

## Expendable Countermeasures



## Providing Platform Protection



# Our Philosophy

“Effective platform protection is achieved only when platform tactics and countermeasure deployment are fully integrated with Electronic Warfare principles. This can only be fully effective when countermeasures are matched to the platform.”

Effective platform protection is achieved by the decoy replicating the platform (in the 'bands' as seen by the seeker) as well as its placement, ensuring that said seeker will transfer lock.

Chemring Countermeasures is a world leader in protecting air and naval forces from the threats posed by heat-seeking and radar-controlled missiles. We have more than 50 years' experience at the forefront of Radio Frequency (RF) and Infrared (IR) expendable decoy research, design and manufacturing.

As each new threat has emerged, Chemring Countermeasures has found successful, reliable countermeasures to protect aircraft and ships from increasingly sophisticated missile threats – saving platforms and lives.

These threats are all too real – more than three-quarters of all aircraft losses in combat during the past 25 years have been as a result of hits by heat-seeking missiles. Our products counter these and other threats with decoy flares and chaff which seduce missiles by providing alternative, more attractive 'targets'.

We are also a world-leading company in naval anti-missile expendable 130mm countermeasures. Chemring Countermeasures payloads are incorporated in many ship decoy systems used for distraction and seduction techniques. To optimise the performance of its current and future decoys, Chemring Countermeasures has developed CENTURION®, a state of the art multiple role 12-barrel 130mm directional launcher, offering capability across multiple warfare domains.

As an innovative company operating at the leading edge of the expendable countermeasures business, we continually invest in technology, people and research. Research and Development (R&D) are essential to finding reliable solutions, not only for today's, but tomorrow's threats facing our armed forces and – in some circumstances – civilian platforms.

We hope this brochure gives you a clear picture of our strengths, experience, commitment to customers, our products and the wealth of expertise at Chemring Countermeasures.

# Air Products

The products can be tailored to meet specific threat-driven solutions to protect front-line strike, fighter and transport aircraft as well as attack, utility and transport helicopters, throughout the world.

Chemring Countermeasures works closely with customers to ensure they obtain a thorough understanding of countermeasure theory to support 'smart' acquisitions. Extensive product support is provided during the initial user requirements or product definition phase, and continues throughout the life cycle to provide cost-effective, tailored solutions.

## IR/EO Countermeasures

Heat-seeking missiles are a significant threat to aircraft. Chemring Countermeasures has responded to this challenge by developing effective infrared decoys, which form a vital part of increasing an aircraft's survivability against such threats. These decoys are available in a wide variety of formats, to suit almost all dispenser types. They are in service with Armed Forces throughout the world.

The company's in-house R&D department is highly experienced in developing and producing advanced IR expendables, ranging from Magnesium Teflon Viton (MTV) through to advanced cutting edge chemical compositions, to defeat the latest missile seeker technology. Chemring Countermeasures is a world leader in developing aerodynamic, spectral and thrusted flares to defeat seekers employing sophisticated flare rejection techniques. Our extensive experience and advanced products offer a tailored solution to meet the customer's most demanding needs.

### MTV

- 1x1x8 MTV (equivalent to M206)
- 2x1x8 MTV (equivalent to MJU 7 A/B)
- 26mm MTV (equivalent to PPI-26)
- 36mm MTV
- 50mm MTV (equivalent to PPI-50)
- 55mm MTV

### Spectral

- 1x1x8 Spectral
- 2x1x8 Spectral
- 26mm Spectral
- 36mm Spectral
- 50mm Spectral
- 55mm Spectral

### Aerodynamic

- 1x1x8 Aerodynamic
- 2x1x8 Aerodynamic

### Kinematic (Thrusted)

- 1x1x8 Thrusted

### Future Flares

Some of the technologies that the company is developing include:

- Multi-shot
- Smart sequencers
- Counters to imaging seekers
- Visual distraction
- Contrast

We offer an extensive range of advanced products designed to combat the latest generation IR missile seekers. Chemring Countermeasures also provides customer-specific solutions ranging from tailored IR profiles to packing and marking.



## RF Countermeasures

Chaff cartridges are used as a defence against radar-guided weapons systems. Chemring Countermeasures has pioneered, and continues to lead the way, in the design and manufacture of passive RF expendable countermeasure products and payloads, the latter of which can be readily tailored to meet the current RF threats.

### Cartridge Formats

- 1x1x8 Chaff (equivalent to RRI70)
- 1x1x8 Chaff (equivalent to RRI88)
- 26mm Chaff
- 36mm Chaff (equivalent to RRI29 A/AL)
- 36mm Chaff (equivalent to RRI44 A/AL)
- 50mm Chaff

### BOL

The Chemring Countermeasures BOL Chaff pack is designed for use with the SAAB BOL dispenser. The BOL system offers storage space of up to five times more chaff capacity than pyrotechnic dispensing systems. BOL is in use by several NATO nations on the F-18, F-15, Gripen and Typhoon aircraft.



### Modular Expendable Block (MEB)

The RF MEB provides additional payloads in the same magazine space giving greater flexibility and an enhanced duration operational capability. The RF MEB contains twice the number of payloads compared with the standard NATO stores. The MEB is a two-part glass-filled nylon block, which is interfaced to the dispenser firing system through an interface plate, which automatically doubles the number of firing pins. The chaff payload is pyrotechnically ejected as normal. Our MEB product range includes:

- MEB Mk1 Type 1 – for use in 6 x 5 dispensers employing digital dispensing control
- MEB Mk2 Type 1 – for use in Thales system dispensers
- MEB Mk3 Type 1 – for use in M147 or upgraded M130 dispensers
- MEB Mk4 Type 1 (Mini) – for use in Thales system dispensers

Chemring Countermeasures offers an extensive range of chaff products designed for both training and operational use. The company also provides customer-specific chaff products, ranging from tailored chaff cuts to individual packing and marking.

## Impulse Cartridges

Our impulse cartridges are electronically initiated, and are made using the very latest fully automatic manufacturing techniques offering high reliability, performance and consistency. Available to many specifications, each cartridge is designed to optimise a specific protection application. Our product range includes:

- CCM11 Mk1 (*BBU35 B equivalent*)
- CCM21 Mk1 (*BBU36 B alternative*)
- CCM11 Mk2
- CCM21 Mk2

Chemring Countermeasures also provides bespoke impulse cartridges to match the specific application required. For example, higher or lower ejection velocities, examples of which are now in the field optimising advanced decoy solutions.

## Civilian

### CIV-IR Decoy

CIV-IR has been developed specifically for the civilian aircraft market and can be used where it is technically or operationally not possible to use pyrotechnic decoys. The CIV-IR decoy is for use within the SAAB Civilian Aircraft Missile Protection System (CAMPS) to combat heat-seeking missiles. The decoy consists of a multiple pyrophoric leaf payload, providing an alternative heat source for a missile.



# Naval Products



**Chemring Countermeasures is the prime supplier of passive decoys to the Royal Navy and other major navies around the globe, including many NATO members.**

The company is a world leader in the field of naval Anti-Ship Missile Defence (ASMD) using passive expendable decoys. Chemring Countermeasures unrivalled expertise, amassed over more than 50 years, places it at the forefront of 130mm countermeasure

development. Its product range covers the entire electromagnetic spectrum and provides radar-reflective and infrared decoys, as well as payloads for many other countermeasure systems.

The company's wealth of experience in passive expendable decoys, together with its innovative new directional launcher offers maximum ASMD protection.

## IR Rounds

### Cartridge Countermeasure 130mm Mk 245 A2

Mk 245 A2 is a 130mm IR seduction round that offers 'comprehensive' performance characteristics, having a walk-off capability. It incorporates five sequential airburst sub-munitions and is compatible with 130mm launchers. The device's payload has a fast rise time; a long duration response; a high radiant intensity; and a large effective area providing full coverage across the 3 to 5  $\mu\text{m}$  and 8 to 14  $\mu\text{m}$  bands.

### Cartridge Countermeasure IR 130mm PIRATE

PIRATE is a 130mm calibre, mortar-launched IR round that provides a ship-like signature in both the 3 to 5 and 8 to 14  $\mu\text{m}$  IR wavebands. It combines air and sea surface emitters to generate a high intensity, long duration, large area output close to the surface. PIRATE can be used in both distraction and seduction modes and is effective against a wide range of IR seeker types, including imaging devices.

## RF Rounds

### Cartridge Countermeasure Chaff 130mm Distraction

CCM 216 Mk I Type I is an 'advanced' RF distraction round that deploys a single 'high' performance Radar Cross Section (RCS) chaff payload and features selectable range (out to approximately 2km) and cloud height. The payload used is of the centre-burst type that takes advantage of multipath to enhance RCS and offers a repeatable burst height independent of the ship's roll.

### Cartridge Countermeasure Chaff 130mm Seduction Mk 36

Mk 36 is a 130mm calibre chaff seduction round that is compatible with all 130mm launchers. It has a single, large volume payload that makes maximum advantage of multipath to enhance RCS. It is a "fire and forget" decoy that has a fixed height and range envelope.

### Cartridge Countermeasure Chaff Seagnat 214

The Mk 214 Mod I Seagnat device is 130mm single large payload chaff seduction round employed widely throughout NATO.





## Other Products

### Practice Rounds

To support its naval expendable decoy range, Chemring Countermeasures has produced a number of training rounds, including the Cartridge 130mm Seduction Practice (SP) and the Cartridge 130mm Drill. Both of these devices are compatible with all 130mm launchers. The Cartridge 130mm SP is designed for launcher test firings and training exercises that do not require chaff. The Cartridge 130mm Drill is (as its designation suggests) designed for launcher loading drill practice.

### Large Payload Carrier

The Chemring Countermeasures Large Payload Carrier is a rocket-propelled 130mm, flared to 170mm, large payload deployment vehicle, compatible with 130mm launchers. The Large Payload Carrier can be used with a variety of payloads including chaff, Anti-Submarine Warfare (ASW) obscuration or other bespoke payloads.



## Future Rounds

### Cartridge CM RF 130mm Mk36 Type 4 - 'TORERO CORNER REFLECTOR'

This future 130mm RF Seduction decoy round includes a high performance corner reflector payload, which provides a large RCS with K band capability. It has a very quick response time, is easy to deploy and suitable for all warships. Compatible with all 130mm fixed and trainable launchers.

### Cartridge Chaff 130mm Seduction Variable Range (RF SVR)

The Cartridge Chaff 130mm SVR is an advanced round that deploys a series of six RF decoy clouds that progressively move the aim point of an incoming threat missile away from its target ship. Functionally, the flight times of the round's individual sub-munition are set immediately prior to launch, by an associated launcher control system via a non-contact data link, to provide optimum decoy cloud placement. Each sub-munition contains wrapped chaff dipoles that provide a response across a broad or tailored frequency band and is controlled by an electronics module in its base. This inherent performance is optimised in the new innovative CENTURION® Launcher.

### Cartridge IR 130 mm Seduction Variable Range (IR SVR)

This advanced round is designed for use with all 130mm launchers but is fully optimised when used in conjunction with CENTURION®. The Cartridge IR 130mm deploys a series of six IR decoy clouds that provide a ship-like response. Functionally, the flight times of the round's individual sub-munition are set immediately prior to launch, by an associated launcher control system via a non-contact data link, to provide optimum decoy cloud placement. The device is effective in the long and short IR bands and able to counter imaging and two colour seekers. Again, each of the device's six sub-munitions is controlled by an electronics module in each of the bases.



# CENTURION

Versatile :: Dynamic :: Defence

Offering a multi-role capability whilst delivering a step change in ASMD through optimising the performance of its current and future decoys, Chemring Countermeasures has developed CENTURION®, a state of the art 12-barrel 130mm, adaptable to other calibres, fully trainable and directional launcher. This innovative system, that stores the rounds vertically to reduce size and weight, enables accurate payload positioning to better replicate a ship's signature, thereby moving electronic warfare capability into a higher range of effectiveness. In addition to offering numerous benefits including data interfaces, low radar cross-section, easier loading and low through-life costs, the launcher's versatile design allows it to consolidate a breadth of capabilities to deliver solutions across all warfare areas.

Delivering performance, versatility and cost-effective multi-mission capability, CENTURION®'s contribution to defeating current and future threats and increasing platform survivability is unbeatable.



## Chemring Technology

– world class defence and civilian Research and Development

Military Aviation Authority (DAOS) Approved

Chemring Technology provides R&D and technical support to Chemring Countermeasures and Chemring Group manufacturing facilities across the world. These extensive services are also available to external customers in both the defence and non-defence industries.

The company is a world leader in countermeasures technology for air and naval applications. We have a highly experienced team of engineers who work with government and other industry partners to research and develop a wide range of countermeasure products.

Our core capabilities in pyrotechnics and explosives, in combination with wide-ranging engineering experience, provide rare, sometimes unique, facilities which can confront the most difficult and challenging objectives.

Chemring Technology has a highly experienced staff of 40, from technician level to graduates and post-graduate specialists in engineering, chemistry, physics, computer modelling, data acquisition and analysis.



We offer full expertise and R&D facilities in:

- Expendable countermeasures
- Design and manufacture of air and naval decoys, obscurants and other specialised payloads
- Environmental test facilities
- Climatic and dynamic testing and specialist pyrotechnic-related facilities
- Explosive technology services
- Safety and compatibility testing
- Prototype engineering
- CNC milling and turning, spark erosion, pre-production injection mould tooling and prototyping
- Pyrotechnics

- Formulation, testing and production to provide deployment, delay, smoke, noise or light effects
- Test facilities and range
- Countermeasure measurement trials at a variety of indoor and outdoor ranges

Modelling and simulation of countermeasure performance is essential in exploring new payload concepts, planning of trials, user training and the illustration of fundamental countermeasure concepts. Chemring Countermeasures has an experienced team of engineers, carrying out countermeasure studies using a variety of modelling and simulation software tools.

## Environmental Test Facilities

Over many years Chemring Countermeasures has built up a comprehensive set of test and evaluation facilities for hazardous / explosive test items. These facilities are available to external clients with the additional Quality Assurance of UKAS accreditation to ISO/IEC 17025:2005 (Test Laboratory No. 2613).

We have a highly experienced team of test engineers who can advise clients on the design of test programmes and the applicable standards (Def Stan 00-35, Mil Std 810, BS/EN 60068, AECTP, and DO160).

Due to the nature of our core business, the test facilities are designed to meet the requirements of the military and commercial pyrotechnic and explosives industries. However, the equipment is also used for the testing and approval of conventional engineering and electronics products. Facilities include:

- Climatic testing
- Walk-in temperature and humidity chamber
- Salt spray
- Low pressure and decompression

## Dynamic testing

All Chemring Countermeasures products are subjected to the following dynamic test:

- Vibration
- Shock / bump
- Wheeled vehicle transportation bounce test
- Freefall impact drop test

Other tests can be carried out at the High Post main site or at other locations and test ranges where we have particular arrangements and experience. These include:

- Slow cook off
- Fast cook off – mini fuel fire
- Sympathetic detonation
- Fluid contamination
- Leak testing
- Acceleration testing
- Underwater shock
- Dust and sand

Chemring Countermeasures Environmental Test House also has access to an extensive range of photographic and IR imaging equipment, chemical analysis laboratories and X-Ray equipment to record and evaluate test items.



## Customer Focus

At Chemring Countermeasures, we ensure that our customers have a thorough understanding of the products that we supply to them. We provide workshops and training courses in the theory of Infrared and Radio Frequency countermeasures, both in the UK and overseas.

We also provide platform-specific or general training in the handling, storage and preparation of countermeasures. These bespoke courses are prepared to our customer's exact requirements and are delivered at a location that is convenient for the customer.

As the main point of contact for all customers and their agents, our responsibilities include:

- Monitoring the progress and status of all orders, ensuring compliance of contracts, documentation and on-time delivery;
- Monitoring any feedback of complaints, so that every attention is given to resolve any perceived deficiencies or product defects to the customer's complete satisfaction;
- Acting as the customer's representative, promoting and ensuring the customer's best interests with all departments and at all levels of Chemring Countermeasures.



## Accreditations

Chemring Countermeasures is certified against the following internationally recognised standards.

ISO 9001:2015 – Quality Management

ISO 14001:2015 – Environmental Management

OHSAS 18001:2007 – Occupational Health and Safety Management

ISO/IEC 17025:2005 – Testing and Calibration Laboratories

CYBER ESSENTIALS

ROSPA Gold Award - Royal Society for the Prevention of Accidents



## Chemring Countermeasures

We would like to thank the following suppliers for their excellent service:

### Adreco Plastics

[www.adrecoplastics.co.uk](http://www.adrecoplastics.co.uk)

### Aldebaran Systems SL

[www.aldebaransistemas.com](http://www.aldebaransistemas.com)

### APB Engineering

[www.apbengineering.com](http://www.apbengineering.com)

### Apsley Precision Engineering Ltd

[www.apsleyeng.co.uk](http://www.apsleyeng.co.uk)

### Ashfield Extrusion Ltd

[www.ashfield-extrusion.co.uk](http://www.ashfield-extrusion.co.uk)

### B.G. Sheet Metal Co. Ltd

[www.bgsheetmetal.co.uk](http://www.bgsheetmetal.co.uk)

### Boddingtons Plastics Limited

[www.boddingtons.co.uk](http://www.boddingtons.co.uk)

### British Felt Company

[www.britishfelt.co.uk](http://www.britishfelt.co.uk)

### C&M Mould Tools Limited

[www.cmmoulds.co.uk](http://www.cmmoulds.co.uk)

### David Bowler & Sons Ltd

[www.metal-presswork.com](http://www.metal-presswork.com)

### Fusite BV

[www.fusite.com](http://www.fusite.com)

### Hardy Advanced Composites

[www.hardycomposites.co.uk](http://www.hardycomposites.co.uk)

### Hi-Tech Mouldings Ltd

[www.hitechltd.com](http://www.hitechltd.com)

### IMCD UK Ltd

[www.imcdgroup.com](http://www.imcdgroup.com)

### M Barnwell Services Ltd

[www.barnwell.co.uk](http://www.barnwell.co.uk)

### NFF Precision Ltd

[www.nff.uk.com](http://www.nff.uk.com)

### non ferrum GmbH

[www.nonferrum.at](http://www.nonferrum.at)

### Phase 3 Plastics Ltd

[www.phase3plastics.co.uk](http://www.phase3plastics.co.uk)

### Plastic Engineering Solutions Ltd

[www.plasticengineeringsolutions.co.uk](http://www.plasticengineeringsolutions.co.uk)

### Portsmouth Aviation Ltd

[www.portav.com](http://www.portav.com)

### Precision Pallets & Cases Ltd

[www.pallets.co.uk](http://www.pallets.co.uk)

### Rediweld Technical Moulding

[www.rediweldmoulding.co.uk](http://www.rediweldmoulding.co.uk)

### Securit Ropes & Packaging Limited

[www.securit-ropes-packaging.co.uk](http://www.securit-ropes-packaging.co.uk)

### Survival Equipment Services Ltd

[www.ses-safety.com](http://www.ses-safety.com)

### Turnparts Engineering Ltd

[www.turnparts-engineering.co.uk](http://www.turnparts-engineering.co.uk)

### Yeovil Circuits Ltd

[www.yeovilcircuits.co.uk](http://www.yeovilcircuits.co.uk)



# The Chemring Countermeasures Approach

For countries needing to protect their ships and aircraft from guided missiles, Chemring Countermeasures is a global market leader in the provision of expendable countermeasures. It provides the broadest range of flare and chaff products (and components) of unrivalled capability, which is why customers all over the world, including the UK's Ministry of Defence, have complete trust in Chemring Countermeasures. Other factors that set Chemring Countermeasures apart include its unrivalled commitment to customers in responding to their individual needs, its ability and willingness to rapidly customise its products to meet specific requirements, and its continuous reinvestment of profits into ever more efficient and flexible production methods, giving customers the assurance that they will get the products they need and receive value for money.

If you would like to find out more about Chemring Countermeasures products and our world-class technology services, please call +44(0)1722 411611

You'll discover a flexible and supportive service geared to meeting customers' needs and an innovative approach to finding solutions. We look forward to hearing from you.

## Chemring Countermeasures Ltd

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