMA and DIN: all four sides are guided, but not gripped.
- ISO, EN and Airbus standards: the upper and lower ends of the specimen are gripped. The sides are guided with linear contact.

CTA: 201513



CAI compression test fixture, Airbus version

## Product Information

### Amsler HIT600F drop weight tester

#### Technical data

Type Item No.	Drop weight tester Amsler HIT600F 1078762	
Potential energy, without acceleration unit, max.	550	J
Potential energy, with acceleration unit, max.	650	J
Potential energy, min.	2.3	J
Drop height, dependent upon the testing equipment, max.	1400	mm
Drop height, dependent upon the testing equipment, min.	50	mm
Drop weight, max.	40.1	kg
Drop weight, min.	2.04	kg
Weight level, min.	0.5	kg
Specimen thickness, max.	15	mm
Impact velocity, dependent upon the testing equipment, max.	5.2	m/s
Impact velocity, dependent upon the testing equipment, min.	1	m/s
Impact velocity, dependent upon the testing equipment, with acceleration (accessory), max.		
With 4.6 kg	8.4	m/s
With 40.1 kg	5.7	m/s
Force signal resolution	16	bit
Measured-value rate (force signal), max.	4	MHz
Dimensions		
Height	2987	mm
Width	1200	mm
Widthwith instrument electronics	1680	mm
Widthwith instrument electronics and open safety door	2120	mm
Depth	800	mm
Weight, with typical accessories, approx.	1020	kg
Specific floor load (applied via the machine footprint)		
Floor load (applied via the load frame surface)		
Static, Based on typical accessories	10.4	kN/m <sup>2</sup>
Display	Capacitive touch display	
Ambient temperature	+10 ... +35	°C
Relative humidity (non-condensing)	20 ... 90	%
Scope of delivery	Ethernet cable Light barrier for determination of impact velocity	
<b>Power input specifications</b>		
Power plug	CEE 7 (ground contact)	

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Type	Drop weight tester Amsler HIT600F	
Item No.	1078762	
Power supply	230	V, 1Ph/N/PE
Current consumption, max.	14.8	A
Power consumption (full load), approx.	3.4	kVA
Power frequency	50/60	Hz
<b>Compressed air</b>		
Supply pressure	5.5 ... 8	bar
Operating pressure	5 ... 8	bar
Compressed air consumption (compressed air) per impact or test	2	l
Required air-supply output-rate	600	l/min
Compressed air connector plug	DN 7	
Maintenance unit	Mounted on instrument	