

119TH CONGRESS
2D SESSION

S. 4894

To establish a pilot program on safety and qualification of printable energetic feedstocks for additive manufacturing.

IN THE SENATE OF THE UNITED STATES

JUNE 24, 2026

Mr. CRUZ (for himself and Mr. KAINE) introduced the following bill; which was read twice and referred to the Committee on Armed Services

A BILL

To establish a pilot program on safety and qualification of printable energetic feedstocks for additive manufacturing.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Feedstocks, Uni-
5 formity, Safety, and Energetics Act” or the “FUSE Act”.

6 **SEC. 2. PILOT PROGRAM ON SAFETY AND QUALIFICATION**
7 **OF PRINTABLE ENERGETIC FEEDSTOCKS**
8 **FOR ADDITIVE MANUFACTURING.**

9 (a) ESTABLISHMENT.—The Secretary of Defense
10 shall establish a pilot program, to be carried out by the

1 Under Secretary of Defense for Research and Engineer-
2 ing, in coordination with the Capability Program Execu-
3 tive, Ammunition and Energetics (or successor organiza-
4 tion) and appropriate service acquisition executives, to
5 evaluate the safety, quality, and qualification pathways of
6 printable energetic feedstocks for controlled additive man-
7 ufacturing applications.

8 (b) PURPOSE.—The purposes of the pilot program
9 are—

10 (1) to determine whether the use of printable
11 energetic feedstocks can improve handling safety,
12 process stability, lot-to-lot consistency, and supply
13 chain resilience relative to traditional energetics
14 manufacturing and handling methods;

15 (2) to analyze logistics impact on throughput,
16 waste, defect rate, and constituent material avail-
17 ability versus state-of-the-art legacy processes;

18 (3) to develop and validate new test and evalua-
19 tion methods, if necessary, including metrology and
20 digital quality assurance, suitable for assessing
21 printable energetic feedstocks for Department of De-
22 fense use;

23 (4) to assess applicability of printable energetic
24 feedstocks to existing or planned munition and
25 energetics modernization efforts, consistent with ex-

1 plusive safety, security, and environmental require-
2 ments, that provide an advantage in performance or
3 logistics; and

4 (5) to identify barriers to adoption, including
5 infrastructure, standards, certification, and work-
6 force requirements.

7 (c) ACTIVITIES.—Activities under the pilot program
8 may include—

9 (1) identification, assessment, and characteriza-
10 tion of representative printable energetic feedstocks
11 and their performance consistency under controlled
12 conditions;

13 (2) development of qualification criteria and
14 data packages to inform safety releases, waivers, or
15 certifications as appropriate;

16 (3) limited demonstrations at Government fa-
17 cilities or contractor facilities that meet all applica-
18 ble explosive safety and security requirements;

19 (4) development of nonproprietary standards,
20 metrology approaches, and digital thread quality
21 controls for printable energetic feedstocks; and

22 (5) analysis of operational impacts via
23 wargaming or mission/campaign modeling and exper-
24 imental performance data.

1 (d) COMPARATIVE SAFETY ASSESSMENT RE-
2 QUIRED.—As a core element of the pilot program, the Sec-
3 retary of Defense shall conduct a comparative assessment
4 of the safety of the use of printable energetic feedstocks
5 relative to traditional energetics manufacturing and han-
6 dling, including, at a minimum—

7 (1) hazards and risks associated with storage,
8 transport, handling, and processing;

9 (2) sensitivity and response to credible stimuli
10 (including thermal and mechanical stimuli) using ap-
11 propriate test standards;

12 (3) process safety considerations, including po-
13 tential failure modes and mitigations for controlled
14 additive manufacturing workflows;

15 (4) accident and incident risk modeling (includ-
16 ing qualitative and quantitative risk assessment
17 where feasible); and

18 (5) recommended safety controls, facility re-
19 quirements, and operational constraints for any fu-
20 ture operational use.

21 (e) SAFETY AND SECURITY REQUIREMENTS.—The
22 Secretary of Defense shall ensure that activities under the
23 pilot program—

1 (1) are conducted only at facilities compliant
2 with applicable explosive safety siting, storage, han-
3 dling, and operating requirements;

4 (2) incorporate counter-diversion safeguards,
5 inventory accountability, and chain-of-custody con-
6 trols;

7 (3) apply cybersecurity and access controls for
8 any digital manufacturing files, process parameters,
9 and quality records; and

10 (4) do not authorize dissemination of restricted
11 manufacturing parameters outside approved Govern-
12 ment and cleared-industry channels.

13 (f) REPORTING.—Not later than 180 days after initi-
14 ation of the pilot program, and annually thereafter for the
15 duration of the pilot program, the Secretary shall submit
16 to the congressional defense committees (as that term is
17 defined in section 101(a) of title 10, United States Code)
18 a report that includes—

19 (1) pilot objectives, participants, test locations,
20 and safety governance structure;

21 (2) test methodologies, standards used, and key
22 safety and quality metrics;

23 (3) results of activities conducted under sub-
24 section (c), including identification, assessment, and
25 characterization of representative printable energetic

1 feedstocks, demonstrations, qualification criteria,
2 data packages, and standard development;

3 (4) results of the comparative safety assessment
4 required under subsection (d), including identified
5 hazards, mitigations, and residual risk;

6 (5) an assessment of cost, schedule, and
7 scalability relative to traditional energetics manufac-
8 turing and handling;

9 (6) recommended qualification and certification
10 pathways, including any standards gaps; and

11 (7) any recommended legislative, regulatory, or
12 resourcing actions required to enable safe adoption.

13 (g) DURATION.—The pilot program shall be carried
14 out for not more than 5 years after the date of the enact-
15 ment of this section.

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