



# U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – ARMY RESEARCH LABORATORY

Process of CS Powder Qualification to MIL-DTL-32495A  
CSAT 2019

Worcester Polytechnic Institute, 25 June 2019

Brian E. Placzankis, Gehn Ferguson, William Lum, Aaron Nardi, & Victor Champagne

Materials Engineers

Weapons & Materials Research Directorate

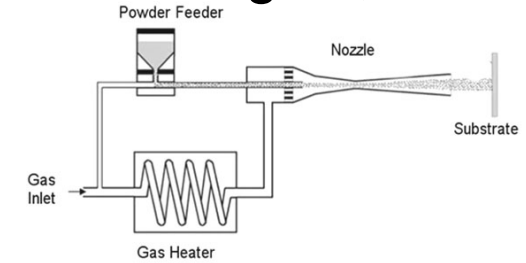
Distribution A: Approved for public  
release; distribution unlimited



## COLD SPRAY SPECIFICATIONS TIMELINE



- MIL-STD-3021, “MATERIALS DEPOSITION, COLD SPRAY” published 4 August, 2008
  - MIL-STD-3021 w/CHANGE 1: 13 July 2011
  - MIL-STD-3021 w/CHANGE 1: 4 March 2015



- MIL-DTL-32495, “ALUMINUM-BASED POWDERS FOR COLD SPRAY DEPOSITION” published 12 May 2014 (Aluminum powders only)

- MIL-DTL-32495 w/Amendment 1: 26 SEP 2014 (Aluminum powders only)
- MIL-DTL-32495 w/Amendment 2: 23 AUG 2015 (Aluminum powders only)



- MIL-DTL-32495A, “POWDERS FOR COLD SPRAY DEPOSITION” major revision published 26 November 2018, (Introduced many more powder classes)
  - MIL-DTL-32495A, w/Amendment 1: 26 November 2019, (minor changes & improvements)
  - MIL-DTL-32495A, w/Amendment 2: project underway (adds new powder class and optimizations)



## POWDER QUALIFICATION – WHY DOES DoD WANT IT?



### *Advantages for DoD*

- The MIL-DTL-32495A Qualified Products List (QPL) is a controlled product population
- Qualified powder products are fully vetted and confirmed to meet requirements
- Still considered a “competitive” procurement because the proposed vendors have all of the technical data requirements available to them
- The “intent” of the qualification process is performance/verification based, to verify capability of the product to meet the users need
- Unlike First Article, the expensive initial qualification testing is already completed and does not need to be repeated every time
- Because, QPL happens pre-award, it is a simple vehicle to procure with, (simple = cheaper)
- Qualified products are issued National Stock Numbers (NSNs) allowing for the capture of useful acquisition data including product usage, tracking, and shelf life controls
- Reduced lead time via reduced paperwork (ease of contracts), reduced time for product delivery
  - Increased readiness & less system nonavailability days
- More and more DLA supply centers are using cost savings contracting vehicles to keep costs down and long term contracts is one of those procurement tools often used.
- QPLs lend themselves nicely to long term contracts



# POWDER QUALIFICATION – WHY? & WHAT’S IN IT FOR MY COMPANY?



## ***Advantages for Powder Suppliers***

- Product exclusivity benefits from the MIL-DTL-32495A QPL (membership has its advantages!)
  - Smaller “competitive” field with other vendors (still considered competitive by DoD)
  - Better brand recognition via direct listing of vendors’ names and their associated products
  - NSNs - National Stock Numbers issued for product(s)
  - Initial investment to qualify followed by less burdensome periodic conformance renewals
  - Reduced time to sales through simplified government procurement actions



**A win for DoD and  
for powder vendors!**



## MIL-DTL-32495A WITH AMENDMENT 1 - TERMINOLOGY



- PIN – Part Identifying Number (outlined in specification)
- NSN – National Stock Number
- QPL/QPD – Qualified Products List / Qualified Products Database
- CEA – Cognizant Engineering Authority
- PA – Preparing Activity
- Qualification – The process by which a powder is added to the QPL
- Conformance – The process by which the quality of the powder is periodically revalidated for continued government usage

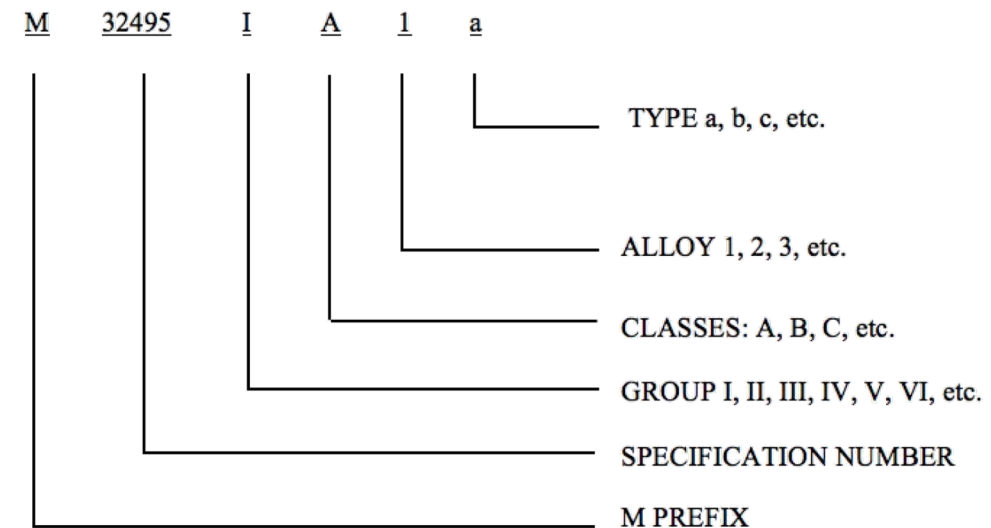




## MIL-DTL-32495 Revision Accomplishments



- Expanded to include many other powders beyond aluminum and its alloys
- Added designated Part Identifying Number (PIN) Nomenclature - PINs to be used for powders acquired under this specification
- Published with inputs by ARL, other DoD services, powder vendors, and end-users
- Defined powder quality for acceptance including contaminants, shelf life, and storage practices
- Added sample images to define quality of powders with examples to reject
- Established Qualified Products List (QPL) replacing original First Article requirement.
- QPL includes products with assigned National Stock Numbers (NSNs)



*Cold Spray Powder Pin Nomenclature Breakdown*



## MIL-DTL-32495A - Cognizant Engineering Authority



The ARL Advanced Materials & Processes Team (Cold Spray Team) serves as a CEA and other U.S. Government agencies seeking to serve as a CEA should send a request to the PA, namely, Army-MR (CCDC ARL Specifications and Standards Office). Nongovernment entities may also be granted CEA status however they must first be fully vetted by a procuring activity or other government agency to be approved and granted CEA eligibility.

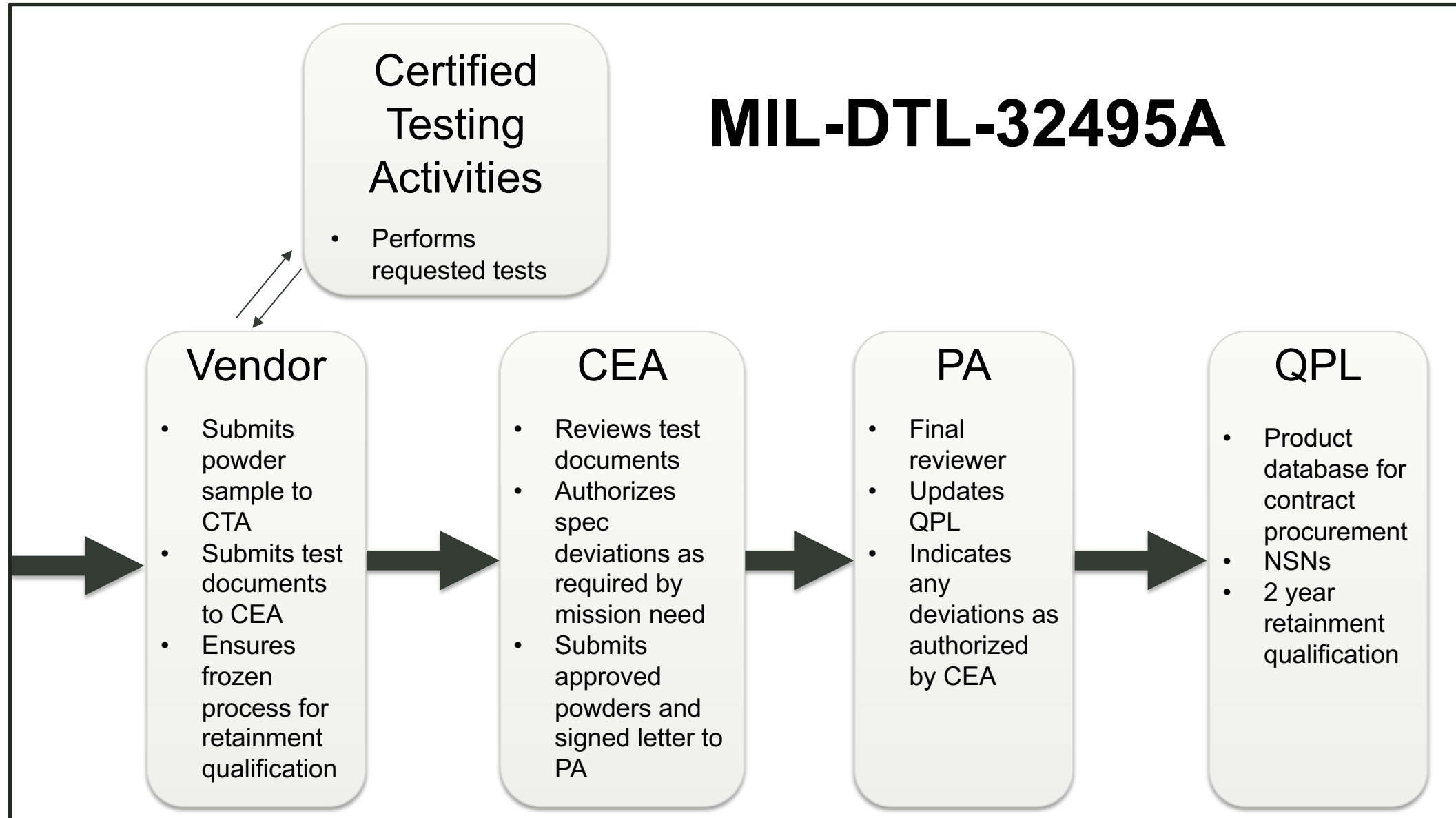
When the CEA has determined that a powder satisfactorily fulfills the compulsory criteria of MIL-DTL-32495A an Acceptance Memorandum is drafted and signed and the powder and its qualification data are submitted to the Preparing Activity (PA), the ARL Specifications and Standards Office, for final review, assignment of a new NSN and inclusion into the QPL document.

Mr. William Lum of the CCDC ARL Specifications and Standards Office manages QPL/QPD and NSN assignment activities and maintains the records database (QPL Product Folders)





# MIL-DTL-32495A Powder Qualification Flow Chart







# MIL-DTL-32495A TESTING REQUIREMENTS



- Qualification vs Conformance Tests
  - 4.2: All test results are forwarded to CEA for maintaining and submission to PA (for QPL)
- Determination of Suitable CS Powders
  - Evaluation of quality and sprayability
- Evaluation of “Grade 2” powders
  - Ensuring properties for structural applications
- Retention qualification
  - DD Form 1718 (Cert. of Qualified Products)
  - QPL Record Folder (William Lum)
- Images of Powders

REQUIREMENTS		TEST METHOD	REFERENCE PARAGRAPH	TESTING	
				QUALIFICATION	CONFORMANCE
Chemical composition (3.2.1)		ASTM E3061	4.6.1	X	X
Prohibited materials (3.2.2)		40 CFR 261, 40 CFR 401.15, and 40 CFR 63		X	X
Non-metallic impurities (3.2.3)		ASTM E1131	4.6.2.1	X	--
Oxygen content (3.2.3)		ASTM E1019	4.6.2.2	X	--
Particle size distribution (3.2.4)		ASTM B822	4.6.3	X	X
Quality (3.2.6)		Visual inspection or as specified in contract or purchase order	4.6.4	X	--
Sprayability (3.2.7)	Metallographic coupon (3.2.7.1)	Visual Inspection	4.6.5.1	X	--
		Porosity ASTM E3 ASTM E2109		X	--
Tension test specimens (3.2.8) Type designated powders only.		MIL-STD-3021 and ASTM E8/E8M		X	X
Mechanical properties (3.2.8.1) “Type designated” only.	Tensile properties (3.2.8.1.1)	ASTM E8/E8M	4.6.6 & Table IV	X	X
Manufacturing Process (3.2.9)		--	3.2.1 thru 3.2.7.1.2 and 3.2.9	X	--



POWDER SUBMISSION PACKAGE DOCUMENTS



CERTIFICATION OF QUALIFIED PRODUCTS  
(To be completed by manufacturer or manufacturer's representative)

OMB No. 0704-0487  
OMB approval expires  
Mar 31, 2015

The public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Service Directorate, Information Management Division, 4800 Mark Center Drive, Alexandria, VA 22304-3100 (0704-0487). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

**PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ORGANIZATION. RETURN COMPLETED FORM TO THE ADDRESS BELOW.**

Please complete a separate form for each plant location producing products qualifying to the specification listed in Block 1. Please certify that the products listed in Block 2 are available and the conditions in Block 5 are still accurate. After completion, please print and sign the form, then either scan and email it - or fax it - to the Qualifying Activity for the document in Block 1 to:

1. GOVERNING SPECIFICATION/STANDARD (Include revision/ amendment number if applicable)  
MIL-DTL-32493A w/Amendment 1

2. MANUFACTURER'S DESIGNATION(S) (If more space is needed, continue in Block 4, "Remarks")  
This is the manufacturer's internal product code number

3. COMPANY DATA

a. LEGAL BUSINESS NAME

b. POINT OF CONTACT

(1) NAME (Last, First, Middle Initial)  
Technical POC's Name

(2) ADDRESS (Include ZIP Code)  
Manufacturer's Address

(3) TELEPHONE (Include Area Code)  
(###) ###-####

(4) FAX (Include Area Code)  
(###) ###-####

(5) EMAIL ADDRESS  
xxxxx@xxxx.com

c. PLANT PHYSICAL ADDRESS AND CAGE CODE (For the plant manufacturing the products in Block 2)  
Plant address and Cage Code - IN ORDER TO OBTAIN A CAGE CODE YOU MUST REGISTER WITH THE SYSTEM FOR AWARD MANAGEMENT (SAM)  
  
CAGE\* CODE:

d. MAILING ADDRESS AND CAGE CODE (If different from 3.c.)  
Similar to bLock c  
  
CAGE\* CODE:

\*Commercial and Government Entity (CAGE) Code: A CAGE Code is required to be listed on an electronic QPL or QML. To register for CAGE Code, go to <http://www.ccr.gov>. If you experience problems, call toll free: 1-866-606-8220.

4. REMARKS (Attach additional pages as needed. Please indicate at the top of each page the governing specification/standard, company name, and CAGE Code.)  
  
This space is typically used for the Preparing Activity's internally generated queue number. This number is used for communication and follow-up with vendors. Company President or Appointed Official (small company) or designated official.

5. THE UNDERSIGNED, A RESPONSIBLE OFFICIAL OF MANAGEMENT, HEREBY CERTIFIES TO THE FOLLOWING STATEMENTS EXCEPT AS MODIFIED UNDER REMARKS.

a. Listed product(s) is (are) still manufactured at the plant address shown in 3.c. above.

b. Plant is under same management.

c. Product(s) is (are) being manufactured under the same conditions as originally qualified, i.e., same process, materials, construction, design, and manufacturer's designation.

d. Product(s) will meet the requirements and tests of latest effective issue of specification/standard.

e. Company name and addresses for CAGE Codes in Block 3 are current in the <http://www.ccr.gov> database.

f. TYPED OR PRINTED NAME (Last, First, Middle Initial)  
Company President or Appointed Official

g. POSITION TITLE  
President (small company) or designated official.

h. SIGNATURE

i. DATE SIGNED (YYYYMMDD)

DD FORM 1718, APR 2012

PREVIOUS EDITION IS OBSOLETE.

Page 1 of 1 Pages  
Adobe Professional 9.0

COMPANY & POC	SERVICE	MATERIAL	GROUP	CLASS	ALLOY	TYPE
REQUIREMENT						COMPLETED
Chemical composition (3.2.1)						
Prohibited materials (3.2.2)						N/A
Non-metallic impurities (3.2.3)						
Oxygen content (3.2.3)						
Particle size distribution (3.2.4)						
Quality (3.2.6)						
Images of Powders ( 3.2.6.1)						
Hardness of Powders (3.2.6.2)						
Sprayability (3.2.7)						
Metallographic coupon (3.2.7.1)						
Tension test specimens (3.2.8.1) Type designated only.						
Tensile properties (3.2.8.1.1) Type designated only						
Non-Destructive Inspection (3.2.8.2) Type designated only.						
Hardness Test Specimens (3.2.8.3) Type designated only.						
Manufacturing Process (3.2.9)						
Shelf life (3.2.10)						
Additional requirements:						

- DD Form 1718 (Cert. of Qualified Products)
- 1.) Cover Sheet / Check list

APPROVED FOR PUBLIC RELEASE

10



## POWDER SUBMISSION PACKAGE DOCUMENTS (CONT.)



### 2. Safety Data Sheet (SDS):

- 1) MATERIAL IDENTIFICATION
- 2) COMPOSITION/DATA ON COMPONENTS
- 3) HAZARDS IDENTIFICATION
- 4) FIRST AID MEASURES
- 5) FIRE FIGHTING MEASURES
- 6) ACCIDENTAL RELEASE MEASURES
- 7) HANDLING AND STORAGE
- 8) EXPOSURE CONTROLS AND PERSONAL PROTECTION
- 9) PHYSICAL AND CHEMICAL PROPERTIES
- 10) STABILITY AND REACTIVITY DATA
- 11) TOXICOLOGICAL INFORMATION
- 12) ECOLOGICAL INFORMATION
- 13) DISPOSAL CONSIDERATIONS
- 14) TRANSPORT INFORMATION
- 15) OTHER REGULATORY INFORMATION
- 16) OTHER INFORMATION

### 3. Technical Data Sheet:

- 1) Date and Company's Product
- 2) Product Description
- 3) Typical Physical and Application Properties
- 4) Standard Package Sizes and Coverage
- 5) Available Product Configurations
- 6) Surface Preparation
- 7) Patents if applicable
- 8) Typical Application Technique
- 9) Spray Application
- 10) Dry/Cure Time\* (N/A)
- 11) Health and Safety Precaution
- 12) Storage
- 13) Contact for Additional Information
- 14) Technical Information
- 15) Product Use
- 16) Warranty, Limited Remedy, and Disclaimer
- 17) Limitation of Liability

\*A remnant from the CARC Specification to be removed in upcoming Amendment 2



# POWDER SUBMISSION PACKAGE DOCUMENTS (CONT.)

MIL-DTL-32495A  
APPENDIX A



## 4. Certified Test Report:

- 1) Date, Company's Product and Description
- 2) Accreditations and Certifications (with any additional quality system standards)
- 3) Test
- 4) Specification's Section and Paragraph
- 5) Requirement
- 6) Result
- 7) Approved Signature

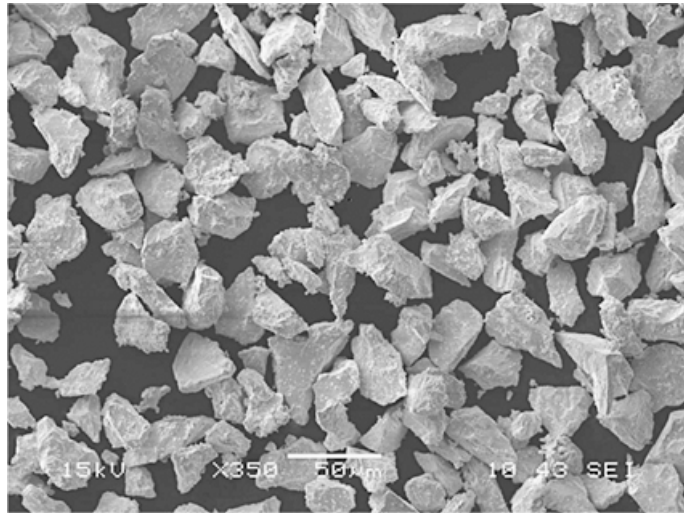
## 5. Process/Control Sheet:

Vendor:		
Specific Service: Army   Air Force   Navy   Other (Circle one)		
Cold Spray System:	Model #:	
Nozzle Type/Material:	Nozzle Throat Diameter, Exit Diameter & Length:	
<b>SAMPLE PREPARATION</b>		
Substrate Material Type:		
Heat Treat Condition :		
Surface Preparation (grit blast, scotch rite, solvent clean, etc.):		
<b>COATING POWDER</b>		
Powder Material:	Powder Mean Diameter:	Material Lot # :
Powder Supplier:		
Powder material specification:		
<b>COATING DATA</b>		
Main Gas Type:	Temperature (Deg. C):	
Main Gas Pressure (MPa):		
Nozzle to Work Distance (mm):		
Deposition Angle:		
Notes:		
Hand-Held Gun: YES   NO	Robotically Manipulated Gun: YES   NO	
Traverse rate (mm/s):	Increment (mm):	
Deposition Thickness as Sprayed:	Number of Passes:	
Notes:		
Vendor POC Information:		
Vendor Approval:		





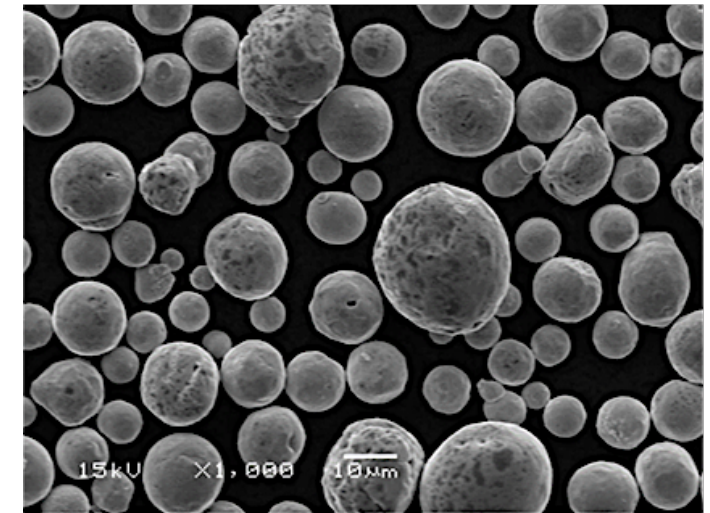
# EXAMPLE IMAGES OF DESIRABLE POWDERS



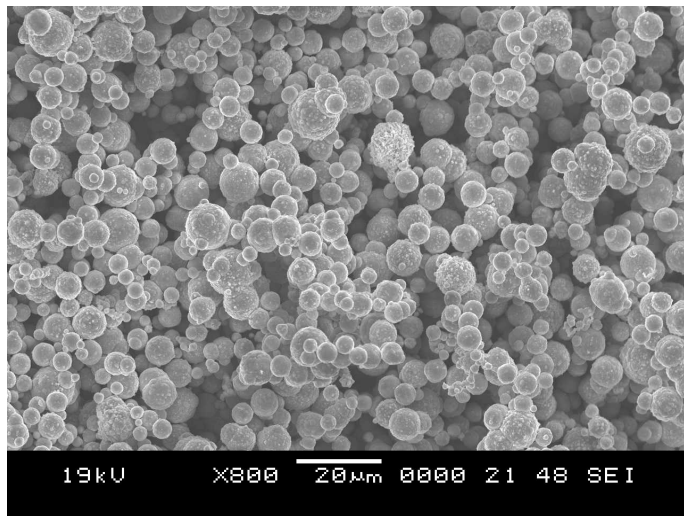
Angular Tantalum Powder



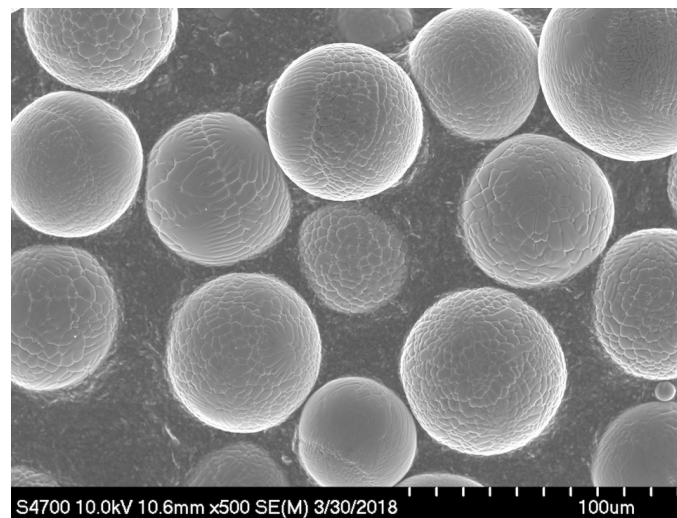
Spherical Copper Powder



Aggregate Aluminum Powder



Spherical Nickel Powder

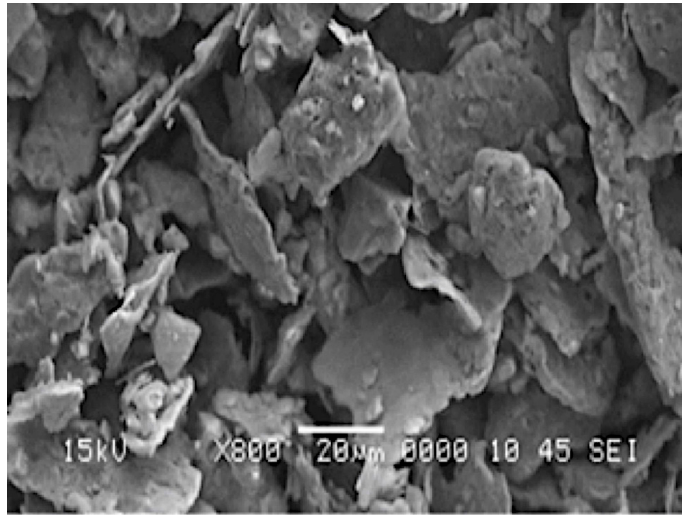


Spherical Al 6061 Powder

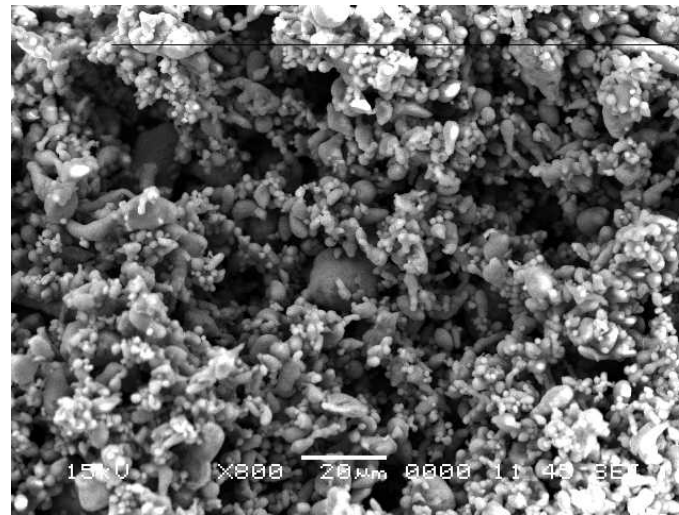
Images submitted  
should resemble  
these



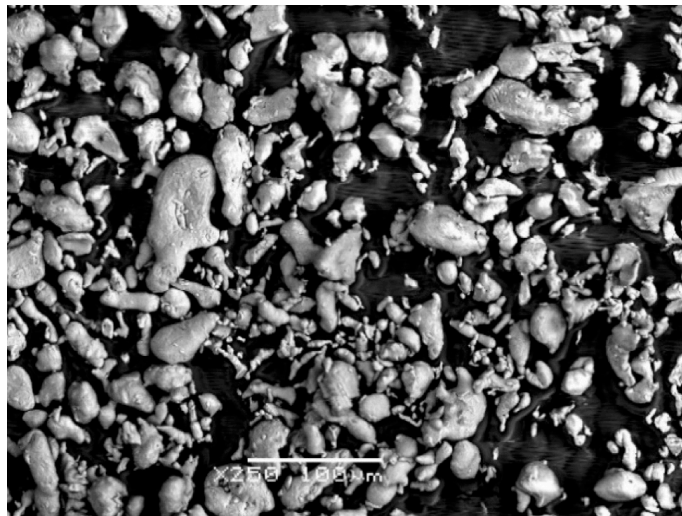
## EXAMPLE IMAGES OF POWDERS SUBJECT TO REJECTION



Flake Aluminum Powder



Agglomerated Powder



Acicular Powders



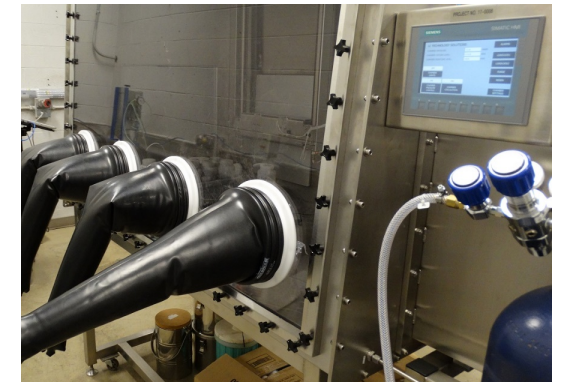




# MIL-DTL-32495A PACKAGING & SHELF LIFE CONSIDERATIONS



- Oxygen and moisture can affect ability to spray and deposit powders
- Avoiding exposure to atmosphere is best practice for cold spray powders
- Shelf-life of powder varies from powder to powder
- Packing in appropriately sized containers reduces unnecessary environmental exposure
- Contracting officer sets packaging requirements or selects a recommendation
  - Individually inert packed, sealed metal container for protection, desiccant packets added to prevent moisture ingress
  - Individual plastic bags, sealed metal container, desiccant packets
  - Individual plastic bags, sealed plastic container







## EXAMPLE UNITS OF POWDER PACKAGING (LBS)



1. AA6061: 1, 2.5, 5.0, 25 (Contains (25) 1 individual pound bags) - Group II, Class F, Alloy 1
2. AA7075: 1, 2.5, 5.0, 25 (25) 1 pound bags) - Group II, Class G, Alloy 1
3. AA2024: 1, 2.5, 5.0, 25 (25) 1 pound bags) - Group II, Class B, Alloy 1
4. WIP-C1 (CrC-Ni): 2.5, 5.0, 10.0, 50 (contains (20) individual 2.5 pound bags)\*
5. WIP-C2 (CrC-NiCr): 2.5, 5.0, 10.0, 50 (contains (20) individual 2.5 pound bags)\*
6. WIP-W1 (WC-Co-Ni): 2.5, 5.0, 10.0, 50 (contains (20) individual 2.5 pound bags)\*
7. WIP-BC1 (CrC-Ni bondcoat): 2.5, 5.0, 10.0, 50 (contains (20) individual 2.5 pound bags)\*

\* Forthcoming powders to be defined under Amendment 2



SAMPLE CEA ACCEPTANCE LETTER



DEPARTMENT OF THE ARMY  
U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND  
ARMY RESEARCH LABORATORY  
WEAPONS & MATERIALS RESEARCH DIRECTORATE  
ABERDEEN PROVING GROUND, MARYLAND 21005-5069

Weapons and Materials Research Directorate  
FCDD-RLW-MC

25 June 2019

Strawman Powder Industries, Inc.  
ATTN: Mr. Austin Scarecrow  
79 Gold Brick Road  
Hayville, OH 45014

Dear Mr. Scarecrow:

Your product(s), Au79-.999, and Au79-.99999 have been evaluated by our laboratory and have been approved for cold spray application use under the product class(es) listed below. Additionally, Au79-.999, and Au79-.99999 have been assigned the following PT number on the Qualified Products List (QPL): CSP#00001.

Specification	Manufacturer Designation	Manufacturer Name/Address	Cage Code	Qualification Number	Group	Class	Alloy
MIL-DTL-32495	Au79-.999 Au79-.99999	Same as above	TBD	CSP#00001	VII	A	1, 2

Our test results indicate that your product complies with all qualification requirements for this specification. This letter serves as notification that the above product is approved for listing on the next revision of the QPL for MIL-DTL-32495. Your product will continue to appear on future QPLs associated with this specification for the Group, Class, and Alloy(s) as noted above, unless we receive notification that your product no longer complies with the specification conformance requirements specified for this Group, Class, and Alloy.

There shall be no changes made to either the formulation (composition) or manufacturing procedures unless the material is re-examined by the CEA and the preparing activity responsible for maintaining the QPL and it is determined that your product complies with the requirements of the latest amendment or revision to this specification. The manufacturer is cautioned not to change any type or grade of compositional ingredient used in the product formulation at subsidiary plants or locations from the original formulation that qualified it for listing; such changes could affect product performance. Such a change is cause for removal from the QPL. If the product fails to meet all of the requirements of this specification or subsequent revisions, it would be cause for removal of the product from the QPL associated with the latest revision to MIL-DTL-32495.

This letter of approval for qualification and listing on the QPL does not guarantee acceptance of products in a purchase, nor does it constitute a waiver of established specification requirements for acceptance, inspection, testing, scheduling or any other provision that may be specified in the contract for this product.



FCDD-RLW-MC  
Strawman Powder Industries, Inc.

25 June 2019

This notice of qualification may not be reproduced, circulated, referred to or otherwise used for private commercial sales, promotional or advertising purposes, and if so used, such approval is subject to cancellation by the Department of the Army. Reproduction may only be used in connection with and for the purpose of sales or proposed sales to the United States Government. NOTE: any reproduction must be done in full text.

It is the responsibility of your company to notify the various elements and subsidiaries of your company that your products have qualified.

The points of contact for this action is the undersigned, who can be reached at 410-306-0751 or Aaron Nardi at 301-787-3859.

Sincerely,

/s/ Gehn D. Ferguson

Gehn D. Ferguson  
CCDC US Army Research Laboratory  
Cold Spray Cognizant Engineering Authority

- Signed by CEA
- Sent to qualified vendors
- Indicates addition to QPL
- Copy sent to PA and filed with acceptance data.



# EXAMPLE OF QPL LISTING – CONTACTS & CAGE CODE



ASSIST - Acquisition Streamlining - gov\_parts

https://qpd.dla.mil/search/parts.aspx?qpl=2815&param=0&type=1

**Qualified Products Database**

Main Search Reports PDF Download Help

Governing Spec: TT-C-490F(4)

The Qualified Product List for the following governing specification was last updated on **30-APR-2019**

QA	FSC	QPL Number	Governing Spec	Doc Date	Doc Status	Title	QPL Notes
MR	MFFP	QPL-TT-C-490	TT-C-490	20-JUL-2018	Active	Chemical Conversion Coatings and Pretreatments for Metallic Substrates (Base for Organic Coatings)	<a href="#">Preamble</a> <a href="#">Footnotes</a>

Search > QPL > Government Parts > Manufacturer Parts > Source POCs

**POCs for 3M COMPANY**

Based on the selected Government Part to the left, Filter for: Filter by: --NONE-- Filter Print All

POC count = 4

POC Name - Last/First/Middle /Salutation	Title/Email	Phone/Fax
Weller, Greg	3M Government Markets gweller@mmm.com	(202) 414-3013
Ramacier, Kelly Keeler	3M QPL POC kkeeler@mmm.com	651-733-7851
3M Federal Sales, CSR	3M Support FSD Orders 3msupport.fsd-orders.us@mmm.com	866-556-5712
Merlini, Kevin W.	3M Aerospace kwmerlini@mmm.com	215-327-3842

Page 1 of 1 1 Go to Page

Green - Source is Certified, Yellow - Source is due for Certification, Red - Source is overdue for Certification. Contact QA for additional information. Total part count = 2 Click on the appropriate link to see more.

▼▲Mfr Designation	▼▲Source Name	▼▲CAGE Code	Related Links
17245BEP/17246CEH	HENTZEN COATINGS, INC. 6937 W MILL RD MILWAUKEE, WI 532181225 USA  http://www.hentzen.com Test Reference: PT#00006	09225	<a href="#">[source Notes]</a>
AC-131 CB	3M COMPANY 3M 3M CENTER SAINT PAUL, MN 551441001 USA  Test Reference: PT#00004	76381	<a href="#">[source POC]</a> <a href="#">[source Plants]</a> <a href="#">[source Notes]</a>

Page 1 of 1 1 Go to Page

WARNING: UNAUTHORIZED ACCESS TO THIS UNITED STATES GOVERNMENT COMPUTER SYSTEM AND SOFTWARE IS PROHIBITED BY PUBLIC LAW 99-474 (THE COMPUTER FRAUD AND ABUSE ACT OF 1986) AND CAN RESULT IN ADMINISTRATIVE, DISCIPLINARY OR CRIMINAL PROCEEDINGS.  
[Privacy and Security](#) and [Accessibility/Section 508](#) Questions or comments: [QPD Feedback](#)

ASSIST - Acquisition Streamlining - gov\_parts

https://qpd.dla.mil/search/parts.aspx?qpl=2815&param=0&type=1

**Qualified Products Database**

Main Search Reports PDF Download Help

Governing Spec: TT-C-490F(4)

The Qualified Product List for the following governing specification was last updated on **30-APR-2019**

QA	FSC	QPL Number	Governing Spec	Doc Date	Doc Status	Title	QPL Notes
MR	MFFP	QPL-TT-C-490	TT-C-490	20-JUL-2018	Active	Chemical Conversion Coatings and Pretreatments for Metallic Substrates (Base for Organic Coatings)	<a href="#">Preamble</a> <a href="#">Footnotes</a>

Search > QPL > Government Parts > Manufacturer Parts > Source Plants

**Plants for 3M COMPANY**

Based on the selected Government Part to the left, Filter for: Filter by: --NONE-- Filter Print All

Plants count = 1

CAGE Code *	Plant Name and Address
1DWR5	3M COMPANY 3M 7341 ANACONDA AVE GARDEN GROVE, CA 928412921 USA

Page 1 of 1 1 Go to Page

Green - Source is Certified, Yellow - Source is due for Certification, Red - Source is overdue for Certification. Contact QA for additional information. Total part count = 2 Click on the appropriate link to see more.

▼▲Mfr Designation	▼▲Source Name	▼▲CAGE Code	Related Links
17245BEP/17246CEH	HENTZEN COATINGS, INC. 6937 W MILL RD MILWAUKEE, WI 532181225 USA  http://www.hentzen.com Test Reference: PT#00006	09225	<a href="#">[source Notes]</a>
AC-131 CB	3M COMPANY 3M 3M CENTER SAINT PAUL, MN 551441001 USA  Test Reference: PT#00004	76381	<a href="#">[source POC]</a> <a href="#">[source Plants]</a> <a href="#">[source Notes]</a>

Page 1 of 1 1 Go to Page

WARNING: UNAUTHORIZED ACCESS TO THIS UNITED STATES GOVERNMENT COMPUTER SYSTEM AND SOFTWARE IS PROHIBITED BY PUBLIC LAW 99-474 (THE COMPUTER FRAUD AND ABUSE ACT OF 1986) AND CAN RESULT IN ADMINISTRATIVE, DISCIPLINARY OR CRIMINAL PROCEEDINGS.  
[Privacy and Security](#) and [Accessibility/Section 508](#) Questions or comments: [QPD Feedback](#)

javascript:WebForm\_DoPostBackWithOptions(new WebForm\_PostBackOptions("Lu\_man\$DG\$ct04\$NoteLinks", "", true, "", false, true))



# EXAMPLE OF QPL LISTING – PRODUCT NOTES

ASSIST - Acquisition Streamlining X gov\_parts X

https://qpd.dia.mil/search/parts.aspx?qpl=2815&param=0&type=1

**Qualified Products Database**

Main Search Reports PDF Download Help

Governing Spec: **TT-C-490F(4)**

The Qualified Product List for the following governing specification was last updated on **30-APR-2019**

QA	FSC	QPL Number	Governing Spec	Doc Date	Doc Status	Title	QPL Notes
MR	MFFP	QPL-TT-C-490	<a href="#">TT-C-490</a>	20-JUL-2018	Active	Chemical Conversion Coatings and Pretreatments for Metallic Substrates (Base for Organic Coatings)	<a href="#">Preamble</a> <a href="#">Footnotes</a>

Search > QPL > Government Parts > Manufacturer Parts > Source Notes

Based on the selected Government Part to the left,  
Filter for:  Filter by:  --NONE--

**Notes for manufacturers part: AC-131 CB**

**Finished**

Class B  
Methods: I, II  
Approved for spray and immersion application on mill finished or abrasive blasted aluminums  
Link to TDS and application guides:  
[http://www.3m.com/3M/en\\_US/company-us/all-3m-products/-/3M-Surface-Pre-Treatment-AC-131?N=5002385+3292667585&rt=rud](http://www.3m.com/3M/en_US/company-us/all-3m-products/-/3M-Surface-Pre-Treatment-AC-131?N=5002385+3292667585&rt=rud)

Green - Source is Certified, Yellow - Source is due for Certification, Red - Source is overdue for Certification. Contact QA for additional information.  
Total part count = 2 [Click on the appropriate link to see more.](#)

▼▲Mfr Designation	▼▲Source Name	▼▲CAGE Code	Related Links
17245BEP/17246CEH	HENTZEN COATINGS, INC. 6937 W MILL RD MILWAUKEE, WI 532181225 USA  <a href="http://www.hentzen.com">http://www.hentzen.com</a> Test Reference: PT#00006	09225 	<a href="#">[source Notes]</a>
AC-131 CB	3M COMPANY 3M 3M CENTER SAINT PAUL, MN 551441001 USA  Test Reference: PT#00004	76381 	<a href="#">[source POC]</a> <a href="#">[source Plants]</a> <a href="#">[source Notes]</a>

Page 1 of 1  1

WARNING: UNAUTHORIZED ACCESS TO THIS UNITED STATES GOVERNMENT COMPUTER SYSTEM AND SOFTWARE IS PROHIBITED BY PUBLIC LAW 99-474 (THE COMPUTER FRAUD AND ABUSE ACT OF 1986) AND CAN RESULT IN ADMINISTRATIVE, DISCIPLINARY OR CRIMINAL PROCEEDINGS.  
[Privacy and Security](#) and [Accessibility/Section 508](#) Questions or comments: [QPD Feedback](#)

javascript:WebForm\_DoPostBackWithOptions(new WebForm\_PostBackOptions("Lu\_man\$DG\$ctl04\$PlantLinks", "", true, "", "", false, true))



# INCH-POUND

MIL-DTL-32495A  
w/AMENDMENT 1  
12 April 2019  
SUPERSEDING  
MIL-DTL-32495A  
26 November 2018

## DETAIL SPECIFICATION

### POWDERS FOR COLD SPRAY DEPOSITION

This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification covers requirements intended for use in the procurement of powders used to produce deposits utilizing a cold spray materials deposition process for the purpose of parts repair, coatings, or fabrication of near-net shaped parts. Cold spray is a process whereby metal powder particles are utilized to form a deposit by means of ballistic impingement upon a substrate in order to produce thin coatings, thick deposits, or near-net shaped parts. This cold spray process is explained in the manufacturing process standard MIL-STD-3021, "Materials Deposition, Cold Spray". The base document of MIL-DTL-32495 contained requirements for Aluminum powders only. This new Revision (A) expands the list of powders to include additional materials beyond aluminum.

1.2 Classification. The powders are of the following Group, Class, Alloy, and Type, as specified (see Table I and 6.2). Note: For type designated powders, additional conformance testing is required to ensure adequate mechanical properties in the as deposited state. This is not an all-inclusive list. Hazardous materials including lead, beryllium, and cadmium while sprayable are not encouraged for usage.

Comments, suggestions, or questions on this document should be addressed to: Director, U.S. Army Research Laboratory, Weapons and Materials Research Directorate, Specifications & Standards Office, Attn: FCDD-RLW-MC, Aberdeen Proving Ground, MD 21005-5069. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil/>.

AMSC N/A

AREA MFFP

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

# Questions?