

SIA GUIDANCE NOTE No. 53 DENATURED ALCOHOLS

Introduction

This Guidance Note describes the various classes of denatured alcohols and the regime under which they can be supplied. Denatured alcohol is defined as dutiable ethanol which has been rendered unfit for human consumption by the addition of legally defined denaturants in proportions laid down in The Denatured Alcohols Regulations 2005 (as amended).

Classes of Denatured Alcohol

There are three classes of denatured alcohol:-

- Completely Denatured Alcohol (CDA)
- Industrial Denatured Alcohol (IDA)
- Trade Specific Denatured Alcohol (TSDA)

Completely Denatured Alcohol (CDA)

This formulation is recognised throughout Europe and is accepted by most member states. The UK standard formulation is produced by adding to every 100 parts by volume of ethanol 3 parts by volume of isopropanol, 3 parts by volume of methyl ethyl ketone and 1 gramme of denatonium benzoate¹. The addition of a purple dye is optional. If a purple dye is required then the colour intensity must be the same as that produced by adding 0.15 grams of methyl violet into 100 litres of the formulation. Completely denatured alcohol can be used for a variety of uses which include heating, lighting, cleaning and general domestic use. However if the intended use is as a motor fuel additive then it may be liable for hydrocarbon oil excise duty.

¹ Denatonium benzoate is benzyldiethyl [(2, 6-xylylcarbonyl) methyl] ammonium benzoate.

From November 2018, the previously recognised standard formulation for CDA, as set out by REGULATION (EC) No 3199/93, was amended in accordance with COMMISSION IMPLEMENTING REGULATION (EU) 2018/1880.

The list below is of products with their Chemical Abstracts Service (CAS) registry number which are authorised for the complete denaturing of alcohol.

Acetone	CAS: 67-64-1
Denatonium benzoate	CAS: 3734-33-6
Ethanol	CAS: 64-17-5
Ethyl tert-butyl ether	CAS: 637-92-3
Fluorescein	CAS: 2321-07-5
Gasoline (including unleaded gasoline)	CAS: 86290-81-5
Isopropyl alcohol	CAS: 67-63-0
Kerosene	CAS: 8008-20-6
Lamp oil	CAS: 64742-47-8 and 64742-48-9

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Methanol	CAS: 67-56-1
Methyl ethyl ketone (2-butanone)	CAS: 78-93-3
Methyl isobutyl ketone	CAS: 108-10-1
Methylene blue (52015)	CAS: 61-73-4
Solvent naphtha	CAS: 92062-36-7
Spirits of turpentine	CAS: 8006-64-2
Technical petrol	CAS: 92045-57-3

In all Member States, any dye may be added to the denatured alcohol to give it a characteristic colour, making it immediately identifiable.

The common denaturing procedure for completely denatured alcohol employed in Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia and Finland:

Per hectolitre (100 litres) of absolute ethanol:

- 1.0 litre isopropyl alcohol
- 1.0 litre methyl ethyl ketone
- 1.0 gramme denatonium benzoate.

An increased concentration of the common denaturing procedure for completely denatured alcohol, employed in the following Member States:

The United Kingdom

Per hectolitre (100 litres) of absolute ethanol:

- 3.0 litres isopropyl alcohol
- 3.0 litres methyl ethyl ketone
- 1.0 gramme denatonium benzoate.

Croatia

Per hectolitre (100 litres) of absolute ethanol: A ***minimum*** of:

- 1.0 litre isopropyl alcohol
- 1.0 litre methyl ethyl ketone
- 1.0 gramme denatonium benzoate

Sweden

Per hectolitre (100 litres) of absolute ethanol:

- 1.0 litre isopropyl alcohol
- 2.0 litres methyl ethyl ketone
- 1.0 gramme denatonium benzoate

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Additional denaturing procedures for completely denatured alcohol employed in certain Member States:

Czech Republic

Per hectolitre (100 litres) of absolute ethanol:

- 0.4 litre solvent naphtha
- 0.2 litre kerosene
- 0.1 litre technical petrol

Greece

Only low quality alcohol (heads and tails from distillation), with an alcoholic strength of at least 93 % volume and not exceeding 96 % volume can be denatured.

Per hectolitre (100 litres) of hydrated alcohol of 93 % volume, the following substances are added:

- 2.0 litres methanol
- 1.0 litre spirit of turpentine
- 0.50 litre lamp oil
- 0.40 grammes methylene blue

At a temperature of 20 °C, the end product will reach, in its unaltered state, 93 % volume.

Industrial Denatured Alcohol (IDA)

This is a UK specific formulation, consisting of 95 parts by volume of ethanol and 5 parts by volume of wood naphtha², or a substitute for wood naphtha. Where a substitute for wood naphtha is used, the volume mixed with every 95 parts of ethanol may be less than 5 parts if:

- a. The proportion of the marker in the resulting mixture is:-
 - In the case of methanol, not less than 36 parts per thousand
 - In the case of tertiary butanol, not less than one part per thousand
 - In the case of another marker approved by HMRC, not less than the proportion specified by them when they approved the marker.
- b. The resulting mixture contains the other substances that HMRC approved when they approved the substitute for wood naphtha in the proportions specified by them.

Industrial denatured alcohol is designed for a wide range of industrial, scientific and external medical applications. If the intend use is as a motor fuel additive then it may be liable for hydrocarbon oil excise duty. A list of previously approved uses is list in the table overleaf:-

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1	For use in the manufacture of any article which in the final form is entirely free from alcohol.
2	For use in the manufacture of any medical, veterinary and pharmaceutical products for external use only.
3	For use in the manufacture of any pharmaceutical product or preparation where no alcohol remains in the final product.
4	For use, where not elsewhere authorised, in the manufacture of any product which contains alcohol but is not, or is not intended or held out to be, a beverage or an article intended for consumption.
5	For use in the manufacture of analytical reagents.
6	For use in any industrial or commercially operated cleaning process.
7	For use in small quantities (no greater than 20 litres per annum) in any specialised hobby or pastime where: <ul style="list-style-type: none"> • Use of IDA is specified in technical or trade literature • The quantities received are reasonable having regard to the nature of the pursuit involved
8	For use by, or under the supervision of, qualified persons in medical, scientific (including photographic) or educational activities
9	For use in the manufacture of any article for exportation.
10	For onward supply in quantities of 20 litres or less to another authorised user.
11	For dealing wholesale i.e. in quantities greater than 20 litres (distributors only)

HMRC may, on application add further uses to the list.

² Wood naphtha and wood naphtha substitute

Natural wood naphtha is made from the distillation of wood. Wood naphthas used for denaturing must contain not less than 72% by volume of methanol. They must also be approved by HMRC and must possess such properties as to render a mixture of 1 part of the wood naphtha with 19 parts of ethanol at strength of not less than 95% by volume, unfit for human consumption.

Because natural wood naphthas are becoming less readily available, substitute wood naphtha with properties similar to natural wood naphthas can be used. These substitute naphthas must be:-

- Fully approved by HMRC.
- Possess such properties as to render a mixture of 1 part of the substitute with 19 parts of ethanol at strength of not less than 95% by volume, unfit for human consumption.
- Include a marker which contains not less than 72% by volume of methanol, or 2% tertiary butanol or such other marker approved by HMRC in proportions specified by them.

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Methanol is not identical to legally defined wood naphtha, or to any approved wood naphtha substitute. Therefore methanol must not be used as a direct substitute for wood naphtha in the manufacture of any denatured alcohol.

Trade Specific Denatured Alcohol (TSDA)

TSDA formulations are types of denatured alcohol which are approved to meet specific trade needs. There are, at the time of writing eleven approved formulations of TSDA, each with different specific approved uses. The formulations, together with their approved uses are listed overleaf:

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Name	TSDA Formulation	Approved Uses
TSDA 1	Tertiary Butyl Alcohol: 0.1% vol. Denatonium benzoate is added to the resulting mixture in the proportion of 10 micrograms per millilitre.	1. Manufacture of skin preparations (perfumes, toiletries, cosmetics and external medical applications such as medicated creams and ointments). 2. Printing Ink. 3. Biocide reagent ³ .
TSDA 2	Cyclohexane: 2.0% vol. Isopropanol : 0.1% vol.	1. Printing Inks (particularly for use on food wrappers). 2. Coatings. 3. Agrochemicals
TSDA 3	Ethyl Acetate: 2.0% vol. Isopropanol : 0.1% vol.	1. Printing Inks (particularly for use on food wrappers). 2. Coatings.
TSDA 4	Methanol: 2.0% vol. Hexane : 0.5% vol.	1. Rocket Fuel Propellants.
TSDA 5	Benzyl Benzoate : 5.0% vol.	1. Perfumes / Toiletries.
TSDA 6	Isopropanol: 2.0% vol. Denatonium benzoate is added to the resulting mixture in the proportion on 10 micrograms per millilitre.	1. Kitchen hard surface cleaners 2. Washing-up liquid.
TSDA 7	Isopropanol : 5.0% vol.	1. Car screenwash. 2. Disinfectants specifically for use in sterile environments, e.g. places where pharmaceutical drugs are produced ^{3,4}
TSDA 8	Methylethylketone: 1.0% vol. <i>(Consisting of 95 to 96% by weight of Methylethylketone, 2.5 to 3% by weight methylisopropylketone and 1.5 to 2% by weight of ethylisopropylketone).</i> 1 gram of Denatonium benzoate is added to the resulting mixture.	1. Car screenwash.
TSDA 9	Methanol: 1.0% vol. Denatonium benzoate is added to the resulting mixture in the proportion of 10 micrograms per millilitre.	1. Bio-ethanol – used as a road fuel. 2. Bio-diesel
TSDA 10	Isopropanol: 5.0% vol. Tertiary butanol : 0.07% vol.	1. Hairstyling products.
TSDA 11	Unleaded petrol with a Research Octane Number (RON) greater than 91 : 1.0% vol.	1. Bio-ethanol – used as a road fuel.

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³ This is subject to the formulation complying with the Biocidal Products Regulations EU 528/2012.

⁴ This TSDA may not be used for the manufacture of more general household disinfectants.

Supply of Denatured Alcohols

CDA is the most heavily denatured alcohol. It can be supplied to anyone, including members of the public.

In the case of IDA and TSDA these denatured alcohols can only be supplied to authorised persons. Before supply to the purchaser, the supplier must be in possession of a valid copy of the customer's authorisation. This document will state:-

- The customer's authorisation number
- The customer's DTR number
- Which denatured alcohol the customer is entitled to receive
- The quantity the customer is allowed to receive per annum
- The specific application for which the denatured alcohol can be used
- Any special conditions which the customer must adhere to
- The location where the denatured alcohol will be used

There is a need for suppliers to regularly review the validity of their customer's authorisations. The reason for this is that HMRC periodically review authorisations. This may result in the conditions of use being changed or in some cases the authorisation itself being revoked.

A customer must not be supplied with a denatured alcohol if:

- If they have exceeded the quantity which they were authorised to receive.
- They have requested a denatured alcohol which is not specified on their authorisation

Printing Ink Blends

Blends of denatured alcohols with other chemicals, commonly acetates, are commonly used in the printing industry as ink additives. It is important to note that these blends, known as ink additives, are components of printing inks and are not the final printing ink product. If the denatured alcohol being used to printing blends is either IDA or TSDA then the blend producer must be registered as an authorised user. This is because a denatured alcohol is being used to produce a component of the printing ink. Once the additional chemicals have been added to the denatured alcohol, then the resulting mixture no longer meets the prescribed formulation for the original denatured alcohol. As a result the ink manufacturer or printer is able to receive the denatured alcohol bend without the need to be authorised.

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IDA supplied by a Pharmacist

A copy of a person's authorisation to receive and use denatured alcohol is not needed when a pharmacist supplies IDA for medical use on the prescription or order of a medical or veterinary practitioner.

Educational Establishments

Schools, colleges or universities are permitted to receive a maximum of five litres per year of a denatured alcohol before the establishment requires to be registered as an authorised user.

Samples

Samples can be supplied to a potential customer without the need for the customer to be authorised provided that the samples are provided free of charge and the intended application is known. Also, the intended application must be a permitted use.

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