

SPECIFICATIONS FOR
ORTHO-CRESOL
META-CRESOL AND
PARA-CRESOL

B.S. 522 : 1964



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THIS BRITISH STANDARD, having been approved by the Tar Products (other than Ammonia) Industry Standards Committee and endorsed by the Chairman of the Chemical Divisional Council, was published under the authority of the General Council on 29th December, 1964.

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First revision September, 1938.

Second revision September, 1948.

Third revision March, 1955.

Fourth revision December, 1964.

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 revisions of the standards to which they refer.

This standard makes reference to the following British Standards:

- B.S. 458/1. 3° xylene.
- B.S. 458/4. 5° xylene.
- B.S. 479/3. Coal-tar solvent naphtha (90/160).
- B.S. 572. Interchangeable conical ground glass joints.
- B.S. 593. Laboratory thermometers.
- B.S. 604. Graduated measuring cylinders.
- B.S. 612. Nessler cylinders.
- B.S. 616. Sampling of coal tar and its products.
- B.S. 718. Density hydrometers and specific gravity hydrometers.
- B.S. 733. Density bottles.
- B.S. 756. Dean and Stark apparatus.

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 B.S.I. references relate to the work on this standard:
Committee reference TPC/2 Draft for comment D63/9808

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CO-OPERATING ORGANIZATIONS

The Tar Products (other than Ammonia) Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- *Association of British Chemical Manufacturers
- *Association of Tar Distillers
- *British Plastics Federation
- *Gas Council
- *Institution of Gas Engineers
 - Ministry of Defence, Army Department
 - Ministry of Defence, Navy Department
 - Ministry of Power
- *National Benzole and Allied Products Association
- Paintmakers Association of Great Britain
- *Standardization of Tar Products Tests Committee

The scientific and industrial organizations 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 Disinfectant Manufacturers' Association
Low Temperature Coal Distillers Association of Great Britain
Individual users and experts

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BRITISH STANDARD SPECIFICATIONS FOR *ORTHO*-CRESOL, *META*-CRESOL AND *PARA*-CRESOL

FOREWORD

This publication forms one of a series of British Standards for phenol and cresylic acids, the preparation of which was authorized by the Chemical Divisional Council. It was first published in 1933, and was revised in 1938, in 1948 and again in 1955.

In this present revision a water content limit has been added to the specifications, and methods of test for the determination of water content and solubility in sodium hydroxide have been added to the appendices. The crystallizing-point is now to be determined on a dehydrated sample.

By agreement with the Standardization of Tar Products Tests Committee, hereafter referred to as S.T.P.T.C., the methods of testing and the descriptions of apparatus contained in the appendices have been reproduced, with editorial modifications, from their publication 'Standard methods for testing tar and its products' (5th edition, 1962).

It should be noted that British Standard specifications are available for many of the items of laboratory equipment used in testing, in addition to those which are described in the S.T.P.T.C. methods or which form the subject of British Standards referred to in the footnotes of this specification.

NOTE 1. These methods are intended to be carried out in accordance with the General Principles and apparatus requirements laid down in the S.T.P.T.C. publication mentioned.

NOTE 2. The following definitions have been approved by the S.T.P.T.C. and have been adopted for the purposes of this British Standard:

Precision. The closeness of agreement among test results obtained under any definite set of conditions. Thus a method may be precise without being accurate. Repeatability and reproducibility are aspects of precision under two such defined sets of conditions.

Repeatability. A measure of the precision of the test results obtained by one operator using one set of apparatus. In this standard, repeatability (R_r) is the difference, between duplicate results on the same sample, that would be equalled or exceeded in the long run in only one case in twenty.

Reproducibility. A measure of the precision of test results obtained by different operators using different sets of the specified apparatus. Two measures of reproducibility are given in this standard. They are:

R_{D1} The difference, between a single result by one operator at one laboratory and a single result on the same sample by another operator at another laboratory, that would be equalled or exceeded in the long run in only one case in twenty.

R_{D2} The difference, between the mean of two results on one sample by one operator at one laboratory and the mean of two results by another operator on the same sample at another laboratory, that would be equalled or exceeded in the long run in only one case in twenty.

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SPECIFICATIONS

SCOPE

1. This British Standard covers the requirements for the following materials:
 - Part 1. *Ortho*-cresol, 3 grades (A, B and C).
 - Part 2. *Meta*-cresol.
 - Part 3. *Para*-cresol.

PART 1. *ORTHO*-CRESOL

DESCRIPTION

2. British Standard *ortho*-cresol shall consist of colourless crystals or white crystalline masses.

NOTE. The material is liable to discolour on storing or on exposure to light.

GRADES

3. The grades of the material are given in Table 1.

TABLE 1. GRADES OF *ORTHO*-CRESOL

Grade	Crystallizing-point
A	Not below 30.3°C: not above 31.0°C
B	Not below 29.3°C: below 30.3°C
C	Not below 28.3°C: below 29.3°C

SOLUBILITY IN SODIUM HYDROXIDE (GRADE A ONLY)

4. The material shall dissolve completely and give a clear solution when tested by the method described in Appendix A.

RESIDUE ON EVAPORATION

5. The material shall not show more than 0.05 per cent (w/w) of residue, when tested by the method described in Appendix B.

WATER CONTENT

6. The water content of the material shall not be greater than 0.3 per cent (w/w) when determined by the method described in Appendix C.

CRYSTALLIZING-POINT

7. The crystallizing-point of the material shall be determined by the method described in Appendix D and shall lie within the appropriate range given in Table 1, according to the grade of the material.

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BOILING-POINT

8. The boiling-point of the material should be approximately 191°C at 760 mm.

SAMPLING AND SIZE OF SAMPLE

9. A representative sample shall be taken from the bulk in accordance with the recommended methods given in B.S. 616, 'Sampling of coal tar and its products'. When the material is in drums and received as a solid crystalline mass it shall be sampled in accordance with the instructions for 'liquefiable solids', in B.S. 616, an adaptation of which is given for the sake of convenience in Appendix G. After thorough mixing, the requisite number of reference samples shall be prepared by transferring portions to clean, dry, amber- or blue-coloured glass-stoppered bottles. For the purpose of examination for compliance with this specification, each one of these samples shall weigh not less than 500 g. The size of the sample bottle used shall be such that it is nearly filled by the sample, sufficient free space being left to allow for expansion and to allow the contents to be mixed by shaking. No rubber, sealing wax or similar material shall be allowed to come in contact with the sample, and any plastics material used for sealing shall be applied in such a way that it cannot contaminate the samples when the bottles are opened.

Phenolic substances burn the skin and can be absorbed into the system through the skin. It is essential for the sampler to wear gloves, preferably of polyvinyl chloride, and also a face shield. Inhalation of the vapours from hot material is to be avoided.

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PART 2. META-CRESOL**DESCRIPTION**

10. British Standard *meta*-cresol shall be in the form of a colourless or almost colourless clear liquid or solid.

NOTE. The material is liable to become slightly brown on keeping, or on exposure to light.

COLOUR

11. The colour of the material shall not be more intense than colour No. 1 on the S.T.P.T.C. scale* when tested by the method described in Appendix E.

NOTE 1. This is approximately equal to 10 units (C) on the Lovibond scale, where $C = Y + 3R$, Y and R being respectively the number of yellow and red units required in combination to match the colour of the sample when measured in a 6 inch cell.

NOTE 2. The material may show a tendency to crystallize at normal laboratory temperatures. In this event the sample should be gently warmed, just sufficiently to render it liquid, and maintained in the liquid state while the colour comparison is made.

SPECIFIC GRAVITY†

12. The specific gravity, $S_{15.5/15.5^{\circ}\text{C}}$, of the material shall not be lower than 1.037 and not higher than 1.040, when determined by one of the methods described in Appendix F. In the event of dispute, Method 1 shall be used.

SOLUBILITY IN SODIUM HYDROXIDE

13. The material shall dissolve completely and give a clear solution when tested by the method described in Appendix A.

RESIDUE ON EVAPORATION

14. The material shall not yield more than 0.05 per cent of residue (w/w) when tested by the method described in Appendix B.

WATER CONTENT

15. The material shall not contain more than 0.3 per cent (w/w) of water when determined by the method described in Appendix C.

CRYSTALLIZING-POINT

16. The crystallizing-point of the material shall not be below 10.5°C when determined by the method described in Appendix D. When an equal weight of *meta*-cresol of crystallizing-point 12.0°C † is added, the crystallizing-point of the sample shall not be lowered and when pure *para*-cresol of crystallizing-point 34.7°C is added, the crystallizing-point of the sample shall be lowered.

* 'Standard methods for testing tar and its products' (1962).

† The term adopted by the International Organization for Standardization for this concept is 'relative density with reference to water'.

‡ Recent determinations by the National Physical Laboratory have shown that the crystallizing point of specially purified *meta*-cresol is 12.25°C . *meta*-Cresol of crystallizing point 12.0°C , however, is more readily available and has given satisfactory results in the determination of the crystallizing point of commercial quality *meta*-cresol.

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BOILING-POINT

17. The boiling-point of the material should be approximately 202°C at 760 mm.

SAMPLING AND SIZE OF SAMPLE

18. A representative sample shall be taken from the bulk in accordance with the recommended methods given in B.S. 616, 'Sampling of coal tar and its products'. When the material is in drums and received in the solid crystallized or partly crystallized state, it shall be sampled in accordance with the instructions for 'liquefiable solids', in B.S. 616, an adaptation of which is given for the sake of convenience in Appendix G. After thorough mixing, the requisite number of reference samples shall be prepared by transferring portions to clean, dry, amber- or blue-coloured glass-stoppered bottles. For the purpose of examination for compliance with this specification, each one of these samples shall weigh not less than 500 g. The size of the sample bottle used shall be such that it is nearly filled by the sample, sufficient free space being left to allow for expansion and to allow the contents to be mixed by shaking. No rubber, sealing wax or similar material shall be allowed to come into contact with the sample, and any plastics material used for sealing shall be applied in such a way that it cannot contaminate the samples when the bottles are opened.

Phenolic substances burn the skin and can be absorbed into the system through the skin. It is essential for the sampler to wear gloves, preferably of polyvinyl chloride, and also a face shield. Inhalation of the vapours from hot material is to be avoided.