BRITISH STANDARD

BS EN
1825-2:2002

Grease separators —

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

The European Standard EN 1825-2:2002 has the status of a British Standard

ICS 13.060.99

National foreword

This British Standard is the official English language version of EN 1825-2:2002.

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 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.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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EUROPEAN STANDARD

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

Installations de séparation de graisses - Partie 2: Choix des tailles nominales, installation, service et entretien

Abscheideranlagen für Fette - Teil 2: Wahl der Nenngröße, Einbau, Betrieb und Wartung

This European Standard was approved by CEN on 29 September 2001.

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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Contents

Foreword

This document EN 1825-2:2002 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 August 2002, and conflicting national standards shall be withdrawn at the latest by June 2004.

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

It is the second part of a two part standard for grease separators. Part 1 gives principles of design, performance and testing, marking and quality control of grease separators.

Annex A is normative. The annexes B, C and D 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, Iceland, Italy, Ireland, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard provides guidance on the selection of nominal sizes, installation, operation and maintenance of grease separators manufactured in accordance with prEN 1825-1.

This standard does not apply to wastewater containing light liquids, e.g. grease or oils of mineral origin, and does not include treating stable emulsions of grease or oil in water.

The standard does not cover the use of biological additives (bacteria, enzymes).

2 Normative references

This European Standard incorporates by dated or undated references, 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).

prEN 1825-1:2000, *Grease separators — Part 1: Principles of design, performance and testing, marking and quality control.*

EN 12056-2, *Gravity drainage systems inside buildings — Part 2: Sanitary pipework, layout and calculation.*

3 Terms and definitions

For the purposes of this European Standard the terms and definitions given in prEN 1825-1 and EN 12056-2 and the following apply.

3.1
selection of the nominal size
determination of the appropriate nominal size of the grease separation chamber for a specific case, based on amount and type of influent

4 Application

Grease separators shall be used wherever it is necessary to separate greases and oils of vegetable and animal origin from wastewater, such as in trade or industrial plants/establishments, e.g.

- commercial kitchens and large catering establishments, e.g. in inns, hotels, motorways service stations, canteens;
- grilling, roasting and frying facilities;
- food distribution points (with returnable crockery);
- butcher's shops, with or without slaughtering facilities;
- meat and sausage factories, with or without slaughtering facilities;
- abattoirs;
- poultry slaughterers;
- tripe preparation plants;
- animal rendering plants;
- bone and glue boiling plants;
- soap and stearine factories;
- oil mills;
- vegetable oil refineries;
- margarine factories;
- pickling plants;
- fast-food preparation plants;
- chip and crisp producers;
- peanut roasting plants.

Wastewater containing a considerable proportion of grease in a non-separable form (i.e. emulsified) from applications such as dairy, cheese making and fish processing, or from distribution points having only dish washing facilities, or from "wet waste compactors", will only be effectively treated in grease separators under certain conditions. The wastewater may require further treatment.

Applications where the discharged wastewater contains solids that are quick to purify (e.g. the fish industry) do not require a sludge trap, but the grease separator shall be fitted with a strainer or screening device fitted on the inlet side to retain coarse solids. Any retained solids should be removed and the separator thoroughly flushed with clean water before operational intervals to prevent putrefaction.

5 Nominal size

For the preferred nominal sizes (NS) see clause 4 of prEN 1825-1:2000.

Multiple separators of the same nominal size may be connected in parallel with the flow split equally between each separator.

6 Selection of the nominal size

6.1 General

The selection of the nominal sizes shall be based on the nature and quantity of wastewater to be treated taking into account:

— maximum flow rate of wastewater;

— maximum temperature of the wastewater;

— density of grease/oils to be separated;

— influence of cleansing and rinsing agents.

If a grease storage capacity greater than 40 · NS in litres is required, e.g. when more than the usual amount of grease is expected, the following options may be used:

1) using a larger nominal size separator than calculated or

2) creating grease storage capacity outside the separator or

3) emptying the separator more frequently than usually.

Where no specific sizing method is offered by a regulatory authority, then the nominal size of the separator shall be determined from the following formula:

$$\mathrm{NS} = Q_s f_t f_d f_r \qquad (1)$$

where

NS is the calculated nominal size of the separator;

Q_S is the maximum flow rate of wastewater, entering the separator in litres per second;

f_t is the impedient factor for the temperature of influent;

f_d is the density factor for the relevant grease/oil;

f_r is the impedient factor for the influence of cleansing and rinsing agents.

After calculation select the next higher preferred nominal size in accordance with clause 4 of prEN 1825-1:2000.

6.2 Determination of the specific values

6.2.1 Maximum flow rate of wastewater

The maximum flow rate of wastewater Q_S shall be determined by:

a) measurement, or

b) calculation based upon catering equipment discharging into the grease separator, or

c) calculation based upon the type of establishment discharging into the grease separator, or

d) special calculation for individual cases, if acceptable by the regulatory authority.

Where data is available to determine Q_S by b) or c), and the designer is unsure of the most appropriate option of use, it is recommended that the higher of the flow rates determined from both calculations is used.

6.2.2 Temperature factor f_t

High wastewater temperature reduces the efficiency of grease separators. Temperature factors f_t are given in Table 1.

Table 1 — Temperature factor f_t

Temperature of wastewater at inlet °C	Temperature factor f_t
≤ 60	1,0
always or occasionally > 60	1,3

6.2.3 Density factor f_d

A density factor f_d = 1,0 shall be used for wastewater discharged from kitchens, abattoirs and meat and fish processing plants.

When the nature of grease/oil is well known, the density coefficient may be taken from Figure 1, where f_d is plotted for a range of different grease and oil densities.

For grease/oil densities > 0,94 g/cm^3, a density factor of 1,5 shall be used.

Densities of different fats and oils are given in annex B.

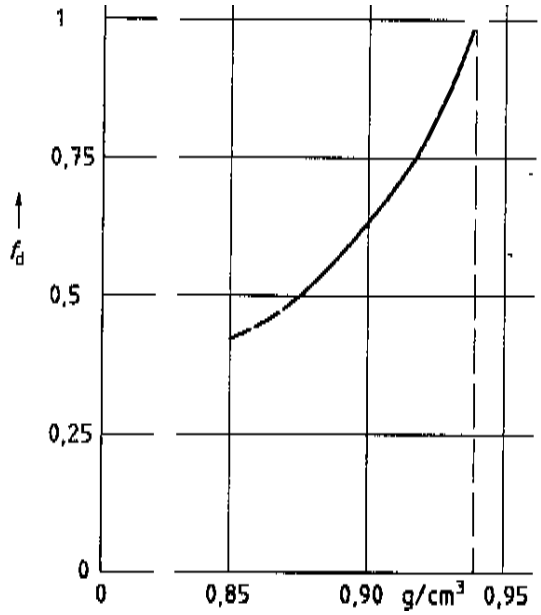

Figure 1 — Relation between f_d and density

6.2.4 Detergent and rinsing agent factor f_r

Detergents, including dishwasher powders and rinsing agents, should carefully be selected and used sparingly. They shall not impair the separating effect as far as possible and not form stable emulsions where they are used upstream of a separator. A detergent and rinsing agent coefficient shall be chosen from Table 2.

Table 2 — Detergent and rinsing agent coefficient f_r

Use of detergent and rinsing agents	Detergent and rinsing agent coefficient f_r
Never used	1,0
Occasionally or always used	1,3
Special cases, e.g. hospitals	≥ 1,5

National and local regulations may limit the use of certain detergents, rinsing agents and solvents.

6.3 Special cases

For industrial plants such as abattoirs and wholesale butchers, the grease separator nominal size NS should be selected on the basis of site specific investigation.

6.4 Determination of sludge trap volume

The sludge trap volume shall be at least 100 · NS in litres but for abattoirs and similar plants a volume of at least 200 · NS in litres is recommended.

7 Installation

7.1 Limitations

Only wastewater containing organic grease and oils shall be discharged to a grease separator. In particular, the following shall not be discharged to a grease separator:

— wastewater containing faeces ("black" water);

— rainwater;

— wastewater containing light liquids, e.g. grease or oil of mineral origin.

7.2 Place of installation

Grease separators should be installed close to the sources of wastewater but should not be sited in unventilated rooms, roads, car parks or storage areas. To prevent odour and fly nuisance, separators should not be sited close to habitable buildings, especially to opening windows and air intakes. They shall be easily accessible to cleaning vehicles. Specific operational and structural conditions may require the separator to be remotely located from the source of wastewater.

Separators should be installed in such a way to prevent frost damage, and allow all parts requiring regular maintenance to be easily accessible at all times.

Where necessary, manhole covers on separators shall be supported so that the load imposed on the separator does not exceed its design strength.

7.3 Drainage to and from the separator

Where no specific local regulations exist, grease separators shall be connected to the drains and sewers as follows:

The wastewater to the grease separator shall be gravity fed. If the static water level in the grease separator is lower than the flood level (see EN 752-1), then the effluent from the separator shall be discharged to the drainage system using a wastewater lifting plant.

Pipelines upstream of the separator shall be laid at a minimum gradient of 2 % (1 : 50) to prevent an accumulation of grease. Where for structural and/or operational reasons, this is not possible, and/or longer pipe runs are required, appropriate measures shall be taken to prevent grease accumulation or deposition (see annex D).

The transition from vertical to horizontal pipes shall be made by using two 45° bends between which a piece of pipe, at least 250 mm long, shall be placed, or by using equivalent long-radius bend. This shall be followed by a stilling section that has a length, in millimetres, equal to at least 10 times the nominal size of the supply pipe and shall be placed upstream of the separator.

Local regulations may limit the temperature of wastewater at the point of connection to the public sewerage system.

Discharge points, e.g. floor drains, shall have traps, which, where necessary, include sediment buckets which can be removed for cleaning purposes.

The use of sludge traps with an inlet from above, e.g. through a grating, is not permitted.

7.4 Ventilation

Pipelines connected to grease separators (upstream and downstream) shall be adequately ventilated. The discharge pipe to the separator shall be provided with a stack vent and branch ventilating pipes shall be connected to all upstream branch pipes more than 5 m long.

Where the nearest vent is further than 10 m upstream of the grease separator, the supply pipe shall be fitted with an additional vent pipe, terminating as close as possible to the separator.

8 Operation, inspection and maintenance

Grease separators should be inspected, emptied and cleaned regularly. Attention is drawn to the need to comply with national or local regulations for the disposal of waste.

The frequency of inspection, emptying and cleaning should be determined with regard to the grease and sludge storage capacity of the separator and in accordance with operational experience. Unless otherwise specified, separators should be emptied, cleaned and refilled with clean water at least once a month and, preferably, every two weeks.

Annex A
(normative)

Calculation of maximum wastewater flow Q_S

A.1 Calculation based on equipment/fittings discharging into the separator

A.1.1 General

This calculation method is based upon the number and type of equipment and fittings discharging into the separator. It may be used for all types of kitchens, meat and fish processing plants and applies equally to existing or proposed installations.

A.1.2 Maximum wastewater flow rate Q_S

The maximum wastewater flow rate is calculated from the equation:

$$Q_S = \sum_{i=1}^{m} n q_i Z_i(n) \qquad \text{(A.1)}$$

where

Q_S is the maximum wastewater flow, in litres per second;

i is the dimensionless counter;

m is the reference number of fittings and pieces of equipment, dimensionless;

n is the number of fittings/equipment of the same type, dimensionless;

q_i is the maximum discharge from the fitting/equipment, in litres per second;

$Z_i(n)$ is the frequency factor from Table A.1, dimensionless.

Table A.1 — Values of q_i and $Z_i(n)$ for typical fittings/equipment

Type of kitchen equipment	m	q_i l/s	$Z_i(n)$					
			$n = 0$	$n = 1$	$n = 2$	$n = 3$	$n = 4$	$n \geq 5$
Boiling pan								
25 mm outlet	1	1,0	0	0,45	0,31	0,25	0,21	0,20
50 mm outlet	2	2,0	0	0,45	0,31	0,25	0,21	0,20
Tilting boiling pan								
70 mm outlet	3	1,0	0	0,45	0,31	0,25	0,21	0,20
100 mm outlet	4	3,0	0	0,45	0,31	0,25	0,21	0,20

Table A.1 — Values of q_i and $Z_i(n)$ for typical fittings/equipment (continued)

Type of kitchen equipment	*m*	q_i l/s	$Z_i(n)$					
			$n = 0$	$n = 1$	$n = 2$	$n = 3$	$n = 4$	$n \geq 5$
Rinse sink								
40 mm siphon outlet	5	0,8	0	0,45	0,31	0,25	0,21	0,20
50 mm siphon outlet	6	1,5	0	0,45	0,31	0,25	0,21	0,20
Rinse sink								
40 mm non-siphonic	7	2,5	0	0,45	0,31	0,25	0,21	0,20
50 mm non-siphonic	8	4,0	0	0,45	0,31	0,25	0,21	0,20
Dish washer	9	2,0	0	0,6	0,45	0,40	0,34	0,30
Tilting roasting-tin	10	1,0	0	0,45	0,31	0,25	0,21	0,20
Fixed roasting-tin	11	0,1	0	0,45	0,31	0,25	0,21	0,20
High pressure cleaner or Steam cleaner	12	2,0	0	0,45	0,31	0,25	0,21	0,20
Scraper	13	1,5	0	0,45	0,31	0,25	0,21	0,20
Vegetable washer	14	2,0	0	0,45	0,31	0,25	0,21	0,20

Where two or more draw-off points are installed only for washing down purposes but are not connected to any equipment, their flow rate should be calculated using equation A.1 and the values given in Table A.2.

Table A.2 — Values of q_i and $Z_i(n)$ for draw-off points

Size of draw-off points	*m*	q_i l/s	$Z_i(n)$					
			$n = 0$	$n = 1$	$n = 2$	$n = 3$	$n = 4$	$n \geq 5$
DN 15	15	0,5	0	0,45	0,31	0,25	0,21	0,20
DN 20	16	1,0	0	0,45	0,31	0,25	0,21	0,20
DN 25	17	1,7	0	0,45	0,31	0,25	0,21	0,20

NOTE Manufacturer´s values should be used, if different to those given in Tables A.1 and A.2.

For equipment and fittings not listed in Tables A.1 and A.2, values of q_i and $Z_i(n)$ should be determined by testing or by reference to manufacturer´s data.

A.2 Method based upon the type of establishment discharging into the separator

A.2.1 General

This calculation method is based upon the type of kitchen or meat processing plant discharging into the separator, irrespective of the fittings and equipment installed.

A.2.2 Maximum wastewater flow rate Q_S

The maximum wastewater flow rate is calculated from the equation:

$$Q_s = \frac{VF}{3600t} \quad \text{(A.2)}$$

where

Q_S is the maximum wastewater flow, in litres per second;

V is the average wastewater volume per day (see A.2.2.1), in litres;

F is the peak flow coefficient, dependent upon the type of plant (see A.2.2.2), dimensionless;

t is the average duration of operation each day, in hours.

A.2.2.1 Average wastewater volume per day *V*

The average wastewater volume per day can be determined by measurement of the water consumption or, where this data is not available, by calculation.

Commercial kitchens

The average wastewater volume per day discharged from commercial kitchens may be calculated using:

$$V = MV_m \quad \text{(A.3)}$$

where

V is the average wastewater volume per day (see A.2.2.1), in litres;

M is the number of meals per day;

V_m is the volume of water used per meal, obtained from Table A.3, in litres.

Table A.3 — Volume of water used per meal

Type of kitchen	Volume of water used per meal V_m l
Hotel	100
Restaurant	50
Hospital	20
Large catering establishment (24 hour operation)	10
Factory and office canteens	5

Meat processing plants

The average wastewater volume per day discharged from meat processing plants may be calculated using:

$$V = M_p V_p \quad \text{(A.4)}$$

where

V is the average wastewater volume per day (see A.2.2.1), in litres;

M_p is the quantity of meat products per day, in kilograms;

V_p is the volume of water used per kilogram of meat products, obtained from Table A.4, in litres.

Table A.4 — Volume of water used per kilogram of sausage products

Size of meat processing plant or butchers	Volume of water used per kilogram of meat products V_p l	Quantity of meat products per day M_p kg
Small, up to 5 GV[1)]/week	20	Where no other information is available, M_p may be assumed to be 100 kg/GV [1)]
Medium, 6 to 10 GV[1)]/week	15	
Large, 11 to 40 GV[1)]/week	10	
[1)] 1 GV = 1 cow or 2,5 pigs		

A.2.2.2 Peak flow coefficient *F*

The peak flow coefficient *F* is given in Table A.5 for various types of kitchen and meat processing plants.

Table A.5 — Peak flow coefficient *F*

Situation	Peak flow coefficient *F*
Commercial kitchens	
Hotel	5,0
Restaurant	8,5
Hospital	13,0
Factory and office canteens	20,0
Large catering establishment (24 hour operation)	22,0
Meat processing plant and butchers	
Small, up to 5 GV[1)]/week	30,0
Medium,6 to 10 GV[1)]/week	35,0
Large, 11 to 40 GV[1)]/week	40,0
[1)] 1 GV = 1 cow or 2,5 pigs	

In the case of meat processing by hand the quantity of meat products per day may be assumed to be approximately $M_p \approx 100$ kg/GV. Additional wastewater volume per day from, e.g. party services, food/snack distribution shall be added when calculating the average wastewater quantity *V*.

Annex B
(informative)

Densities of greases and oils

The densities of greases and oils are given in Table B.1.

Table B.1 — Densities of greases and oils

Fat/oil	Density ρ at temperature of 20 °C g/cm^3
Animal fat	0,85 to 0,94
Aniseseed oil	1,00
Butter fat	0,91
Cacao butter	0,89 to 0,94
Castor oil	0,95 to 0,97*)
Coconut oil	0,92 to 0,93
Corn oil	0,92
Cottonseed oil	0,92
Pine oil	0,87 to 0,91
Fish oil	0,89 to 0,94
Jojoba oil	0,86 to 0,90
Lard oil	0,91 to 0,92
Linseed oil	0,93 to 0,94
Majoram oil	0,89 to 0,91
Oleic acid	0,89 to 0,90
Olive oil	0,91
Palmitic oil	0,84
Palmkernel oil	0,94 to 0,95
Palm oil	0,91 to 0,92
Peanut oil	0,91 to 0,92
Pine oil	0,93 to 0,94
Poppy oil	0,92
Rapeseed oil	0,91 to 0,92
Resin oil	0,87 to 0,91
Sesame oil	0,92
Soybean oil	0,92 to 0,93
Stearic acid	0,84
Sunflower oil	0,92 to 0,93

Table B.1 — Densities of greases and oils (continued)

Fat/oil	Density ρ at temperature of 20 °C g/cm^3
Tallow	0,92
Vegetable oil	0,95 to 0,97*)
Wood oil	0,95 to 0,97*)
*) Specific attention shall be given if fat/oil is treated in grease separator according to this standard.	

Annex C
(informative)

Examples of determining nominal size of grease separator

C.1 Examples of calculation based on equipment/fittings discharging into the separator

EXAMPLE 1 Canteen kitchen

For the equipment listed in Table C.1, determine the size of separator to be used NS.

Table C.1

m	Equipment	*n*	Values from Table A.1		$n\ q_i\ Z_i(n)$ l/s
			q_i	$Z_i(n)$	
1	Boiling pan, 25 mm outlet	2	1,0	0,31	0,62
2	Boiling pan, 50 mm outlet	1	2,0	0,45	0,90
5	Rinse sink, 40 mm siphonic outlet	2	0,8	0,31	0,50
9	Dishwasher	1	2,0	0,60	1,20
10	Tilting roasting tin	1	1,0	0,45	0,45
$Q_s = \sum n\ q_i\ Z_i(n)$					3,67

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated size required NS, using equation 1:

NS = 3,67 · 1,0 · 1,0 · 1,3
= 4,77

Nearest larger preferred separator = NS 7 (see prEN 1825-1)

If separate sludge trap is used the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 700 l

EXAMPLE 2 Hospital kitchen

For the equipment listed in Table C.2, determine the size of separator to be used NS.

Table C.2

m	Equipment/fittings	*n*	Values from Tables A.1 and A.2		$n\ q_i\ Z_i(n)$ l/s
			q_i	$Z_i(n)$	
2	Boiling pan, 50 mm outlet	6	2,0	0,20	2,40
5	Rinse sink, 40 mm siphonic outlet	3	0,8	0,25	0,60
6	Rinse sink, 50 mm siphonic outlet	5	1,5	0,20	1,50
9	Dishwasher	1	2,0	0,60	1,20
10	Tilting roasting tin	1	1,0	0,20	0,45
16	20 mm draw-off point	2	1,0	0,31	0,62
17	25 mm draw-off point	2	1,7	0,31	1,50
$Q_s = \sum n\ q_i\ Z_i(n)$					8,33

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,5 (high usage of detergents, solvents and rinsing aids, see 6.2.4)

Therefore, calculated size required NS, using equation 1:

NS = 8,33 · 1,0 · 1,0 · 1,5
= 12,50

Nearest larger preferred separator = NS 15 (see prEN 1825-1)

If separate sludge trap is used the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 1 500 l

EXAMPLE 3 Hotel-restaurant kitchen

For the equipment listed in Table C.3, determine the size of separator to be used NS.

Table C.3

m	Equipment/fittings	*n*	Values from Table A.1		$n\ q_i\ Z_i(n)$ l/s
			q_i	$Z_i(n)$	
1	Boiling pan, 25 mm outlet	2	1,0	0,31	0,62
2	Boiling pan, 50 mm outlet	1	2,0	0,45	0,90
5	Rinse sink, 40 mm siphonic outlet	5	0,8	0,20	0,80
6	Rinse sink, 50 mm siphonic outlet	11	1,5	0,20	3,30
9	Dishwasher	2	2,0	0,50	2,00
12	Steam cleaner	2	2,0	0,31	1,24
$Q_s = \sum n\ q_i\ Z_i(n)$					8,86

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated size required NS, using equation 1:

NS = 8,86 · 1,0 · 1,0 · 1,3
= 11,52

Nearest larger preferred separator = NS 15 (see prEN 1825-1)

If separate sludge trap is used the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 1 500 l

EXAMPLE 4 Restaurant kitchen

For the equipment listed in Table C.4, determine the size of separator to be used NS.

Table C.4

m	Equipment	*n*	Values from Table A.1		*n* q_i $Z_i(n)$ l/s
			q_i	$Z_i(n)$	
5	Rinse sink, 40 mm siphonic outlet	3	0,8	0,25	0,60
9	Dishwasher	1	2,0	0,60	1,20
11	Fixed roasting tin	1	0,1	0,45	0,05
$Q_s = \sum n\ q_i\ Z_i(n)$					1,85

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated size required NS, using equation 1:

NS = 1,85 · 1,0 · 1,0 · 1,3
= 2,41

Nearest larger preferred separator = NS 4 (see prEN 1825-1)

If separate sludge trap is used the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 400 l

EXAMPLE 5 Small meat processing plant

For the equipment listed in Table C.5, determine the size of separator to be used NS.

Table C.5

m	Equipment/fittings	n	Values from Tables A.1 and A.2		$n\ q_i\ Z_i(n)$ l/s
			q_i	$Z_i(n)$	
1	Boiling pan, 25 mm outlet	1	1,0	0,45	0,45
2	Boiling pan, 50 mm outlet	1	2,0	0,45	0,90
5	Rinse sink, 40 mm siphonic outlet	2	0,8	0,31	0,50
16	20 mm draw-off point	1	1,0	0,45	0,45
$Q_s = \sum n\ q_i\ Z_i(n)$					2,30

Assume:

f_t = 1,3 (temperature exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated size required NS, using equation 1:

NS = 2,30 · 1,3 · 1,0 · 1,3
= 3,89

Nearest larger preferred separator = NS 4 (see prEN 1825-1)

If separate sludge trap is used the minimum required volume in accordance with the preferred nominal size will be

= 200 NS (see 6.4)
= 800 l

C.2 Examples of calculation based on the type of establishment discharging into the separator

EXAMPLE 6 Canteen kitchen

Determine the size of separator to be used NS for a canteen kitchen serving 1 200 meals per day between 07.00 a.m. and 03.00 p.m.

t = 8 h

M = 1 200 meals/d

V_m = 5 l/meal (from Table A.3)

F = 20 (from Table A.5)

V = $M V_m$ (equation A.3)
= 1 200 x 5
= 6 000 l/d

Q_S = $V F / 3\,600\, t$ (equation A.2)
= (6 000 x 20)/ (3 600 x 8)
= 4,17 l/s

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated size required NS, using equation 1:

NS = 4,17 · 1,0 · 1,0 · 1,3
= 5,42

Nearest larger preferred separator = NS 7 (see prEN 1825-1)

If separate sludge trap is used, the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 700 l

EXAMPLE 7 Hotel-restaurant kitchen

Determine the size of separator to be used NS for a hotel kitchen serving 600 meals per day between 05.00 a.m. and 01.00 a.m.

t = 20 h

M = 600 meals/d

V_m = 100 l/meal (from Table A.3)

F = 5 (from Table A.5)

V = $M\ V_m$ (equation A.3)
= 600 x 100
= 60 000 l/d

Q_S = $V\ F/3\ 600\ t$ (equation A.2)
= (60 000 x 5)/ (3 600 x 20)
= 4,17 l/s

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated nominal size required NS, using equation 1:

NS = 4,17 · 1,0 · 1,0 · 1,3
= 5,42

Nearest larger preferred separator = NS 7 (see prEN 1825-1)

If separate sludge trap is used, the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 700 l

EXAMPLE 8 Kitchen or speciality restaurant

Determine the size of separator to be used NS for a restaurant kitchen serving 400 meals per day between 06.00 a.m. and 09.30 p.m.

t = 15,5 h

M = 400 meals/d

V_m = 50 l/meal (from Table A.3)

F = 8,5 (from Table A.5)

V = $M\,V_m$ (equation A.3)
= 400 x 50
= 20 000 l/d

Q_s = $V\,F/3\,600\,t$ (equation A.2)
= (20 000 x 8,5) / (3600 x 15,5)
= 3,43 l/s

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated nominal size required NS, using equation 1:

NS = 3,43 · 1,0 · 1,0 · 1,3
= 4,46

Nearest larger preferred separator = NS 7 (see prEN 1825-1)

If separate sludge trap is used, the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 700 l

EXAMPLE 9 Hospital kitchen

Determine the size of separator to be used NS for a hospital kitchen serving 930 meals per day between 07.00 a.m. and 07.00 p.m.

t = 12 h

M = 930 meals/d

V_m = 20 l/meal (from Table A.3)

F = 13 (from Table A.5)

V = $M\ V_m$ (equation A.3)
= 930 x 20
= 18 600 l/s

Q_S = $V\ F/3\ 600\ t$ (equation A.2)
= (18 600 x 13) / (3 600 x 12)
= 5,60 l/s

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,5 (detergents used, see 6.2.4)

Therefore, calculated nominal size required NS, using equation 1:

NS = 5,60 · 1,0 · 1,0 · 1,5
= 8,40

Nearest larger preferred separator = NS 10 (see prEN 1825-1)

If separate sludge trap is used, the minimum required volume in accordance with the preferred nominal size will be

= 100 NS (see 6.4)
= 1 000 l

EXAMPLE 10 Small meat processing plant

Determine the size of separator to be used NS for a meat processing plant handling 8 GV a week, operating between 06.00 a.m. and 04.00 p.m., Monday to Friday.

t = 10 h

V_p = 15 l/kg of meat products (from Table A.4)

F = 35 (from Table A.5)

M_p = 8 GV/week with 100 kg/GV
= (8 x 100)/5
= 160 kg/d

V = M_p V_p (equation A.4)
= 160 x 15
= 2 400 l/d

Q_s = $V F$/3 600 t (equation A.2)
= (2 400 x 35)/ (3 600 x 10)
= 2,33 l/s

Assume:

f_t = 1,0 (temperature never exceeds 60 °C, see 6.2.2)

f_d = 1,0 (grease density < 0,94 g/cm^3, see 6.2.3)

f_r = 1,3 (detergents used, see 6.2.4)

Therefore, calculated size required NS, using equation (1):

NS = 2,33 · 1,0 · 1,0 · 1,3
= 3,03

Nearest larger preferred separator = NS 4 (see prEN 1825-1)

If separate sludge trap is used, the minimum required volume in accordance with the preferred nominal size will be

= 200 NS (see 6.4)
= 800 l

Annex D
(informative)

Measures to prevent grease accumulating and grease build-up in the pipelines upstream of the grease separator

The aim of every project should be to plan and position the system in such a way that supplementary measures to prevent grease accumulating and grease build-up in the pipelines upstream of the grease separator shall not be required.

For structural and/or operational reasons, e.g. where longer pipe runs are required for low ambient temperatures, supplementary measures can be required, e.g. thermal insulation of pipes, or trace heating with thermal insulation.

— Pipes led through cool cellars can require thermal insulation.

— Pipes led through areas of buildings prone to frost, e.g. underground garages, can require trace heating with thermal insulation.

— The temperature of trace heating should be thermostatically controlled (between 25 °C and 40 °C) to allow for seasonal changes.

— Trace heating is only useful during times that grease contaminated wastewater is flowing, therefore, a time-clock is recommended.

Pipes in heated rooms, pipes buried beneath buildings and frost-proof installed pipes installed outside buildings do not require supplementary measures, provided they have been installed in accordance with 7.3 and 7.4.

Bibliography

EN 752-1, *Drain and sewer systems outside buildings — Part 1: Generalities and definitions.*

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