



The British Technical Council of the Motor and Petroleum Industries
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GUIDANCE NOTES FOR THE IDENTIFICATION AND CLASSIFICATION OF AUTOMOTIVE COOLANTS



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FOREWORD

These guidance notes were developed at the request of the Engine Coolants Technical Committee of the British Technical Council of the Motor and Petroleum Industries to address a perceived need within the industry for a means of classification of coolants on the basis of the inhibitor technology employed.

A Sub-Group was formed comprising of members of the Coolants Committee representing vehicle manufacturers, coolant manufacturers and distributors, and cooling system component manufacturers. The composition of the sub-group is given in the appendix.

1 INTRODUCTION

This classification system was developed to provide a means by which coolants can be grouped according to their composition. The objective of the classification is to provide vehicle manufacturers and coolant manufacturers with a means of indicating the likely compatibility or incompatibility between two different products. There will inevitably be products in the marketplace that do not fit neatly into one category and for which the categorisation will be a subjective decision. It is also possible to further categorise the different types of products however further categorisation increases the complexity of the issue and is unlikely to be helpful. The categorisation does not, and is not intended to, give any indication of the quality, serviceability or merits of the different formulations.

2 SCOPE

This system can be applied to any type of glycol or aqueous based automotive engine coolant. It may be used by coolant manufacturers to indicate the type of product being produced. It can also be used by vehicle manufacturers both to indicate the type of coolant used for original fill and also to indicate the type(s) of coolant, which may or may not be suitable for topping up the cooling system.

3 CLASSIFICATION

This system for the classification of automotive coolants is based solely upon their chemical composition. The classification consists of three elements:

The first element indicates the type of inhibitor technology used.

The origins of all modern glycol based coolants can be traced back to the three formulations specified in the series of British Standards BS3150, BS3151 and BS3152 published in the late 1950s and now obsolete. All three of these standards specified a composition rather than performance requirements. These were as follows:

BS3150 specified 3% triethanolamine orthophosphate plus 0.3% sodium mercaptobenzothiazole

BS3151 specified either 5% or 7.5% sodium benzoate with 0.5% sodium nitrite

BS3152 specified 3% sodium tetraborate decahydrate (borax)

Elements of these formulations, or combinations thereof can be found in modern formulations and which compounds or combination of compounds are used in the formulation is the basis for the first element of the classification.

The coolant is assigned a "Type", indicated by the numbers 1, 2, 3,4 or 0, on the basis of the following criteria;

Type 1: - Containing phosphate, possibly in combination with an amine, but not containing silicate or borate

Type 2: - Containing borate and possibly silicate, but not containing amine or phosphate. May or may not contain nitrite.

Type 3: - Containing borate in conjunction with organic acid salts and possibly silicate but not containing amine or phosphate. May or may not contain nitrite.

Type 4: - Containing organic acid salts, free from amine, phosphate, borate and silicate. May or may not contain nitrite.

Type 0: - Any combination of additives not complying with the four coolant types described above (See Note 1)

The second element of the classification is the type of base glycol (if any) used in the formulation. The most commonly used glycols are ethylene glycol (ethanediol) and propylene glycol (propanediol). Coolant formulations could be based on other higher glycols but whilst these are not currently included in the classification scheme, they could be incorporated if later required. Additionally there are aqueous based products (glycol free), formulated to give corrosion protection only.

The final element of the classification is whether or not the product contains nitrite. There are a number of products on the market having very similar formulations differentiated only by the inclusion or exclusion of nitrite.

4 NOMENCLATURE

The classification resulting from the above can be shown with a designation containing two or three elements as follows.

Firstly the "Type" of product is shown, the first element will therefore be either 1,2,3,4 or 0.

Secondly the type of glycol is shown, E to signify ethylene glycol, P to signify propylene glycol and A to signify an aqueous based system.

Thirdly, where nitrite is present an N should be added as a third element in the classification, if nitrite is not present in the formulation the third element is not used.

5 EXAMPLES

- i) Type **2EN** would indicate a product containing borate, nitrite, possibly silicate but not amine or phosphate and formulated with ethylene glycol.
- ii) Type **4P** would be a nitrite, amine, phosphate, borate and silicate free product containing organic acid salts based on propylene glycol.
- iii) Type **OAN** would indicate an aqueous based product containing a combination of inhibitors not consistent with any of types 1 to 4 and including nitrite.

6 NOTES

- (1) Where Type 0 products are recommended the user is advised to consult the vehicle handbook or manufacturer for more detailed information regarding the compatibility of the coolants.

7 LABELLING

Where the classification code is incorporated in the labelling of packaged products, the following statement **MUST** accompany it:

“The manufacturer of this product guarantees that the composition of this product is consistent with the requirements of the assigned classification as specified in the BTC ‘Guidance Notes on the Identification and Classification of Automotive Coolants’. The BTC does not guarantee its performance nor give endorsement to its use.”

APPENDIX - Sub-group Membership

Company	Member
Associated Octel Company Ltd	Ian Bradbury
BASF PLC	Colin Irwin
Calsonic Kansei Europe PLC	Huw Evans
Castrol Division of BP	Jim Lane
Holt Lloyd International Ltd	Robin Gray
Jaguar Cars Ltd	Robin Trigger
Petrochem Carless Ltd	Ken Nash
Powertrain Ltd	John May

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