BRITISH STANDARD

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Separator systems for light liquids (e.g. oil and petrol) —

Part 2: Selection of nominal size, installation, operation and maintenance

The European Standard EN 858-2:2003 has the status of a British Standard

ICS 13.060.30

National foreword

This British Standard is the official English language version of EN 858-2:2003.

The UK participation in its preparation was entrusted to Technical Committee B/505, Wastewater engineering, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Separator systems for light liquids (e.g. oil and petrol) - Part 2: Selection of nominal size, installation, operation and maintenance

Installations de séparation de liquides légers (par exemple hydrocarbures) - Partie 2: Choix des tailles nominales, installation, service et entretien

Abscheideranlagen für Leichtflüssigkeiten (z.B. Öl und Benzin) - Teil 2: Wahl der Nenngröße, Einbau, Betrieb und Wartung

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CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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Foreword

This European Standard (EN 858-2:2003) has been prepared by Technical Committee CEN/TC 165 "Wastewater engineering", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2003, and conflicting national standards shall be withdrawn at the latest by July 2003.

It is the second part of a two part standard for separator systems for light liquids. Part 1 gives principles of design, performance and testing, marking and quality control of separator systems for light liquids.

When pollution control requires the treatment of pollutants other than light liquids, additional measures can be necessary.

The annexes A and B are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard applies to separator systems used to separate hydrocarbons of mineral origin from wastewater. It does not apply to grease and oils of vegetable or animal origin nor to separation of emulsions or solutions.

This European Standard provides guidance on the selection of nominal sizes, as well as the installation operation and maintenance of light liquid separators manufactured in accordance with EN 858-1. It also gives advice on the suitability of cleansing agents if they are discharged to a separator.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 752-2, *Drain and sewer systems outside buildings — Part 2: Performance requirements.*

EN 752-4, *Drain and sewer systems outside buildings — Part 4: Hydraulic design and environmental consideration.*

EN 858-1:2002, *Separator systems for light liquids (e.g. oil and petrol) — Part 1: Principles of design, performance and testing, marking and quality control.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 858-1 as well as the following term and definition apply.

3.1
cleansing agent
chemical substance which, when combined with light liquids, initially forms an emulsion during cleaning process that rapidly breaks down in the separator

4 Determination of type and size of separator systems

4.1 General

Separator systems are used in a wide variety of situations to fulfil a number of different requirements. It is important to establish why a separator system is needed and what specific function it is expected to fulfil before selecting the appropriate size and type of installation.

Generally, separator systems are installed for one or more of the following reasons:

a) to treat waste water (trade effluent) from industrial processes, vehicle washing, cleansing of oil covered parts or other sources, e.g. petrol station forecourts;

b) to treat oil contaminated rainwater (run-off) from impervious areas, e.g. car parks, roads, factory yard areas;

c) to retain any spillage of light liquid and to protect the surrounding area.

Where there is no specific sizing method given by a regulatory authority the following guidance on sizing of the separator system shall be used:

4.2 Components of separator systems, their combination and application

4.2.1 General

The component parts of separator systems complying with EN 858-1 are listed in Table 1.

Table 1 — Components of separator systems

Components	Code letter
Sludge trap	S
Separator Class II	II, II b (for bypass separators)
Separator Class I	I, I b (for bypass separators)
Sampling shaft	P

Annex B gives guidance on the selection of components to suit particular applications.

4.2.2 Bypass separators

Bypass separators include a device to allow a flow in excess of the maximum permissible flow to bypass the separator.

Bypass separators are not suitable for category a) uses (see 4.1). They shall be used only in locations where it is unlikely that there will be significant hydrocarbon contamination during times of heavy rainfall.

Separator systems shall not surcharge or cause surcharging upstream when subject to their maximum design flow.

4.2.3 Classes of separators

Classes of separators (class I and II) are defined in EN 858-1:2002, clause 4.

Class I separators provide a higher degree of separation than class II separators (see Table B.2 for applications).

4.3 Sizing of separators

4.3.1 General

The sizing of light liquid separators shall be based on the nature and flow rate of the liquids to be treated and will need to take account of:

— maximum flow rate of rain water;

— maximum flow rate of waste water (trade effluent);

— density of the light liquid;

— presence of substances that may impede separation (e.g. detergents).

The sizing does not take into account special operational conditions (see 4.3.8).

The size of the separator shall be calculated from the following formula:

$$NS = (Q_r + f_x \cdot Q_s)\, f_d \qquad (1)$$

where

NS is the nominal size of the separator;

Q_r is the maximum flow rate of rainwater, in l/s;

Q_s is the maximum flow rate of wastewater, in l/s;

f_d is the density factor for the relevant light liquid;

f_x is the impediment factor depending on the nature of the discharge.

4.3.2 Factors

4.3.2.1 Impediment factor f_x

The impediment factor f_x allows for unfavourable separating conditions, e.g. where detergents are present in the wastewater. The minimum recommended impediment factors are listed in Table 2.

Table 2 — Minimum impediment factors f_X

Discharge type in accordance with 4.1	f_X
a)	2
b)	not relevant as Q_S = 0 (only rainwater)
c)	1

4.3.2.2 Density factor f_d

The density factor f_d allows for differing densities of light liquids when using different combinations of system components. Additional information is given in annex A.

Table 3 — Density factors f_d

Density g/cm³	up to 0,85	over 0,85 up to 0,90	over 0,90 up to 0,95
Combination	Density factor f_d		
S-II-P	1	2	3
S-I-P	1 [a]	1,5 [a]	2 [a]
S-II-I-P	1 [b]	1 [b]	1 [b]

[a] For class I separators operating by gravity only, use f_d for class II separator.

[b] For class I and class II separators.

4.3.2.3 Cleansing agents

Cleansing agent manufacturers shall submit a declaration stating that the product is free from organically combined halogen compounds or BTX aromas. Only cleansing agents which form temporary stable emulsions with light liquids and then de-emulsify after the cleaning process should be used. Instructions for use shall also be provided, together with the effects of mixing with other cleansing agents, particularly regarding the separation process.

4.3.3 Combined drainage of rainwater and wastewater

If a separator is receiving rainwater and wastewater, e.g. from vehicle washing, and the two maximum flows are not expected to occur simultaneously, then the separator can be sized for the higher flow rate.

4.3.4 Wastewater

The wastewater inflow in accordance with 4.1, case a), shall be calculated as the sum of the contributing flows from the following formula:

$$Q_s = Q_{s1} + Q_{s2} + Q_{s3} + \ldots \quad (2)$$

where

Q_{S1} is the flow from draw-off points, in l/s;

Q_{S2} is the flow from car washes, in l/s;

Q_{S3} is the flow from high pressure cleaning units, in l/s.

Any other contributing flow shall be added.

4.3.4.1 Draw-off points

Where it is not possible to determine the maximum flow from draw-off points by measurement, it may be estimated by using Table 4. Table 4 takes account the probability of the likelihood of all draw-off points, irrespective of size, being used at the same time. Calculations should be based on the flow rates from the largest draw-off points first.

Table 4 — Flow rates from draw-off points

Draw-off points					
Nominal diameter	Flows from draw-off point Q_{S1} [a] in l/s				
	1st point	2nd point	3rd point	4th point	5th point and subsequent
DN 15	0,5	0,5	0,35	0,25	0,1
DN 20	1,0	1,0	0,70	0,50	0,2
DN 25	1,7	1,7	1,20	0,85	0,3
[a] Values given for supply pressure of about 4 bar to 5 bar; other supply pressures may cause different Q_V-values.					
Example for calculation of Q_{S1} for 1 DN 15, 1 DN 20 and 2 DN 25 points: 1st point DN 25 = 1,7 l/s; 2nd point DN 25 = 1,7 l/s; 3rd point DN 20 = 0,7 l/s; 4th point DN 15 = 0,25 l/s; ..... Q_{S1} = 4,35 l/s					

In case of supply pressure differing from that stated in footnote 1 of Table 4, the flow from draw-off point shall be calculated from the following formula:

$$Q_{s1(x\,bar)} = \frac{Q_{s1(4\,bar)}}{\sqrt{\frac{4\,bar}{x\,bar}}} \qquad (3)$$

where

$Q_{s1(x\ bar)}$ is the flow from draw-off point at a supply pressure of x bar, in l/s;

$Q_{s1(4\ bar)}$ is the flow from draw-off point as given in Table 4, in l/s.

4.3.4.2 Automatic car washes (roll-over, drive-through)

Wastewater from low pressure car washes (with a back pressure up to 20 bar) where only carriage bodies and chassis are cleaned does not usually contain any significant amount of light liquid.

Should there be wastewater from high pressure car washes (with a back pressure higher than 20 bar) and/or any additional washing procedures which will result in wastewater containing light liquids, then for every car wash place or drive through a wastewater value Q_{S2} of 2 l/s plus a wastewater value Q_{S3} for each high pressure unit in accordance with 4.3.4.3 shall be included. When the car wash place is multiple used, e. g. for maintenance, for plants with higher quantities of waste water i. e. without mechanical cleaning devices, the actual quantity of waste water has to be considered.

A reduction of the wastewater flow rate Q_{S2} for plants with water recirculation and overflow into a sewer is not admissible.

4.3.4.3 High pressure units

Irrespective of the effective use of water from a high pressure unit, a wastewater value Q_{S3} of 2 l/s shall be considered. If there is more than one high pressure unit an additional 1 l/s shall be included for each unit.

If a high pressure unit is being used together with an automatic car wash for this unit a wastewater value Q_{S3} of 1 l/s shall be included.

4.3.5 Rainwater flow rate

For category b) uses (see 4.1), the size of the separator will depend on the design, rainfall intensity and the catchment area draining to the separator.

The maximum rainwater flow rate Q_r in l/s shall be calculated using equation (4) in accordance with EN 752-4.

$$Q_r = \Psi \cdot i \cdot A \quad (4)$$

where

i is the rainfall intensity, in l/s · ha;

A is the area receiving rainfall, measured horizontally, in ha;

Ψ is a dimensionless run-off coefficient.

In most cases the value of the run-off coefficient can be taken as $\Psi = 1$.

The rainfall intensity i mainly depends on the analysis of local rainfall data and shall be adopted according to local regulations.

For very large rainfall receiving areas, the rainwater flow can be divided by catchment areas and drained into several separators.

NOTE Surface areas covered by a canapy will receive reduced rainfall. For the purpose of the equation (4), the value A may be reduced for these areas.

4.3.6 Spillages

For category c) uses (see 4.1) separator systems shall be sized sufficiently to retain any spillage of light liquid. A higher storage capacity may be necessary.

4.3.7 Quantity of light liquid

When, in certain cases, a higher light liquid storage capacity than that specified in EN 858-1 is required, e.g. when more than the usual amount of light liquid is expected, the following options can be considered:

a) using a larger nominal size separator than calculated or

b) creating light liquid storage capacity outside the separator or

c) emptying the separator more frequently than usually.

4.3.8 Special cases

Separators operating under special conditions, e.g. for transformer stations, compressor stations, shall be reviewed on a site-specific basis.

Separators receiving wastewater from trade or industrial manufacturing processes may need to be specially sized after investigating the composition and properties of the wastewater.

4.4 Sludge traps

Sludge traps shall only be fed from the design inlets and not positioned to allow flow directly from the surface.

NOTE This does not apply to drainage channel type silt collection, e.g. in car washes, to retain solids.

Separator systems shall incorporate a sludge trap either as a separate unit or as an integral part of the separator. The volume can be determined as given in Table 5.

Table 5 — Volume of sludge traps

Quantity of sludge anticipated for e.g.:		Minimum sludge trap volume l	
None	- condensate	Not required	
Small	- processing waste water with defined small sludge volume - all rainwater collecting areas where a small amount of silt from traffic or similar appears, i.e. catchment basins on petrol tank areas and covered filling stations	$\frac{100 \cdot NS}{f_d}$	a
Medium	- filling stations, carwash by hand, part washing - bus washing places - waste water from garages, vehicle parking lots - power plants, machinery plants	$\frac{200 \cdot NS}{f_d}$	b
High	- washing plants for site vehicles, site machines, farm machines - truck wash places	$\frac{300 \cdot NS}{f_d}$	b
	- automatic car washes i.e. roll-over, drive-through	$\frac{300 \cdot NS}{f_d}$	c

a Not for separators smaller than or equal *NS* 10, except for covered car parks.

b Minimum volume of sludge traps 600 l.

c Minimum volume of sludge traps 5000 l.

5 Installation

5.1 Limitations

Separator systems shall only be installed on drainage systems where light liquids need to be separated from water and retained within the separator. They shall not be installed on drain and sewer systems containing domestic wastewater.

The drainage of areas where light liquids are unlikely to occur, such as roofs and grassed areas, should not discharge through separators.

5.2 Retention of light liquid

Separator systems shall be installed with automatic closure devices which ensure that no stored light liquid passes into the outlet of the separator.

Automatic closure devices operated by floats shall be adjusted and marked for densities of 0,85 g/cm³, 0,90 g/cm^3 or 0,95 g/cm^3 in accordance with the anticipated density of light liquid.

5.3 Automatic warning devices and electrical devices

Electrical warning devices for light liquids and other electrical devices housed in the separator shall be suitable for operation in a zone 0 hazardous area (see Directive 94/9/EC).

5.4 Drainage to and from separator systems

All drainage to and from separator systems shall be in accordance with EN 752-2.

Pipes and connections to the separator system shall be resistant to the light liquids.

5.5 Place of installation

Separator systems shall be installed close to the source of the light liquid, in well ventilated areas and easily accessible for cleaning and maintenance.

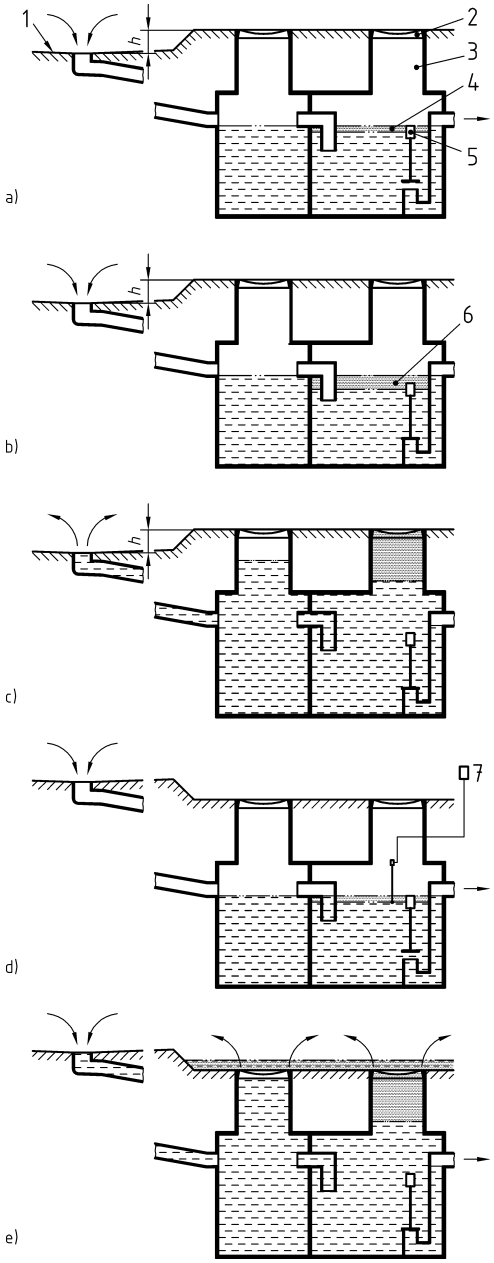
In the case of special processing plants, e.g. emulsion splitting plants, separators according to this standard shall be installed on the inlet side of these plants in order to retain separable light liquids.

Depending on place of installation, covers shall be supported so, that loads do not impose excessive loads on the separator.

5.6 Protection against escape of light liquids

The light liquids shall not be able to escape from the separator system or the extension shafts. Separator systems shall be installed in such a way that the level of the manhole cover (ground level) is higher than the water level on the surface being drained (see Figure 1, situation a to c). This will prevent the possible escape of light liquid from the system (see Figure 1, situation e).

The respective level will be the highest possible rainwater build-up when wastewater and rainwater are drained together. When only wastewater is drained the upper surface of the lowest installed drain will be the respective level. For separators up to NS 6 the projection shall be taken as 130 mm as no calculation is made. For systems larger than NS 6 the respective projections have to be calculated for sludge traps and separators. If this projection cannot be provided a warning device for light liquids (see 5.3) has to be installed. See also Figure 1, situation d.



Key

a Separator system in operation
b Maximum storage capacity is reached. Automatic closure device closed and stops further effluents.
c Additional waste water raises the liquid level in the system, until the lowest installed drain is reached. The light liquid level in the extension shaft is higher than the corresponding water level in drainage system. For protection against the escape of light liquid the level of the covers (of the extension shaft) shall be higher than the relevant level of the drains. This dimension *h* has to be calculated.
d Cover below relevant level. Installation protection by a warning device to prevent the situation shown in situation e.
e Closed automatic closure device causes the escape of light liquid out of the extension pieces.

1 Surface area / relevant water level
2 Cover
3 Extension shaft
4 Light liquid
5 Automatic closure device
6 Maximum storage capacity for light liquid
7 Warning device

Figure 1 — Protection against escape of light liquids

5.7 Connection to the drainage system

The connection of the separator system to the drainage system shall be done in accordance with the local regulations.

Sampling access shall be either integral or separately installed, immediately downstream of the separator.

To avoid turbulence within the separator, pumping and lifting plants should be installed downstream of the separator.

The provision of traps on drains depends on local regulations. The drains as well as the connected pipelines shall be installed to fall to the separator system.

If for technical reasons long pipe runs are required for large collecting areas, e.g. tank farms, army barracks, refineries, full pipelines may be necessary for special protection of the drainage installations.

6 Operation, inspection and maintenance

All parts which have to be regularly maintained shall be at all times reachable. Maintenance of the system has to be carried out at least every six months by experienced personnel. The maintenance shall be carried out in accordance with the manufacturers instructions, but at least shall include the following items:

a) sludge trap

- determination of sludge volume

b) separator

- measure the thickness of light liquids
- check the operation of the automatic closure device
- check the coalescing devices for permeability, if the water levels in front and behind the coalescing device show significant difference
- check the function of the warning device

c) sampling shaft

- clean the drain channel

Light liquid and sludge shall be removed as required. Before putting in service sludge trap and separator shall be re-filled with fresh water.

NOTE Emptying is recommended when one half of the sludge volume or 80 % of the storage capacity of the separator is reached.

In exceptional circumstances, when personnel need to enter the separator, it shall be fully drained and thoroughly ventilated.

The regulations/decrees for avoiding accidents and the handling of dangerous materials shall be followed.

In intervals of at maximum five years the separator system shall be emptied and then submitted to general inspection covering the following items:

- tightness of the system;
- structural condition;

— internal coatings, if present;

— state of inbuilt parts;

— state of electrical devices and installations;

— checking of adjustment of automatic closure device, e.g. floating bodies.

The cleaning and maintenance records shall be kept and made available to the authorities upon request and shall contain remarks on specific events (e.g. repairs, accidents).

Annex A
(informative)

Density factor f_d for particular light liquids and combination of components

The density factor f_d for particular light liquids and types of combination of components is given in Table A.1.

Table A.1

Light liquid	Density at 15 °C to 20 °C (g/cm³)	Separability	f_d			Remarks	
			S-II-P	S-I-P	S-II-I-P	Max. solubility in water under certain conditions	Others
Acetic-acid-amylacetate	0,876	Yes	2	1,5	1	2,5 g/l	[a]
Acetic-acid-ethylester (Ethylacetate)	0,9	Limited	3	2	1	86,0 g/l	After a while decomposition in acetic acid and water
Acetic-acid-methylacetate	0,930 to 0,934	Limited	3	2	1	292 g/l	[a] particularly in closed compartments
Acetic-acid-n-buthylester	0, 876	Limited	2	1,5	1	7 g/l	After a while decomposition in acetic acid and ethylalcohol
Acetone	0,791	No	-	-	-	Unlimited	-
Amber oil	0,8	Yes	1	1	1	-	-
Amylalcohol	0,815	Limited	1	1	1	27 g/l	Mixtures with water harmful
Benzene	0,87	Yes	2	1,5	1	1,8 g/l	[a]
Butylalcohol	0,81	Limited	1	1	1	90 g/l	[a]
Coal tar oil	0,86 to 0,89	Yes	2	1,5	1	0,2 g/l	-
Cresol oil	1,03	No	-	-	-	20 g/l	-
Cyclohexanol	0,968	No	-	-	-	56,7 g/l	-
Cyclohexane	0,778 to 0,779	Yes	1	1	1	Nearly insoluble	[a]
Dekaline (dekahydro-naphtalene)	0,870 to 0,896	Yes	2	1,5	1	Nearly insoluble	-
Diesel fuel, diesel oil	0,85	Yes	1	1	1	Nearly insoluble	-
Diethyleter	0,714	Limited	1	1	1	75 g/l	Emission of diethylether gases
Dioxane	0,10306	No	-	-	-	Unlimited	[a] In case of high concentration
Ethylalcohol	0,789	No	-	-	-	Unlimited	[a] In case of high concentration

Table A.1 (continued)

Light liquid	Density at 15 °C to 20 °C (g/cm³)	Separability	f_d			Remarks	
			S-II-P	S-I-P	S-II-I-P	Max. solubility in water under certain conditions	Others
Ethylbutyrate (butyric-acid n-ethylether)	0,879	Limited	2	1,5	1	6,2 g/l	[a]
Ethylmethylketon	0,805	No	-	-	-	Well soluble	-
Formic acid ethylester	0,919 to 0,921	Limited	3	2	1	110 g/l	[a]
Formic acid methylester	0,969 to 0,971	Limited	3	2	1	3000 g/l	[a]
Fuel oil, extra light	< 0,86	Yes	1	1	1	Nearly insoluble	-
Fuel oil, light	0,87	Yes	2	1,5	1	-	-
Fuel oil, medium	0,92	Yes	3	2	1	-	-
Fuel oil, heavy	0,94 to 0,99	Limited up to ≈ 0,96 g/cm^3	3	2	1	Nearly insoluble	-
Heavy petrol	0,70 to 0,75	Yes	1	1	1	Nearly insoluble	-
Heptane	0,684	Yes	1	1	1	Nearly insoluble	[a]
Hexane	0,659	Yes	1	1	1	Nearly insoluble	[a]
Iso-amylalcohol	0,813	Limited	1	1	1	30 g/l	
Iso-butylalcohol	0,806	Limited	1	1	1	95 g/l	[a] on warm days
Iso-propylalcohol	0,785	No	-	-	-	Unlimited	[a]
Kerosine (jet petrol)	0,8	Yes	1	1	1	-	[a] When exposed to sunlight
Light oil → fuel oil, light							
Light petrol → petrol, gasoline							
Lignite tar oil → coal tar oil							
Lubricating oil	0,89 to 0,9	Yes	2	1,5	1	Nearly insoluble	-
Methyl alcohol	0,790 to 0,791	No	-	-	-	Unlimited	[a]
Methylcyclohexanol	0,91 to 0,94	Yes	3	2	1	-	-
Oil of turpentine	0,86 to 0,87	Yes	2	1,5	1	-	[a] in case of higher temperatures
Paraffin oil	0,88 to 0,94	Yes	3	2	1	Nearly insoluble	-
Pentane	0,625 to 0,626	Yes	1	1	1	0,36 g/l	[a]
Petrol, gasoline, mixture of brands	0,77 to 0,79	Yes	1	1	1	-	[a]
Petrol, gasoline, branded	0,68 to 0,75	Yes	1	1	1	-	[a]
Petrol, racing cars	0,78	Yes, but check formula	1	1	1	-	[a]
Petroleum	0,8	Yes	1	1	1	Nearly insoluble	-
Pine oil → oil of turpentine							
Propionacidethylester	0,889 to 0,891	Yes	2	1,5	1	22 g/l	[a]

Table A.1 (concluded)

Light liquid	Density at 15 °C to 20 °C (g/cm³)	Separability	f_d			Remarks	
			S-II-P	S-I-P	S-II-I-P	Max. solubility in water under certain conditions	Others
Propylalcohol	0,804	No	-	-	-	Unlimited	-
Propylbutyrate	0,88	Yes	2	1,5	1	≈ 0,3 g/l	-
Tetraline (tetrahydronaphtalene)	0,967 to 0,969	Limited	3	2	1	-	-
Test petrol	0,764 to 0,794	Yes	1	1	1	Nearly insoluble	-
Toluene	0,866 to 0,867	Yes	2	1,5	1	Nearly insoluble	[a]
Tractor fuel → diesel fuel and petroleum							
Transformer oil (isolating oils) - not containing PCB - containing PCB PCB = polychlorinated biphenyls	≈ 0,82	 Yes No	 1 -	 1 -	 1 -	-	-
Xylene	0,862 to 0,875	Yes	2	1,5	1	0,2 g/l	[a]

[a] Possible formation of explosive atmosphere above water level.

NOTE Some of these liquids can produce chemical attack on the materials of the surface of the sludge trap, separator and internal components. Care should therefore be taken to specify materials and/or surface preparation to withstand attack from such light liquids.

Annex B
(informative)

Configuration and application of separator systems

Guidance for the configuration of separator systems are given in Tables B.1 and B.2. Table B.1 gives the minimum configuration needed to meet effluent quality requirements and Table B.2 gives recommendations for specific applications.

Table B.1 — Configuration to meet effluent quality requirements

Direction of flow	Configuration	Quality of effluent
→	S-II-P	Recommended as a minimum quality of effluent for input in drainage/sewerage systems and sewage system plants
→	S-I-P	Recommended where higher grade of separation may be required
→	S-II-I-P	Recommended for same quality of effluent as combination S-I-P but where the inflow rate may contain larger quantities of light liquids
→	S-IIb-P [a]	May be used for trapping spillage of light liquid
→	S-Ib-P [a]	May be used for treating the first flush of contaminated run-off
[a] See also 4.2.1		

Table B.2 — Specific cases of application

Application	Remarks	Treatment before discharge into		Preventive measures
		P.S. [a]	S.W. [a]	
1 Rainwater from the petrol station	May not contain detergents of cleaning activities	S-II-P	S-I-P	Additional storage capacity for light liquid may be required.
2 Rainwater from oil storage and oil transfer territories		S-II- P S-IIb-P [b]	S-I-P	
3 Rainwater from vehicle parks etc.		S-II-P S-IIb-P [b]	S-I-P	
4 Rainwater from roads etc. in special cases	e.g. water catchment areas.	S-II-P S-IIb-P [b]	S-I-P	
5 Cleaning (spillage and leakage) floors of work-shops, test centres, factories etc.			Discharge into surface water directly from the separator is not allowed. In very exceptional circumstances and with the agreement of the local authority the discharge into surface water with additional treatment after the separator may be permitted.	Use of absorbents.
5.1 With use of cleaning agents		S-I-P		Collect spills and drains on dry materials.
5.2 Without use of cleaning agents		S-II-P		
6 Vehicle wash				
6.1 By hand	Cleaning only car surfaces, cleansing agents free of hydrocarbons	S-P		
6.2 Automatic car washes	Cleaning only car surfaces, including underwash (low pressure), cleansing agents free of hydrocarbons	S-II-P		
6.3 By high pressure cleaner				
6.3.1 Cleaning only vehicle surfaces without oil contamination	Cleansing agents free of hydrocarbons	S-P		It is advisable to re-use the treated wastewater.
6.3.2 Cleaning vehicle surfaces with oil contamination		S-I-P [c]		
6.4 Underwash				
6.5 Engines		S-II-EBS-P		
6.6 Self-service by high-pressure cleaner				
7 Cleaning (except car wash)	Cleaning engines or parts			It is advisable to re-use treated wastewater
7.1 With high-pressure cleaner		S-I-P S-II-EBS-P		
7.2 With rotocleaner		S-I-EBS-P		
8 Removal of parafin wax or similar, e.g. from new vehicles, including anti-rost treatment		S-II-EBS-P		
9 Scrapyards		S-II-P		Collect spills and drains on dry materials, to avoid water pollution.
10 Soil treatment		S-II-P		

Table B.2 — Specific cases of application (concluded)

Application	Remarks	Treatment before discharge into		Preventive measures
		P.S. [a]	S.W. [a]	
11 Treatment (plants) for sludge and light liquids from separators		S-I-P		

[a] After treatment the effluent is discharged in a public sewer (P. S.) or in surface water (S. W.).

Effluents may be discharged if the quality is conform to the discharge standard required by local authorities (see also 5.6).

[b] Subject to local regulations

[c] Conditions:

- pressure less than 60 bar
- temperature less than 60 °C
- pH-neutral
- Using of cleansing agents in accordance with 4.3.2.3

S Sludge trap

I Class I separator

II Class II separator

II b Class II bypass separator

P Sampling shaft

EBS Emulsion break system or further treatment

Bibliography

Directive 94/9/EC, *Directive 94/9/EC of the European Parliament and the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.*

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