

MIL-P-82658 (OS)
31 January 1977
 Superseding
 (see section 6)

MILITARY SPECIFICATION

POLYMER, LIQUID, POLYBUTADIENE, CARBOXY TERMINATED

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of carboxy terminated polybutadiene liquid polymer referred to herein as "the material".

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. 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.

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipping and Storage
MIL-STD-1218	ACS Chemicals

(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.)

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Ordnance Station, Standardization Division (611), Indian Head, Maryland 20640 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 6810

MIL-P-82658 (OS)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 70-72

Specific Gravity of Semi-solid Bituminous Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

CODE OF FEDERAL REGULATIONS

49 CFR 100-199

Transportation

(The Code of Federal Regulations is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Orders should specify "49 CFR 100-199 (latest revision)")

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT
National Motor Freight Classification

(Application for copies should be addressed to American Trucking Associations, Attn: Tariff Order Section, 1616 P Street, Washington, DC 20036.)

INTERNAL REVENUE SERVICE

IRSP No. 368

Formulas for Denatured Alcohol and Rum

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402. Orders should cite IRSP No. 368, current revision.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT
Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Material. The material shall be an opaque amber color, viscous, carboxy terminated polybutadiene liquid polymer containing a nominal 1.0 percent 2, 2' methylene bis (4-methyl-6 tertiary butylphenol) anti-oxidant as an additive.

MIL-P-82658 (OS)

4.3 Sampling.

4.3.1 Lot. Unless otherwise specified in the contract (see 6.2), a lot shall consist of all material manufactured in one continuous production run or in one batch, under essentially identical conditions, from the same raw materials, and to be offered for acceptance at one time. Several batches, manufactured from the same raw materials, may be blended to form a uniform larger batch which shall then constitute a lot for inspection purposes.

4.3.2 Sampling. Sampling for quality conformance inspection shall be in accordance with inspection level I of MIL-STD-105. The sample unit shall be one unit package or container of material. Each sample shall consist of sufficient material to perform the quality conformance tests as specified in 4.4.

4.4 Quality conformance inspection. Each sample obtained in accordance with 4.3.2 shall be subjected to the tests and examination of 4.5. The acceptable quality level (AQL) shall be 2.5% defective. When specified in the contract (see 6.2), the contractor shall furnish test reports showing quantitative results for all quality conformance tests specified for each lot of material.

4.5 Tests and examination. Unless otherwise specified herein, all chemicals shall be ACS grade in accordance with MIL-STD-1218.

4.5.1 Visual examination. All samples shall be visually examined to verify conformance to the workmanship requirements.

4.5.2 Viscosity. Viscosity at 25°C shall be determined in accordance with the following:

a. Apparatus:

1. Constant temperature water bath maintained at 25°C.
2. Brookfield Viscometer, Model RVF, Brookfield Engineering Laboratories, Straughton, Massachusetts or equivalent.

b. Procedure:

1. Remove the wood handle and mount the viscometer on a ring stand. Carefully attach the Brookfield No. 7 spindle.
2. Pour the sample into a 600 millilitre (ml) beaker, place in the water bath at 25°C and stir with a thermometer until the sample comes to the test temperature. Use care to avoid stirring air bubbles into the sample.

MIL-P-82658 (OS)

3. Lower the viscometer on the ring stand until the surface of the sample is in the narrow section of the spindle. Level the viscometer, and operate at 20 rpm for determinations in the 100-2000 poise range. During operation maintain the spindle depth in the sample so that the polymer level climbs midway up the narrowest section of the spindle.
4. Obtain a series of readings until the value is constant.

c. Calculations:

1. Using the No. 7 spindle at 20 rpm and reading the 0 to 100 scale, calculate the viscosities as follows:

$$\text{Viscosity at } 25^{\circ}\text{C} = (20) (\text{scale reading})$$

If a different spindle is used, consult the chart accompanying the instrument for proper multiplying factor. Convert the resulting centipoise to poise by dividing by 100.

4.5.3 Specific gravity. The specific gravity, 25/25°C, shall be determined in accordance with ASTM D 70-72.

4.5.4 Acid value. The acid value shall be determined in accordance with the following:

a. Reagents:

1. Benzene.
2. Ethanol, anhydrous, denatured, Formula D-30 conforming to Internal Revenue Service Publication No. 368.
3. Phenolphthalein indicator.
4. Standardized 0.1 normal (N) alcoholic potassium hydroxide (KOH).

b. Apparatus:

1. Graduated cylinder, 100 ml.
2. Microburet, 10 ml.
3. Erlenmeyer flask, 250 ml.

- c. Preparation of neutral benzene-ethanol mixture: Mix 3 parts by volume of benzene with 1 part by volume of ethanol. Add 0.5 ml of phenolphthalein indicator and titrate with 0.1 N alcoholic KOH to a faint pink endpoint that persists for a minimum of 15 seconds (s).

MIL-P-82658 (OS)

- d. Procedure: Weigh a 0.8 to 1.2 (g) sample, to the nearest 0.1 mg, into a 250 ml Erlenmeyer flask. Add 100 ml of neutral benzene-ethanol mixture and approximately 0.5 ml of phenolphthalein indicator. Mix thoroughly until sample is completely dissolved. Titrate with 0.1 N alcoholic KOH to a faint pink color that persists for a minimum of 15 s.
- e. Calculation: Acid value, mg KOH/g = $\frac{56.1NV}{W}$
- where: N = normality of standard alcoholic KOH solution
 V = volume of standard alcoholic KOH solution, ml
 W = weight of sample, g
 56.1 = molecular weight of KOH
- f. Report the results of a minimum of 2 determinations and their average.

4.5.5 Water content. The water content shall be determined in accordance with the following:

- a. Reagents:
1. Methanol.
 2. Carrier solution - 1:1:1 parts by volume pyridine: benzene:methanol.
 3. Stabilized Karl Fischer reagent, diluted to a water equivalent of 2.5 to 3.0 mg/ml with Karl Fischer diluent.
 4. Sodium tartrate.
- b. Apparatus:
1. Aquameter, Beckman Model KF-4, or equivalent.
 2. Graduated cylinder, 100 ml.
- c. Standardization of Karl Fischer reagent: Add 100 ml of methanol to the reaction vessel. Neutralize the methanol with dilute Karl Fischer reagent by automatically titrating to a 30 s endpoint using the Aquameter. Carefully add 0.09 to 0.11 g of sodium tartrate, weighed to the nearest 0.1 mg, to the neutralized methanol. Dissolve the sodium tartrate in the methanol by setting the stirring action to the highest speed which will not cause splashing or bubble formation. Automatically titrate with dilute Karl Fischer reagent to a 30 s endpoint. Record the volume of dilute Karl Fischer reagent. Repeat the standardization procedure until three determinations agree within 0.05 mg/ml.

MIL-P-82658 (OS)

- d. Calculate the water equivalent of the dilute Karl Fischer reagent as follows:

$$A = \frac{156.6B}{C}$$

where: A = water equivalent of the dilute Karl Fischer reagent, mg/ml
 B = weight of sodium tartrate, g
 C = volume of dilute Karl Fischer reagent used to titrate the standard, ml
 156.6 = factor for sodium tartrate water content

- e. Procedure: Add 100 ml of the carrier solution to the reaction vessel. Neutralize the carrier solution with the dilute Karl Fischer reagent by automatically titrating to a 30 s endpoint using the Aquameter. Add 8 to 10 g of sample, weighed to the nearest 0.01 g, to the carrier solution in the reaction vessel. Set the stirring action the same as that used in the standardization. Dissolve the sample and automatically titrate with standardized dilute Karl Fischer reagent to a 30 s endpoint. Record the volume of dilute Karl Fischer reagent.

- f. Calculate the water content as follows:

$$\text{water content, wt\%} = \left[\frac{AD}{1000E} \right] \times 100$$

where: A = water equivalent of the dilute Karl Fischer reagent (from d. above), mg/ml
 D = volume of dilute Karl Fischer reagent used to titrate the sample, ml
 E = sample weight, g
 1000 = multiplication factor to convert g to mg

- g. Report the results of a minimum of 2 determinations and their average.

4.5.6 Antioxidant determination. The antioxidants shall be determined as follows:

- a. Apparatus:

1. Mixing device. Any device is suitable which will rotate the sample vials end over end at about 50 rpm.
2. Ultraviolet spectrophotometer. The Beckman Model DU or an equivalent instrument is satisfactory.
3. Vials. 40 ml with plastic screw caps equipped with tetrafluoroethylene (TFE) liners.
4. Volumetric glassware.

- b. Reagents and materials:

1. Antioxidant
2. Cyclohexane. Spectro grade.
3. Potassium hydroxide, alcoholic solution. Dissolve 28.05 g of KOH in 500 ml of methanol, and filter through glass fiber filter paper to remove insoluble carbonates.

- c. Procedures:

1. Preparation of calibration curve. Weigh 1.0 g, accurate to ± 1 mg, of the same brand and grade of antioxidant used in the plant

MIL-P-82658 (OS)

process into a weighing bottle. Dissolve the antioxidant in cyclohexane and quantitatively transfer to a 1 liter volumetric flask, rinsing the weighing bottle three times with cyclohexane. Dilute to volume with cyclohexane and mix well.

Pipet 1, 2, 3 and 4 ml portions of the standard antioxidant solution into separate 50 ml volumetric flasks and dilute to volume with alcoholic KOH. The resulting solutions contain 20, 40, 60 and 80 $\mu\text{g/ml}$ of antioxidant.

Measure the absorbance of each of the standards in a 1 centimetre (cm) cell vs. alcoholic KOH at wave lengths of 308, 330 and 292 nm. Compute the differential absorbance as follows:

$$\underline{A} = A_{308} - A_{330} + \frac{22}{38} (A_{292} - A_{330}) \dots\dots \text{Equation 1}$$

where: \underline{A} = differential absorbance

A_{308} , A_{330} , A_{292} , absorbance at 308, 330 and 292 nm, respectively.

Prepare a calibration curve by plotting values for \underline{A} vs corresponding concentrations of antioxidant in $\mu\text{g/ml}$.

2. Analysis. Weigh about 0.1 g of sample, accurately to $\pm 0.1 \text{ mg}$, into a 40 ml sample vial. Add 15 ml of cyclohexane and close the vial with a TFE lined screw cap. Place the vial on the mixing device until the sample dissolves (preferably overnight).

Pipet 20 ml of alcoholic KOH into the vial containing the dissolved sample, and place the vial on the mixing device for 20 minutes. Remove the vial from the mixer, allow the phases to separate and remove with a pipet or syringe a sufficient amount of the alcoholic KOH to fill a 1 cm spectrophotometer cell. Measure the absorbance at wave lengths of 308, 330, and 292 nm vs alcoholic KOH as reference.

d. Calculations:

1. Compute \underline{A} using Equation 1 under Procedure c. Read the concentration of antioxidant in the extract in $\mu\text{g/ml}$ from the previously prepared calibration curve.
2. Calculate the weight percent (wt%) antioxidant content of the sample as follows:

$$\text{Antioxidant, wt\%} = \left[\frac{(C)(V)}{(W)(10-6)} \right] \times 100$$

where: C = concentration of antioxidant in the extract, $\mu\text{g/ml}$
 V = ml of alcoholic KOH used in extraction
 W = weight of sample, g

Duplicate determinations should not differ from the mean by more than $\pm 0.02\%$ antioxidant in the range of 0.1 to 2%.

4.5.7 Unsaturation determination. The determination of unsaturation shall be as follows:

MIL-P-82658 (OS)

a. Apparatus:

1. Infrared spectrophotometer. A double beam instrument is required. Although a Perkin-Elmer Model 21 or its equivalent is preferred, one of the less expensive instruments such as the Infracord or the IR-5 may be used with some sacrifice in repeatability.
2. Sample cells. Two matched pairs of cells are required, with sample cell thickness of 1500 and 500 microns. These cells must be built in the laboratory inasmuch as no satisfactory commercial product is available. Directions for preparation of the cells are given under 4.5.7.c.(1).
3. Accessory equipment
 - a. Vacuum desiccator
 - b. Vacuum pump
 - c. Volumetric flasks - 25 ml

b. Reagents and materials:

1. Carbon disulfide
2. Antioxidant. Phenyl-B-naphthylamine (PBNA) or equivalent

c. Procedure:

1. Preparation of sample cells. Pairs of infrared cells are required. One cell, of known thickness, serves as a sample cell, while the other should be the proper thickness to compensate for the carbon disulfide solvent in the sample cell. Experience has shown that these matched cells cannot be purchased and should be built in the laboratory. The first step is to build a sample cell of the proper thickness, and then to build several cells about 2.5% thinner. Obtain differential spectra between a 2.5% polybutadiene solution in the sample cell and pure carbon disulfide in the sample cell and pure carbon disulfide in the reference cells. Examine the carbon disulfide absorption bands at 4.35, 4.65 and 11.65 μm . A suitable reference cell should show no appreciable absorption at these wave lengths.

Normally only one sample cell thickness, about 1500 μm , will be needed for this method. Its thickness can be measured with an optical microscope equipped with a vernier scale for measuring lens tube travel. Occasionally a 500 μm sample cell may be needed and should therefore be kept on hand. The thickness of this cell may be measured accurately by interference fringes.

MIL-P-82558 (OS)

It is desirable to have a complete reserve set of cells on hand. Cells slowly lose transmission with use and require periodic rebuilding. There is also the possibility that an unnoticed piece of gel will clog the cell completely. A spare set of cells will eliminate loss of time in such cases.

2. Purification of samples. The exact procedure for purification before analysis cannot be specified explicitly because it will depend to a large extent on the form in which the sample is received. In general, raw samples will contain two types of contaminants.
 - a. Inorganic materials, such as catalyst residue, which will not contribute much infrared absorption of their own, but which will cause the concentration of the solution to be in error.
 - b. Organic materials, such as antioxidant, which may affect the trans and vinyl determinations if they have infrared absorption bands near 10.35 or 11.0 μm .
3. Preparation of solutions.
 - a. Regular procedure. Prepare a stock solution of solvent by dissolving about 0.1 g of PBNA or other suitable antioxidant in a fresh 5 lb. bottle of carbon disulfide.

Tare a 25 ml volumetric flask to the nearest 0.1 mg. Add to the flask about 0.625 g of polymer, and reweigh the flask to ± 0.1 mg. Care should be taken to prevent the polymer from sticking to the lip or neck of the flask where solvent will not reach it. Add stock carbon disulfide to about $2/3$ final volume. Allow to stand, with occasional shaking until the polymer is dissolved.

Check the solution thoroughly for gel. Gel occurs in two forms: "Tight gel" which is visible as definite particles and a "loose gel" which may be detectable only by the slight difference in refractive index from the surrounding solution.

Make the solution up to final volume and shake well immediately before sampling.
 - b. Alternate procedure. This procedure should be used instead of that in 4.5.7.c.3.a for those samples which are found in the regular procedure to contain gel.

MIL-P-82658 (OS)

Weigh about 1.3 g of polymer into a small bottle and add 50 ml of stock carbon disulfide. Allow to stand with occasional shaking until the polymer has gone into solution. Examine the solution carefully for gel; if any is present, remove it by filtration.

Tare a small (about 25 ml) vial to the nearest 0.1 mg. At the time the infrared cells are filled, withdraw 10.0 ml of the solution with a pipet and place in the tared vial. Place the vial in a hood and allow the solvent to evaporate. Remove the last traces of solvent overnight in a vacuum desiccator. Weigh the vial to the nearest 0.1 mg and subtract the tare weight to obtain the weight of the solids. The concentration of the solution in g/l is 100 times the weight of the residue in grams.

4. Scanning of samples. Check the instrument to see that it meets performance specifications, particularly as regards electrical balance and the 100 percent T line. Set the zero percent T line to coincide with that of the chart paper. When these checks are completed, the instrument is ready for scanning.

Make the polymer solution up to final volume and shake thoroughly. Fill the 1500 μm sample cell. Fill the reference cell with the same stock carbon disulfide used to make the solution. Make a complete spectrum of the 1500 μm sample cell with the reference cell in the beam. Normal operating conditions may be used although a slower scanning speed may be used if desirable. If the transmission at the band maximum of either the 10.35 or 11.0 μm band is less than 20%, it will be necessary to scan the sample in the 500 μm cell.

5. Measurement of spectra. Measure all absorbances for the trans and vinyl bands at the band maxima. Draw the baselines as shown in Figure 1. For the 10.35 μm band, the baseline is tangent to the transmission maxima at about 10.2 and 10.7 μm . For the 11.0 μm band the baseline is tangent to the transmission maxima at about 10.7 and 11.2 μm .

Calculate the absorbance, A , as follows:

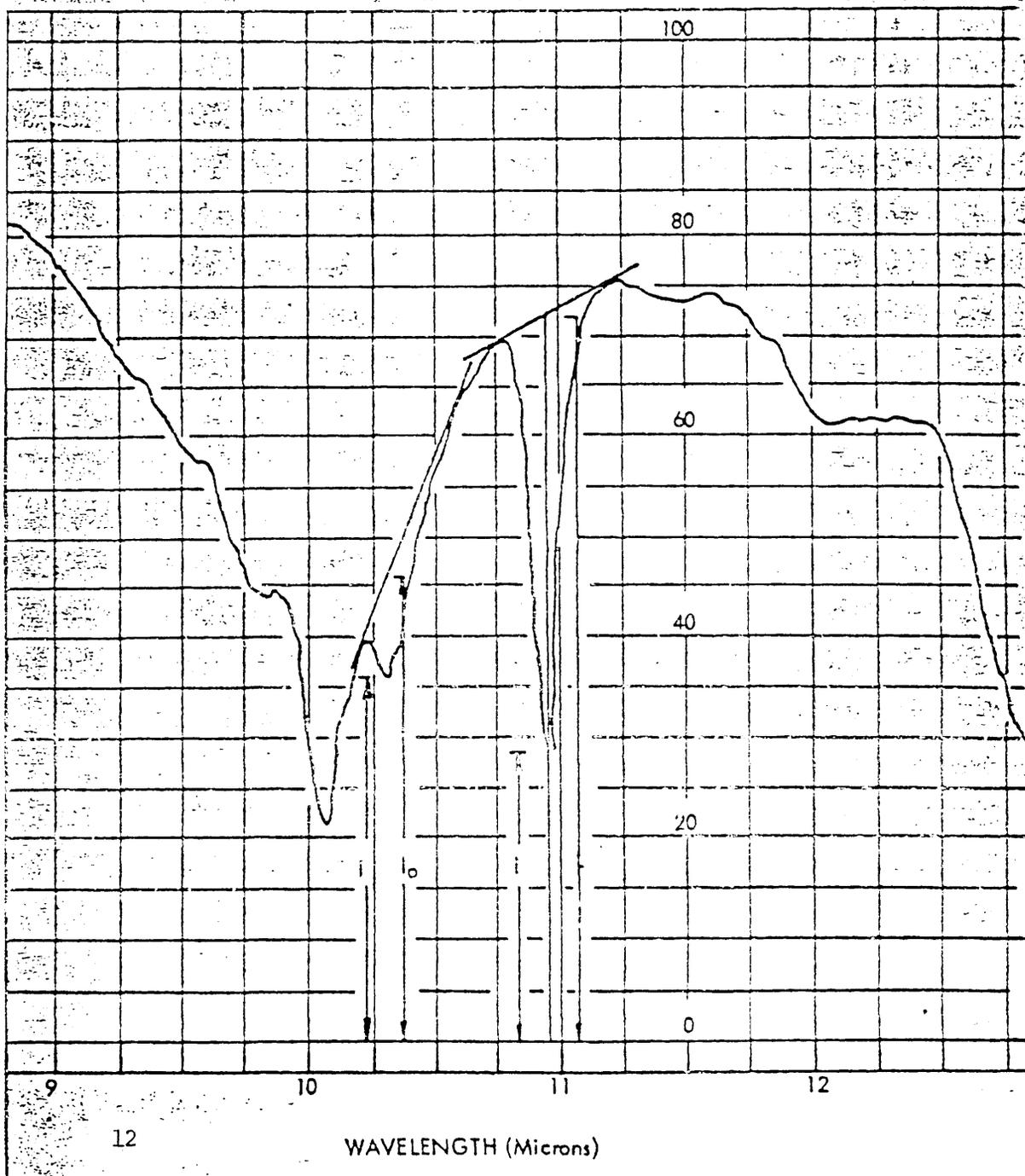
$$A = \log l_0 - \log l$$

where l_0 and l are measured as shown on Figure 1. Make this measurement as accurately as possible. Use an accurately ruled scale such as K & E No. 1631P or 1655P or equivalent.

MIL-P-82658 (OS)

FIGURE 1.

95% CIS-1,4 ADDITION POLYBUTADIENE.



d. Calculations:

1. Calculate the trans and vinyl concentrations as follows:

$$\text{Percent unsaturation} = \frac{100 A}{a b c}$$

where: A = measured absorbance
 a = absorptivity as determined under calibration
 b = cell thickness, cm
 c = polymer concentration, g/l

2. Calculate the cis concentration from the relation:

$$\% \text{ cis} = 100 - (T + V)$$

where: T = % trans
 V = % vinyl

NOTE: Four significant figures may be carried in the calculation but the final result should be reported only to the nearest 0.1 percent.

- e. Calibration: Calibration is accomplished using as secondary standards samples of Cis-4 polybutadiene which have been analyzed according to the complete procedure in Analytical Chemistry, 31, 529 (1959), and which therefore have known trans and vinyl concentrations.

If the short method is to be used with the same instrument on which the complete method has been calibrated, no additional spectra are necessary. If a different instrument is to be used, the samples selected as calibration standards will have to be measured on it also. Preferably, they should be measured near the same time as the samples for the complete method and in the same cells. If this is not possible it will be necessary to purify the samples and to prepare new solutions.

Measure baseline absorbances at 10.35 and 11.0 μm on the spectra of the secondary standards, as described in procedure c. Calculate the absorptivities for trans and vinyl as follows:

$$a = \frac{100 A}{b c d}$$

where: a = absorptivity to be determined
 A = appropriate baseline absorbance
 b = cell thickness, cm
 c = polymer concentration, g/l
 d = % concentration of the unsaturation type being measured as determined by the complete method

MIL-P-82658(OS)

Several polymers should be used as secondary standards. The average absorptivity for each type of unsaturation is then substituted in the equation given under calculations. In general, low molecular weight olefins cannot be used for calibration because the absorptivities so determined will be lower than those appropriate for polybutadiene. This will lead to high trans and vinyl concentrations and consequently low cis concentrations.

4.6 Packaging inspection. The packaging, packing and marking shall be inspected to verify conformance with the requirements of section 5.

5. PACKAGING

5.1 Packaging and packing. Unless otherwise specified in the contract (see 6.2), packaging and packing shall be level C.

5.1.1 Level C. Unless otherwise specified in the contract (see 6.2), packaging and packing of the liquid polymer shall be in accordance with standard commercial practice applicable to the type of material. The packaging and packing shall be of such construction and materials that the contents will be adequately protected against loss or contamination. Container size shall be as specified in the contract or order (see 6.2). Containers shall conform to Uniform Freight Classification, National Motor Freight Classification or to rules of other carriers applicable to the mode of transportation and shall be suitable for indoor storage at 32°C (90°F) maximum.

5.2 Marking. In addition to any special marking required by the contract or order (see 6.2), each container shall be marked in accordance with MIL-STD-129 and Code of Federal Regulations 49 CFR 171-179. Marking shall include, but not be limited to, the following information:

- a. Title, number and date of this specification
- b. Manufacturer's name and location
- c. Material trade name
- d. Net weight
- e. Lot number, batch number(s), and date of manufacture
- f. Storage conditions
- g. Contract or purchasing order number
- h. Shelf life (see 6.3)

6. NOTES

6.1 Intended use. Liquid polymer in accordance with this specification is intended for use as an ingredient in a solid propellant for the CCU-22/A impulse cartridge and other cartridge devices.

6.2 Ordering data. Procurement documents should specify the following:

6.2.1 Procurement requirements.

MIL-P-82658 (OS)

- a. Title, number and date of this specification
- b. Quantity required
- c. Place of delivery
- d. Inspection conditions when other than as specified (see 4.2)
- e. Lot size if other than as specified (see 4.3.1)
- f. Packaging requirements if other than as specified (see 5.1)
- g. Size of container required (see 5.1)
- h. Any special markings required (see 5.2)

6.2.2 Contract data requirements. Items of deliverable data required by this specification are cited in the following paragraph herein:

<u>Paragraph</u>	<u>Data Requirement</u>	<u>Applicable DID*</u>
4.4	Quality conformance inspection data	-

*DID's (Data Item Description/DD Form 1664) for the above requirements will be documented in the applicable ADL (Authorized Data List). Such data will be delivered as identified on completed (numbered) DID's when specified on DD Form 1423 (Contract Data Requirements Lists) and incorporated into applicable contracts.

6.3 Shelf life. The nominal shelf life of this material is 6 months, when stored under normal warehouse conditions. Polymer that has exceeded this shelf life should be retested to the requirements of this specification prior to use.

6.4 Suggested source of supply. A product that has met the requirements of this specification in past procurement actions is HC (P) Polymer 434 with A0-2246, manufactured by Thiokol Chemical Corporation. This information is for the convenience of the procuring activity and is not to be construed as a waiver of any requirement of this specification nor as any limitation of additional potential sources of supply.

6.5 Supersession information. MIL-P-82658 is intended to be used in lieu of AS 3057 (Code Ident 30003) data 6 December 1974 for Naval Sea Systems Command procurement.

Custodian:
Navy - OS

Preparing Activity:
Navy - OS
Project Number:
6810-NA32

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE

MIL-P-82658 (OS), Polymer, Liquid, Polybutadiene, Carboxy Terminated

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

 DIRECT GOVERNMENT CONTRACT SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3. IS THE DOCUMENT RESTRICTIVE?

 YES NO (If "Yes", in what way?)

4. REMARKS

SUBMITTED BY (Printed or typed name and address - Optional)

TELEPHONE NO.

DATE

DD FORM 1426
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17