

EI 1542

Identification markings for dedicated aviation
fuel manufacturing and distribution facilities,
airport storage and mobile fuelling equipment

8th edition



IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL
MANUFACTURING AND DISTRIBUTION FACILITIES, AIRPORT
STORAGE AND MOBILE FUELLING EQUIPMENT

EI STANDARD 1542

Eighth edition
August 2007

Issued under license to Phillips 66 aviation customers only. Not for further circulation.

IMPORTANT: This file is subject to a licence agreement issued by the Energy Institute, London, UK. All rights reserved. It may only be used in accordance with the licence terms and conditions. It must not be forwarded to, or stored or accessed by, any unauthorised user. Enquiries: e: pubs@energyinst.org.uk t: +44 (0)207 467 7100

**IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL
MANUFACTURING AND DISTRIBUTION FACILITIES, AIRPORT
STORAGE AND MOBILE FUELLING EQUIPMENT**

EI STANDARD 1542

Eighth edition
August 2007

Published by

ENERGY INSTITUTE, LONDON

The Energy Institute is a professional membership body incorporated by Royal Charter 2003
Registered charity number 1097899

The Energy Institute gratefully acknowledges the financial contributions towards the scientific and technical programme from the following companies:

BG Group	Murco Petroleum Ltd
BHP Billiton Limited	Nexen
BP Exploration Operating Co Ltd	Saudi Aramco
BP Oil UK Ltd	Shell UK Oil Products Limited
Chevron	Shell U.K. Exploration and Production Ltd
ConocoPhillips Ltd	Statoil (U.K.) Limited
ENI	Talisman Energy (UK) Ltd
ExxonMobil International Ltd	Total E&P UK plc
Kuwait Petroleum International Ltd	Total UK Limited
Maersk Oil North Sea UK Limited	

Copyright © 2010 by The Energy Institute, London:

The Energy Institute is a professional membership body incorporated by Royal Charter 2003.

Registered charity number 1097899, England

No part of this book may be reproduced by any means, or transmitted or translated into a machine language without the written permission of the publisher.

The information contained in this publication is provided as guidance only and while every reasonable care has been taken to ensure the accuracy of its contents, the Energy Institute cannot accept any responsibility for any action taken, or not taken, on the basis of this information. The Energy Institute shall not be liable to any person for any loss or damage which may arise from the use of any of the information contained in any of its publications.

ISBN 978 0 85293 567 5

Published by the Energy Institute

Further copies can be obtained from Portland Customer Services, Commerce Way,
Whitehall Industrial Estate, Colchester CO2 8HP, UK. Tel: +44 (0) 1206 796 351
email: sales@portland-services.com

Electronic access to EI publications is available via our website, www.energypublishing.org.

Documents can be purchased online as downloadable pdfs or on an annual subscription for single users and companies.

For more information, contact the EI Publications Team.

e: pubs@energyinst.org.uk

CONTENTS

	Page
Foreword	vii
Acknowledgements	viii
1 General	1
1.1 Purpose	1
1.2 Reasons for a marking code	1
2 Marking code	3
3 Product designations	5
3.1 Aviation gasoline designations	5
3.2 Jet fuel designations	6
4 Colour codes and labelling	9
4.1 Aviation gasoline label and colour code	9
4.2 Jet fuel colour code	9
5 Product tags	11
5.1 General	11
5.2 Aviation gasoline – All grades	11
5.3 Jet fuel – All grades	11
6 Banding programme	13
6.1 General	13
6.2 Aviation gasoline banding programme	13
6.3 Jet fuel banding programme	13
6.4 Summary figure	13
7 Fuel handling facilities/equipment	15
7.1 Pits and hydrants	15
7.2 Buried piping systems	15
7.3 Curbside fuelling cabinets	15
7.4 Dispensing nozzles	15
7.5 Storage tanks	15
7.6 Road/rail transport loading positions	15

Contents cont...	Page
8 Ground level facility off-loading points	17
9 Aviation fuelling vehicles	21
10 Mechanical coding	23
11 Aviation drums	25
12 Military aviation fuels	27
13 Aircraft fuel grade markings	29
Annex A – References	31

FOREWORD

An effective aviation fuel handling equipment marking system for product identification can help to promote safe and efficient manufacturing and marketing operations in the petroleum industry.

The marking and colour-coding system described herein is suitable for worldwide adoption. It is the culmination of a joint effort combining the recommendations of the international aviation community.

This eighth edition of this publication has been produced jointly by the API Aviation Technical Services Subcommittee and the Energy Institute (EI) Aviation Committee. It replaces the seventh edition published in 2002.

It should be noted that the recommendations given in this publication for the marking of different aviation fuel products and grades are additional to the markings that are required by national legislation concerning the transport of dangerous goods (e.g. ADR (Europe) and DOT (USA) regulations) which may also be applicable to mobile fuelling equipment addressed in this standard.

The word 'shall' has been used in this publication to denote minimum provisions from which there is to be no deviation. However, it should be noted that the adoption of this publication is voluntary.

The EI is not undertaking to meet the duties of employers to warn and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligations under local and regional laws and regulations.

Nothing contained in any EI publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

Although it is hoped and anticipated that this publication will assist those responsible for designing, constructing, commissioning, operating and maintaining aviation fuel handling systems, the EI cannot accept any responsibility, of whatever kind, for damage or loss, or alleged damage or loss, arising or otherwise occurring as a result of the application of the guidance contained herein.

Suggested revisions are invited and should be submitted to the Technical Department, The Energy Institute, 61 New Cavendish Street, London, W1G 7AR or e: technical@energyinst.org.

ACKNOWLEDGEMENTS

The preparation of this edition of this publication was undertaken by Mr. J. Thurston, Air BP, with input from technical representatives of the following companies:

Air BP Limited
Air TOTAL International
AFS Aviation Fuel Service GmbH
Chevron
ConocoPhillips
ExxonMobil Aviation International Ltd.
ExxonMobil Fuels Marketing Company
Kuwait Petroleum International Aviation Company Ltd.
Marathon Petroleum Company LLC
Shell Aviation Ltd.
Shell Oil Products

1

GENERAL

1.1 PURPOSE

This publication is intended to provide a system for marking aviation fuel types and grades on fuel-handling installations and equipment.

In addition to the requirements for proper marking and colour-coding, there is a need throughout the aviation industry, in general, for uniformity in product labels. The aviation gasoline (Avgas) and turbine fuel (Jet Fuel) labelling system included herein for aviation use is recommended for worldwide use, not only for aviation fuel handling equipment at airport fuel storage facilities, but for all situations where it is desirable to identify Avgas and Jet Fuel by type and grade. It is intended to apply to equipment that is in continuous use for a single grade of aviation fuel, e.g.:

- Airport depots.
- Airport fuel hydrant systems.
- Airport fuelling vehicles.
- Dedicated grade aviation fuel storage tanks and piping within terminals.
- Dedicated grade aviation fuel loading facilities at refineries, terminals or airports, etc.

It is not intended to apply to equipment that is not in continuous aviation fuel use, e.g.:

- Refinery storage tanks and associated piping.
- Multi-product pipelines.
- Non-dedicated loading facilities, etc.

For further information on labelling systems for equipment not in aviation use see the latest edition of either API RP 1637 *Using the API color-symbol system to mark equipment and vehicles for product identification at service stations and distribution terminals*, or EI *Code of practice for a product identification system for petroleum products*.

1.2 REASONS FOR A MARKING CODE

The aviation industry requires a uniform and easily understood system for showing which fuel is in each part of an aviation fuel handling system. This requirement is based on the need to handle fuels safely, to prevent mixing one grade with another, and to prevent delivery of the wrong grade of fuel into an aircraft. Emphasis is placed on a colour-code system to show Avgas as a type different from Jet Fuel and then to separate the grades within each type. The methods of marking shall be clear from a distance as well as at close range.

A marking code is one element of protection against grade mixing and contamination. Good practice will dictate other protection measures including mechanical or electronic devices to achieve product selectivity. This standard does not address the general subject of equipment selectivity; but mechanical coding of hydrant pit couplers is covered (see section 10). Aviation fuel handling systems should be clearly marked wherever piping connections are made, valves turned, or product loaded or unloaded.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

The marking code described herein permits rapid identification under normal daylight conditions and also during emergency, rainy, or night light conditions. The elements of the system are clearly visible whether the surface is black, green, or covered with snow.

2

MARKING CODE

The marking code provides the following four separate ways of rapidly identifying the product in each installation element:

- a. Labelling system.
- b. Colour code.
- c. Banding programme.
- d. Product tag.

Table 1 summarizes the marking code for a, b and c.

The labelling system shall always have adjacent to it a band of the correct colour representing the grade of fuel of the labelling (see Figures 1 and 2).

At some points throughout the system, dependent on the actual layout of the fuel storage facility, it may be desirable or necessary to use only of one of these

four elements of the marking code.

The labelling system and appropriate band shall, as a minimum, be placed at the inlets and outlets of each aviation gasoline fuel storage facility and above ground storage tank.

Colour-coding can be used to identify major valves, hydrant pit covers and receipt and dispensing connections.

The labelling with appropriate band or the band alone can be used at sites on piping arrangements to give better clarity to the operator of the contents of the lines.

Product tags can be used on a valve stem of a buried or enclosed valve, or on ground level off-loading fill pipe connections and dust caps.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

3

PRODUCT DESIGNATIONS

3.1 AVIATION GASOLINE DESIGNATIONS

There are five grade classifications of commercial Avgas, described as "Avgas 80", "Avgas 82UL", "Avgas 91", "Avgas 100" and "Avgas 100LL". "Avgas 82UL" is listed in ASTM D 6227 *Standard specification for 82 unleaded aviation gasoline*. "Avgas 91" is listed in ASTM D 910 *Standard specification for aviation gasolines*. "Avgas 80", "Avgas 100" and "Avgas 100LL" are listed in ASTM D 910 *Standard specification for aviation gasolines* and the UK Ministry of Defence (MoD) Defence Standard 91-90 *Gasoline, aviation: Grades 80/87, 100/130 and 100/130 low lead, Joint Service Designation: Avgas 80, Avgas 100 and Avgas 100LL*, and are distinguished by the following characteristics:

- a. Lean-mixture rating.
- b. Rich-mixture rating.
- c. Tetraethyl lead content.
- d. Colour.

Avgas 80 has the following characteristics:

- a. Minimum lean-mixture rating octane number of 80,0.
- b. Minimum rich-mixture rating octane number of 87,0.
- c. Maximum tetraethyl lead content of 0,14 gPb/L.
- d. Dyed red.

Avgas 82UL has the following characteristics:

- a. Minimum lean-mixture motor method octane number of 82,0.

- b. No minimum rich-mixture rating octane number.
- c. Unleaded (UL).
- d. Dyed purple.

Avgas 91 has the following characteristics:

- a. Minimum lean-mixture motor method octane number of 91,0.
- b. Minimum rich-mixture rating octane number of 98,0.
- c. Maximum tetraethyl lead content of 0,56 gPb/L.
- d. Dyed brown.

Avgas 100 has the following characteristics:

- a. Minimum lean-mixture rating octane number of 99,5.
- b. Minimum rich-mixture rating performance number of 130,0.
- c. Maximum tetraethyl lead content of 1,12 gPb/L (for fuels meeting ASTM D-910) or 0,85 gPb/L (for fuels meeting Def Stan 91-90).
- d. Dyed green.

Avgas 100LL has the following characteristics:

- a. Minimum lean-mixture rating octane number of 99,5.
- b. Minimum rich-mixture rating performance number of 130,0.
- c. Maximum tetraethyl lead content of 0,56 gPb/L.
- d. Dyed blue.
- e. The suffix LL describes a grade containing lower tetraethyl lead (Low Lead) than a second grade (Avgas 100) of identical lean and performance rating.

3.2 JET FUEL DESIGNATIONS

There are three grade classifications of commercial aviation "Jet Fuels" for use in turbine-powered aircraft. "Jet A" is listed in ASTM D 1655 *Standard specification for aviation turbine fuels* and IATA *Guidance material for aviation turbine fuel specifications*. "Jet A-1" is listed in ASTM D 1655 *Standard specification for aviation turbine fuels*, UK MoD Defence Standard 91-91 *Turbine fuel, aviation kerosene type, Jet A-1, NATO Code: F-35, Joint Service Designation: AVTUR*, and JIG *Aviation fuel quality requirements for jointly operated systems (AFQRJOS)*. "Jet B" is listed in ASTM D 6615 *Standard*

specification for Jet B wide cut aviation turbine fuel and the IATA *Guidance material for aviation turbine fuel specifications*.

















Jet A is a kerosine-type distillate with a relatively high flash point (minimum 38 °C). It has a maximum freezing point of -40 °C.

Jet A-1 is a kerosine-type distillate similar to Jet A but incorporating special low-temperature characteristics. It has a maximum freezing point of -47 °C.

Jet B is a volatile distillate with a relatively wide boiling range. It has a maximum freezing point of -50 °C.

PRODUCT DESIGNATIONS

Table 1: Airport equipment marking for fuel identification recommendations for airport fuel storage installations and Terminals with dedicated fuel storage handling facilities

Product	Colour Code	Piping and Misc. Equipment	Banding	Labelling
Aviation Gasoline Grades				
Avgas 80	Red	White ^a		
Avgas 82UL	Purple	White		
Avgas 100	Green	White ^a		
Avgas 91	Brown	White		
Avgas 100LL	Blue	White ^a		
Aviation Turbine Fuels				
Jet A	Black	White ^a		
Jet A-1	Black	White ^a		
Jet B	Yellow	White ^a		
^a Aluminium is equally suitable, or if piping is all the colour shown for the colour code no banding is necessary.				

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

4

COLOUR CODES AND LABELLING

4.1 AVIATION GASOLINE LABEL AND COLOUR CODE

The labels for Avgas grades are printed in white letters and numbers on a red background. Red is used for the background because it is an indication of the special care which must be taken in the handling of the more volatile fuels. White lettering is used for contrast. The label may take the form of a stencil and painted on or as a decal with the applicable colour-coding. Labels and bands shall, as a minimum, be placed at the inlets and outlets of each Avgas fuel storage facility above ground storage tank. The labelling system shall always have adjacent to it a band of the correct colour representing the grade of fuel of the labelling.

Each grade of Avgas is dyed a distinctive colour: Grade 80 is red, Grade 82 UL is purple, Grade 91 is brown, Grade 100 is green, and Grade 100LL is blue. This colour code shall mark all major valves and pumps with the same colour as the Avgas within the particular system.

Pipelines, minor valves (e.g. pressure relief, air elimination), filter vessels (and associated drain valves) shall be either painted the same identifying colour or painted white or aluminium. Large pipelines (greater than 75 mm (3 in.)) shall be marked with a label/band combination or band. Small pipelines (75 mm (3 in.) or less) shall be marked with a band of the proper colour at intervals as described in 6.2.

Figure 1 illustrates the labelling and colour coding for Avgas. The large colour designation on the right of the gasoline grade markings represents the colour for the colour code.

4.2 JET FUEL COLOUR CODE

The labels for jet fuel grades are printed in white letters and numbers on a black background. Black is used because it offers a distinct difference from the red used for Avgas grades. Again, white is used for contrast. The label may take the form of a stencil and painted on, or as a decal with the applicable colour-coding. Labels shall, as a minimum, be placed at the inlets and outlets of each Avgas fuel storage facility above ground storage tank.

The labelling system shall always have adjacent to it a band of the correct colour representing the grade of fuel of the labelling.

None of the jet fuels is dyed; the three grades normally vary naturally from white to light yellow. Thus the colours used for banding have no relation to the colour of the jet fuel. They are as follows: Jet A is black, Jet A-1 is black, and Jet B is yellow. The more volatile product, Jet B, is distinguished by colour for the banding programme. This colour code shall mark all major valves and hydrant pit covers with the same colour as the aviation fuel within the particular system.

Pipelines, minor valves (e.g. pressure relief, air elimination), filter vessels (and associated drain valves) shall be either painted the same identifying colour or painted white or aluminium. Large pipelines (greater than 75 mm (3 in.)) shall be marked with a label/band combination or band. Small pipelines (75 mm (3 in.) or less) shall be marked with a band of the proper colour at intervals as described in 6.2.

Figure 2 illustrates the banding, labelling and colour-coding for jet fuels. In this figure, the large colour designation on the right of the jet fuel grade marking represents the colour for the colour-coding.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT



Figure 1: Aviation gasoline identification band, label and colour coding

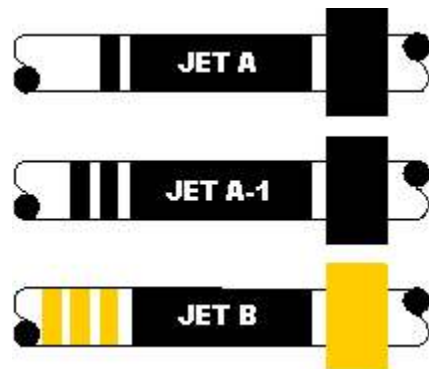


Figure 2: Jet fuels identification band, label and colour coding

5

PRODUCT TAGS

5.1 GENERAL

Where product tags are required, for example, on valve stems of buried or enclosed valves, off-loading fill stems and dust caps, the colour code shall be followed to be consistent with the grade labelling requirements in section 3 and Table 1.

The tag shall be a rectangular metal strip of appropriate size (a suggested size is 50 mm (2 in.) long by 25 mm (1 in.) wide and 7 mm (1/4 in.) thick) that shall contain the grade label in a legible display. The tag shall be attached using a durable material.

The grade label on the metal strip shall be painted on, applied on as a decal or applied by some other method which will resist weathering.

5.2 AVIATION GASOLINE – ALL GRADES

The product tag shall have a red background with the fuel grade in white lettering.

5.3 JET FUEL – ALL GRADES

The product tag for Jet A and Jet A-1 shall have a black background with the fuel grade in white lettering.

The product tag for Jet B shall have a yellow background with the fuel grade in white lettering.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

6

BANDING PROGRAMME

6.1 GENERAL

Circular bands of an identifying colour are painted or taped around the piping at intervals. The circular band is used because it appears the same from all directions. The band shall also be used next to a label.

6.2 AVIATION GASOLINE BANDING PROGRAMME

Avgas piping is banded with a single band in the grade-identifying colour. It is recommended that each band be at least 5 cm (2 in.) wide and be placed at intervals of no more than 6 m (20 feet). Longer intervals may be used on long pipelines when the preceding and next bands are visible from each band location.

If the pipeline is painted the grade-identifying colour, no banding is required.

Figure 1 illustrates the labelling system, colour code, and banding programme for Avgas grades.

6.3 JET FUEL BANDING PROGRAMME

Jet A lines are marked with one black band. Jet A-1 lines are marked with two black bands. Jet B lines are marked with three yellow bands.

It is recommended that bands be at least 10 cm (4 in.) wide and be placed at intervals of no more than 6 m (20 feet). Longer intervals may be used on long pipelines as long as the preceding and next bands are visible from each band location.

If the pipeline is painted the grade-identifying colour, no banding is required.

Figure 2 illustrates the labelling system, colour code and banding programme for jet fuel grades.

6.4 SUMMARY FIGURE

Table 1 is a summary of the marking code. The upper portion refers to the identification system of the five Avgas grades; the lower portion to the three jet fuel grades.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

7

FUEL HANDLING FACILITIES/EQUIPMENT

7.1 PITS AND HYDRANTS

Hydrants, low point drain and high point drain covers which hold valves, hydrant connections, hose reels, filters or other fuelling equipment should be painted in the identifying product-grade colour where space is insufficient to permit labelling.

7.2 BURIED PIPING SYSTEMS

Where the piping is buried and inaccessible and only the valve stem and wheel are exposed, they shall be painted the identifying product-grade colour, and a flag post that shows the label and banding should be fixed permanently to the valve or to a concrete pad near the valve.

7.3 CURBSIDE FUELLING CABINETS

Curbside fuelling cabinets, which cover piping, filters, pumps, valves and hose reels shall bear grade identification labels. Labels for the specific grade shall be installed on all sides, tops, and inside main access doors.

7.4 DISPENSING NOZZLES

Overwing nozzles shall be colour-coded, using colour-coded grade identification sleeves over the nozzle body,

or use colour-coded handles in the product grade colour (i.e. jet fuel - black, Avgas – red) which will assist in identification of the correct grade when fuelling aircraft. The use of small grade decals in addition to painting the nozzle or using colour-coded handles can be an additional safeguard. Components of the nozzle, such as the spout, which come in contact with fuel or aircraft connectors, shall not be painted. Additional detailed information on this subject can be found in EI Recommended Practice 1597 *Procedures for overwing fuelling to ensure delivery of the correct fuel grade to an aircraft*.

7.5 STORAGE TANKS

A proportional-sized label which is clearly visible from 20 m (60 feet), of the identifying product grade label, shall be applied or painted on the tank wall above the tank inlet and outlet piping.

7.6 ROAD/RAIL TRANSPORT LOADING POSITIONS

Loading position top or bottom loading arms or hoses shall be equipped with a label of the specific grade clearly visible from the loading position. Bottom loading couplings shall be equipped with an appropriate sized label of the specific grade visible to the operator.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

8

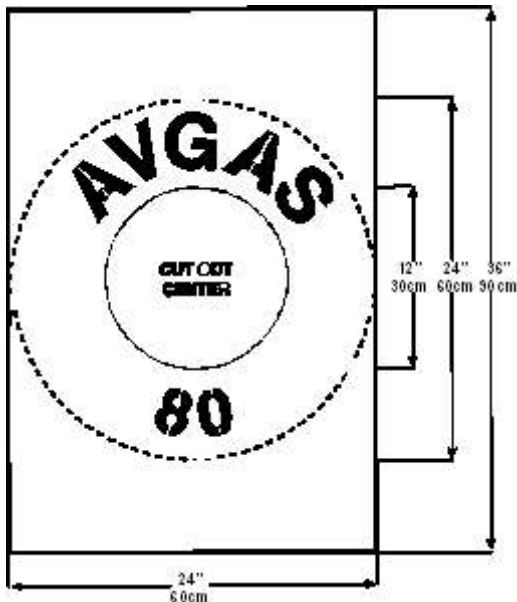
GROUND LEVEL FACILITY OFF-LOADING POINTS

When off-loading ground level fill boxes are used, the fill box cover lid shall be painted in the colour code of the applicable grade of fuel. The fuel grade name shall be applied in white letters around the fill box lid and shall extend no more than 150 mm (6 in.) from the outside rim of the fill box lid.

Examples of stencils that can be used to apply the colour-coding by painting are illustrated in Figures 3, 4,

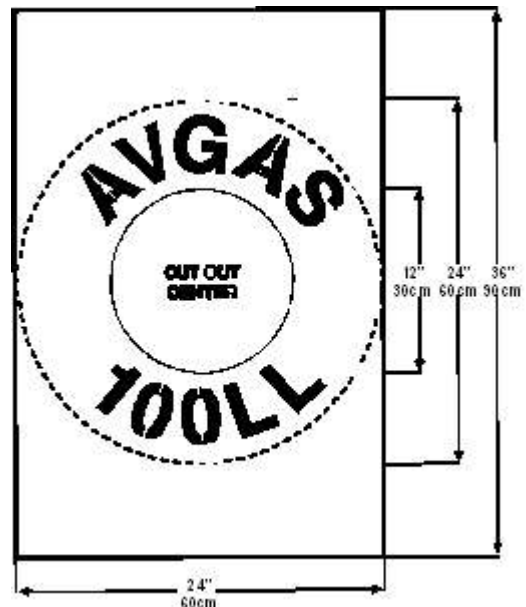
5, 6, 7, 8, 9 or 10.

Above ground airport storage receipt connection adapters and dust covers for underground storage tanks shall have the inlet off-loading points painted in the identifying product grade colour with identifying banding and labelling located as near possible to the receipt.



This is NOT a decal - This is a stencil for spray painting

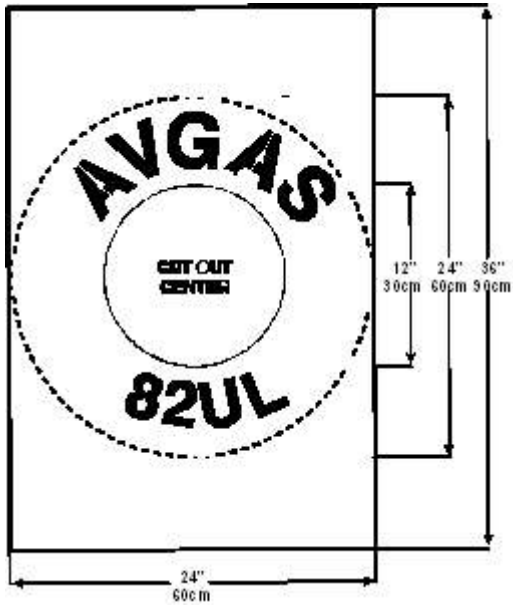
Figure 3: Gravity drop identification for Avgas 80



This is NOT a decal - This is a stencil for spray painting

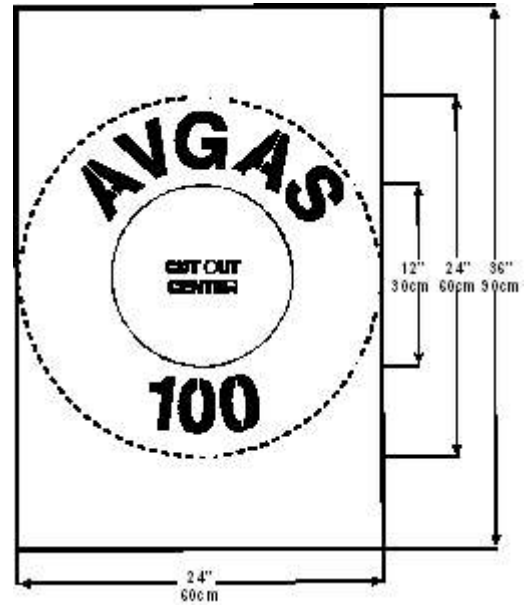
Figure 4: Gravity drop identification for Avgas 100LL

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT



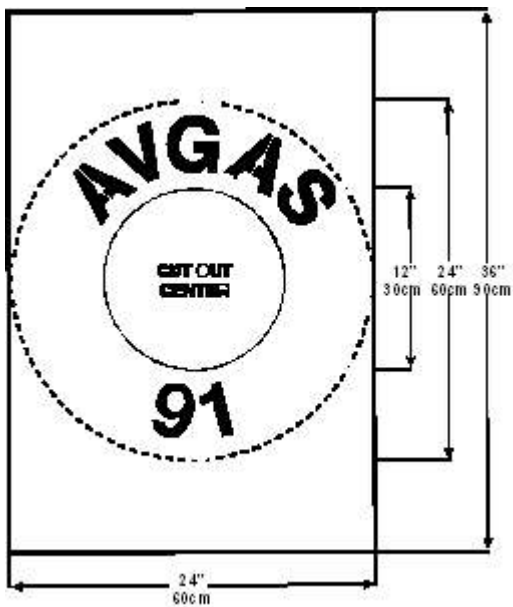
This is NOT a decal - This is a stencil for spray painting.

Figure 5: Gravity drop identification for Avgas 82UL



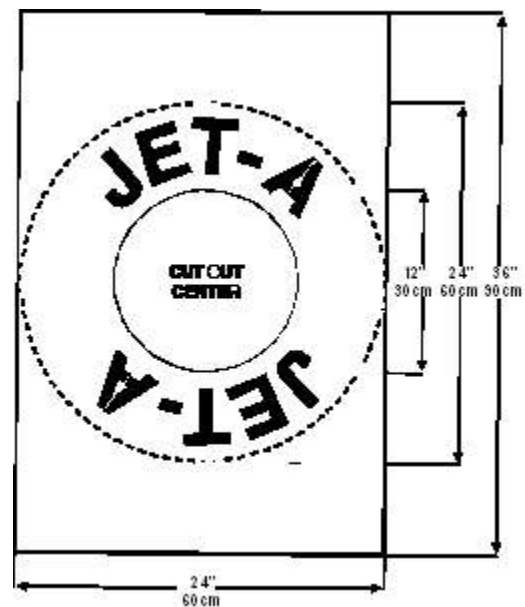
This is NOT a decal - This is a stencil for spray painting.

Figure 6: Gravity drop identification for Avgas 100



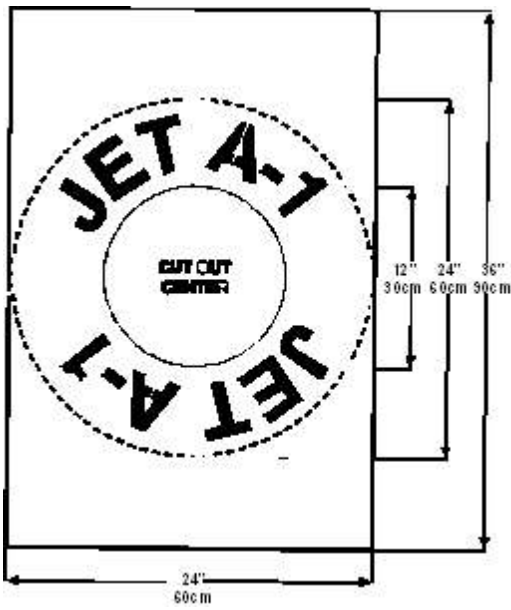
This is NOT a decal - This is a stencil for spray painting.

Figure 7: Gravity drop identification for Avgas 91



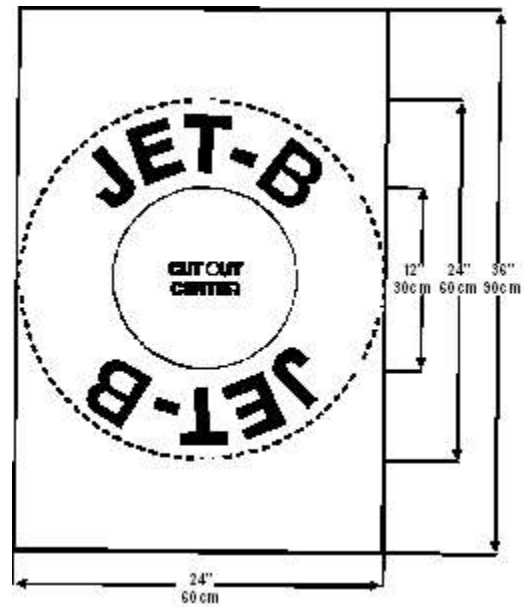
This is NOT a decal - This is a stencil for spray painting.

Figure 8: Gravity drop identification for Jet A Fuel



This is NOT a decal - This is a stencil for spray painting.

Figure 9: Gravity drop identification for Jet A-1 Fuel



This is NOT a decal - This is a stencil for spray painting.

Figure 10: Gravity drop identification for Jet B Fuel

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

9

AVIATION FUELLING VEHICLES

The identifying product grade labels on refuellers, hydrant servicers and carts shall be applied to the front, back, sides, and prominently displayed inside the driving compartment within the driver's field of view (e.g. on the dashboard or steering wheel centre). In addition these labels, or additionally applied labels if warranted, shall be visible from each fuelling hose reel, fueller bottom load adapter, sample return tanks,

collector tanks, manway if the vehicle is top loaded and sample points. See 7.4 and 10 for additional aids in overwing nozzle colour-coding and coupler mechanical coding.

It is recommended that aviation grade-specific dedicated road bridgers (transports) be equipped with grade labels and bands located adjacent to the loading and off-loading delivery points on the tank.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

10

MECHANICAL CODING

Couplers are available in a number of configurations having simple selectivity and including a six-position product-selection standard. One type of 63,5 mm (2,5 in.) coupler mates with the International Standard bayonet adapter. One type of 101,6 mm (4 in.) coupler has interchangeability dimension to conform to API RP 1004 *Bottom loading and vapor recovery for MC-306 tank motor vehicles* and EI Specification 1584 *Four-inch hydrant system components and arrangements*.

Note: The 101,6 mm (4 in.) coupler is one of several available coupling systems.

The coupler product setting shall be made in accordance with Table 2.

Table 2: Six-position product selection

Position	Product
1	Avgas 100, Avgas 100LL
2	Avgas 80
3	
4	Jet A
5	Jet B
6	Jet A-1

Avgas 91 and Avgas 82UL shall use an aviation approved simple selective coupler incompatible with the couplings mentioned in the six product settings above.

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

11

AVIATION DRUMS

Drums used for the loading, storage and dispensing of aviation fuels shall have the following information, colour-coding and labelling.

Signage in the form of an identifying grade label and band shall be applied on the top lid with, as a minimum, the following information applied below it:

- Aviation product designation.
- Specification the aviation product was manufactured to.
- Batch number.
- Filling date.
- Retest date.
- Quantity.
- Filling point.
- Leaded fuel [if applicable for the grade of aviation fuel stored].

The identifying grade label and band (see Figure 11) of the product contained in the drum should be approximately 250-350 mm (10-14 in.) long and 75-

100 mm (3-4 in.) wide. The information displayed below it should be in approximately 10-12 mm (0,38-0,5 in.) tall black letters and numbers; red letters may be used on drums containing Avgas, but not on drums containing jet fuel, and should be on a white background. The identifying grade label, banding and signage dimensions may be reduced in size if additional area is needed to display manufacturer, local or national HAZCOM/HAZMAT and other signage, or to be able to fit more conveniently onto the drum head and side.

The information may be applied by stencil or decal. If by decal, consideration shall be given to ensure that any filling location information applied on the decal is applied in a way to ensure it cannot be rubbed off or inadvertently removed easily.

A duplicate-sized identifying grade label and the information displayed below it by decal or stencil, shall also be applied to the side of the drum. This is to ensure the grade of fuel stored and the information displayed below can be identified when drums are stacked or stored upside down.

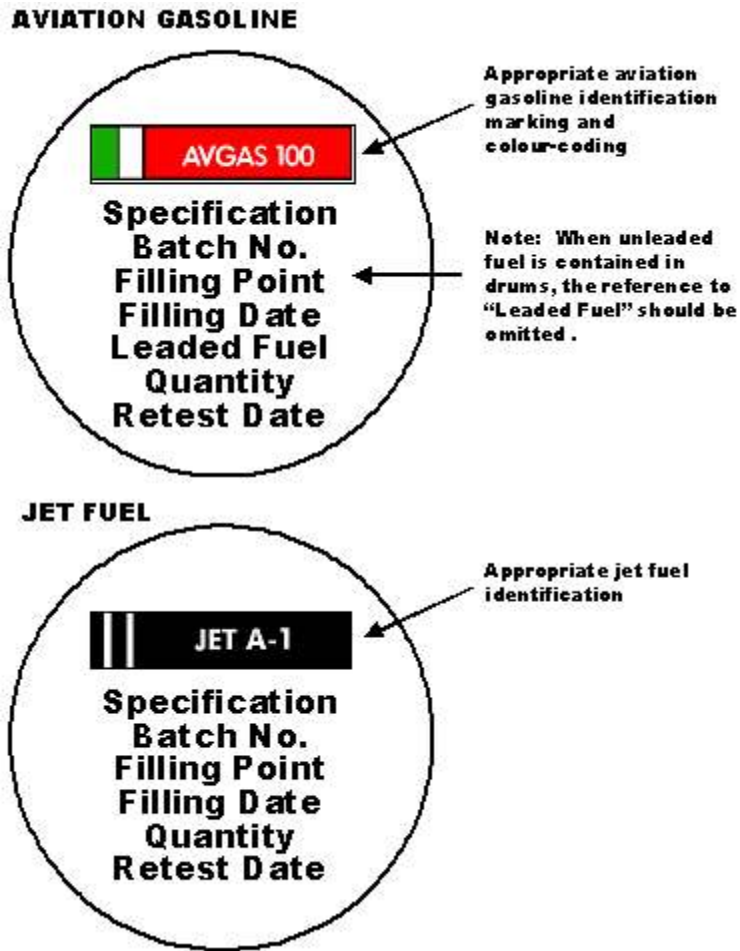


Figure 11: Aviation fuel top lid drum colour-coding and signage

12

MILITARY AVIATION FUELS

Military aviation fuel equipment markings for fuel identification can be found in MIL-STD-161 (latest revision) *Identification methods for bulk petroleum products systems including hydrocarbon missile fuel.*

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

13

AIRCRAFT FUEL GRADE MARKINGS

Aircraft fuel grade markings, usually in the form of a decal, are typically located adjacent to the aircraft fuel ports. These types of markings are useful in ensuring the fuelling operator is aware of the grade of fuel

required by the aircraft. For a detailed discussion of this subject see EI Recommended Practice 1597 *Procedures for overwing fuelling to ensure delivery of the correct fuel grade to an aircraft.*

IDENTIFICATION MARKINGS FOR DEDICATED AVIATION FUEL MANUFACTURING AND DISTRIBUTION FACILITIES,
AIRPORT STORAGE AND MOBILE FUELLING EQUIPMENT

ANNEX A

REFERENCES

API¹

API RP 1004 *Bottom loading and vapor recovery for MC-306 tank motor vehicles*

API RP 1637 *Using the API color-symbol system to mark equipment and vehicles for product identification at service stations and distribution terminals*

ASTM International²

ASTM D 1655 *Standard specification for aviation turbine fuels*

ASTM D 6227 *Standard specification for 82 unleaded aviation gasoline*

ASTM D 6615 *Standard specification for Jet B wide cut aviation turbine fuel*

ASTM D 910 *Standard specification for aviation gasolines*

Energy Institute³

EI *Code of practice for a product identification system for petroleum products*

EI Specification 1584 *Four-inch hydrant system components and arrangements*

EI Recommended Practice 1597 *Procedures for overwing fuelling to ensure delivery of the correct fuel grade to an aircraft*

International Air Transport Association (IATA)⁴

Guidance material for aviation turbine fuel specifications

Joint Inspection Group⁵

Aviation fuel quality requirements for jointly operated systems (AFQRJOS)

¹ Available from API Publications, Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO80112-5776, USA. Tel: 303 397 7956, Fax: 303 397 2740, www.api.org

² Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, USA, www.astm.org

³ Available from Portland Customer Services, Commerce Way, Whitehall Industrial Estate, Colchester, CO2 8HP. Tel: +44(0)1206 796 351, email: sales@portland-services.com, www.energyinstpubs.org.uk.

⁴ Available from IATA, 800 Place Victoria, PO Box 113, Montréal, Québec, Canada, HY2 1M1, Tel: +1 514 874 0202, Fax: +1 514 874 9632, email: sales@iata.org, www.iata.com

⁵ Available from the Joint Inspection Group, c/o 35 Abercorn Place, London, NW8 9DR, UK. Free to download from www.jointinspectiongroup.org

UK Ministry of Defence (MoD)⁶

Defence Standard 91-90 *Gasoline, aviation: Grades 80/87, 100/130 and 100/130 low lead, Joint Service Designation: Avgas 80, Avgas 100 and Avgas 100LL*

Defence Standard 91-91 *Turbine fuel, aviation kerosene type, Jet A-1, NATO Code: F-35, Joint Service Designation: AVTUR*

US Department of Defence⁷

MIL-STD-161 *Identification methods for bulk petroleum products systems including hydrocarbon missile fuel*

⁶ Available from UK Defence Standardization, Room 1138, Kentigern House, 65 Brown Street, Glasgow, G2 8EX, Tel: +44(0)141 224 2531, Fax: +44(0)141 224 2503, www.dstan.mod.uk

⁷ Available from the ASSIST database at <http://astimage.daps.dla.mil/online/new>

Global aviation fuel handling publications

The Energy Institute is the provider of the following portfolio of equipment standards and operational recommended practices to facilitate the safe and efficient handling of aviation fuel, particularly at airports. They are available for use internationally. The titles include those that were developed jointly with the API.

These are available through the EI from either www.energypublishing.org or Portland Customer Services (t: +44 (0)1206 796 351). The two API titles can be obtained from www.global.ihs.com. For further information on the EI aviation fuel handling portfolio please contact technical@energyinst.org.

General			
Title		Ed.	ISBN
EI 1540	Design, construction, operation and maintenance of aviation fuelling facilities	4th	978 0 85293 565 1
EI 1541	Performance requirements for protective coating systems used in aviation fuel storage tanks and piping	1st	978 0 85293 566 8
EI 1542	Identification markings for dedicated aviation fuel manufacturing and distribution facilities, airport storage and mobile fuelling equipment	8th	978 0 85293 567 5
EI 1585	Guidance in the cleaning of aviation fuel hydrant systems at airports	2nd	978 0 85293 568 2
EI 1594	Initial pressure strength testing of airport fuel hydrant systems with water	2nd	978 0 85293 569 9
EI 1597	Procedures for overwing fuelling to ensure delivery of the correct fuel grade to an aircraft	1st	978 0 85293 570 5
EI HM 20	Meter proving: Aviation fuelling positive displacement meters	1st	978 0 85293 302 2
Equipment (excluding filtration)			
EI 1529	Aviation fuelling hose and hose assemblies	6th	978 0 85293 571 2
EI 1584	Four-inch hydrant system components and arrangements	3th	978 0 85293 572 9
EI 1598	Considerations for electronic sensors to monitor free water and/or particulate matter in aviation fuel	1st	978 0 85293 573 6
EI Research report	Review of methods of bonding a hydrant dispenser (servicer) to an aircraft for refuelling	1st	978 0 85293 475 3
Filtration equipment			
EI 1550	Handbook on equipment used for the maintenance and delivery of clean aviation fuel	1st	978 0 85293 574 3
EI 1581	Specification and qualification procedures for aviation jet fuel filter/separators	5th	978 0 85293 575 0
EI 1582	Specification for similarity for EI 1581 aviation jet fuel filter/separators	1st	978 0 85293 576 7
EI 1583	Laboratory tests and minimum performance levels for aviation fuel filter monitors	5th	978 0 85293 527 9
EI 1590	Specifications and qualification procedures for aviation fuel microfilters	2nd	978 0 85293 577 4
EI 1596	Design and construction of aviation fuel filter vessels	1st	978 0 85293 578 1
EI 1599	Laboratory tests and minimum performance levels for aviation fuel dirt defence filters	1st	978 0 85293 579 8
EI Research report	Electrostatic discharges in 2-inch fuel filter monitors	1st	978 0 85293 388 6
EI Research report	Electrostatic discharges in 2-inch aviation fuel filter monitors Phase 2: Properties needed to control discharges	1st	978 0 85293 408 1
EI Research report	Investigation into the effects of lubricity additives on the performance of filter/water separators	1st	978 0 85293 395 4
North American fuel handling			
API 1543	Documentation, monitoring and laboratory testing of aviation fuel during shipment from refinery to airport	1st	A154301
API 1595	Design, construction, operation, maintenance, and inspection of aviation pre-airfield storage terminals	1st	A159501

Issued under license to Phillips 66 aviation customers only. Not for further circulation.

IMPORTANT: This file is subject to a licence agreement issued by the Energy Institute, London, UK. All rights reserved. It may only be used in accordance with the licence terms and conditions. It must not be forwarded to, or stored or accessed by, any unauthorised user. Enquiries: e: pubs@energyinst.org t: +44 (0)207 467 7100



Energy Institute

61 New Cavendish Street
London W1G 7AR, UK

t: +44 (0) 20 7467 7157

f: +44 (0) 20 7255 1472

e: [**pubs@energyinst.org.uk**](mailto:pubs@energyinst.org.uk)

[**www.energyinst.org.uk**](http://www.energyinst.org.uk)

This publication has been produced as a result of work carried out within the Technical Team of the Energy Institute (EI), funded by the EI's Technical Partners. The EI's Technical Work Programme provides industry with cost effective, value adding knowledge on key current and future issues affecting those operating in the energy sector, both in the UK and beyond.

ISBN 978 0 85293 567 5