HEMRL

High Energy Materials Research Laboratory

About Lab

High Energy Materials Research Laboratory (HEMRL) is one of the prestigious laboratories under Armament and Combat Engineering Systems (ACE) cluster of Defence Research & Development Organization (DRDO), dealing with entire spectrum of high energy materials ranging from Initiators & Pyrotechnic devices to High Explosives, Gun Propellants & Solid Rocket Propellants.

HEMRL is the only lab in the country of its kind dealing with all types of munitions starting from small arms, gun & mortar ammunition, high energy solid propellants for guns, rockets & missiles. In view of specialized nature and sensitivity of the tasks, HEMRL has developed indigenous expertise to synthesise High Energy ingredients, to design pilot scale plants for batch production, to assist productionisation. HEMRL has been at the forefront in transferring critical technologies to PSU's/ private industries to encourage private participation in development and production activities. ToT's include various products, sub-systems, processes, etc. and till date HEMRL has successfully transferred 195 Nos of ToT's tovarious public sector and private industries. In last five years, more than 90 LAToTs havebeen signed with industry partners.

1000 lbs Thermobaric Bomb

1000lbs TB Bomb

TB Bomb fitted on Mig 27 UPG

TB Bomb Detonation

Thermobaric bombs use advanced fuel rich explosive filling capable of sustained terminal effects with enhanced lethality. TB bombs are capable to defeat soft and medium hard targets in open / confined environments with high impulse blast (TNT equivalent of 1.6) and thermal output. TB bombs are capable to generate higher blast impulse (> 30%) and long duration thermal effects (>1600oC, > 400ms) compared to conventional HE bombs. The bombs are adaptable to NATO and Russian aircrafts. The TB composition with enhanced performance parameters are developed as one to one replacement of existing bombs which uses TNT based conventional filling.

IR Decoy Flare for CMDS

Infra red (IR) guided missiles pose major threat to military aircrafts. For aerial intercept missions, IR guided missiles have been developed around the world. Military as well as civilian aircrafts/helicopters are prone to attack by ground to air and air to air IR guided missiles.

IR flare for CMDS is used to decoy the incoming IR guided missiles and thus save the aircraft/ helicopter. HEMRL has successfully developed these flares and its impulse catridge and accepted by IAF and ToT given to five private industries.

IR Decoy Flare Ø50 mm

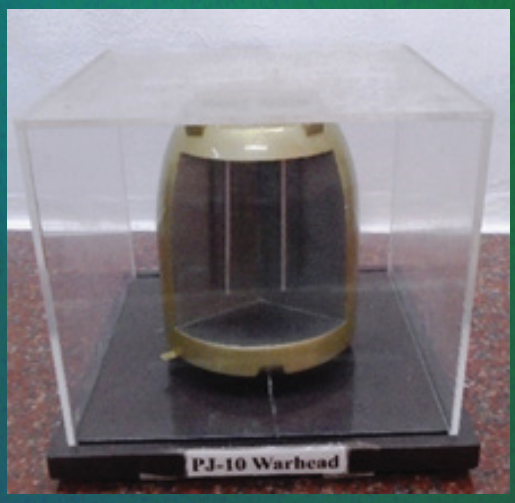
The 50 mm MTV Flares are used to save the fighter, transport and helicopters from IR guided missiles (both surface to air and air to air threats).
50 mm IR Flare, on produces very intense IR radiations in the desired waveband for more than 5s duration.The flare is compatible with APP-50 UV Mk I 30 (Russia) CMDS.

These flares are incorporated with a Safety and Functioning (SFU) unit, to ensure ignition of pellet only after ejection. User trials have been completed.

81 mm Anti Thermal-Anti Laser Smoke Grenade

HEMRL has designed and developed 81 mm Anti Thermal-Anti Laser smoke grenade for Indian Army for use with T-72, T-90, MBT Arjun and BMP-2
The grenade instantaneously generates smoke screen to defeat Thermal Imaging (TI) Sights and Laser equipment of enemy modern Tanks.
This grenade will replace existing inventory (3D6 Russian grenade)
Development has been completed and accepted by Indian Army and under production.

Brahmos warhead



Brahmos is a supersonic cruise missile with a range of 300km (Flight time 300 s) and carried a warhead of about 200 kg. Anti-Ship PCB warhead for Brahmos missile is indigenously developed by Programme PJ-10. HEMRL has developed the novel high explosive HEMEX which is a HMX based explosive. HEMEX formulation has been developed by HEMRL, based on the requirement given in terms of shock sensitivity, VoD, filling density and TNT equivalent. HEMRL has also developed the procedure and infrastructure required for filling the warhead casing and preparation of booster pellet during the development phase. Vacuum casting method has been adopted for filling the warhead with HEMEX composition to achieve desired density.

Canopy Severance System (CSS)

Canopy Severance System (CSS) is an emergency escape aid system used for rescue of pilot in the shortest possible time. It consists of two independent sub-systems namely-

- Ground Egress System (GES)
- In-flight Egress System (IES)

GES is used during emergency when the aircraft is on ground. It can be operated either by pilot himself or the ground crew. On operation, the canopy is cut along its periphery and then it is removed to facilitate the exit of the pilot.

In-flight Egress System (IES) is used during flight. It is operated by the pilot by pulling the handle of ejection seat. On its operation, canopy is cut over the head of pilot which facilitates him to eject out easily through the canopy

CSS has been accepted by IAF and production is established under ToT.

Other Recent Products / Technologies:

- Explosive Reactive Armour Mk-II for T-72 and T-90
- Thermobaric bombs – 100-120kg
- Warhead explosives, pyro devices and propellants for BrahMos
- High Explosives for 500 kg PF bomb
- High Explosives for refurbishment of Pechora warhead
- Less sensitive explosives for SUT torpedo, RGB 60 & RL 140 Naval warheads
- High Explosive composition for Astra Warhead
- HE Fillings for Nipun, Vibhav, Ulka, Prachand and Parth munitions
- Propulsion system Guided Pinaka MBRL
- Bi-Modular Charge System (BMCS)
- Advanced Demolition Devices (ADD)
- Multispectral IR Flare
- 1W- 1A Detonator
- Explosive Detection Kit and OPX-Revilator Explosive Detector
- High energy propellant for Gun and Solid Rocket Motor
- Scale-up technologies for various HEMs like TATB, FOX-7, TNSTAD, etc.

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High Energy Materials Research Laboratory
Sutarwadi, Pune - 411021