

2018

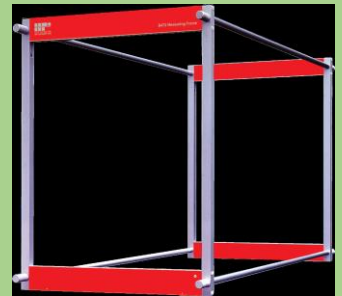
Ballistic Test Equipment



1. Barrels, Breeches & Launchers



2. HSV, Velocity Measurement & Instrumentation



3. Backstops, Target Handling & Conditioning Equipment



4. Grenades, Projectiles, Ammunition & Reloading Equipment



5. Lighting, Extraction, CCTV & Misc Range Equipment



1: Barrels, Breeches & Launchers

Through top tier manufacturing partners Hephaestus is able to supply to order ballistic test barrels in any calibre up to 14.5mm. manufactured from the highest grade materials with cut rifling Hephaestus barrels provide market leading performance, durability and longevity.

Barrels can be provided to customers external profile specifications, custom rifling profiles and smoothbore barrels are also available on request. Pressure ports can be drilled to customers requirements and barrels supplied with or without pressure measurement sensors (Kistler or HPI).

To compliment this range of barrels Hephaestus can also supply the Hep-B universal receiver system. With its unique quick change, self centring barrel system the Hep-B automatically accommodates differences in headspacing whilst at the same time fully the rear of the cartridge case providing enhanced levels of safety in the event of a case or primer failure.

Hephaestus accept commissions for bespoke launchers and impact testers for applications such as ice and debris impact up to heavy item (i.e. wheel assembly) launch as well as low velocity gas launchers for body armour fragment testing.



Data Sheet



Hephaestus Small Arms Test Barrels

Description

The Hephaestus Small Arms Test Barrel product line (up to 14.5mm) are a range of high grade test barrels, produced to the highest tolerances to suit a wide range of applications. Through close work with expert manufacturing partners, Hephaestus is now able to provide a turnkey service for test barrel procurement using bespoke, sniper quality stainless steel barrels. The benefits of Hephaestus barrels when compared to conventional options are greatly increased accuracy, projectile stability, more consistent velocity control and increased barrel life compared to conventional steel test barrels.

As part of this range, we are able to offer standard specification barrels to suit NATO ammunition from .17calibre through to .50calibre with standard and custom chambering. Whilst offered un-proofed for ballistic testing purposes with universal breech systems, proofing is available upon request (via the UK's London Proof house), as is specialist fitting (coming standard with a metric thread of your choosing at the receiver). Customer specific rifling profiles are available on request.

Specialist barrels

Through working with our specialist team of rifleshooters we are able to offer specialist barrels for specific requirements. These now include specialist rifling for low velocity and subsonic firings, special and surrogate ammunition barrels and hyper velocity, low drag barrels. Whilst the same levels of accuracy cannot be guaranteed with these systems due to the inherently experimental nature of the ammunition, these systems can facilitate stabilisation in flight of almost any projectile that can be practically loaded.



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Hephaestus is also able to offer custom chambering. This may allow use of a wildcat cartridge, an experimental or modified projectile or use of now obsolete ammunition types. Previously this approach has been used for production of high accuracy FSP launch systems and hyper velocity systems for small fragments.

Capability and options

Hephaestus maintains a UK stock of .224, .30, .338 and .50-barrel blanks ready for processing on an ongoing basis with almost all other calibres available on a short lead time upon request.

Barrel length can be up to 38" with standard/stock barrels having a finished length in the 26-28" length range. The specifics of this can be confirmed on quotation to suit customer requirements.

Fitting of the Hephaestus barrels is bespoke to each system, as such the Hephaestus barrels are delivered either unfinished or to suit your requirements in a range of metric and imperial standard thread types.

Specialist fitting is available upon request, this can include but is not limited to pressure tapping, mounting for sighting systems or threading for muzzle mounted accessories and instrumentation.



Data Sheet



Hephaestus Universal Breech System 'Size B'

Description

The **Hephaestus Universal Breech System Size B (Hep-B)** is the medium size (up to 20mm inc 14.5x114) offering from Hephaestus Consulting Ltd with the same standard features and base design as all breeches in the Hephaestus range. These gun systems are designed to be cost effective, simple to use, compact and, above all else, safe, reliable and easy to maintain.

Compared to most universal receiver systems of similar capacity range, **Hep-B** is compact and very light, saving space in the range and storage but also facilitating safe and easy manual handling of the system.

With its slimline design, the **Hep-B** becomes a very effective system for use in multi-barrel or burst-fire systems or small operations where space is at a premium. In its entirety, the HepB main housing comes in at a mere 325mm long and 120mm wide.

As a fail-safe capability, the **Hep-B** is capable of being electrically or manually fired, either directly or via a lanyard. This prevents the compromise of a trial due to power failures or electrical failures, especially prudent when operating in harsh or adverse environments.

Barrel mounting in the **Hep-B** system is achieved through a single, threadless self aligning barrel attached nut (or in some cases a nut direct machined into the barrel blank). This system removes large, sloppy and



jammable threads as well as allowing the easy dismantling of the housing for cleaning and maintenance. Additionally, as no parts are required to slide over the barrel the **Hephaestus Barrel Mounted Sight Rail (BMSR)** can be applied to each barrel allowing permanent attachment of shockproof sighting systems to each barrel. In most cases this prevents the need to zero on each set up meaning a barrel can be installed and immediately used without time consuming setup.

A key point of pride for Hephaestus is the quality of our products. As such, we have direct input at every stage of design and manufacture. In the case of the Hep-B, we can guarantee 100% on-shore UK manufacture and have used a combination of 30 years ballistics experience, 3D CAD and FEA techniques to ensure as far as possible the operational safety of the unit with pressure safety levels assessed in excess of 3x the standard limits of the cartridges designed for.

Specifications

Feature	Specification Hep-B
Calibre range	4.6x30mm to 20mm FSP
Safety features	Auto-Safety Self retracting firing pin Safe-cock Firing pin block/ratchet engages at the very beginning of the cocking operation and prevents striking of the primer in the case of accidental release of cocking handle. Screw-in safety pin prevents accidental firing and cannot be accidentally removed / knocked off Stressed for 30x173 proof pressures
Firing mode	Single shot manual action
Sighting systems	Set up for integration of all standard sighting systems to customer requirements. Compatible with Hephaestus BMSR system. Specialist fittings can be arranged upon request.
Bench fitting	4 bolts and 2 dowel pins for attachment as standard (bolt pattern available in most drawing formats), alternatively the unit can be supplied with a base plate or combined with the Hephaestus integrated recoil and impact adjustment system.
Barrel fitting	The Hep-B system utilises a self headspacing barrel system. As part of this the Hephaestus self-aligning barrel nut provides rapid barrel changes with no risk of large, locked up threads or incorrectly set headspacing.
Dimensions (mm)	The complete operational unit will be ~400mm long, ~150mm wide and 150mm tall varying slightly with headspacing and required firing system.
Mass (kg)	Approximately 23kg depending on specification
Environmental finish	A variety of environmental finishes are available upon request. As standard most exterior components are coated with heavy duty black Epoxy paint or powder coat finish. Other colours are also available. Working components are manufactured from corrosion resistant materials wherever possible though some will require a light oil finish for longevity and smooth operation.



Maintenance, spares and enhanced capability components

A wide selection of spare components is available for the Hep-B gun system. From the outset the Hep-B has been designed as a minimal moving part system and so minimal wear items are seen.

Wear and spare items	
Item	Specification
Firing pins	Firing pins are a consumable item to any test facility. As such the Hephaestus system use a simple, easily replaced pin available on a short turnaround from Hephaestus Consulting Ltd. A variety of pin diameters are available to suit different primer types.
Bolt face	Whilst not a standard wear item the bolt face of any firearm takes the brunt of wear and punishment during a high pressure firing or a case failure. Should the bolt face become damaged during such an event these are individually available upon request.
Solenoid	As the only standard electrical components on the HepB system the solenoid is considered a mid-term wear item. This can either be replaced with a correct Hephaestus supplied unit or with an appropriately powerful off the shelf model.
Hephaestus Barrel Nut	The proprietary Hephaestus Barrel nut is designed to allow repeatable, quick and safe changing of barrels. These can either be supplied as a “blank” with only out OD profile completed, threaded to your requirement or fully fitted to a supplied/purchased barrel. It is advised that for full use of the breech system each barrel should be furnished with a nut although they are able to be moved between barrels depending on the compatibility of the barrel threads.

Enhancements and optional extras

As a simple but effective breech system the Hep B can be treated as a kit system for specific tasks. This includes electrical firing and mobile test ranges; the necessary parts are supplied in kit form but can be supplied individually for the purposes of spares.

Enhanced capability kits	
Item	Specification
Barrel Mounted Sight Rail (BMSR)	Supplied as a kit requiring only basic workshop tools to fit the Barrel Mounted sight rail allows addition of a sighting system directly to each barrel allowing for permanent zeroing of the optical system to the barrel and reducing shot wastage.
Rimfire compatibility add-on	Provided as a small kit to enable compatibility with rimfire cartridges in the Hephaestus Breech systems (spares for system available separately)
Pressure tapping compatibility kit	For some projects pressure measurement of cartridges is necessary for analysis. This package allows fitment of case-mouth Kistler sensors. The barrel must be provided for compatibility checks and fitment to the package.
Electrically isolated firing pin kit (measurement)	This kit allows measurement of primer contact to assess cartridge pressure behaviours and initiation. It can also be applied to check contact with the primer has been achieved to assess actions in event of a cartridge failure.
Electrical initiation kit	The specialist electrical initiation kit can be added to the HepB system to be used with electrically initiated cases (Typically 27V). This system allows the firing pin to become the firing electrode for relevant cases.
Travel cases	Due to the compact size of the Hep B breech system and Barrel sets we can offer travel cases for their storage and transport as an add on item. These are available in three configurations; as a breech only case, as a breech and standard barrel (up to 1” profile and 26” length plus barrel nut or as a breech and barrel set unit to fit your specific requirements.



Related products

Hephaestus Provides a turnkey service for ballistic test equipment with a wide selection of off the shelf and tailorable ballistic apparatus to furnish any facility. Other products related to the Hephaestus B Breech system include;

Related products	
Product	Specification
Hephaestus A breech system	The Hephaestus A Breech system is the smaller sibling of the HepB, this system operates in the same manner at the HepB but for calibres up to .338Lapua cartridges (95mm C.O.A.L.)
Hephaestus C breech system	The Hephaestus C Breech system is the larger sibling of the HepB, this system operates in the same manner at the HepB but for calibres larger than 20mm. These units are semi-bespoke with the specific capability of these units determined by customer requirements and design limits.
Hephaestus Ai, Bi and Ci Breech systems	With lettering coinciding with the HepA, B and C range as previously described, the “i” range incorporate the Hephaestus insulated firing pin system for measurement, the “+” range providing the electrical initiation version.
Hephaestus Ap, Bp and Cp Breech systems	With lettering coinciding with the HepA, B and C range as previously described, the “p” range incorporate pressure measurement compatible fittings for the breech systems. These can be incorporated with the “i” series breeches to provide timed pressure and initiation analytical capability for ammunition monitoring and testing.
Hephaestus Barrels	Hephaestus consulting are able to provide high quality, precision barrels in all small arms calibres as well as larger calibre barrels. For further information please contact Hephaestus as each barrel requirement requires individual tailoring.
Hephaestus Integrated Recoil and Impact Adjustment platform	The Hephaestus recoil table provides recoil absorption as well as elevation and azimuth adjustment in an exceptionally compact and robust package. Standard products designed to interface directly with Hep-A and Hep-B breeches.
Hephaestus Range Benches	Hephaestus is able to design and produce bespoke and standard range tables for all requirements. Current benches are operating with systems up to 30x165mm cannon.



Data Sheet



Hephaestus Triple Shot Burst-Fire Gun System

Description

The **Hephaestus BFG System** offering from Hephaestus Consulting Ltd is a triple shot burst fire test gun for ballistic testing of armour and insensitive munitions. Based around the Hephaestus size B receiver and matched recoil plate this single system can accommodate every weapon calibre from .22r to 20mm with only barrel swaps being required. Leaning on the same standard features and base design as all breeches in the Hephaestus range the BFG system is designed to be cost effective, simple to use, compact and, above all else, safe, reliable and easy to maintain.

A typical supply package includes a floor mounted range table, 3 independently adjustable recoil plates (>3 degrees of adjustment in azimuth and elevation) rated to 14.5mm and a range of Hephaestus Stainless steel test barrels. Typical combinations include 5.56mm, 7.62mm & 14.5mm as well as 0.5" as a standalone for IM testing. With its slimline design, the **Hephaestus BFG** is a very effective system for use in multi-barrel or burst-fire systems or small operations where space is at a premium. In its entirety, the footprint of the system is a mere 1020mm long and 610mm wide.

The BFG system is typically supplied to function with a customers firing system though a Hephaestus designed system can be provided on special request. As a fail-safe capability, the **BFG** is capable of manually fired, either directly via a lanyard on each breech. This prevents the compromise of a trial due to power failures or electrical failures, especially prudent when operating in harsh or adverse environments.



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Barrel mounting in the **Hep-B** system is achieved through a single, threadless self aligning barrel attached nut (or in some cases a nut direct machined into the barrel blank). This system removes large, sloppy and jammable threads as well as allowing the easy dismantling of the housing for cleaning and maintenance.

As each receiver is a standalone unit a single BFG unit can also replace a standard universal receiver within a firing range as each breech can be operated individually for conventional single shot ballistic testing. Furthermore multiple calibres can be simultaneously installed for when a test standard calls for a range of ammunitions to be fired (i.e. STANAG level 1 requiring 5.56mm and 7.62mm). This reduces setup time as all the barrels for a days testing can be installed during initial setup saving time and increasing shot rate throughout the test serial.



Specifications

Feature	Specification Hep-B
Calibre range	.22r & 4.6x30mm to 20mm FSP
Safety features	Auto-Safety Self retracting firing pin Safe-cock Firing pin block/ratchet engages at the very beginning of the cocking operation and prevents striking of the primer in the case of accidental release of cocking handle. Screw-in safety pin prevents accidental firing and cannot be accidently removed / knocked off Stressed for 30x173 proof pressures
Firing mode	Single shot manual action & 3 shot burst fire in excess of 0.1s shot spacing (+/- 0.006s firing signal dependent)
Sighting systems	Set up for integration of all standard sighting systems to customer requirements. Supplied with 1x picatinny rail per reciever. Specialist fittings can be arranged upon request. All three barrels individually adjustable for impact location



Bench fitting	4 bolts and 2 dowel pins for attachment as standard (bolt pattern available in most drawing formats) for mounting with the Hephaestus integrated recoil and aimpoint adjustment system.
Barrel fitting	The Hep-B system utilises a self headspacing barrel system. As part of this the Hephaestus self-aligning barrel nut provides rapid barrel changes with no risk of large, locked up threads or incorrectly set headspacing.
Dimensions (mm)	1020x650x1000
Mass (kg)	
Environmental finish	A variety of environmental finishes are available upon request. As standard most exterior components are coated with heavy duty black Epoxy paint or powder coat finish. Other colours are also available. Working components are manufactured from corrosion resistant materials wherever possible though some will require a light oil finish for longevity and smooth operation.

Maintenance, spares and enhanced capability components

A wide selection of spare components is available for the Hep-B gun system. From the outset the Hep-B has been designed as a minimal moving part system and so minimal wear items are seen.

Wear and spare items	
Item	Specification
Firing pins	Firing pins are a consumable item to any test facility. As such the Hephaestus system use a simple, easily replaced pin available on a short turnaround from Hephaestus Consulting Ltd. A variety of pin diameters are available to suit different primer types.
Bolt face	Whilst not a standard wear item the bolt face of any firearm takes the brunt of wear and punishment during a high pressure firing or a case failure. Should the bolt face become damaged during such an event these are individually available upon request.
Solenoid	As the only standard electrical components on the HepB system the solenoid is considered a mid-term wear item. This can either be replaced with a correct Hephaestus supplied unit or with an appropriately powerful off the shelf model.
Hephaestus Barrel Nut	The proprietary Hephaestus Barrel nut is designed to allow repeatable, quick and safe changing of barrels. These can either be supplied as a “blank” with only out OD profile completed, threaded to your requirement or fully fitted to a supplied/purchased barrel. It is advised that for full use of the breech system each barrel should be furnished with a nut although they are able to be moved between barrels depending on the compatibility of the barrel threads.



Enhancements and optional extras

Built around the simple but effective Hep-B breech system the Hep BFG can be treated as a kit system for specific tasks. This includes electrical firing and mobile test ranges; the necessary parts are supplied in kit form but can be supplied individually for the purposes of spares.

Enhanced capability kits	
Item	Specification
Barrel Mounted Sight Rail (BMSR)	Supplied as a kit requiring only basic workshop tools to fit the Barrel Mounted sight rail allows addition of a sighting system directly to each barrel allowing for permanent zeroing of the optical system to the barrel and reducing shot wastage.
Rimfire compatibility add-on	Provided as a small kit to enable compatibility with rimfire cartridges in the Hephaestus Breech systems (spares for system available separately)
Pressure tapping compatibility kit	For some projects pressure measurement of cartridges is necessary for analysis. This package allows fitment of case-mouth Kistler sensors. The barrel must be provided for compatibility checks and fitment to the package.
Electrically isolated firing pin kit (measurement)	This kit allows measurement of primer contact to assess cartridge pressure behaviours and initiation. It can also be applied to check contact with the primer has been achieved to assess actions in event of a cartridge failure.
Electrical initiation kit	The specialist electrical initiation kit can be added to the HepB system to be used with electrically initiated cases (Typically 27V). This system allows the firing pin to become the firing electrode for relevant cases.
Travel cases	Due to the compact size of the Hep B breech system and Barrel sets we can offer travel cases for their storage and transport as an add on item. These are available in three configurations; as a breech only case, as a breech and standard barrel (up to 1" profile and 26" length plus barrel nut or as a breech and barrel set unit to fit your specific requirements.



Service Information Sheet

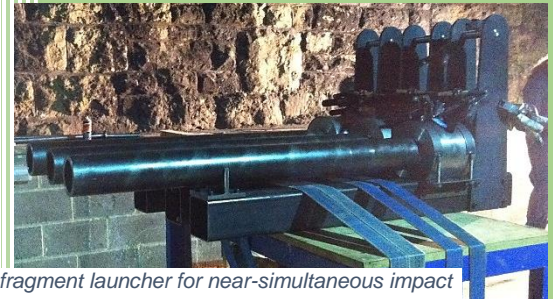
Abnormal Threat Services

Hephaestus Consulting specialises in providing test and evaluation services for not only established standards but also for novel, improvised or otherwise unusual threats / environments.

Regardless of threat, requirement, task or standard Hephaestus has the ability and knowhow to provide launch services, equipment and scientific testing. Primarily we use a combination of gas and powder cannons and a variety of sledding facilities provided by our third party partners to achieve an accurate and, repeatable test in a quantifiable and scientific manner.

Examples of our previous work have included launching bricks, rubble and paving slabs at armoured vehicles, dropping 80kg paving slabs on component assemblies and even the effects on vehicle mounted equipment from an armoured vehicle driving through thick, mature vegetation at speed.

In addition to scientific testing to support the armour community Hephaestus also supply services to TV and media companies.



Triple barrelled fragment launcher for near-simultaneous impact

If you require a service or even just advice on how to scientifically achieve an unusual or unattainable trial please don't hesitate to contact us. The exacts of our services vary project to project but are broadly grouped into the classes seen below.

	Service may include
Technical consultation	Technical support, requirement interpretation and advice on an ad-hoc basis. This service is ideal for customers with experience in the ballistics and trials preparation field facing a new or unusual challenge
Test equipment	Design and manufacture of test equipment
Trials conduct and management	Complete trials conduct, management and technical reporting for the, completion and reporting of the trial
Project management	Complete end to end support of the trials and qualification process. This will include; interpretation of the standards it needs to meet, development of the process to qualify the product in a repeatable fashion and aftercare to develop the product to meet any failures.
Current Equipment	25mm Smoothbore high velocity and Ice launcher 75mm Medium velocity debris / fragment launcher 75mm Shocktube 210mm Low velocity brick / debris launcher



Data Sheet

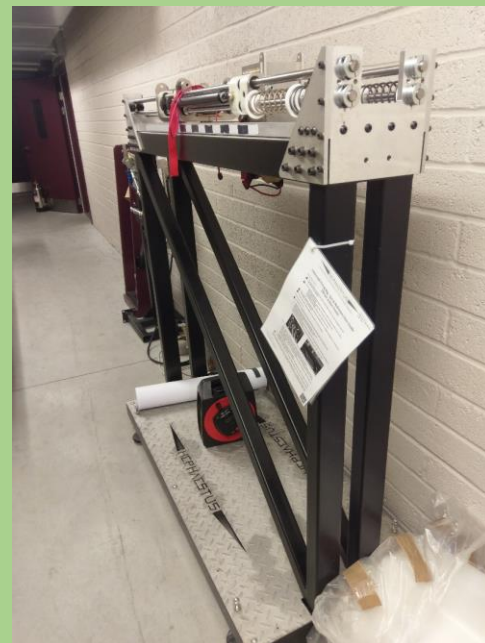
Recoil Representative Static Firing Rig: Rifles & Long Guns > 0.600"

Description

The Hephaestus small arms firing rig is designed for the static firing of long barrelled fire-arms up to 0.600" in calibre. The rig is designed to hold the firearm in a manner which is representative of the human shooter and to apply the same recoil forces (over the same time period) as would be experienced in manned firings.

The rig consists of 4 parallel rails arranged in pairs. A sliding carriage runs on these rails and consists of a front section comprising of a slider and fore-end grip, a pair of link side plates connect this front section to a rear slider consisting of slider / stock grip assembly. The stock grip attaches to the firearm stock directly and allows the stock to fall for use in break-action guns. The stock grip interlocks into the rear sliders and is held in place with two toggle clamps (one per side).

A pair of adjustable hydraulic dampers (which operate in both recoil and return stroke) are mounted between the rails and react against the front section of the slider. These dampers are protected from accidental damage by the link side plates. An array of coil springs are mounted co-axially with the rails behind the rear part of the carriage such that they are compressed on recoil. A number of different springs of different spring rates are used to represent the true movement and behaviour of the human shooter. These springs can be adjusted / swapped to represent shooters of differing stature.



Technical details

Dimensions (rig)	W = 223mm, L = 1400mm, H = 130mm (when fitted to appropriate table to allow for depth of stock support)
Typ Dimensions (table + rig)	W = 600mm, L 1400mm, H = 1487mm
Max / Min Firearm Dimensions	<p>Fore grip: WxD 75x60mm Stock: WxD 30x150mm Stock – foregrip <i>MINIMUM</i> length (Measured from stock to front of furniture):</p> <ul style="list-style-type: none"> • 670 - 820mm (Recoil stroke is reduced by 150mm at shortest setting*. Specific Short-Stock carriages are available) <p>Stock – foregrip <i>maximum</i> length (Measured to front of furniture):</p> <ul style="list-style-type: none"> • Unlimited (45mm maximum width at base of furniture) • 850-1000mm (wide furniture – lengths above 850mm require reduction in recoil stroke) <p><small>* In special cases it is possible to reduce the stroke to as little as 50mm to allow for firearms of 570mm length (from front of furniture to end of stock), so long as the firearm is of very small calibre with insufficient recoil force to exceed the available damper travel. It is advised that Hephaestus is contacted for advice in such situations. C.Morgans@HephaestusConsulting.com</small></p>
Firearm capacity	<ul style="list-style-type: none"> • 12.7x99mm NATO*⁺ • .600 Nitro express (15.7x76R)* • 63g shotgun (10 / 12 bore)* • 42g shotgun (12bore) validated against human shooter <p><small>*Currently un-validated against human shooter ⁺Muzzle brake advisable</small></p>
Firearm limitations	<p>Not suitable for firearms with a fixed forend pistol grip or bi-pod*. Not suitable for use with handguns Suitable for shot bursts of automatic firing only, limited by weapon / ammunition type and recoil stroke.</p> <p><small>*Unless bi-pod / pistol grip can sit outside the rig and not strike the front of the rig on recoil</small></p>
Tooling and Accessories	<p>Socket (hex) head wrenches (supplied) required for adjustment of rig (suit M8 and M6 ISO socket head bolts). No other tools required. Grip plate sets of different sizes to suit OU and SS guns Different spring sets available to represent shooters of small-medium and medium-large stature.</p>

Accessories

In its standard form the rig is supplied with a floor standing range table or interface plate to allow it to mount to a range table of the customers choice. Additional options such as bench-top or ground mounting are available on request.

The rig is supplied to represent shoulder firing only. Prone firing imparts different loads on the firearm and thus requires a bespoke fore-end mount and spring setup. Please contact Hephaestus for further details.

For firing of particularly short firearms (such as machine-pistols or similar) a reduced length carriage and recoil dampers may be required. A short stroke version of this rig is available on request to suit these smaller weapons. This rig not suitable for use with handguns.



Use and Operation

To prepare the rig for use it must first be setup with the correct springs for the test being conducted (Hephaestus recommends the use of the medium-heavy spring set as a default suitable for the vast majority of applications). Springs are installed by removing the rear rail support plate, sliding the springs over the guide rails before installing the spring retaining collars and replacing the rear rail support plate.



The firearm should then be installed in the rig, sliding the muzzle into the front grip first before seating the stock in the rear clamp. If the stock length is too short for the front furniture to sit securely in the front grip the carriage can be shortened by removing the bolts connecting the rear slides to the link plates and moving the slides forwards relative to the link plate. Adjustment of the rear slide may require adjustment of the damper rear mounting bracket and a corresponding reduction in recoil stroke.

The firearm is secured in the front grip by and in the rear grip by means of grub screws in the sides of the clamp. These force rubber faced grips against the sides of the stock and the sides of the front furniture. A pair of screws at the bottom of the clamp supports the bottom edge of the stock and adjusts the pitch angle of the gun. A webbing strap attached to the grip wraps over the top of the stock and is tightened by hand along one side of the grip. This webbing strap prevents the stock from jumping out of the grip. A further webbing strap with a rubber pad fastens over the top of the gun at the very front of the front grip. This strap prevents the gun from rotating should the stock jump from the rear grip or from being wrenched from the front grip when the action is opened.



To load the firearm (in the case of break-action designs) the rear grip is detached from the rear slides by means of a sprung loaded latch. When released the entire rear grip structure can fall with the stock as the action is opened. The gun is retained in the rig via the front grips.



The firearm is fired by means of a trigger string. The trigger string has one adjustable end attached to the rear grip, the string loops around the trigger and returns to the other side of the grip, passes through the rear mounting plate and attaches to an upright trigger lever. Firing is accomplished by pulling rearwards on the trigger lever.



2: HSV, Velocity Measurement & Instrumentation

Ballistic Test Instrumentation

Hephaestus can supply a range of velocity measurement equipment including Optical 'Sky Screens', optical targets, chamber pressure measurement sensors and data acquisition, High intensity flood and burst lighting for High Speed Video and even High Speed Video cameras themselves.

Instrumentation Protection

Ballistic firing ranges of all calibers are dangerous environments, especially when armour and ammunition testing is being conducted. Hephaestus design and produce a range of bespoke protection solutions for range equipment ranging from aramid fragmentation blankets to rigid metallic shields capable of stopping target or sabot fragments or even direct hits by stray projectiles. Solutions tend to be application specific with the exception of those shields designed for a particular piece of equipment. Please contact Hephaestus Consulting directly to discuss your requirement in more detail.



3: Backstops, Target Conditioning & Handling Equipment

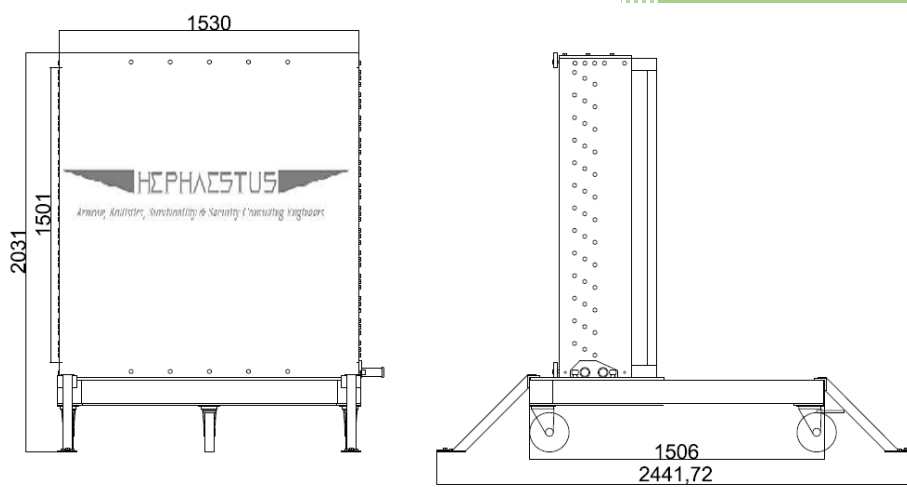
Hephaestus design and supply a diverse range of target handling equipment for all sizes of ballistic laboratories. Basic target sample holders and fixtures are produced on a case-by case basis (with the exception of bespoke fixtures such as those for helmet testing). The Hephaestus XY target frame allows for movement of the target between shots without the need to disturb and re-aim the test gun (this also keeps shot direction perfectly perpendicular to the target surface) and increases working space around the test gun.

Behind the target Hephaestus produce a range of ballistic backstops capable of handling up to 14.5mm in calibre. These products range in size from wheeled or bench top 'bullet catchers' to full sized permanent installations and all emphasise easy cleaning, robustness and ease of maintenance.

Hephaestus also supply a range of highly affordable environmental chambers for target, ammunition and plastillina conditioning. Fitted with advanced, data logging controllers these chambers offer the most advanced capability for ballistic laboratories allowing for precise tracking of conditioning cycles to be reported. The Hephaestus chambers are not supplication specific and as such can be used for environmental conditioning trials to suit Mil-Std-610F and Def-Stan 00-35 as well as target conditioning duties.



Data Sheet



Backstops & Bullet traps

Description

Hephaestus can supply a range of fixed and mobile backstops for threats up to 14.5mm KE and 20mm fragment. The size range of available products extend from table-top small arms bullet traps to range-width backstops with a 1500x1500mm working area. In addition to conventional backstops soft capture (rubber crumb) bullet catchers are also available for ammunition development and forensic work.

In general Hephaestus backstops are designed to be either self clearing or easy clearing to ensure the minimum of time is spent on upkeep. Sandbox style backstops of course require de-leading and cleaning on a periodic basis.

All backstops and bullet traps are constructed from high hardness ballistic or wear plate steel and are of bolted construction allowing them to be 'flat packed' for transport as well as for easy replacement of consumable parts.



Technical details

The range of Hephaestus backstops and bullet traps can be tailored to customers specific requirements and can be supplied as both fixed or mobile installations. The following technical specifications are aimed to give a guidance of what is possible rather than be an exhaustive and accurate technical datasheet. For specific requirements please contact Hephaestus.

Tabletop Bullet Catcher	
Specification	Value and comments
Height	1000mm*
Width	1100mm, plus handles and bolt heads*
Depth	800mm*
Weight	
	*Bench Mounted – Excludes wheeled frame
Maximum threat (ball/soft)	.50BMG lead core ball FMJ @ 1100m/s strike velocity
Maximum threat (Armour Piercing)	7.62mm/.308cal FFV/API B32 @ 1100m/s strike velocity
Maximum threat (Fragment simulating Projectile)	.50cal FSP to STANAG specification @ 1200m/s strike velocity
Operational shot range	To minimise risk of damaging equipment the muzzle should be no less than 6m for pistol and small rifle calibres, 11m for larger calibres. Velocity measurement equipment should be placed as far from the unit as possible.

1.5x1.5m Wheeled Heavy Louvered Backstop	
Specification	Value and comments
Height	2031mm
Width	1530mm, plus handles and bolt heads
Length	2442mm with bolt down feet, 1506mm without
Weight	In excess of 2.5tons
Maximum threat (ball/soft)	.50BMG lead core ball FMJ @ 1100m/s strike velocity
Maximum threat (Armour Piercing)	7.62mm/.308cal FFV/API B32 @ 1100m/s strike velocity
Maximum threat (Fragment simulating Projectile)	.50cal FSP to STANAG specification @ 1200m/s strike velocity
Operational shot range	To minimise risk of damaging equipment the muzzle should be no less than 6m for pistol and small rifle calibres, 11m for larger calibres.



	Velocity measurement equipment should be placed as far from the unit as possible.
--	---

1.5x1.5m Wheeled Sandbox Backstop	
Specification	Value and comments
Height	2031mm
Width	1530mm, plus handles and bolt heads
Length	~2500mm
Weight	Empty..... Full.....
Maximum threat (ball/soft)	.50BMG lead core ball FMJ @ 1100m/s strike velocity
Maximum threat (Armour Piercing)	14.5mm API BS41 1100m/s strike velocity
Maximum threat (Fragment simulating Projectile)	20mm FSP to STANAG specification @ 1200m/s strike velocity
Operational shot range	To minimise risk of damaging equipment the muzzle should be no less than 6m for pistol and small rifle calibres, 11m for larger calibres. Velocity measurement equipment should be placed as far from the unit as possible.

Self-cleaning bullet traps	
Specification	Value and comments
Height	Customer Specific
Width	Customer Specific
Length	Customer Specific
Weight	Empty..... Full.....
Maximum threat (ball/soft)	.50BMG lead core ball FMJ @ 1100m/s strike velocity
Maximum threat (Armour Piercing)	14.5mm API BS41 1100m/s strike velocity
Maximum threat (Fragment simulating Projectile)	20mm FSP to STANAG specification @ 1200m/s strike velocity
Operational shot range	To minimise risk of damaging equipment the muzzle should be no less than 6m for pistol and small rifle calibres, 11m for larger calibres. Velocity measurement equipment should be placed as far from the unit as possible.

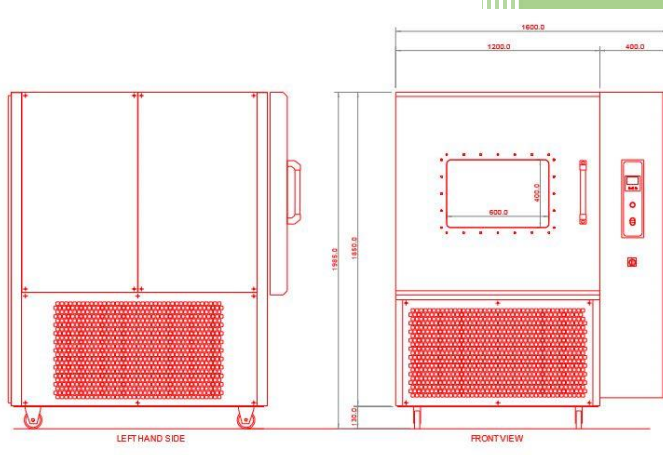
Soft Capture bullet traps	
Specification	Value and comments
Height	Customer Specific
Width	Customer Specific
Length	Customer Specific
Weight	Empty..... Full.....



Maximum threat (ball/soft)	.50BMG lead core ball FMJ @ 1100m/s strike velocity
Maximum threat (Armour Piercing)	50BMG steel core 1100m/s strike velocity
Maximum threat (Fragment simulating Projectile)	N/A
Operational shot range	To minimise risk of damaging equipment the muzzle should be no less than 6m for pistol and small rifle calibres, 11m for larger calibres. Velocity measurement equipment should be placed as far from the unit as possible.



Data Sheet



Environmental & Conditioning Chambers

Description

Hephaestus is able to supply environmental chambers with conditioning chambers in excess of 1500l in volume for conditioning of equipment, armour materials and ammunition. All chambers are built around a well proven set of components for maximum reliability and service.

Wherever possible Hephaestus chambers are designed with maximum flexibility and ease of use in mind meaning that a single chamber can fulfil multiple roles within a ballistic test lab. Chamber controls allow multiple user-defined programmes to be installed and saved. With touch-screen 'tablet like' functionality and a bright, easy to read screen the chamber controller gives the user a high degree of control.



Technical Specifications

Chamber			
Temperature Range STANDAD	-20°C to +150°C (+30°C max ambient)	Temperature Range ENHANCED	-65°C to +180°C (+30°C max ambient)
Humidity Range (Typ)	10-98% (Temperature Dependent)		
Rate of Change of Temperature (typ)	2°C/min average across the full temperature range (Rates for empty chamber with 1 shelf – Options available for faster heating / cooling rates on request)		
Tolerance / Fluctuation (typ)	Temperature	Humidity	Distribution
	+/-0.5°C after stabilisation	+/-3.0%	+/-1°C after stabilisation
Refrigerant			
Construction			
Interior - Fully welded stainless steel liner – grade 304 bright annealed Exterior – Fine textured powder coated mild steel – either light grey RAL7035 or dark blue RAL5003 Other colours available but may incur additional cost CFC – free mineral fibre insulation Single left hand hinged door with heavy-duty hinges and double silicon rubber seal Optional – Multi-glazed heated window (not all chambers) Interior illumination by low voltage halogen lamp 1 off 100mm access port with silicone rubber bung Stainless Steel shield with adjustable positions 4 off heavy duty swivel castors, 2 fitted with brakes (floor mounted chambers only)			
Control System			
Typically Watlow F4T, touch screen programmable controller with Ethernet connectivity via RJ45 socket Other communication interfaces are available upon request Data logging and trending are optional extra Temperature sensing with a Platinum resistance thermometer Humidity sensing with industrial grade capacitive transmitter 24 volt ac control circuit			



Data Sheet



Environmental Chamber with Soft Armour Tumbler to suit NIJ 0101.06

Description

The Hephaestus FMH1000 Environmental chamber is a multi-purpose piece of conditioning equipment capable of providing a wide range of environmental conditions, heating and cooling rates to satisfy the extremes of Mil-Std-610F and Def-Stan 00-35 environmental testing. With a fully programmable PIC controller individual test programmes can be installed and saved by the user. A generous 1000x1000x1000mm chamber allows for multiple samples of a range of sizes to be conditioned at once.

The Chamber is provided with additional power supplied and instrumentation circuitry and automation controls to allow the installation of the Hephaestus soft armour tumbler to allow for conduct of the 7 day accelerated aging / conditioning test as specified in the NIJ 0101.06 standard.

The sot armour tumbler is plug-and-play with a single connector on the control panel of the chamber providing motor power and cycle counter signal feedback. The Watlow F4T controller comes pre-installed with a NIJ cycle programme and automatically adjusts tumbler speed via a closed loop speed controller.

Drum and Tumbler base are supplied as two separate items to allow for easy installation into the chamber. No drive belts or gears require connection.



Technical Specifications

Chamber			
External Size WxDxH	1510x1750x2010mm	Internal Size	1000x1000x1000mm
Weight			
Temperature Range STANDAD	-20°C to +150°C (+30°C max ambient)	Temperature Range ENHANCED	-65°C to +180°C (+30°C max ambient)
Humidity Range	10-98% (Temperature Dependent)		
Rate of Change of Temperature	2°C/min average across the full temperature range (Rates for empty chamber with 1 shelf – Options available for faster heating / cooling rates on request)		
Tolerance Fluctuation	Temperature	Humidity	Distribution
	+/-0.5°C after stabilisation	+/-3.0%	+/-1°C after stabilisation
Refrigerant			
Construction			
Interior - Fully welded stainless steel liner – grade 304 bright annealed Exterior – Fine textured powder coated mild steel – either light grey RAL7035 or dark blue RAL5003 Other colours available but may incur additional cost CFC – free mineral fibre insulation Single left hand hinged door with heavy-duty hinges and double silicon rubber seal Optional – Multi-glazed heated window, 300mm x 400mm viewing area Interior illumination by low voltage halogen lamp 1 off 100mm access port with silicone rubber bung 1 off shelf with adjustable positions 4 off heavy duty swivel castors, 2 fitted with brakes			
Control System			
Watlow F4T, touch screen programmable controller with Ethernet connectivity via RJ45 socket Other communication interfaces are available upon request Data logging and trending are optional extra Temperature sensing with a Platinum resistance thermometer Humidity sensing with industrial grade capacitive transmitter 24 volt ac control circuit			
Soft Armour Tumbler			
Size WxDxH	900x700x900mm	Weight (Empty)	kg
Description	Stainless Steel and Aluminium construction. Drum is constructed with a perforated steel body and ends for maximum air circulation. 4 tapered impact resistant PET-G paddles are equ-spaced around the drum with a NIJ Compliant tip radius of xmm. The drum is driven by two rollers powered by a powerful 24v DC gearmotor in the tumbler frame.		
Drum Speed	5 RPM +/- 1		
Max Capacity	5 Soft armour packs	Xx Kgs (wet)	
Electrical	24V DC 4.5 A 100 W Motor, 165rpm	Amphenol 6 pin Plug Mil-DTL-5105 MS 3120 E 14S 6	
Cycle counter	Ferrite Magnetic pickup and Reed Switch	Xx V	
Condition Limits	Max / Min Temp		Max/Min Humidity
	+80-40C		0-80%rh



Data Sheet



NIJ 0101.06 Soft Armour Immersion Tank

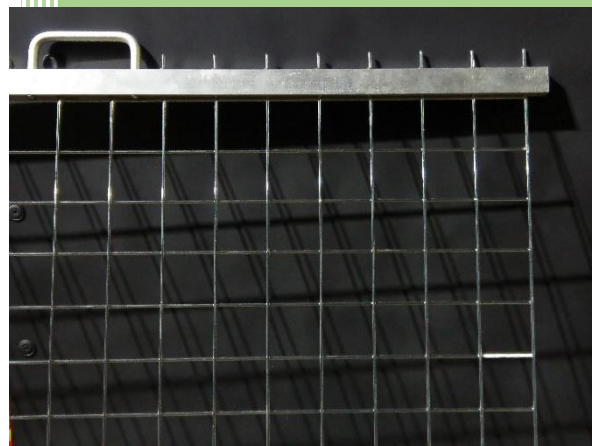
Description

The Hephaestus Soft armour immersion tank is designed to allow simultaneous immersion conditioning of up to 5 separate samples of soft armour prior to ballistic test. The chamber complies with the requirements set out in NIJ 0101.06 but will also suit other test standards set by other authorities such as the UK HOSDB.

The immersion tank is provided with water circulation, heating *and* cooling equipment to ensure that tank temperature is maintained at a constant pre-set level irrespective of laboratory or external environmental conditions.

Armour samples are clipped to 5 wire racks which fit securely within the tank, weights are provided for more buoyant items. All racks are marked to indicate minimum immersion depth.

An integral drying rack allows for convenient placement of samples after immersion and for the collection of initial water run-off

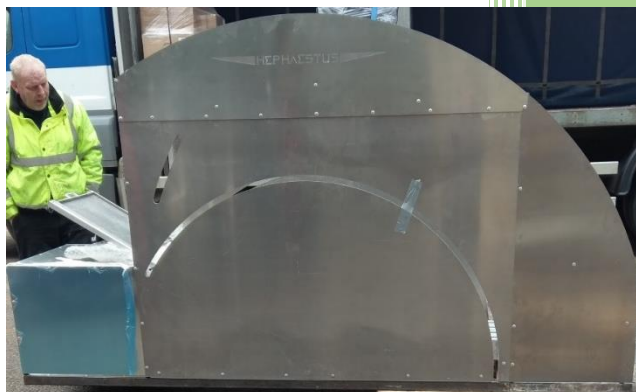


Technical Specifications

Size WxDxH	900x700x900mm	Weight (Empty)	kg
Rack Size	864x812mm	Suits large soft armour pack as per annex C of NIJ	
Electrical aspects	240v/ 50Hz	510W max load	
	300W Water heater	200W Water cooler	10W Pump



Data Sheet



Hard Armour Impact Tester to Suit NIJ 0101.06

Description

The Hephaestus Soft Hard Armour Impact Tester is designed to the requirements set out in NIJ 0101.06. A light weight, low inertia arm supports a removable plastillina tray onto which the hard plate to be tested is mounted using straps. Loading of the tray and sample is done at a safe working height to minimise any risk of injury.

The arm is raised to the vertical position where it is held by a locking arm. This arm is provided with a sawtooth profile to prevent accidental dropping of the sample. Once raised the arm is released by lifting a single handle. The impact tester can be operated from either side. Integral provision for storage of sample trays and tooling is provided.

Impact is against a solid cement block, integrally cast into the frame and polished flat. The impact area is provided with a polycarbonate window through which the impact can be viewed using high speed cameras. The impact tester is fully enclosed to prevent accidental entrapment or injury by the falling impactor arm.

Technical Specifications

Size WxDxH	900x700x900mm	Weight (Empty)	kg
Sample Holder Size		Suits XL Insert as per annex C of NIJ	



4: Grenades, Projectiles, Ammunition & Reloading equipment

Hephaestus can supply a wide range of projectiles and surrogate fragmentation grenades for ballistic and blast testing of armour material. In addition to the standard blast threats for vehicle evaluation (DM31, DM51 & DTG5) Hephaestus also supply individual fragments with sabots for pre-screening testing.

Hephaestus can supply all FSP's (Fragment Simulating Projectiles) listed within Stanag / AEP-2920 as well as corresponding launch sabots.

In addition to Fragments and blast surrogates Hephaestus also produces reverse engineered surrogate ammunition for hard-to find ballistic threats. Customer specific reverse engineering can be performed on almost any threat item.

All of Hephaestus' test devices, FSP's and surrogates are supplied with fully certified materials performance and traceability, Clearly marked batch numbers (usually laser etched) and thus the confidence that from shot-to-shot, batch-to-batch the test item is performing in a reliable and repeatable manner.

As well as ammunition surrogates Hephaestus is able to source most types of ammunition required for ballistic testing on request through our extensive network of contacts.



W: www.HephaestusConsulting.com

Test Standards Applicable

STANAG 4569 / AEP-55 Vol 1 Ed 2, AEP-2920

Related products / Services

In addition to standard FSP's Hephaestus can produce atypical fragments for any requirement, the following photograph shows steel cube FSP's popular in steel hardened steel and tungsten for a range of testing purposes including naval armour (RATTAM).

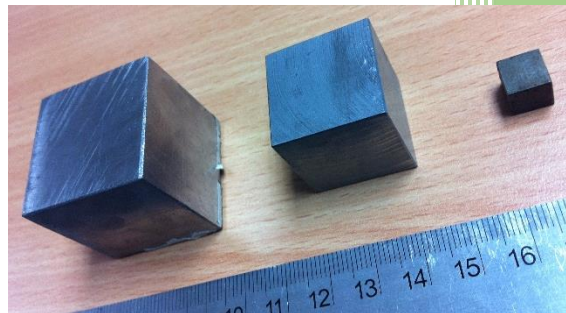


Figure 2 Custom Steel Cube Fragments

Hephaestus can provide sabots to suit this test item and allow for launch from smoothbore test guns

Design and construction of custom powder and gas launchers to suit PPE testing as well as vehicle armour testing also available on request. The Hep-B universal receiver and recoil system provides a safe and effective platform for FSP launch up to and exceeding STANAG 4569 level 6 FSP velocities for a 20mm FSP. The same system is capable of launching low velocity 0.30" and 1.1g sabot FSP's with appropriate barrels

Hephaestus can provide full test and evaluation services (including launch and velocity recording) of this test item through our UK based T&E partners.



Data Sheet



DTG-5 Test Grenade & Single Frag Sabots for VSAG-12 & PAS-300 Testing

Description

The Hephaestus 3D-printed DTG-5 grenade is a VSAG12 and PAS300:2015 compliant fragmentation jacket. These are designed to provide a fully repeatable & traceable blast threat for ballistic validation of armour systems in line with the requirements of VSAG12 threat levels VS-UB-1b and VS-RB-1b & PAS:300 2015 threat levels UB-B and RB-B for vehicle protection. These grenades are designed as a repeatable ballistic surrogate for the M67 & HG85 (& formerly the L2A2) anti-personnel grenades. They provide ballistically matched performance to the average performance of the real-world specification grenade systems with the benefit of providing fair and repeatable benchmark of performance.

The jackets are provided with no explosive fill for ease of transport and storage with simple construction allowing easy on-site filling with the required 200g C4 explosive. On delivery the fragmentation load is already in place in the jacket with correct mass and grade of fragments.

Sabots to suit the DTG-5 fragmentation are also available to facilitate low cost material screening activity by means of a ballistic trial prior to conducting costly blast testing.

All surrogate product lines by Hephaestus are scrutinised to ensure the highest levels of consistency, in the case of the DTG-5 the jackets are checked for conformity via mass checks and dimensional batch testing. Additionally, each batch of fragmentation is supplied with independent certification of hardness and strength.



Validated performance

To qualify the Hephaestus DTG-5 the required tests were conducted during December 2017 at Radnor Ranges, Wales, UK. The following images show the results confirming the required device performance

Technical details



Figure 3; Images showing the rear face of the 12.7mm (L) and 8mm (R) test plates for DTG-5 qualification as defined in PAS-300 No penetrations of the thicker panel and >50% penetration of the thinner panel as required in the standard performance criteria.

	Fragmentation Qty	Fragmentation Size	Material	Performance
3D Printed DTG-5	507	5mm Sphere	AISI 4230 55 (+/- 3) HRC Grade 100	>50% penetration 8mm 6082 @300mm 0% Penetration 12.7mm 6082 @300mm

Test Standards Applicable

VSAG-12 & PAS-300

Related products & Supply

The DTG-5 surrogates are an off the shelf item with moderate stock levels held, MOQ is usually 10units with pricing and lead times to be confirmed on enquiry. Shipment and export can be arranged based on the laws relevant to the destination, within the UK the units will be shipped via standard courier services. To ensure these products are only used in the process of developing and proving armour concepts, we will require an end user statement and company information to perform background checks where necessary, this is purely to ensure these devices are unable to find their way into illegitimate usage.

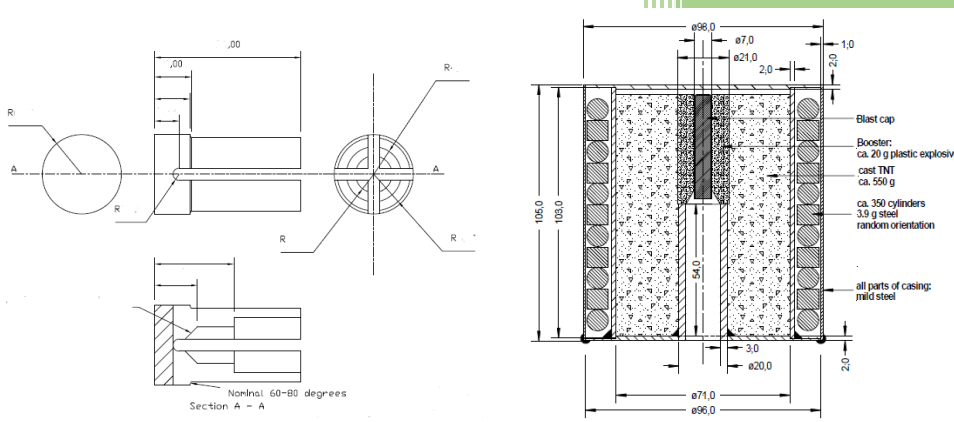
Sabots and individual ball projectiles are available for gun-launched pre-test material down-selection and evaluation.



Figure 4 Single Fragment sabot (suit 0.50")



Data Sheet



DM31 Test Grenade & Single Frag Sabots for STANAG 4569 /AEP-55 Testing

Description

The Hephaestus DM31 Surrogate test grenade is a STANAG4569 / APE-55 Vol2 Ed2 compliant armour test device. These are designed to provide a fully repeatable & traceable blast threat for ballistic validation of armour systems in line with STANAG for vehicle protection. The test grenades are supplied un-filled and with full certification of the fragments metallurgical properties.

The jackets are provided with no explosive fill for ease of transport and storage with simple construction allowing easy on-site filling with the required 550g TNT and 200g booster. On delivery the fragmentation load is already in place in the jacket with correct mass and grade of fragments.

Sabots and individual DM31 fragments are also available to facilitate low cost material screening activity by means of a ballistic trial prior to conducting costly blast testing.

All surrogate product lines by Hephaestus are scrutinised to ensure the highest levels of consistency, in the case of the DM31, the fragments are checked for conformity via mass checks and dimensional batch testing. Additionally, each batch of fragmentation is offered with independent certification of hardness and strength as well as full mill traceability of the stock material. This level of quality assurance eases results analysis (especially in the case of an unexpected failure) as it the properties of the fragments can be traced to a known value with proven provenance.



Validated performance

The Hephaestus DM31 is validated against 500Bhn Steel to MIL-A-46100.

All fragment stock is supplied with mill traceability, as well as independent hardness and UTS certification. Each grenade is batch numbered and fully trackable.

Technical details

	Fragmentation Qty	Fragmentation Size	Material	Performance
DM31 Surrogate	350	3.9g (+/- 0.3g) 0.75-0.9AR chopped steel rods	Low carbon steel certified hardness and UTS	Perforation of 6mm MIL-A-46100 500Bhn steel @ 800mm- 0% Perforation of 8mm MIL-A- 46100 500Bhn steel @ 800mm-

Test Standards Applicable

STANAG 4569 / AEP-55 Vol2 Ed2

Related products & Supply

The DM13 surrogates are an off the shelf item with moderate stock levels held, MOQ is usually 10units with pricing and lead times to be confirmed on enquiry. Shipment and export can be arranged based on the laws relevant to the destination, within the UK the units will be shipped via standard courier services. To ensure these products are only used in the process of developing and proving armour concepts, we will require an end user statement and company information to perform background checks where necessary, this is purely to ensure these devices are unable to find their way into illegitimate usage.

Sabots and individual ball projectiles are available for gun-launched pre-test material down-selection and evaluation.

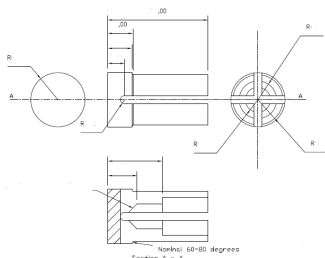


Figure 5 Single Fragment sabot (suit 0.50")



Data Sheet



DM-51 Replica Grenade for VPAM, VSAG-12 & PAS-300 Testing

Description

The Hephaestus 3D-printed DM51 test grenade (DM51H) is an accurate replica of the hard to source (and now discontinued) Dehil DM51 fragmentation grenade. The surrogate is reverse engineered from genuine DM51 grenades with dimensions and features a direct copy whilst the fragmentation has been subjected to metallurgical analysis to provide an accurate match.

The Hephaestus DM51 are designed to provide a fully repeatable & traceable blast threat for ballistic validation of armour systems in line with the requirements of VPAM and VSAG standards for vehicle protection amongst others. By bringing production in-house we can guarantee and certify fragmentation properties backed up with independent certification and traceability. This is especially important in the field of blast testing to help understand anomalous results.

The jackets are provided with no explosive fill for ease of transport and storage with simple construction allowing easy on-site filling with the required 60g of PETN explosive. On delivery the fragmentation load is already in place in the jacket with correct mass and grade of fragments.

All surrogate product lines by Hephaestus are scrutinised to ensure the highest levels of consistency, in the case of the DM51H the jackets are checked for conformity via mass checks and dimensional batch testing. Additionally, each batch of fragmentation is supplied with independent certification of hardness and strength.



Validated performance

The Hephaestus DM51 replica is regularly validated against genuine charges using aluminium witness sheets

Technical details

	Fragmentation Qty	Fragmentation Size	Material	Performance
3D Printed DM51	~6500	2mm Sphere	Proprietary Steel	On request

Test Standards Applicable

VPAM ERV2008, VSAG-12 & PAS-300

Related products & Supply

The DM51 surrogates are an off the shelf item with moderate stock levels held, MOQ is usually 10units with pricing and lead times to be confirmed on enquiry. Shipment and export can be arranged based on the laws relevant to the destination, within the UK the units will be shipped via standard courier services. To ensure these products are only used in the process of developing and proving armour concepts, we will require an end user statement and company information to perform background checks where necessary, this is purely to ensure these devices are unable to find their way into illegitimate usage.



Data Sheet

SURROGATE PROJECTILE : 25x137MM APDS-T

Description

This test item is an accurate replica of the NATO 25x137mm APDS-T projectile (as per STANAG 4569 / AEP-55 Vol 1 ed2 level 5a). This test surrogate has been reverse engineered from actual projectiles and is correct in mass, dimensions and metallurgy. The surrogates are supplied as a core only with the sabot pusher assembly of the original projectile is omitted. This allows the user choice in launch method, (a Saboted surrogate ideally would require a progressive rifled cannon barrel to function correctly resulting in considerable expense. Hephaestus designed Sabots are available to suit this core for a range of calibres as well as, bespoke for to suit calibre of the customers choice. The tracer cavity of the original design is retained and is supplied empty, this cavity can be filled with an inert material if required.

Image



Figure 6 (left); Complete Hephaestus Surrogates, 25x137mm APDS-T flight surrogate (top) and full (bottom)

Figure 2 (right); Complete, 25x137mm APDS-T round



Technical details

	Mass (g)	Length (mm)	Material	Performance
Flight Surrogate	50.5 +/-1	61.5 +/- 0.3	Steel (flight surrogate)	Accurate flight simulation for zeroing and practice
Full Surrogate	115 +/-1		Metallurgically representative surrogate alloy with appropriate heat treatment	
Launch System	Ideally >20mm rifled or smoothbore with appropriate sabot			
Sabot	Hephaestus Sabots 25mm APDS-T Sabots can be ordered in 14.5mm, 25mm and 50mm smooth bore as standard with custom fitting upon request.			



Test Standards Applicable

STANAG 4569 / AEP-55 Vol 1 Ed 2 Level 5 (one of two specified projectiles)

Related products / Services

Hephaestus can provide sabots to suit this test item and allow for launch from smoothbore test guns

Hephaestus can provide full test and evaluation services (including launch and velocity recording) of this test item through our UK based T&E partners.

DRA



Data Sheet

SURROGATE PROJECTILE : 30x165MM AP-T

Description

This test item is an accurate copy of the penetrating core from the Soviet 30x165mm AP-T projectile (as per STANAG 4569 / AEP-55 Vol 1 ed2 level 6a). The surrogate has been reverse engineered from actual projectiles and is correct in mass, dimensions and metallurgy. The pressed steel windshield is omitted as the aerodynamic function it performs is not required for armour T&E purposes (This also greatly improves projectile flight). The copper driving band of the original projectile is also omitted and its location simplified to prevent use in an actual weapon. The tracer cavity of the original design is retained and is supplied empty, this cavity can be filled with an inert material if required.

Image



Figure 1; Hephaestus Surrogates production flight surrogate 30x165mm AP-T core for use in with Hephaestus Sabot

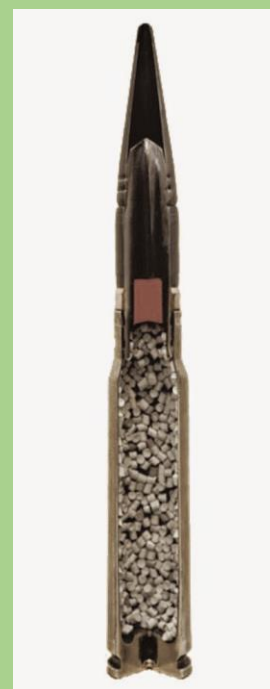


Figure 2; Original Soviet production 30x165mm AP-T shell

Technical details

	Mass (g)	Length (mm)	Material	Performance
Flight Surrogate	385 +/- 1	385mm	Mild Steel (flight surrogate)	Low cost, velocity, zeroing 7 practice option to reduce cost of equipment setup
Full Surrogate	385 +/- 1	385mm	Metallurgically representative surrogate alloy with appropriate heat treatment	Identical to original projectile.
Launch System	Smoothbore launchers of >40mm ID only			



Sabot	Hephaestus Sabot systems are available fit this product as both standard and custom fit options. The current standard option is to fit a 50mm smooth bore.
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Test Standards Applicable

STANAG 4569 / AEP-55 Vol 1 Ed 2 Level 6 (one of two specified projectiles)

Related products / Services

Hephaestus can provide sabots to suit this test item and allow for launch from smoothbore test guns

Hephaestus can provide full test and evaluation services (including launch and velocity recording) of this test item through our UK based T&E partners.

DRA



Data Sheet

Reloading Equipment

DRA



5: Lighting, Extraction, CCTV & Misc Range Equipment

Ballistic firing ranges are aggressive environments requiring careful consideration to be given to extraction of dust & fumes as well as the provision of illumination and monitoring equipment robust enough to withstand multiple fragment strikes from projectile / target debris without ceasing to operate.

Hephaestus has used its more than a decade of ballistic testing experience to develop a range of extraction and lighting equipment suited to the rigours of life at the sharp end of ballistic testing facilities. In addition to general purpose illumination high intensity, flicker free illumination for high-speed videography has been developed using the same principles of robustness, compactness and cost-effectiveness that define many of Hephaestus' range products

CCTV systems are essential for all firing ranges however these are often placed in unsuitable environments resulting in a short lifespan and failures at the least convenient moment. Hephaestus target camera are industrial quality hardened units capable of being placed near a target for impact effects observation as well as remote safety assessment. Ethernet and long-range wireless (200m-5km) options are available as are hardened 'pop-up' cameras suitable for placement very close to large NEQ blasts.



Data Sheet

Explosion Safe High Volume HEPA Fume & Dust Extractor

Description

The Hephaestus HV-EPA filtration unit provides powerful and safe extraction of target and propellant fumes for ballistic firing ranges. The filtration unit can be fitted with a single or multiple ducts to allow one unit to extract fumes from more than one point within the range (i.e. target area and firing point).

A High efficiency filtration unit removes 85% of airborne contaminants (based on most penetrating particle size) whilst a pre-filter prolongs life of the main filter by removing large airborne particulates such as composite and ceramic target debris).

Each unit moves 3500m³ per hour, enough to fully cycle a 25m enclosed tunnel range in less than 5 minutes.

This system is intended to provide high volume air cycling and extraction of range and ballistic lab spaces. Spot extraction from target chambers and firing points can be provided through the use of Hephaestus HS-HEPA high suction local extractor units.

Image



Extractor power unit



Side Withdrawal Filter housing (pre filter and EPA filter)



Technical details

<i>Physical Characteristics:</i>	Mass (kg)	Dimensions L,W,H (mm)	Material	Performance
<i>Fan Unit</i>	15kg	440x395x395	Powdercoated Steel	Up to 3500m ³ per hour @ 294Pa. 66dB (A) noise
<i>Filter Unit</i>		682x682x877		EPA Grade Options E10(≥85%), BSEN 1822:2010 G4 Pre-Filter EN779
	Voltage	Frequency	Power	IP Rating
<i>Electrical</i>	110/240V	~ 50Hz	500W 10A Fuze	IP54 as standard
Safety Features	<p>The Explosion proof fan has a single speed explosion proof motor that meets and conforms to all the standards required for gases and vapours, acetone, ammonia, benzene, butane, propane, ethanol, gasoline fumes, hexane, methane, natural gas, naphtha, propane, carbonaceous dust, charcoal, coal, or coke dust, and dusts that have been sensitized by other materials so that they present an explosion hazard. The fan can also tolerate atmospheres containing combustible dusts including flour, grain, wood and plastic.</p> <p>The fan unit is placed downstream of the filtration unit so will only be exposed to explosive gaseous atmospheres as the filter will have removed particulate and vapour threats.</p> <p>EX Mark: Ex d IIB T4 Gb Cert # : CNeX16. 3452</p>			
<i>Filter options</i>	<p>Pre-filter: G4 to EN 779 PN# 140956</p> <p>EPA filter: E10 PN# 1130457</p>			

Related products / Services

Hephaestus can provide replacement filters, ducting and inlets as required



Data Sheet

High Suction HEPA Fume & Dust Extractor

Description

The Hephaestus HS-HEPA filtration unit provides powerful and safe extraction of target and propellant fumes for ballistic firing ranges and test chambers.

A High efficiency HEPA filtration unit removes up to 99.995% of airborne contaminants (depending on choice of filter grade) whilst a pre-filter prolongs life of the main filter by removing large airborne particulates such as composite and ceramic target debris).

Each unit moves 1300m³ per hour, enough to fully extract a target chamber of airborne dust and fumes within minutes

This system is intended to provide high power local extraction of fumes and airborne debris from target areas and firing points. High volume large space extraction from firing ranges can be provided through the use of Hephaestus HV-EPA high volume extractor/filtration units.

Image



Extractor power unit



Example Filter housing (pre filter and EPA filter)



Technical details

<i>Physical Characteristics:</i>	Mass (kg)	Dimensions L,W,H (mm)	Material	Performance
<i>Fan Unit</i>			Powdercoated Steel	Up to 1300m ³ per hour @ 800Pa.
<i>Filter Unit</i>		682x682x877		HEPA Grade Options H13(≥99,95%), H14(≥99,995%)
	Voltage	Frequency	Power	IP Rating
<i>Electrical</i>	110/240V	~ 50Hz	550W 10A Fuze	IP54 as standard
Safety Features	The centrifugal fan unit is powerful and robust with a motor unit placed externally to the extracted airflow. The fan unit is placed downstream of the filtration unit so will only be exposed to fully filtered air (>99.95%) of dust and vapour removed. Not rated for use in an explosive atmosphere or with combustible gas			
<i>Filter options</i>	Pre-filter: G4 to EN 779 PN# 140956 HEPA filter: H13/14 PN#			

Related products / Services

Hephaestus can provide replacement filters, ducting and inlets as required



Data Sheet

Hardened General Purpose & HSV lighting



Data Sheet

Hardened Ethernet CCTV / Target Cameras

