



**SLOVENSKI STANDARD**  
**SIST CR 262:1998**

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**Hlapljivost bencina**

Volatility of petrol

Flüchtigkeit von Benzin

Volatilité du pétrole

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**CEN****REPORT  
RAPPORT  
BERICHT**

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English version

Volatility of petrol

Volatilité du pétrole

Flüchtigkeit von Benzin

This CEN REPORT has been established by Technical Committee CEN/TC 19 "Test Methods and specifications of petroleum products" and has been approved on 1991-06-05 by the Technical Board on behalf of the Administrative Board of the European Committee for Standardisation in accordance with CEN Internal Regulations.

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Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

C E N

European Committee for Standardisation  
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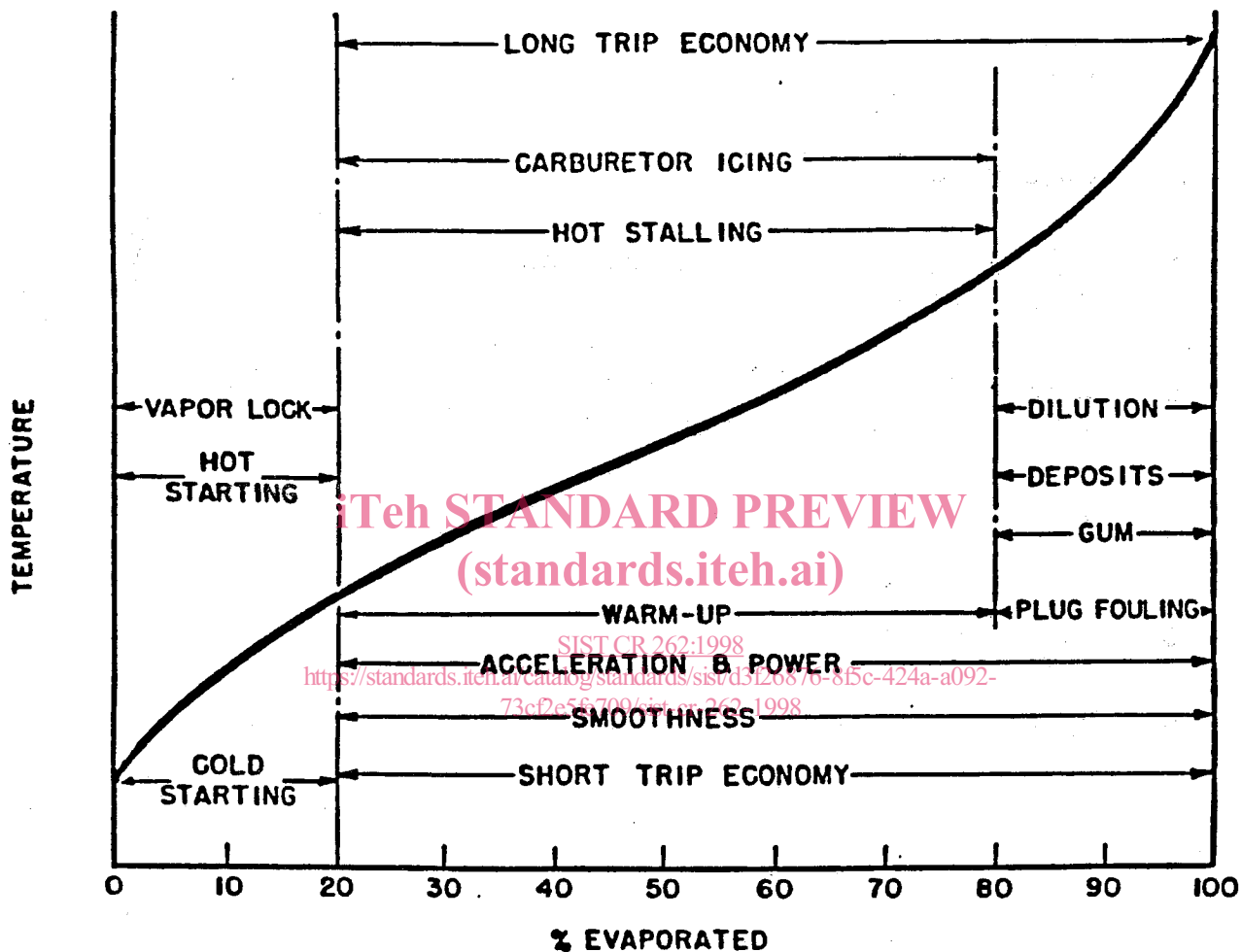
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Fig. 1 Relationship between distillation characteristics and vehicle performance.



## 1 INTRODUCTION

Volatility, defined as the totality of distillation characteristics and the (Reid) Vapour Pressure, is a very important part of petrol specifications. Its importance relates to product availability, manufacturing economics, product handling and safety, evaporation losses and especially vehicle performance. Incorrect fuel volatility may result in vehicles suffering malfunctions such as difficult cold start, stalling due to iceformation in the carburettor, hesitation during warm-up, difficulty in restarting after hot-soak and loss of power after hot restart. Also fuel economy and engine durability may be affected. An illustration of the relationship between distillation characteristics and vehicle performance is given in figure 1, extracted from SAE paper 650427.

Volatility requirements in different parts of Europe vary considerably, due to differences in climate, car populations, driving conditions, consumer expectations, manufacturing and transport facilities and raw materials availability.

These differences have proven to be strong enough to prevent the development of uniform petrol volatility specifications acceptable to a majority of CEN members. During the 13th meeting of CEN TC 19, July 1985 in Athens, no agreement could be reached on European wide volatility specification limits, in spite of requests put forward by the Commission of the European Communities and by the CEN Central Secretariat. The importance of volatility specifications, however, was underlined during the same meeting by acceptance of resolution 8, calling for the establishment of a guide to enable European harmonisation of unleaded petrol volatility. Working group 19 was created with the specific task to prepare a CEN report on volatility, providing an objective basis for national bodies to set volatility specification limits on a commonly recognized basis, adaptable to national conditions. WG 19 membership showed a broad representation of the European car and oil industry (see the Annex) and arrived at the underlying CEN-report on volatility which was unanimously accepted by CEN/TC 19.

## 2 OBJECTIVES

The objectives of the Report were defined as follows:

- 2.1 To prepare an inventory of existing and proposed national regulatory or industry volatility specifications, for leaded and unleaded petrol grades. This inventory was to be based on a questionnaire, including specification items and limits, test methods and the nature of such specifications.
- 2.2 To give guidelines for national authorities or bodies in Europe to set specifications on volatility of petrol, with regard to distillation characteristics and RVP.
- 2.3 To explain the interrelationship between individual volatility aspects, e.g. by other parameters such as Vapour Lock Index.

The objective was not to propose numerical specification limits. Neither was it the objective to elaborate on other than performance criteria in this advisory report.

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### 3 SUMMARY OF VOLATILITY SPECIFICATIONS OF PETROL IN EUROPE.

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Information on volatility specifications in European countries was collected by means of a questionnaire. The replies from eight countries which were received to this questionnaire and additional information (on Belgium, Spain, Sweden and Switzerland) available to individual members of the working group can be summarized as follows :

3.1 Distillations characteristics3.1.1 Premium grade - leaded

Country	E 70 %	E 100 %	E 180 %	FBP °C	Residue % max	Loss %
Austria (1)						
summer	15-42	40-65	-85	-215	2	
winter	20-47	42-70	-85	-215	2	
Belgium	15-45	40-70	-90	-215	2	
France (2)	-10	-50(2)	-95(2)	-205	3	
Germany						
summer	15-40	42-65	-90	215	2	
winter	20-45	45-70	-90	215	2	
Greece (3)	-10	50(4)	-90	205	1,5	
Italy	-10	-30	(4)		2	
Netherlands	no agreed specifications					
Portugal	-10	(5)	-90		2	
Spain	-10	SIST(6)262:1998		210	2	1,5
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Sweden						
summer	15-40	42-65	-90	215	2	
winter	20-45	45-70	-90	215	2	
U.K.	10-45	36-70	-90	220	2	

## Comments :

- (1) The ÖNORM C 1103 Draft-Standard (Requirements for Premium petrol-12.1985) specifies that the Volumes quoted have to be recovered at or below the temperatures indicated, e.g. a minimum of 15% and a maximum of 42% of the volume have to be recovered at a maximum temperature of 70 °C for the summer quality, between 42 to 70% at a maximum of 100 °C for the winter quality etc.
- (2) The distillation points specified in Standard CSR 04-G (Supercarburant) are E 70, E 140 and E 195 °C.
- (3) The distillation points specified in the Greek Government Gazette, Section 2, No 514, May 5, 73 (Premium 98 RON) are: 10% of the volume have to be recovered at a maximum temperature of 70 °C, 50% at a maximum temperature of 130 °C, and 90% at a maximum temperature of 180 °C.
- (4) A minimum value is set of 90% at E 190 and 95% at E 225 in the Standard NC 623-01 (8/11/1985) for "Benzina Super".
- (5) The distillation points specified are E 70, E 125 and E 180. For E 125 50% or more have to be distilled.
- (6) The official specification of royal decree 284, 20 February 1985 requires that 10% are recovered below 70 °C, 50% below 140 and 90% below 195 °C.



## 3.1.2 Regular grade - leaded

Country	E 70 %	E 100 %	E 180 %	FBP °C	Residue % max	Loss %
Austria	----- grade does no longer exist -----					
Belgium	15-45	40-70	-90	-215	2	
France (1)	-10	-50(1)	-95(1)	-205	2,5	
Germany						
summer	15-40	42-65	-90	215	2	
winter	20-45	45-70	-90	215	2	
Greece (2)	-10	-50(3)	-90	205	1,5	
Italy	-10	-30	(3)		2	
Netherlands	----- no agreed specifications -----					
Portugal	-10	(4)	-90		2	
Spain	-10	(5)		210	2	1,5
Sweden						
summer	15-40	42-65	-90	215	2	
winter	20-45	45-70	-90	215	2	
U.K.	10-45	36-70	-90	220	2	

## Comments:

- (1) The distillation points specified in Standard CSR 03-E (Essence-Auto) are E 70, E 140 and E 195 °C.
- (2) The distillation points specified in the Greek Government Gazette, Section 2, No 514, May 5, 73 (Regular 90 RON) are:  
10% of the volume have to be recovered at a maximum temperature of 70 °C, 50% at a maximum temperature of 130 °C, and 90% at a maximum temperature of 180 °C.
- (3) A minimum value is set of 90% at E 190 and 95% at E 225 in the standard NC 620-01 (19/02/1981) for "Benzina Normale".
- (4) The distillation points specified are E 70, E 125 and E 180. For E 125 50% or more have to be distilled.
- (5) The official specification of royal decree 284, 20th February 1985, requires that 10% are recovered below 70 °C, 50% below 140 and 90% below 195 °C.

## 3.1.3 Premium grade - unleaded

Country	E 70 %	E 100 %	E 180 %	FBP °C	Residue % max	Loss %
Austria						
summer	15-42	40-65	-85	-215	2	
winter	20-47	42-70	-85	-215	2	
Belgium	15-45	40-70	-90	-215	2	
France	- - - - - no agreed specifications yet - - - - -					
Germany						
summer	15-42	40-65	-85	215	2	
winter	20-47	42-70	-85	215	2	
Greece	- - - - - grade not available - - - - -					
Italy	-10	-30	(1)		2	
Netherlands	- - - - - no agreed specifications - - - - -					
Portugal	- - - - - grade not available - - - - -					
Spain	-10(3)			210	2	1,5
Sweden						
summer	15-42	40-65	-85	215	2	
winter	20-47	42-70	-85	215	2	
Switzerland						
summer	15-42(2)	min.40	-85	215	2	
winter	20-47(2)	min.42	-85	215	2	
U.K.	10-45	36-70	-90	220	2	

## Comments:

- (1) A minimum value is set of 90% at E 190 and 95% at E 225 in the standard NC 623-02 (8-11-85) for "Benzina Super Senza Piombo" (unleaded premium).
- (2) Swiss Standard SN 181 162 specifies that alternatively to the distillation requirements listed above the requirement RVP + 7 times E 70 has to be smaller than 990 for summer quality and smaller than 1180 for winter quality.
- (3) The official specification of decree 2482/1986, September, will be in force dated 1989-06-01 and requires that 10% are recovered below 70°C, 50% below 140 °C and 90% below 195 °C.

3.1.4 Regular grade - unleaded

Country	E 70 %	E 100 %	E 180 %	FBP °C	Residue % max	Loss %
Austria						
summer	15-42	40-65	-85	-215	2	
winter	20-47	42-70	-85	-215	2	
Belgium	15-45	40-70	-90	-215	2	
France	- - - - - grade not available - - - - -					
Germany						
summer	15-42	40-65	-85	215	2	
winter	20-47	42-70	-85	215	2	
Greece	- - - - - grade not available - - - - -					
Italy	- - - - - grade not available - - - - -					
Netherlands	- - - - - no agreed specification - - - - -					
Portugal	- - - - - grade not available - - - - -					
Sweden						
summer	15-42	40-65	-85	215	2	
winter	20-47	42-70	-85	215	2	
U.K.	10-45	36-70	-90	220	2	

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3.1.5 Test methods

Country	National method	Correlation to other methods
Austria	ON C 1160	"Essentially based on ASTM D 86"
Belgium	NBN-T-52072	"Equivalent to ASTM D 86"
France	NF M 07-002	"Slight differences (of results) with ASTM D 86"
Germany	DIN 51 751 (5.78)	Similar to ASTM D 86
Greece	ASTM D 86	
Italy	ASTM D 86	
Netherlands	ISO 3405/ASTM D 86	
Portugal	NP-1336/76 (ISO 3405-75)	
Spain	NORMA UNE 51011.	Similar to ASTM D 86
Switzerland	ISO 3405, ASTM D 86 or DIN 51 751 are accepted.	
U.K.	IP 123	Method was adopted as a joint IP/ASTM Standard.