

MIL-S-17526A (OS)  
10 July 1972  

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SUPERSEDING  
MIL-S-17526 (NOrd)  
14 May 1953  

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See Section 6

PROPOSED

MILITARY SPECIFICATION

SANDS, MOLDING

*This specification has been approved by the Naval  
Ordnance Systems Command, Department of the Navy.*

1. SCOPE

1.1 Scope. This specification covers foundry sands for use in preparing molds for casting metals.

1.2 Classification. Foundry sands shall be of the classes shown in table I, as specified (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

RR-S-366

Sieve, Standard for Testing Purposes

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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2.2 Other publications. The following publication forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or requests for proposal shall apply.

American Foundrymen's Society

Foundry Sand Handbook (Seventh Edition) 1963

(The publisher of this Handbook is the American Foundrymen's Society, Golf and Wolf Roads, Des Plaines, Ill. 60016.)

3. REQUIREMENTS

3.1 Materials. Foundry sands covered by this specification shall be naturally occurring molding sands or silica sands prepared by screening, washing, etc. so as to be reasonably uniform, free of rock, organic matter, or other foreign material to meet the requirements of this specification for the class specified in accordance with table I.

3.2 Physical and chemical properties. Foundry sand shall meet the requirements for physical properties and chemical composition of the class specified as shown in table I.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Sampling.

4.1.1.1 Lot. For sampling purposes, a lot shall consist of one bulk carload or less of a single class of sand prepared for delivery at the same time.

Table I

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## PHYSICAL AND CHEMICAL PROPERTIES

Class	Com- mercial design- ation	Grain fine- ness No.	Grain distri- bution classi- fication	AFS clay con- tent (%)	Grain shape class	Moisture content as rec'd, max. (%)	Green perme- ability, min.	Green compres- sive strength, min. (lb/in <sup>2</sup> )	Green tensile strength, min. (oz/in <sup>2</sup> )	Green hard- ness, ±5	Sinter- ing point, min. (°C)
1	Downer Open Hearth	60-70	3:3:4	2-5	Sub- angular	7.0	150	0.8	1.0	5	1300
2	Downer Steel	60-70	3:3:4	6-10	Sub- angular	7.0	75	2.0	2.0	40	1250
3	Lumberton Iron	70-80	5:4:3	15-18	Sub- angular	6.0	75	7.0	15.0	85	1200
4	Zanesville Iron	70-80	3:4:3	22-30	Sub- angular	7.0	40	12.0	20.0	85	1200
5	Millville Gravel	23-27	1:4:7	17-19	Sub- angular	7.0	250	10.0	16.0	85	1250
6	Silica Clay	170-200	7:4:0	40-60	Compound sub- angular	7.0	2	10.0	5.0	80	1125
7	No. 00 Albany	180-200	7:4:0	11-13	Sub- angular	6.0	10	5.0	5.0	80	1050
8	No. 1 Albany	110-130	5:4:0	12-15	Sub- angular	6.0	15	8.0	5.0	80	1075
9	French Substitute	200-220	6:3:0	20-23	Sub- angular	7.0	10	10.0	15.0	85	1125
10	Fine Brass	180-200	6:3:0	12-15	Compound	7.0	10	6.0	6.0	75	1100
11	Richmond Iron	100-120	3:6:2	20-23	Sub- angular	7.0	15	10.0	15.0	85	1075
12	Richmond Gravel	20-30	0:5:7	10-15	Angular	5.0	400	6.0	10.0	80	1150
13	Zanesville Brass	180-210	6:4:0	15-18	Sub- angular	6.0	10	5.0	4.0	75	1050
									SiO <sub>2</sub> , min. (%)	Fe <sub>2</sub> O <sub>3</sub> , max. (%)	
14	Foundry Silica	20-30	1:3:4	-	Sub- angular	2.0	600	99.5	0.15	-	1350
15	Foundry Silica	30-40	1:3:3	-	Sub- angular	2.0	300	99.5	0.15	-	1350
16	Foundry Silica	45-55	3:3:2	-	Sub- angular	2.0	160	99.5	0.15	-	1350
17	Foundry Silica	50-60	3:3:4	-	Sub- angular	2.0	140	99.5	0.15	-	1350
18	Foundry Silica	60-70	3:2:4	-	Sub- angular	2.0	100	99.5	0.15	-	1350
19	Foundry Silica	30-40	2:2:2	-	Rounded	2.0	400	99.5	0.15	-	1350
20	Foundry Silica	40-50	2:2:2	-	Rounded	2.0	180	99.5	0.15	-	1350
21	Foundry Silica	110-120	3:3:2	-	Sub- angular	2.0	30	99.5	0.15	-	1350

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4.1.1.2 Samples. Samples of foundry sand may be taken as it is loaded or unloaded, or by coring at various points in a pile, or by collection of samples distributed throughout a pile so as to be representative of the entire carload or smaller lot. At least 10 samples, 10 pounds each, shall be taken from each lot. These samples shall be mixed, quartered, and reduced in accordance with the methods described in the Foundry Sand Handbook.

#### 4.2 Test procedures.

4.2.1 Preparation for testing. Samples of foundry sand shall be prepared for testing by tempering to within  $\pm 0.2$  percent of the moisture contents given in table I, in accordance with the methods given in the Foundry Sand Handbook.

4.2.2 Standard test specimen. The standard test specimen used in the determination of compressive and tensile strengths, green permeability, green surface hardness, and sintering point shall be the AFS (American Foundrymen's Society) standard 2- by 2-inch specimen as described in the Foundry Sand Handbook.

4.2.3 Tests. Testing of foundry sands shall be in accordance with the methods described in the 1963 edition of the Foundry Sand Handbook. Values obtained by these methods shall be in accordance with the definitions of the quantities specified in table I.

4.2.3.1 Grain fineness number - a number obtained by multiplying the percentage retained on each of the sieves used in the sieve analysis by the multiplier indicated in table II, adding the products and dividing by the sum of the percentages. All percentages are based on the original weight of the dry sample including clay (AFS procedure).

4.2.3.2 Grain distribution classification - a group of numbers obtained from the sieve analysis as follows:

(a) The middle number is the least number of adjacent sieves in the sieve series used (see 4.2.3.1) on which the total amount retained is at least 75 percent of the weight of the sample. (Where more than one combination of sieves can be used to determine the middle number, that combination showing the highest total percentage retained shall be used.)

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(b) The first number is the number of sieves on which grains coarser than those included in (a) are retained.

(c) The third number is the number of sieves on which grains finer than those included in (a) are retained.

Table II

MULTIPLIERS FOR DETERMINING  
GRAIN FINENESS NUMBER

U. S. Standard Sieve No. (RR-S-366)	Multiplier
6	3
12	5
20	10
30	20
40	30
50	40
70	50
100	70
140	100
200	140
270	200
Pan	300

4.2.3.3 AFS total clay - the percentage, by weight of the sample of sand, of that portion which, when tested in accordance with the method described in the Foundry Sand Handbook, fails to settle at the rate of 1 inch per minute. It consists of particles less than approximately 20 microns in diameter. The water used in this test should be distilled, and the temperature  $70^{\circ} \pm 5^{\circ}$  Fahrenheit.

4.2.3.4 Grain shape classes.

4.2.3.4.1 Angular - composed mainly of fractured particles with sharp edges and corners.

4.2.3.4.2 Subangular - grains partially rounded.

4.2.3.4.3 Rounded - composed mainly of rounded grains, with few sharp edges.

4.2.3.4.4 Compound - containing considerable amounts of grains joined together and not separated in the sieve analysis.

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4.2.3.5 Green permeability - a numerical value representing the rate of passage of air through the standard test specimen (see 4.2.2).

$$P = \frac{vh}{pat}$$

where

P = green permeability

v = volume (usually 2000 cc) of air passing through the test specimen

h = height of specimen in centimeters

p = pressure of air in grams per square centimeters

a = cross-sectional area of specimen in square centimeters

t = time in minutes to pass v.

4.2.3.6 Green compressive strength - the average green compressive strength pounds per square inch (lb/in<sup>2</sup>) for at least three standard test specimens.

4.2.3.7 Green tensile strength - the average green tensile strength ounces per square inch (oz/in<sup>2</sup>) for at least three standard test specimens.

4.2.3.8 Green surface harness - depth of penetration, in thousandths of an inch, of a loaded spherical indenter 0.1 inch in radius. The indicator of the indenter shall show a value of 100 for a load of 237 grams and a value of 50 for a load of 100 grams.

4.2.3.9 Sintering point - the lowest temperature at which a heated platinum ribbon "burns on" a dried standard test specimen under a definite load applied to the ribbon. The heated ribbon shall remain in contact with the specimen for 4 minutes.

4.2.3.10 Chemical composition. The methods of Foundry Sand Handbook shall be used.

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## 5. PREPARATION FOR DELIVERY

5.1 Shipping. Foundry sand is usually shipped in bulk. Any special preparation required by common or other carrier shall be provided by the contractor without additional expense to the Government.

## 6. NOTES

6.1 Procurement documents should state the title, number, and date of this specification, inspection procedures, and the class of sand required.

6.2 Bid samples. Bidders are required to furnish a sample (approximately 25 pounds) representative of each class of sand they propose to furnish. Such samples shall be packed in strong, finely woven bags and shall be identified with the name of the producer, class of sand, the title, number, and date of this specification, and the bid, order, and requisition number.

6.3 Supersession data. This specification includes the requirements of MIL-S-17526 (NOrd) dated 14 May 1953, issued in lieu of Navy-5052(ORD) dated 29 July 1949, NAVORD OS-795 dated 10 March 1942, and NAVORD OS-905 dated 1 April 1939. When drawings, etc. refer to these superseded documents, this specification applies.

Custodian:  
Navy - OS

Preparing activity:  
Navy - OS  
(Project No. 9350-N073)



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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
<p><b>INSTRUCTIONS:</b> This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.</p>		
<p><b>SPECIFICATION</b> MIL-S-17526A (OS), Sands, Molding</p>		
<p><b>ORGANIZATION</b></p>		
<p><b>CITY AND STATE</b></p>		<p><b>CONTRACT NUMBER</b></p>
<p><b>MATERIAL PROCURED UNDER A</b>  <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT      <input type="checkbox"/> SUBCONTRACT         </p>		
<p><b>1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?</b>  <b>A. GIVE PARAGRAPH NUMBER AND WORDING.</b> </p>		
<p><b>B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES</b></p>		
<p><b>2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID</b></p>		
<p><b>3. IS THE SPECIFICATION RESTRICTIVE?</b>  <input type="checkbox"/> YES      <input type="checkbox"/> NO (If "yes", in what way?)         </p>		
<p><b>4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)</b></p>		
<p><b>SUBMITTED BY (Printed or typed name and activity - Optional)</b></p>		<p><b>DATE</b></p>

DD FORM 1426  
1 JAN 66

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

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