

F24H

FLUID HEATERS, e.g. WATER OR AIR HEATERS, HAVING HEAT-GENERATING MEANS, e.g. HEAT PUMPS, IN GENERAL (steam generation [F22](#))

Definition statement

This place covers:

Self-contained heaters comprising heat generating means for heating fluids:

- Water heaters having heat generating means
- Air heaters having heat generating means
- Fluid heaters using a heat pump
- Combined water and air heaters
- Storage heaters in which energy is stored as heat in masses staying in the heater
- Fluid heaters having means specially adapted for extracting latent heat from flue gases by means of condensation
- Details thereof, including constructional details and control means for fluid heaters.
- Control of fluid heaters

Relationships with other classification places

Subclass [F24H](#) covers heater as such, i.e. the arrangements where the heat is generated.

Heaters integrated in a heating system adapted for domestic- or space-heating application, in which the heat is transmitted by a circuit to a consumer, are classified in [F24D](#).

Self-contained heaters of the type stoves or ranges are classified in [F24B](#) and [F24C](#).

Subclass [F24H](#) concerns to the function of heating in general. Heaters adapted for special applications are classified both in [F24H](#) and in the relevant subclass for the application:

- application in vehicles [B60H](#) or [B60S](#);
- apparatus for making beverages [A47J](#).

The components of a heater are also classified in the relevant subclasses:

- burners in [F23B](#);
- electric heating means in [H05B](#);
- heat pumps in [F25B](#);
- solar collector or geothermal systems in [F24S](#), [F24T](#);
- heat exchangers in [F28](#);
- valves in [F16K](#);
- control of temperature in [G05D 23/00](#).

References

Limiting references

This place does not cover:

Steam generation	F22
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Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Arrangement or adaptation of heating devices specially for passenger or goods spaces of vehicles, the heat being derived otherwise than from the propulsion plant	B60H 1/22
Air-heating in railway vehicles	B61D 27/00
Air-heating in ships or other waterborne vessels	B63J 2/12
Arrangements or adaptations of air-treatment apparatus for aircraft crew or passengers, or freight space, the air being heated	B64D 13/08
Domestic- or space-heating systems; Domestic hot-water supply systems	F24D

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protecting plants by heating in gardens, orchards or forests	A01G 13/06
Baking ovens and apparatus for baking	A21B
Apparatus for making beverages	A47J
Forge furnaces	B21J
Heat-transfer, heat-exchange or heat-storage materials	C09K 5/00
Tube furnaces for thermal non-catalytic cracking	C10G 9/20
Devices, e.g. valves, for venting and aerating enclosures	F16K 24/00
Steam traps or like apparatus	F16T
Combustion apparatus	F23
Heat source: Burners	F23B
Domestic stoves or ranges	F24B , F24C
Heat source: Solar and geothermal heating means	F24S , F24T
Heat source: Heat pumps	F25B
Driers for solid material	F26B
Furnaces, kilns, ovens, retorts	F27
Heat exchangers	F28
Storage tanks	F28D 20/00
Controlling temperature	G05D 23/00
Electric heating elements and arrangements	H05B

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Water includes other liquids; air includes other gases or gas mixtures	"water" and "air" always mean respectively, the liquid and gas to be heated
Furnace tubes	means tubes inside the heater wherein combustion is performed
Fire tubes	means tubes inside the heater wherein combustion is performed

Water tubes	means the tubes inside the heater through which water to be heated flows
Heater	means apparatus including both heat generating means and means for transferring the generated heat to water or air

F24H 1/00

Water heaters, e.g. boilers, continuous-flow heaters or water-storage heaters (steam boilers [F22B](#))

Definition statement

This place covers:

Water heaters having generating means of the following kind:

- With reduced pressure or of the vacuum steam type;
- Electrically heated;
- Using fluid fuel;
- Immersion heaters for open containers of ponds;
- Using solid fuel;
- Special heating applications, i.e. heated bath tubs, vehicles;
- portable or mobile heaters;
- packaged or self-contained boilers comprising water heaters with control devices and pump in a single unit;
- Continuous-flow heaters, i.e. which heat is generated only while the water is flowing, said heater arranged either with water separated from the heating medium or with direct contact of the water with the heating medium;
- Water storage heaters;
- Water heaters other than continuous-flow or water storage heaters, e.g. water-heaters for central heating;
- Water heaters having plural combustion chambers;
- Water heaters for central heating incorporating heaters for domestic water.

Relationships with other classification places

The group heaters of the reduced pressure or vacuum steam type ([F24H 1/0009](#)) is rarely used. Steam boilers as such are covered by [F22B](#).

The group heaters using solid fuel ([F24H 1/0063](#)) is rarely used. Domestic stoves or ranges with additional provisions for heating water are covered by [F24B 9/00](#), [F24C 13/00](#).

In the group water storage heaters ([F24H 1/18](#)) the water must be able to flow outside the storage tank for being used. If the storage mass, which can be water, stays in the tank and there is a further intermediate medium for conveying the heat, this arrangement is only classified in [F24H 7/00](#).

Water heaters with a heating pump as heat source are classified in [F24H 4/00](#).

Water heaters extracting latent heat from flue gases (condensing boilers) are classified in [F24H 8/00](#).

The group [F24H 1/48](#) covers water heaters for central heating incorporating heaters for domestic water, i.e. the heaters (tank, heat exchanger) for domestic water have to be within the boiler. If the domestic water heaters are located outside of the boiler, the invention is classified in [F24D 3/08](#).

Heat exchangers which are exclusively used in boilers are classified in this group. Heat exchangers being able to be used in a boiler and elsewhere are classified both in this group and in the relevant subclass in [F28](#).

Relationships with other classification places

Arrangement or mountings of control or safety device for water heaters are covered by [F24H 9/20](#).

References

Limiting references

This place does not cover:

Steam boilers	F22B
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Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Domestic stoves or ranges with additional provisions for heating water	F24B 9/00 , F24C 13/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Water heaters characterised by the use of heat pumps	F24H 4/02
Liquid storage heaters using heat pumps	F24H 4/04
Storage heaters, i.e. heaters in which the energy is stored as heat in masses for subsequent release	F24H 7/00
Fluid heaters characterised by means for extracting latent heat from flue gases by means of condensate	F24H 8/00
Details of fluid heaters	F24H 9/00
Solid fuel fired boiler	F24H 2230/00
Cooking vessels	A47J 27/00
Water boiling vessels in beverage making machines	A47J 31/54
Continuous-flow heaters for boiling water in beverage making machines	A47J 31/542
Bathing devices for therapeutic purposes	A61H 33/00
Windscreen washers comprising a water heater	B60S 1/487
Details concerning the thermal insulation of a container	B65D 81/38
Details of washing machines	D06F 39/00
Plumbing installations for fresh water having heating or cooling apparatus	E03C 1/044
Systems for heating the water content of swimming pools	E04H 4/129
Heating or cooling pipes or pipe systems	F16L 53/00
Details of baffles or deflectors within the combustion chamber	F23M 9/00
Hot-water central heating systems in combination with systems for domestic hot-water supply	F24D 3/08
Central heating systems using heat accumulated in storage masses	F24D 11/00
Solar heating of swimming pools	F24S 20/02
Storing heat collected by solar heat collectors	F24S 60/30
Storing geothermal heat	F24T 10/30
Tubular heat-exchangers	F28D 7/00
Tubular elements, Assemblies of tubular elements	F28F 1/00

Ohmic-resistance heating	H05B 3/00
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F24H 1/10

Continuous-flow heaters, i.e. heaters in which heat is generated only while the water is flowing, e.g. with direct contact of the water with the heating medium

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Water heaters for central heating incorporating heat exchangers for domestic water	F24H 1/52
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F24H 1/18

Water-storage heaters

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Water heaters for central heating incorporating heaters for domestic water tanks	F24H 1/50
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F24H 1/181

{Construction of the tank}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Containers or tanks in general, e.g. metal containers	B65D , B65D 7/00
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F24H 1/182

{Insulation}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Containers with thermal insulation in general	B65D 81/38
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F24H 1/183**{Inner linings}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Linings for containers in general	B65D 25/14 , B65D 90/04
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F24H 1/22**Water heaters other than continuous-flow or water-storage heaters, e.g. water heaters for central heating****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Water heaters for central heating incorporating heaters for domestic water	F24H 1/48
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F24H 1/24**with water mantle surrounding the combustion chamber or chambers****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Water heaters other than continuous-flow or water storage heaters with water chamber arranged adjacent to the combustion chamber or chambers	F24H 1/34
Water heaters other than continuous-flow or water storage heaters with water contained in separate elements	F24H 1/38
Water heaters other than continuous-flow or water storage heaters with water tube or tubes	F24H 1/40
Water heaters other than continuous-flow or water storage heaters with combinations of two or more of said water heaters	F24H 1/44

F24H 1/34

with water chamber arranged adjacent to the combustion chamber or chambers, e.g. above or at side

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Water heaters other than continuous-flow or water storage heaters with water mantle surrounding the combustion chamber or chambers	F24H 1/24
Water heaters other than continuous-flow or water storage heaters with water contained in separate elements	F24H 1/38
Water heaters other than continuous-flow or water storage heaters with water tube or tubes	F24H 1/40
Water heaters other than continuous-flow or water storage heaters with combinations of two or more of said water heaters	F24H 1/44

F24H 1/38

with water contained in separate elements, e.g. radiator-type element

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Water heaters other than continuous-flow or water storage heaters with water mantle surrounding the combustion chamber or chambers	F24H 1/24
Water heaters other than continuous-flow or water storage heaters with water chamber arranged adjacent to the combustion chamber or chambers	F24H 1/34
Water heaters other than continuous-flow or water storage heaters with water tube or tubes	F24H 1/40
Water heaters other than continuous-flow or water storage heaters with combinations of two or more of said water heaters	F24H 1/44

F24H 1/40

with water tube or tubes

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Water heaters other than continuous-flow or water storage heaters with water mantle surrounding the combustion chamber or chambers	F24H 1/24
Water heaters other than continuous-flow or water storage heaters with water chamber arranged adjacent to the combustion chamber or chambers	F24H 1/34

Water heaters other than continuous-flow or water storage heaters with water contained in separate elements	F24H 1/38
Water heaters other than continuous-flow or water storage heaters with combinations of two or more of said water heaters	F24H 1/44

F24H 1/48

Water heaters for central heating incorporating heaters for domestic water

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Central heating systems	F24D
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F24H 3/00

Air heaters

Definition statement

This place covers:

Air heaters sorted by the type of heat source, e.g. using electric energy supply or using fluid combustible or using solid combustibles.

Air heaters with forced circulation of air.

Air heaters with a main heat source and additional heating arrangements.

Air heaters where the air is heated at the same location where the heat is generated.

Relationships with other classification places

Central heating radiators are not considered as an air heater as covered in this group. The central heating radiators as such are covered by [F28D 1/00](#). Central heating radiators comprising additional heating means located within the radiator are covered by [F24D 13/04](#).

Hot-air central heating systems are covered by [F24D 5/00](#).

Ventilation systems which can be heated and cooled are covered by [F24F](#).

Air heaters adapted for special applications are classified both in [F24H 3/00](#) and in the relevant subclass for the application:

- welding [B23K](#)
- hair dryer [A45D 20/00](#)
- vehicles [B60H](#)

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Arrangement or adaptation of heating devices specially for passenger or goods spaces of vehicles, the heat being derived otherwise than from the propulsion plant	B60H 1/22
Interaction of the air heater with the vehicle (mounting a heater within a vehicle)	B60H 1/2215
Hot air central heating system	F24D 5/00
Central heating radiators for heating air comprising an additional electric heating means	F24D 13/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Air heaters characterised by the use of heat pumps	F24H 4/06
Storage heaters, i.e. heaters in which the energy is stored as heat in masses for subsequent release	F24H 7/00
Fluid heaters characterised by means for extracting latent heat from flue gases by means of condensation	F24H 8/00
Hair dryers	A45D 20/00
Towel racks, Towel rails, Towel rods, Towel rolls	A47K 10/00
Welding wherein the heat is provided by a hot air stream	B23K
Domestic stoves or ranges with additional provisions for convection heating of air	F24B , F24C
Air conditioning devices which provide heated and cooled air	F24F
Lighting fixture and air heating means	F24F 13/078
Central heating radiators as such	F28D 1/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

For air heaters using electric energy supply, the term

Heating medium	means the resistive element, PTC/NTC element, induction element, microwave generator, Peltier element or lamp
Direct contact	means that the resistive element, electrodes and fins are bond together without additional elements (e.g. tubes or plates) in between

F24H 3/02**with forced circulation****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Air heaters with additional heating arrangements	F24H 3/12
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F24H 4/00**Fluid heaters characterised by the use of heat pumps****Definition statement**

This place covers:

Liquid or gas heaters using heat pumps as heat source.

References**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Other domestic or non-central space-heating system, consisting of self-contained heating units	F24D 15/02
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Combined water and air heaters	F24H 6/00
Air conditioning devices using heat pumps which provide heated and cooled air	F24F
Heat pump systems in general	F25B
Heat pumps (heat of condenser is used for a specific purpose, e.g. heating tap water)	F25B 30/00
Heat storage plants or apparatus in general	F28D 20/00

F24H 6/00**Combined water and air heaters****Definition statement**

This place covers:

Combined water and air heaters.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Hot-air central heating systems	F24D 5/00
Hot-air central heating systems using heat pumps	F24D 5/12

F24H 7/00

Storage heaters, i.e. heaters in which the energy is stored as heat in masses for subsequent release

Definition statement

This place covers:

Storage heaters ranked by the kind of the heat source, in which the heat storing material stays in the heater and wherein the released heat is either conveyed to a transfer fluid, e.g. air or water, or the released heat is radiated.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Water storage heaters	F24H 1/18
Storage materials	C09K 5/00
Material undergoing a change of physical state when being used	C09K 5/02
Domestic stoves or ranges with additional heat storage masses	F24B 1/24 , F24C 15/34
Central heating systems using heat accumulated in storage masses	F24D 11/00
Electric heating systems with resistances incorporated in construction elements, e.g. panels	F24D 13/022
Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00 e.g. using solar heat, combined with household units such as an oven or water heater	F24F
Heat storage plants or apparatus	F28D 20/00

F24H 8/00

Fluid heaters characterised by means for extracting latent heat from flue gases by means of condensation

Definition statement

This place covers:

Fluid heaters arranged in a self-contained manner:

- having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation located within the heater
- having means for moistening the combustion air with condensate from the combustion gases
- having means for removing condensate from the heater.

Relationships with other classification places

This group covers the arrangements of condensing boilers where the condensing heat exchanger is located inside the boiler.

The arrangements where the condensing heat exchanger is located outside the boiler (e.g. economizer) are covered by [F24D 12/02](#) combined with [F24D 2200/18](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for treating smokes in the chimneys, in particular coolers	F23J 15/06
Fumes purifications: water draining devices associated with fumes	F23J 2900/13004
Flue gas condenser	F28D 21/00

F24H 9/00

Details

Definition statement

This place covers:

Details of liquid/water heaters and gas/air heaters.

Casings; Cover lids; Ornamental panels therefore (not for central heating radiators).

Arrangement of mountings or supports therefore (not for central heating radiators).

Connecting heaters to circulation pipes.

Connecting different sections within water-heaters.

Arrangements for water drainage.

Arrangement or mounting of grates, burners, or heating elements within the heater.

Arrangement or mounting of control or safety devices.

Combustion air preheating arrangements.

Fluid heaters having electric generators.

Details about the kind of electrical heat generating means.

Relationships with other classification places

This group covers details concerning the device generating the heat.

Details concerning central heating radiators are covered by [F24D](#).

Valves which are exclusively used in boilers are classified in this group. Valves being able to be used elsewhere are classified in the relevant subclass in [F16K](#).

Pipe joints which are exclusively used in boilers are classified in this group. Pipe joints being able to be used elsewhere are classified in the relevant subclass in [F16L](#).

Details concerning the control of a boiler are covered in [F24H 9/20](#). Arrangements for control of temperature and algorithm therefore are also covered in [G05D 23/00](#). In the particular case of electric heating means, the controls/automatic switching for the electric heater are also covered by [H05B 1/02](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control valves	F16K
Safety devices for burners	F23D
Constructional details of combustion chambers, not otherwise provided for	F23M
Regulating or controlling combustion	F23N
Connecting central heating radiator to circulation pipes	F24D 19/0002
Arrangements for mountings or supports for central heating radiators	F24D 19/02
Casings, cover lids or ornamental panels for central heating radiators	F24D 19/06
Arrangements for drainage, venting or aerating in domestic- or space-heating systems	F24D 19/08
Casings, Header boxes, Auxiliary supports for elements, Auxiliary members within casings	F28F 9/00
Arrangements for connecting different sections of heat exchange elements, e.g. of radiators	F28F 9/26

F24H 9/06

Arrangement of mountings or supports

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Space heating radiators	F24D 19/02
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F24H 9/12

Arrangements for connecting heaters to circulation pipes

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Pipe joints in general	F16L
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F24H 9/14

Arrangements for connecting different sections, e.g. in water heaters
(arrangements for connecting heaters to circulation pipes [F24H 9/12](#))

References**Limiting references**

This place does not cover:

Arrangements for connecting heaters to circulation pipes	F24H 9/12
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Informative references

Attention is drawn to the following places, which may be of interest for search:

In radiators	F28F 9/26
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F24H 9/16

Arrangements for water drainage

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Valves for drainage	F16K , F16K 21/00
Arrangements for water drainage in pipes or pipe systems in general	F16L 55/00
Arrangements for water drainage in domestic-or space-heating systems	F24D 19/08

F24H 9/18

Arrangement or mounting of grates or heating means

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Burners	F23D
Grates	F23H
Electric heating elements	H05B

F24H 9/20**Arrangement or mounting of control or safety devices****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Control valves	F16K
Safety devices for burners	F23D 3/26 , F23D 5/16 , F23D 14/72
Combustion control devices	F23N
Automatic switching for electric heating apparatus	H05B 1/02

F24H 15/204**Temperature of the air before heating****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Room temperature	F24H 15/254
Outdoor temperature	F24H 15/258

F24H 15/457**using telephone networks or Internet communication****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Remote controls using telephone networks for air conditioning devices	F24F 11/57
Remote controls using Internet communication for air conditioning devices	F24F 11/58
Information and communication technology specially adapted for the Internet of Things [IoT]	G16Y

F24H 2240/00**Fluid heaters having electrical generators****References*****Informative references***

Attention is drawn to the following places, which may be of interest for search:

Small-scale combined heat and power [CHP] generation systems specially adapted for domestic heating, space heating or domestic hot-water supply	F24D 18/00
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