



POF 1262-A
(INDIGENOUS
SUPPLIES)

Government of Pakistan
PAKISTAN ORDNANCE FACTORIES
TENDER ENQUIRY

To M/s

Dear Sirs,

Reference : TENDER ENQUIRY NO. **0068/LP/FILL/55**

DATED **30-APR-25**

You are requested to submit quotations for the item(s) noted in the Schedule to the Tender. Please note the following instructions for filling the tender:-

1. SUBMISSION OF TENDER

- 1.1 Tenders will be opened at **12:00 hours** on **31-MAY-25** at Bid Centre adjacent to Rabita Hall, POF Wah Cantt. Quotation must be submitted electronically on **www.ebidding.pof.gov.pk** as well as in hard form (duly sealed in envelope) before 30 minutes of opening time. The tender received late will not be entertained. You may witness the opening of the tender if you so desire. If a representative is deputed, he should bring a letter of authority from you.

Tender Enquiry No: **0068/LP/FILL/55**

Tender to be opened on: **31-MAY-25**

Address as follows:-

(www.ebidding.pof.gov.pk) BID CENTER

ADJACENT TO RABITA HALL

POFs, WAH CANTT.

2. GENERAL INSTRUCTIONS REGARDING PREPARATION OF QUOTATIONS

- 2.1 **For Materials**, the prices should be filled in column 5 and delivery date in column 7 of the schedule to this Tender Enquiry. As per **PPRA Rule 36(b)**, **Single Stage two envelope method** will be utilized for "Open competitive bidding." Moreover, technical & commercial evaluation of Bids will be carried out strictly as per PPRA rules and contract(s) will be awarded to the most advantageous bidder(s).
- 2.2 **For Plant and Machinery**, you are required to quote in two parts:-
Part I "Technical Offer": It should exclusively give technical details and literatures/brochures of the offered plant, machinery and equipment; validity date; delivery schedule; and signed undertaking given on the schedule to this Tender Enquiry. It must not indicate price, costs etc.

Cont....P-2

Part II "Commercial Offer": It should indicate the commercial terms e.g. price, terms of payment, mode of payment, mode of supply.

- 2.3 The quotation must remain valid for, at least 90 days from the date of opening of commercial tenders, extendable if so desired.
- 2.4 The quotation should hold good for any reduced or enhanced quantities without notice.
- 2.5 In the event of non-acceptance of offer, intimation may be given to the Tenderers on their request.
- 2.6 Conditional offers or alternative offers are likely to be ignored.
- 2.7 Quotations should be based on:-

F.O.R. station of dispatch basis, i.e. delivered free on rail, inclusive of packing and forwarding charges. The stores will be booked under Military Credit Note, to be provided by the purchaser.

and/or

Free delivery at POF's stores at **WAH CANTT**

In this case Octroi duty, will be payable by the supplier.

- 2.8 Taxes and Duties etc. where applicable, must be shown separately, quoting references to Registration No. in cases of Sales Tax and relevant authority in the case of others. Offers without these clarifications and inclusive of Taxes and Duties may be ignored.
- 2.9 Taxes and duties levied on or after Tender opening date or on or after the date offer was signed and dispatched will be allowed to include in the offered rates.
- 2.10 "Suppliers will furnish a certificate, issued by Excise & Taxation deptt., that he has cleared all Professional Tax payable by him" offers received without this certificate will be rejected.
- 2.11 Suppliers will render necessary information regarding hazardous effects on environment, of the material/products supplied by them, in their quotations and shipping/dispatch documents.
- 2.12 If the requisite information is not furnished on the T.E forms or offer received is not conformity with the requirement of the T.E such offer shall be ignored.

3. INSPECTION

- 3.1 Supplies shall be subject to the inspection and acceptance by the competent inspection authority nominated by the Purchaser, who will arrange it at his own cost. Inspection facilities such as tools, test equipment, instruments etc will, however, be provided by the Suppliers in accordance with the relevant specifications.
- 3.2 Where considered necessary by the Purchaser, stores may be obtained on Warranty/Guarantee subject to inspection on receipt. Rejected stores will be removed and replaced with the acceptable stores by the Supplier at his own expense, within a specified time.

Contd...P-3

4. TENDER FEE

The tender must be accompanied by a copy of non-refundable fee by means of a crossed postal order/pay order for Rs. 500/- in favour of: **Director-Admin-POFs, Wah Cantt.** The tender fee instrument in original must be provided on day/date of tender opening in the Bid Center.

4.1 TENDER SAMPLE

Where required, offer must accompany tender sample., strictly according to the description and specification given in Tender Enquiry. Offer not accompanied by tender sample will NOT be entertained excepting the established and reputable firms who have either previously satisfactorily supplied the same or similar stores or have submitted an acceptable sample thereof against previous T.E.

5. BID Security

- 5.1 A copy of Bid Security should accompany the tender in shape of deposit at call receipt/Pay Order/Banker Cheque from scheduled bank drawn in favour of :-

GM PP&C FILL

- 5.2 Bid security instrument in original must be provided on the day/date of tender opening in the Bid Center as under:

- a. Registered/indexed firms including foreign firms - 2% of quoted value subject to the maximum ceiling of Rs. 0.5 Mn.
- b. Registered/un-indexed firms including foreign firms - 3% of quoted value subject to the maximum ceiling of Rs. 0.75 Mn.
- c. Unregistered Firms including foreign firms - 5% of quoted value subject to the maximum ceiling of Rs. 1.00 Mn.
- d. Govt organization/production units/state owned enterprises/welfare projects of Svcs HQ - Rs 0.50 M. can be waived off on request by DG(C)
- e. Bid money will be returned to unsuccessful (less first three lowest quotee firms) bidders on opening of commercial offers
- f. Bid money will be returned to successful bidders on submission of performance bond/unconditional B.G.
- g. Quotation accompanied with less bid money will be accepted on provisional basis for 10 x days after opening of bids. However the firms are bound to provide/furnish the balance bid money within 10 x days after opening of bid otherwise such quotations will be ignored or rejected
- h. Offers received without Bid Security will not be entertained.
- i. Bid money will be forfeited in case the quotation is withdrawn before the expiry of its validity date.

6. ACCEPTANCE OF OFFERS

- 6.1 POF may reject all bids or proposals at any time prior to the acceptance of bid(s) or proposal, but is not required to justify grounds for its rejection. POF shall incur no liability towards supplier or contractor who have submitted bids or proposals.

6.2 PERFORMANCE BOND

- (a) The successful bidders shall provide performance bond which shall not exceed 10% of contract value, in the form of Deposit At Call Receipt from a scheduled Bank; or, an un-conditional Bank Guarantee on a prescribed format. The performance Bond will be in favour of C.M.A.(POF) Wah Cantt. It will be returned on satisfactory completion of contract.
- (b) If the Supplier fails to furnish the Performance Bond within the specified time, such failure will constitute a breach of the contract and the Purchaser shall be entitled to make other arrangements for purchase of the stores at the risk and expense of the Supplier.

6.3 Performance Bond from State owned organizations may be waived off at the discretion of the Purchaser.

6.4 FAILURE TO SUPPLY THE STORES

All deliveries must be completed by the specified date. In case of failure to deliver the stores within the scheduled time should have arisen from "Force Majeure", which the purchaser may admit as reasonable ground for further time, he will allow such additional time as he may consider to have been required by the circumstances of the case. Otherwise, he will be entitled, at his discretion, to cancel the contract; and/or claim liquidated damages upto 2% but not less than 1% of the contract price of the items and their quantities for each and every month or part of a month, beyond the specified delivery date, during which these may not be delivered, subject to a maximum of 10% of the total contract value of the particular stores which remained unsupplied either in part or in full: or, to purchase from elsewhere, the unsupplied stores at the risk and cost of the supplier.

6.5 PAYMENT

Payment will be made by the CMA(POF) through crossed cheque on receipt/acceptance of stores on our prescribed bill form supported by receipt voucher on part/full supply basis.

(a) Payment of duties/Taxes including professional tax (where applicable) must be supported by proof of having paid these to concerned Govt. Taxation Deptt.

7. SECURITY OF INFORMATION

The tenderer and his employees must not communicate any information relating to the sale/purchase of stores under this enquiry to any person other than the manufacturer or to any press or agent not authorised in writing by POFs to receive it.

Please return the Schedule to the Tender duly signed by the specified date, along with the specifications, drawings etc. if any, enclosed herewith - even if you are unable to quote.

WARNING In case the firm abstain from making offers or fail to return/acknowledge the tender form by the specified date on three consecutive occasions, no further tender enquiry may be issued to them and their names would be liable to be removed from the approved list.

Yours faithfully

**SUMAIRA YAMIN
MANAGER**

for PAKISTAN ORDNANCE FACTORIES

PAKISTAN ORDNANCE FACTORIES

SCHEDULE TO TENDER NO. 0068/LP/FILL/5530-APR-25**(1) FOR MATERIALS**

| (1) | (2) | (3) | (4) | (5) | (6) | | (7) |
|----------|------------------------------|------|-----|--------------|--|----------|---------------|
| Item No. | Description with Specs. etc. | Unit | Qty | Quoted Value | Price Per Unit FOR or free delivery | | Delivery Date |
| | | | | | In Figures | In Words | |

| | | | | | | | |
|---|---|-----|-----|--|--|--|--------------------|
| 1 | AMYL ACETATE (PACKED IN 05 GALLON HERMETICALLY SEALED BARREL/ DRUM) BS-552 | LTR | 740 | | | | WITHIN 3 MONTHS |
|---|---|-----|-----|--|--|--|--------------------|

| | |
|-------------------------|--|
| Total Rs = | |
| + GST = | |
| Total value Rs = | |

(2) For Plant & Machinery:
Specification:-

(3) Special Conditions

- (1) Required Delivery period: 03 Months after placement of contract.
- (2) Inspection of store will be carried out by I of Armts Rawalpindi.
- (3) Firms registered with Sales Tax and Income Departments who are on Active Taxpayers List (ATL) of FBR are eligible to participate in the bid. Documentary proof of the same must be attached with the bid.
- (4) If the firm is participating 1st time in tender of requisite store, the sample of requisite store free of cost strictly as per required parameters have to be submitted alongwith technical quotation.
- (5) The tender received without electronic means will not be entertained. You may witness the opening of tender if you so desire. If a representative is deputed, he should bring a letter of authority.
- (6) Hard copy of both technical & financial quotation must also be reached to Bid Centre before tender opening. Photocopy of bid money hiding the amount must be accompanied with technical quotation.
- (7) Quotation must remain valid for 90 days from date of commercial tender opening and should hold good for any reduced or enhanced quantity.
- (8) Photocopy of NTN & PTC Certificate duly attested by Gazetted Class-I Officer must be attached with the bid.
- (9) Participating firms should have not defaulted in any contract with POF or any other govt. organization.
- (10) Bids will be opened as per PPRA Rule 36 (b) "Single Stage-Two Envelope Procedure" in which the bid shall comprise of two separate envelopes: Technical proposal and commercial proposal. Initially only Technical Offer will be opened.
- (11) Price escalation clause is not allowed. No fax or e-mail offer will be accepted.
- (12) Supplier must accept all the terms and conditions embodied in the form POF 1281 (General conditions of contract) and in T.E general instructions Performa form POF 1262 A (indigenous supplies).
- (13) Rates and sales Tax must be shown separately otherwise rate will be considered inclusive of G.S.T.
- (14) Please clearly confirm our specs / drawing. Conditional or alternative offers are likely to be ignored.
- (15) The store must be protected adequately and appropriately against damages from environmental effects, water or other substances during journey/transportation to withstand the rough handling involved in the transit and provide preservation of store while held in the storage by the supplier.
- (16) Any quantity of store, if found defective functionally will essentially be replaced by the supplier free of cost under his own arrangements.
- (17) Clearly confirm shelf life in your technical quotation for minimum 03 years from the time of supply.
- (18) Please return copy of undertaking of TE duly signed and stamped.

PAKISTAN ORDNANCE FACTORIES

SCHEDULE TO TENDER NO. 0068/LP/FILL/5530-APR-25

| (1) | (2) | (3) | (4) | (5) | (6) | | (7) |
|----------|------------------------------|------|-----|--------------|--|----------|---------------|
| Item No. | Description with Specs. etc. | Unit | Qty | Quoted Value | Price Per Unit FOR or free delivery | | Delivery Date |
| | | | | | In Figures | In Words | |

Undertaking

Should our offer be accepted, we hereby undertake to supply the stores/render the services contracted on the basis of General Conditions of Contract embodied in Form POF 1281, and to deposit the performance bond within the prescribed time, failing which it will constitute a breach of contract, and POF will have the right to purchase the stores/services elsewhere at our risk and cost.

Place _____

Date _____

Signature of the Tenderer _____

Name _____

Position _____

Address _____

Income Tax G.I.R. No _____

Official Stamp _____

SPECIFICATION FOR
AMYL ACETATE

BS 552 : 1970

Price 8s (40p) net

BRITISH STANDARDS INSTITUTION

Incorporated by Royal Charter

British Standards House, 2 Park Street, London W1Y 4AA

Telegrams: Standards London W1

Telephone: 01-629 9000

0041 5/1
0534

THE BRITISH STANDARDS INSTITUTION

The British Standards Institution was founded in 1901 and incorporated by Royal Charter in 1929.

The principal objects of the Institution as set out in the charter are to co-ordinate the efforts of producers and users for the improvement, standardization and simplification of engineering and industrial materials; to simplify production and distribution; to eliminate the waste of time and material involved in the production of an unnecessary variety of patterns and sizes of articles for one and the same purpose; to set up standards of quality and dimensions, and to promote the general adoption of British Standards.

In carrying out its work the Institution endeavours to ensure adequate representation of all viewpoints. Before embarking on any project it must be satisfied that there is a strong body of opinion in favour of proceeding and that there is a recognized need to be met.

The Institution is a non-profit-making concern. It is financed by subscriptions from members—individuals, companies, technical and trade associations, and other bodies interested in its work, by a Government grant and by the sale of its publications. Membership of the Institution confers a number of specific rights and privileges. The demands on the services of the Institution are steadily increasing and can only be met if continuing and increased support is provided by those who use British Standards.

THIS BRITISH STANDARD, having been approved by the Chemicals Industry Standards Committee, was published under the authority of the Executive Board on 23 July, 1970.

First published, May, 1934.

First revision, March, 1950.

Second revision, March, 1957.

Third revision, July, 1970.

SBN: 580 06071 3

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price £1. The BS Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

BS 593. Laboratory thermometers.

BS 612. Nessler cylinders.

BS 658. Apparatus for the determination of distillation range.

BS 1792. One-mark volumetric flasks.

BS 2511. Determination of water by the Karl Fischer method.

BS 3591. Industrial methylated spirits.

BS 3978. Water for laboratory use.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:
Committee references CIC/4 and CIC/4/5
Draft for comment 69/27346

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CO-OPERATING ORGANIZATIONS

The Chemicals Industry Standards Committee under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

Board of Trade
 British Steel Industry
 *Chemical Industries Association
 Department of Health and Social Security
 Fertilizer Manufacturers' Association Ltd
 Gas Council
 Institution of Gas Engineers
 Ministry of Agriculture, Fisheries and Food
 *Ministry of Technology—Laboratory of the Government Chemist
 National Sulphuric Acid Association
 Royal Institute of Public Health & Hygiene

The Government department and industrial organization marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard.

British Plastics Federation
 Ministry of Defence, Navy Department
 Oil and Colour Chemists' Association
 Paintmakers' Association of Great Britain
 Pharmaceutical Society of Great Britain
 Research Association of British Paint, Colour and Varnish Manufacturers
 Royal Institute of Chemistry
 Society of Chemical Industry
 Society of Motor Manufacturers and Traders Ltd.
 Toilet Preparations Federation

BRITISH STANDARD SPECIFICATION FOR
AMYL ACETATE

FOREWORD

This standard forms one of a series of British Standards for solvents and allied products, the preparation of which was authorized originally by the Fine Chemicals Industry Standards Committee (now merged in the Chemicals Industry Standards Committee).

This British Standard was first issued in 1934, and was last revised in 1957. In the present revision a limit for colour has been introduced.

The opportunity has been taken to clarify the wording of the standard and to bring it into line with current conventions.

NOTE. Attention is drawn to certification facilities offered by BSI; see back cover of this standard.

SPECIFICATION

1. SCOPE

This British Standard specifies requirements for amyl acetate suitable for industrial purposes.

2. DESCRIPTION

British Standard amyl acetate shall be clear and free from matter in suspension, and shall consist essentially of the acetic esters of amyl alcohols, mixtures thereof, or alcohols obtained from fusel oil.

3. COLOUR

The colour of the material shall not exceed 15 Hazen units when measured by the method described in Appendix A or by a suitable instrumental method.

4. RELATIVE DENSITY

The relative density* of the material at any one of the following temperatures shall be within the appropriate values as shown:

| Temperature | Relative density | |
|-------------|------------------|-------|
| | min. | max. |
| °C | | |
| 20/4 | 0.866 | 0.874 |
| 20/20 | 0.868 | 0.876 |
| 25/25 | 0.864 | 0.872 |

* Ratio of the density of a liquid at a specified temperature to the density of water at a specified temperature.

5. DISTILLATION YIELD

The material, on distillation by the method described in Appendix B, shall yield at 101.3 kN/m²* (760 mmHg) pressure not less than 95 % by volume between 120 °C and 145 °C and not more than 67 % by volume below 135 °C.

6. RESIDUE ON EVAPORATION

The material shall not leave more than 0.01 % by mass of residue when tested by the method described in Appendix C.

7. WATER

The material shall not contain more than 0.3 % by mass of water, determined by the method described in BS 2511† and using 20 ml of the material.

8. ACIDITY

The material shall not contain more than 0.01 % by mass of acid, calculated as acetic acid, CH₃COOH, and determined by the method described in Appendix D.

9. ESTER CONTENT

The ester content of the material shall be not less than 95 % by mass, calculated as amyl acetate, CH₃COOC₅H₁₁, and determined by the method described in Appendix E.

10. SAMPLING AND SIZE OF SAMPLE

A representative sample of the material measuring not less than half a litre shall be taken from the bulk for the purpose of examination in accordance with this standard. The sample shall be placed in a clean, dry and airtight glass-stoppered bottle of such a size that it is nearly filled by the sample.

When it is necessary to seal the container, care shall be taken to avoid the risk of contaminating the contents in any way.

* 1 kN/m² = 10 mbar = 7.5 mmHg

† BS 2511, 'Determination of water by the Karl Fischer method'.

APPENDIX A

LIMIT TEST FOR COLOUR

A.1 Apparatus. The apparatus required comprises:

- (1) *Matched Nessler cylinders**, two of 100 ml capacity.
- (2) *One-mark volumetric flasks†*, one of 250 ml capacity and one of 500 ml capacity.

A.2 Reagents. The reagents used shall be of a recognized analytical reagent quality. Water complying with BS 3978‡ shall be used throughout.

- (1) *Cobaltous chloride, hexahydrate.*
- (2) *Hydrochloric acid, concentrated, 36 % m/m (11N).*

Either

(3) *Chloroplatinic acid reagent.* Dissolve 250 mg of platinum in a small quantity of aqua regia contained in a glass or porcelain basin by heating on a water bath. When the metal has dissolved evaporate the solution to dryness. Add 1 ml of the hydrochloric acid and again evaporate to dryness. Repeat this operation twice more.

or

- (4) *Potassium chloroplatinate.*

A.3 Preparation of colour standard. Dissolve 0.5 g of the cobaltous chloride hexahydrate and either the whole of the chloroplatinic acid (prepared as described above) or 2.490 g of potassium chloroplatinate, in 50 ml of the hydrochloric acid. Warm, if necessary, to obtain a clear solution and after cooling, pour into the 500 ml volumetric flask. Dilute with water to the mark.

Pipette 7.5 ml of this solution into the 250 ml volumetric flask. Dilute with water to the mark. This diluted solution has a colour of 15 Hazen units and should always be freshly prepared.

A.4 Procedure. Fill one of the Nessler cylinders to the mark with the sample, and the other with the colour standard. Using a white background, compare the colours.

* BS 612, 'Nessler cylinders'.

† BS 1792, 'One-mark volumetric flasks'.

‡ BS 3978, 'Water for laboratory use'.

APPENDIX B

METHOD FOR THE DETERMINATION OF DISTILLATION YIELD

B.1 Apparatus. The apparatus required is described in BS 658* and comprises:

- (1) *Distillation flask* of 150 ml distillation capacity complying with the requirements of BS 658*.
- (2) *Thermometer*, No. F255C/100, complying with the requirements of BS 593†.
- (3) *Receiver*, Type 1, of 100 ml capacity, complying with the requirements of BS 658*.
- (4) *Condenser*, Type 1, complying with the requirements of BS 658*.
- (5) *Draught screen*, Type 2, and *asbestos board* (central hole 50 mm in diameter) complying with the requirements of BS 658*.

B.2 Corrections to be applied to the specified distillation temperatures before commencing the distillation

B.2.1 Read the barometer and correct the reading as described in BS 658*.

B.2.2 When the corrected barometric pressure deviates from 101.3 kN/m²† (760 mmHg), apply corrections to the specified distillation temperatures by adding 0.36 °C for every 1 kN/m² above 101.3 kN/m² (0.047 °C per millimetre of mercury) or subtracting 0.36 °C for every 1 kN/m² below 101.3 kN/m² (0.047 °C per millimetre of mercury).

NOTE. These corrections are valid only for pressure above 93 kN/m² (700 mmHg).

B.2.3 If the thermometer gives incorrect readings at the corrected specified distillation temperatures, further adjust the latter by adding the amount of error if the thermometer is reading high, or subtracting the amount of error if the thermometer is reading low.

B.3 Procedure. Assemble the apparatus as described in BS 658*. Measure 100 ml of the sample in the receiver. Transfer the sample as completely as possible to the distillation flask and add a few anti-bumping granules. Place the flask, thermometer and receiver in position and ensure that the condenser has a steady supply of water. Adjust the rate of heating so that the first drop of distillate falls from the end of the condenser in 10 to 15 minutes. Further adjust the rate of heating so that the distillate is collected at the rate of 3 ml to 4 ml per minute.

Read the volume of distillate in the receiver when the thermometer indicates each of the corrected specified distillation temperatures and express the volumes so recorded as percentages by volume.

* BS 658, 'Apparatus for the determination of distillation range (including flasks and receiver)'.
 † BS 593, 'Laboratory thermometers'.

‡ 1 kN/m² = 10 mbar = 7.5 mmHg.

APPENDIX C

METHOD FOR THE DETERMINATION OF RESIDUE ON EVAPORATION

C.1 Procedure. Pipette 100 ml of the sample into a weighed glass evaporating dish on a boiling water bath. Blow a stream of filtered air onto the surface of the liquid from a jet 1 mm in diameter, with the tip of the jet 10 mm above the edge of the dish and under a pressure of 0.5 kN/m² (50 mm of water).

Evaporate the sample to dryness and dry the residue for one hour in an oven, at a temperature of 105 ± 5 °C. Cool in a desiccator and weigh. Dry the residue in the oven again for 30 minutes, cool in a desiccator and weigh again. Repeat, if necessary, until two successive weighings do not differ by more than 1 mg.

C.2 Calculation. Residue on evaporation, per cent by mass

$$= \frac{M}{d}$$

where M = mass, in grammes, of residue

and d = relative density of the sample.

APPENDIX D

METHOD FOR THE DETERMINATION OF ACIDITY

D.1 Reagents. The reagents used shall be of a recognized analytical reagent quality. Water complying with BS 3978* shall be used throughout.

(1) *Sodium hydroxide*, 0.1N solution.

(2) *Ethanol*†, 95 %.

(3) *Phenolphthalein indicator solution*, 10 g/l. Dissolve 2.5 g of phenolphthalein in 250 ml of ethanol†, 95 % (v/v), and make faintly pink by the addition of dilute sodium hydroxide solution.

* BS 3978, 'Water for laboratory use'.

† Ethanol may be replaced by industrial methylated spirits, 66 degrees O.P., complying with BS 3591. It should be noted that the use of industrial methylated spirits is governed by The Methylated Spirits Regulations 1952 (S.I. 1952, No. 2230).

D.2 Procedure. Take 50 ml of the ethanol, add 0.5 ml of the phenolphthalein indicator and neutralize with sodium hydroxide solution. Add 50 ml of the sample and titrate the mixture immediately with the 0.1N sodium hydroxide solution until the first pink colour persists for at least 10 seconds.

D.3 Calculation. Acidity, calculated as acetic acid, CH_3COOH , per cent by mass

$$= \frac{0.012 \times V_1}{d}$$

where V_1 = volume, in millilitres, of 0.1N sodium hydroxide used
and d = relative density of the sample.

APPENDIX E

METHOD FOR THE DETERMINATION OF ESTER CONTENT

E.1 Reagents. The reagents used shall be of a recognized analytical reagent quality. Water complying with BS 3978* shall be used throughout, and shall be freshly boiled and cooled.

(1) *Potassium hydroxide*, approximately N solution in 95 % (v/v) ethanol†.

(2) *Hydrochloric acid*, N solution.

(3) *Phenolphthalein indicator solution*, 10 g/l. Dissolve 2.5 g of phenolphthalein in 250 ml of ethanol†, 95 % (v/v) and make faintly pink by the addition of dilute sodium hydroxide solution.

E.2 Procedure. Measure 50.0 ml of the potassium hydroxide solution into each of two dry 250 ml conical flasks with ground glass jointed stoppers. Close the flasks with their glass stoppers. Transfer by means of a weighing pipette between 3.0 g and 3.5 g of the sample (weighed to the nearest 0.001 g) into one of the flasks.

Attach the flasks to water-cooled reflux condensers with ground glass joints, and heat for one hour in a boiling-water bath. Withdraw the flasks, still carrying their condensers, and immerse them in cold running water. When cool, wash down the inside of each condenser with two 20 ml portions of water. Disconnect the flasks and wash each joint with a further 20 ml of the water. Add 0.5 ml of phenolphthalein indicator and titrate the mixture immediately with the N hydrochloric acid solution until the pink colour is just discharged.

E.3 Calculation. Ester content, calculated as amyl acetate, $\text{CH}_3\text{COOC}_5\text{H}_{11}$,

$$\text{per cent by mass} = \frac{13.02 (V_2 - V_3)}{M_2}$$

where V_2 = volume, in millilitres, of N hydrochloric acid solution required by blank,

V_3 = volume, in millilitres, of N hydrochloric acid solution required by sample

and M_2 = mass, in grammes, of sample taken.

* BS 3978, 'Water for laboratory use'.

† Ethanol may be replaced by industrial methylated spirits, 66 degrees O.P., complying with BS 3591. It should be noted that the use of industrial methylated spirits is governed by The Methylated Spirits Regulations 1952 (S.I. 1952, No. 2230).