

Advances in propellants, made in America, are crucial to long-range fires



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Smart solutions to access advanced technology, and modernize and secure domestic production of artillery shells



U.S. Soldiers assigned to 4th Battalion, 1st Field Artillery Regiment, 3rd Armored Brigade Combat Team, 1st Armored Division perform M109 Howitzer calibration operations during Rotation 24-08 at the National Training Center, Fort Irwin, Calif. (U.S. Army photo by Spc. James Robinson, Operations Group, National Training Center)

The U.S. industrial base for munitions and energetics is at a crossroads, with the Army investing heavily in munitions technology and production capacity. This includes a critical focus on artillery shells, which complements a simultaneous pursuit of vitally needed howitzer capability improvements – all in search of desperately needed improved long-range precision artillery fires.

But to fully realize the artillery capability needed, the Army must also invest in propellant technology and associated production capabilities to ensure the U.S. defense industrial base can support the surge with affordable, accessible, domestic production of Nitrocellulose (NC) and propellant at scale.

Unfortunately, the existing industrial base infrastructure is not well suited to manufacture the advanced energetics needed for surging demand and higher artillery performance. Currently, the most advanced technology and production resides outside the U.S. For example, the U.S. sources some of its most important artillery propellants from Canada, creating

supply chain risk. The most advanced tank and artillery propellant technologies in use in systems globally are found in overseas allied industrial bases. Addressing these shortcomings in domestic technology and production is critical to enabling U.S. howitzers – and tanks and medium caliber systems – to deliver the increased lethality American servicemembers need and deserve, and to ensure industrial resilience and magazine depth to win even in prolonged battles. Presently, Army propellants and energetics are primarily domestically manufactured at the Radford Army Ammunition Plant (Radford) in Virginia. In operation since WWII, the Government-Owned, Contractor-Operated (GOCO) facility is the only U.S.-based facility capable of producing single, double, and triple base propellants, as well as their constituent ingredients: NC, nitroglycerin, and acids.

However, America's next war will require longer-range, more lethal, more targeted engagements fueled by next-generation propellants, and Radford's production capabilities must be improved to support this future scenario. Radford's basic infrastructure (electrical, utilities, sewage) needs extensive modernization and many of the manufacturing processes and technologies in use are more than 50 years old. Radford is also not adequately prepared to produce solvent propellants at scale, although it has a legacy capability, which has contributed to sourcing these critical propellants from outside the U.S. The U.S. government is close to commissioning an NC facility modernization that will allow Radford to eventually produce more of the basic propellant constituents necessary to improve this troubling picture. However, modernization of other aspects of munitions such as artillery shells has advanced more quickly. It is vital the modernization of the propellant industrial base also accelerates so as to not leave a critical capability in the fires ecosystem behind

On the cover: America's next war will require longer-range, more lethal, more targeted engagements fueled by next-generation propellants. (Rheinmetall image)

that could undermine overall lethality and capacity improvements so desperately sought.

With this backdrop, the U.S. Army must revitalize its propellant industrial base – in technology as well as production capacity and excellence. An especially efficient, fast and effective way to do so within the GOCO model is to select an industry team experienced in energetics facility operation and modernization that possesses world-class expertise in propellant technology development and deployment. This would ensure that next-generation propellants for future munitions can be accessed, produced at scale, and made in America.

[American Rheinmetall Munitions \(ARM\)](#) is one such company that has brought its expertise, global technology portfolio, and public-private collaboration to the U.S. industrial base. ARM is committed to working with the Army to address technology and production demands for more and better energetics for soldiers today and into the future – and it has solutions readily available.

Leveraging a global footprint for energetics to accelerate munitions industrial base modernization

The DoD's ammunition industrial base faces challenges of capacity, technology, and dated facilities and processes. But there is a remarkable opportunity to act now to rebuild America's manufacturing capabilities in energetics production and its advanced energetics technology portfolio — quickly.

The Army can tap the proven advanced technology, production, and manufacturing expertise of world leaders in energetics such as Rheinmetall. The longstanding U.S. munitions subsidiary of the global technology leader, ARM, provides a domestic outlet to access this allied international technology and production excellence – and to do so with the speed this moment calls for.

“What we are prepared to do is to support the U.S. Army in establishing its own critical capability to be self-sufficient in producing the energetics needed for



Nitrochemie makes propellants for all calibers. (Rheinmetall photo)

its next generation munitions demand,” said Andrew Whittaker, vice president, business development for Nitrochemie, a European-based energetics joint venture between Rheinmetall and RUAG MRO Holding AG that partners closely with sister company ARM.

“Rheinmetall recognized a number of years ago that to grow it needed to establish its own capabilities in plant design engineering, which it has done through internal investment and through JVs such as the one started in 2024 with Resonant Holdings, a South African specialist in plant engineering for chemical applications for munitions,” continued Whittaker. “With these assets, a number of munitions and propellant facilities have been designed and built across Europe. This expertise in modernization and delivering turnkey infrastructure projects is well established as a proven capability that can enable us to support a low-risk expansion and modernization of the U.S. industrial base. Now Rheinmetall – via ARM – is prepared to rapidly deliver U.S. domestic solutions on the basis of these methodologies and technologies already developed and proven out in the allied industrial base.

“ARM is backed by a global supply chain of know-how in munitions technology, production, design, and supply chain,” said Whittaker. “All of this knowledge can be brought into the U.S. national technology and

industrial base. There’s tremendous opportunity here to leverage from what we’ve already done in practice. We’ve done the legwork, we’ve got the resources, the capabilities and the knowledge to move quickly in helping the Army modernize and go forward.”

The importance of transforming energetics

The U.S. arsenal and energetics industrial base must achieve modernization to enable next-generation munitions and secure a vertically integrated U.S. supply chain. American Rheinmetall Munitions, backed by the global Rheinmetall infrastructure, is ideally positioned to support this effort through its expertise in energetics and propellant technology, production, and infrastructure design.

Proven global manufacturing and technology solutions can enable the critically needed rapid advancement of U.S. production capacity – including surge capacity – of the advanced energetics needed to deliver the lethality U.S. warfighters must possess. An effective public-private collaboration with the Army will bring advanced, safer, and more stable – but most importantly more lethal – energetic materials into production at scale, while helping to modernize the defense industrial base.