

F24H

FLUID HEATERS, e.g. WATER OR AIR HEATERS, HAVING HEAT GENERATING MEANS, IN GENERAL (heat-transfer, heat-exchange or heat-storage materials C09K5/00; tube furnaces for thermal non-catalytic cracking C10G9/20; devices, e.g. valves, for venting and aerating enclosures F16K24/00 ; steam traps or like apparatus F16T; steam generation F22; combustion apparatus F23; domestic stoves or ranges F24B, F24C; domestic- or space-heating systems F24D; furnaces, kilns, ovens, retorts F27; heat-exchangers F28; electric heating elements or arrangements H05B)

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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

Heaters integrated in a heating systems 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 [F24J](#);
- heat exchangers in [F28](#);
- valves in [F16K](#);
- control of temperature in [G05D 23/00](#).

References relevant to classification in this subclass

This subclass/group does not cover:

Baking ovens and apparatus for baking	A21B
Forge furnaces	B21J
Domestic stoves or ranges	F24B , F24C
Domestic or space heating systems	F24D
Driers for solid material	F26B
Furnaces, kilns, ovens, retorts	F27

Apparatus for making beverages	A47J
Application in vehicles	B60H , B60S

Informative references

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

Valves	F16K
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Heat source: Burners	F23B
Heat source: Solar and geothermal heating means	F24J
Heat source: Heat pumps	F25B
Heat exchangers	F28
Storage tanks	F28D 20/00
Heat source: Electric heating means	H05B
Controlling temperature	G05D 23/00

Glossary of terms

In this subclass/group, 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 having heat generating means, e.g. boiler, flow-

heater (F24H7/00, F24H8/00 take precedence; details F24H9/00; steam boilers F22B; domestic stoves or ranges with additional provisions for heating water F24B9/00, F24C13/00)

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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.

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

References relevant to classification in this group

This subclass/group does not cover:

Steam boilers	F22B
Domestic stoves or ranges with additional provisions for heating water	F24B 9/00 , F24C 13/00
Fluid heaters having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation; Condensing boilers	F24H 8/00
Storage heater	F24H 7/00

Informative references

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

Cooking vessels	A47J 27/00
Apparatus for making beverages	A47J 31/54

Apparatus for making beverages	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
Heating swimming pools	E04H 4/129
Heating or cooling pipes or pipe systems	F16L 53/00
Steam boilers of furnace-tube type, i.e. the combustion of fuel being performed inside one or more furnace tubes built-in in the boiler body	F22B 7/00
Details of baffles or deflectors within the combustion chamber	F23M 9/00
Domestic stoves or ranges with additional provisions for heating water	F24B 9/00
Other domestic stoves or ranges with additional provisions for heating water	F24C 13/00
Central heating systems using heat accumulated in storage masses	F24D 11/00
Hot-water central heating systems in combination with systems for domestic hot-water supply	F24D 3/08
Liquid storage heaters using heat pumps	F24H 4/04
Details of fluid heaters	F24H 9/00

Solar heating of swimming pools	F24J 2/423
Tubular heat-exchangers	F28D 7/00
Tubular elements, Assemblies of tubular elements	F28F 1/00
Ohmic-resistance heating	H05B 3/00
Ohmic-resistance heating	H05B 3/00
Solid fuel fired boiler	F24H 2230/00

F24H 3/00

Air heaters having heat generating means (F24H7/00, F24H8/00 take precedence; details F24H9/00; domestic stoves or ranges with additional provision for convection heating of air F24B, F24C)

Definition statement

This subclass/group 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.

This group covers air heaters where the air is heated at the same location where the heat is generated.

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Central heating radiators for heating air comprising an additional electric heating means	F24D 13/04
Hot air central heating system	F24D 5/00
Air conditioning devices which provide heated and cooled air	F24F
Lighting fixture and air heating means	F24F 13/078
Air heaters in which the air is heated by a heat pump	F24H 4/06
Storage heater	F24H 7/00
Fluid heaters having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation; Condensing boilers	F24H 8/00
Central heating radiators as such	F28D 1/00

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

Adapted for hair drying	A45D 20/00
Adapted for welding	B23K
Adapted to be used in vehicles	B60H

Informative references

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

Hair dryers	A45D 20/00
Welding wherein the heat is provided by a hot air stream	B23K
Interaction of the air heater with the vehicle (mounting a heater with in a vehicle)	B60H 1/2215
Towel racks, Towel rails, Towel rods, Towel rolls	A47K 10/00

Glossary of terms

In this subclass/group, 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
Direct contact	means that the resistive element, electrodes and fins are bond together without additional elements (e.g. tubes or plates) in between

F24H 4/00

Fluid heaters using heat pumps

Definition statement

This subclass/group covers:

Liquid or gas heaters using heat pumps as heat source.

References relevant to classification in this group

This subclass/group does not cover:

Air conditioning devices using heat pumps which provide heated and cooled air	F24F
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Informative references

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

Other domestic or non-central space heating system, consisting of self-contained heating units	F24D 15/02
Combined water and air heaters	F24H 6/00
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 (F24H8/00 takes precedence)

Definition statement

This subclass/group covers:

Combined water and air heaters.

References relevant to classification in this group

This subclass/group does not cover:

Fluid heaters having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation	F28H 8/00
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Informative references

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

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 energy is stored as heat in masses for subsequent release (domestic stoves or ranges with additional heat storage masses F24B1/24, F24C15/34)

Definition statement

This subclass/group 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, water or the released heat is radiated.

Relationship between large subject matter areas

Water storage heaters where the heated water is able to flow outside the storage tank for being used are covered by [F24H 1/18](#).

References relevant to classification in this group

This subclass/group does not cover:

Domestic stoves or ranges with additional heat storage masses	F24B 1/24
Elements and arrangements for heat storage	F24C 15/34
Water storage heaters	F24H 1/18

Informative references

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

Storage materials	C09K 5/00
Material undergoing a change of physical state when being used	C09K 5/02
Central heating systems using heat accumulated in storage masses	F24D 11/00
Electric heating systems with resistances incorporated in	F24D 13/022

construction elements, e.g. panels	
Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00 [N: 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 having heat-generating means specially adapted for extracting latent heat from flue gases by means of condensation

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Fluid heaters in combination with a separate flue gas condenser	F24D 12/02
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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
Flue gas condenser	F28D 21/00
Fumes purifications: water draining devices associated with fumes	F23J 2900/13004

F24H 9/00

Details

Definition statement

This subclass/group 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.

Relationship between large subject matter areas

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 relevant to classification in this group

This subclass/group does not cover:

Control valves	F16K
Safety devices for burners	F23D
Combustion control devices	F23N
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
Connecting central heating radiator to circulation pipes	F24D 19/0002
Arrangements for connecting different sections of heat exchange elements, e.g. of radiators	F28F 9/26

Informative references

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

Constructional details of combustion chambers , not otherwise provided for	F23M
Regulating or controlling combustion	F23N

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