F24D

DOMESTIC- OR SPACE-HEATING SYSTEMS, e.g. CENTRAL HEATING SYSTEMS; DOMESTIC HOT-WATER SUPPLY SYSTEMS; ELEMENTS OR COMPONENTS THEREFOR (using steam or condensate extracted or exhausted from steam engine plants for heating purposes F01K 17/02)

Definition statement

This place covers:

Systems for domestic- or space heating, in which heat is generated at one location and transmitted by a circuit to a consumer at a different location, of the following kind:

- Steam central heating systems
- Hot-water central heating systems
- Hot-air central heating systems
- Central heating systems employing heat-transfer fluids not being hot-water or hot-air, e.g. oil, salt, gas
- Central heating systems employing combinations of two or more of the above-mentioned heat transfer fluids
- District heating systems
- Central heating systems using heat accumulated in storage masses
- Other central heating systems
- Electric heating systems (central heating or domestic heating)
- Other domestic- or non-central space-heating systems
- Domestic hot-water supply systems
- Details thereof, including constructional details and control means for heating systems

Relationships with other classification places

The heaters as such are covered by F24H, e.g. details concerning the heaters are covered in F24H 3/00.

Air-conditioning systems for cooling and heating are only covered by F24F.

Arrangements for protecting plants by heating, e.g. in gardens, are only covered by A01G 13/06.

Systems for space heating specially adapted for vehicles are covered by B60 - B64.

The components of the heating system, e.g. heat sources or central heating radiators are also classified in other relevant groups:

- burners in F23B
- arrangements for feeding fuel to burner in F23K
- air supply, air draught for burner in F23L
- electric heating means in H05B
- heat pumps in F25B
- solar collector or geothermal systems in F24S, F24T
- heat exchangers in F28
- valves in F16K
- pumps F04
- water supply and sewerage in E03B and E03C
- arrangements for controlling temperature in G05D 23/00.
References

Limiting references

This place does not cover:

Steam engine plants using steam or condensate extracted or exhausted from steam engine plants for heating purposes

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:

Systems of space heating adapted for vehicles

Informative references

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

Preventing corrosion
Water supply in general
Pumps
Valves
Steam traps
Combustion apparatus in general
Domestic stoves or ranges
Water or air heaters having heat generating means
Apparatus using heat produced by solar, geothermal or other external chemical reaction other than combustion
Combined heating and refrigeration systems
Heat exchange apparatus or elements
Heat storage plants
Cleaning heat exchange tubes
Arrangements for controlling temperature
Electric heating elements or arrangements

Glossary of terms

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

Central heating system
District heating system (less commonly called teleheating)
Domestic hot water heating system
**F24D 1/00**

Steam central heating systems (district heating systems F24D 10/00; central heating systems using heat accumulated in storage masses F24D 11/00)

**Definition statement**

This place covers:

Central heating systems comprising steam as heat transport medium and combinations thereof:
- in combination with systems for domestic water supply
- operating with live steam (i.e. steam produced for heating)
- operating with exhaust steam of a generating power plant being used for heating
- operating with superheated steam
- feed-line arrangements thereof.

**Relationships with other classification places**

Constructional details of steam boilers are covered by F22B.

The special case of using steam or condensate extracted or exhausted from steam engine plants for heating purposes are covered by F01K 17/02.

**References**

**Limiting references**

This place does not cover:

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

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<td>Steam generation; Steam boilers</td>
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<td>Details concerning the heat exchanger</td>
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**Special rules of classification**

Details of the steam central heating systems concerning drainage, venting, aerating or control are covered by the relevant subgroup in F24D 19/1003.
**F24D 3/00**

Hot-water central heating systems (district heating systems [F24D 10/00]; central heating systems using heat accumulated in storage masses [F24D 11/00])

**Definition statement**

This place covers:

Hot-water central heating systems:
- combined with solar energy
- with forced circulation, e.g. by pumps
- with the water under high pressure
- in combination with systems for domestic hot-water supply
- arrangements for feeding water into the system
- tube and panel arrangements for ceiling, wall, or underfloor heating
- using heat pumps.

**Relationships with other classification places**

The hot-water central heating systems in this group do not comprise a storage mass for the central heating transfer fluid. Heating systems with a storage mass for the central heating transfer fluid are covered by [F24D 11/00].

Hot-water central heating systems in combination with systems for domestic-hot water supply, where said domestic-hot water supply arrangements are located outside the boiler are covered by [F24D 3/08]. Devices with the domestic-hot water supply arrangements located within the boiler are covered by [F24H 1/48].

Domestic hot water supply systems are covered by [F24D 17/00].

Feed-line arrangements (filling valves, expansion tanks, pumps, distributors), which are exclusively used in hot-water central heating systems are classified in this group. An special case of feed-line arrangement concerning the connection of a water heater to circulation pipes is also covered by [F24H 9/12].

Component, e.g. valves, pumps, etc, which are able to be used elsewhere are classified in the relevant subclass in [F16K] or [F04].

Tube arrangements for ceiling, wall or underfloor heating, where the heating medium is hot-water are covered in [F24D 3/12]. Floorings in general are covered by [E04F 15/00]. Coverings or linings (walls, ceilings, etc) having conduits for fluids, in [E04F 13/0869]. The special use of the coverings or floorings for heating is covered by the group [E04F 2290/023].

Electric underfloor heating is only covered by [F24D 13/02].

Hot-water central heating systems in which additional heating means are located within the central heating radiators are covered by [F24D 13/04].

Cooling ceilings are covered by [F24F 5/00].

Heating floor for outdoor is covered by [E01C 11/00].

Details of the hot-water central heating systems concerning drainage, venting, aerating or control are covered by the relevant subgroup in [F24D 19/08].
### References

#### Limiting references

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<tr>
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<tr>
<td>Plumbing installations for fresh water</td>
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<tr>
<td>Floor construction with regard to insulation, Connections specially adapted therefore</td>
<td>E04B 5/00</td>
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<tr>
<td>Special adaptations of floors for incorporating ducts, e.g. for heating or ventilating</td>
<td>E04B 5/48</td>
</tr>
<tr>
<td>Ceilings, Construction of ceilings, e.g. false ceilings, Ceiling construction with regard to insulation</td>
<td>E04B 9/00</td>
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<tr>
<td>Building elements of block or other shape for the construction of parts of buildings characterised by special adaptations, e.g. serving for locating conduits</td>
<td>E04C 1/39</td>
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<tr>
<td>Building elements of relatively thin form for the construction of parts of buildings, e.g. sheet materials, slabs, or panels</td>
<td>E04C 2/00</td>
</tr>
<tr>
<td>Building elements of relatively thin form for the construction of parts of buildings with special adaptations for auxiliary purposes, e.g. serving for locating conduits</td>
<td>E04C 2/52</td>
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<tr>
<td>Coverings or linings (walls, ceilings...) having conduits for fluids</td>
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<td>Flooring</td>
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<tr>
<td>Control, e.g. regulation, of pumps, pumping installations or systems</td>
<td>F04D 15/00</td>
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<tr>
<td>Multiple-way valves, e.g. mixing valves, pipe fittings incorporating such valves</td>
<td>F16K 11/00</td>
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<tr>
<td>Supports for pipes, cables or protective tubing, e.g. hangers, holders, clamps, cleats, clips, brackets</td>
<td>F16L 3/00</td>
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<tr>
<td>Branching pipes, joining pipes to walls</td>
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<tr>
<td>Air-conditioning systems, e.g. air-conditioning units using radiation from walls or panels, cool ceilings</td>
<td>F24F 5/00</td>
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<tr>
<td>Water haters for central heating incorporating heater for domestic water</td>
<td>F24H 1/48</td>
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<tr>
<td>Connecting water heaters (not the radiator) to circulation pipes</td>
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<td>Arrangements of inlet valves used with water heaters</td>
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<tr>
<td>Heat storage plants or apparatus in general</td>
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F24D 3/12
Tube and panel arrangements for ceiling, wall, or underfloor heating (electric underfloor heating F24D 13/02)

References

Limiting references
This place does not cover:

| Electric underfloor heating | F24D 13/02 |

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

| Special adaptations of floors for incorporating ducts, e.g. for heating or ventilating | E04B 5/48 |
| Building elements of block or other shape for the construction of parts of buildings characterised by special adaptations, e.g. serving for locating conduits | E04C 1/39 |
| Building elements of relatively thin form for the construction of parts of buildings with special adaptations for auxiliary purposes, e.g. serving for locating conduits | E04C 2/52 |

F24D 5/00
Hot-air central heating systems (district heating systems F24D 10/00; central heating systems using heat accumulated in storage masses F24D 11/00; air conditioning F24F); Exhaust gas central heating systems

Definition statement
This place covers:
Hot-air central heating systems:
• the heat source being solar energy
• operating with discharge of hot air into the space or area to be heated
• operating without discharge of hot air into the space or area to be heated
• using heat pumps.

Relationships with other classification places
Air conditioning systems heating and cooling air are classified only in F24F.

In the systems using a heat pump, the condenser is placed in the air channel for heating the air. There is no additional intermediate circuit between the cooling fluid of the heat pump and the air.

Arrangements with heat pumps heating a water circuit, said water circuit being used for heating air are covered in F24D 3/18.

Details of the control of hot-air central heating systems are covered by the relevant subgroup in F24D 19/1084.
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>District heating systems</td>
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<td>Central heating systems using heat accumulated in storage masses</td>
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<tr>
<td>Air conditioning systems able for cooling and heating</td>
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Informative references

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<tr>
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<tbody>
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<tr>
<td>Arrangements or mounting of control or safety devices for air heating systems</td>
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<td>Air heaters having heat generating means</td>
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<tr>
<td>Combined water and air heaters</td>
<td>F24H 6/00</td>
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F24D 7/00

Central heating systems employing heat-transfer fluids not covered by groups F24D 1/00 - F24D 5/00, e.g. oil, salt, gas (district heating systems F24D 10/00; central heating systems using heat accumulated in storage masses F24D 11/00)

Definition statement

This place covers:

Central heating systems employing heat-transfer fluids other than hot-water or hot-air, e.g. oil, salt, gas.

Relationships with other classification places

Systems with steam as heat-transfer are covered by F24D 1/00.

References

Limiting references

This place does not cover:

<table>
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<tr>
<td>District heating systems</td>
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<tr>
<td>Central heating systems using heat accumulated in storage masses</td>
<td>F24D 11/00</td>
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</table>
F24D 9/00
Central heating systems employing combinations of heat transfer fluids covered by two or more of groups F24D 1/00 - F24D 7/00 (district heating systems F24D 10/00; central heating systems using heat accumulated in storage masses F24D 11/00)

Definition statement
This place covers:
Central heating systems employing combinations of heat transfer fluids covered by two or more of the prior groups.

References
Limiting references
This place does not cover:

| Central heating systems using heat accumulated in storage masses | F24D 11/00 |
| District heating systems | F24D 10/00 |

F24D 10/00
District heating systems

Definition statement
This place covers:
District heating systems with:
• domestic delivery stations having a heat exchanger
• direct domestic delivery stations

"District heating system" (less commonly called teleheating) is a system for distributing heat generated in a distant centralized location outside a building and distributed by means of a transfer fluid to multiple buildings or facilities. In the normal central heating systems, the heat source is located within the building.

Relationships with other classification places
District heating systems with heat accumulated in storage masses are covered by F24D 11/001.

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

| Central heating systems with heat accumulated in storage masses and using a heat pump | F24D 11/0207 |
| Arrangements of mounting of control or safety devices for steam heating systems | F24D 19/1003 |
| Steam engine plants, steam accumulators, engine plants not otherwise provided for, engines using special working fluids or cycles | F01K |
| Air conditioning | F24F |
Heat exchanger

Systems for controlling or regulating non-electric variables

F24D 11/00

Central heating systems using heat accumulated in storage masses (self-contained storage heating units F24D 15/02)

Definition statement

This place covers:

Central heating systems using heat accumulated in storage masses, in particular:

- district heating systems
- water heating systems
- air heating systems
- using heat pumps

Relationships with other classification places

The central heating systems in this group comprise a storage mass for the central heating transfer fluid. This storage mass can stay in the tank or be able to flow outside for being used. Details concerning tanks of the storage mass per se are covered by F24H 7/00. Details concerning water storage tanks with water being able to flow outside for being used are covered by F24H 1/18. Details of the tanks as such are covered by F28D 20/00.

Details of storage heaters heating a fluid using a heat pump are also covered by F24H 4/04.

Storage masses in general are classified in the relevant subclasses, e.g. C04B.

References

Limiting references

This place does not cover:

Self-contained storage heating units F24D 15/02

Informative references

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

| Central heating system with domestic hot water storage tank | F24D 3/08 |
| Other central heating systems not covered by groups F24D 1/00 - F24D 11/00, in particular systems with more than one heat source | F24D 12/00 |
| Domestic hot water supply system with accumulation of heated water | F24D 17/00 |
| Arrangement or mounting of control or safety devices for water heating systems | F24D 19/1006 |
| Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00 | F24F 5/00 |
| Details of water storage tanks with water being able to flow outside the tank for being used | F24H 1/48 |
| Storage heaters for fluids using heat pumps | F24H 4/04 |
Storage heaters with storage masses staying in the tank and with the transfer fluid being a liquid
Use of solar heat, e.g. solar heat collectors
Other production or use of heat, not derived from combustion
Combined heating and refrigeration systems, e.g. operating alternately or simultaneously
Heat pumps as such
Heat storage plants or apparatus in general

Special rules of classification
Central heating systems using heat accumulated in storage masses using heat pumps are covered by F24D 11/02.

F24D 11/02
using heat pumps

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

| Heat pumps for producing heat in general | F25B 29/00 |

F24D 12/00
Other central heating systems

Definition statement
This place covers:
Arrangements of central heating systems in which a combination of more than one heat source is disclosed.

In particular, this class covers central heating systems without an storage mass recuperating waste heat source with a separate flue gas condenser.

The cases in which one of the heat sources is a heat pump are classified in other relevant subclasses.

Relationships with other classification places
Condensing boilers, in which the means adapted for extracting latent heat from the flue gases by means of condensation are located within the boiler are classified in F24H 8/00.

Cogeneration machines are classified in F02G.

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

| Cogeneration machines | F02G |
Condensing boilers, in which the means adapted for extracting latent heat from the flue gases by means of condensation are located within the boiler are classified

F24D 13/00

Electric heating systems

Definition statement

This place covers:

• Electric heating systems solely using resistance heating, e.g. under-floor heating
• Electric heating systems using electric heating of heat-transfer fluid in separate units of the system, e.g. radiators connected to the central heating systems by fluid pipes comprising additional electric heating means.

Relationships with other classification places

Self-contained air heaters are classified in F24H 3/00.

References

Informative references

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

| Arrangements or mounting of control of safety devices for electric heating systems | F24D 19/1096 |
| Layered products essentially comprising sheet glass, or glass, slag, or like fibres | B32B 17/00 |
| Flooring | E04F 15/00 |
| Electric water or air heaters | F24H |
| Ohmic-resistance heating | H05B 3/00 |

Special rules of classification

Central heating radiators comprising additional heating means located within the radiator are covered by F24D 13/04.

F24D 15/00

Other domestic- or space-heating systems

Definition statement

This place covers:

Other domestic- or non-central space-heating systems, in particular:

• self-contained heating units, e.g. storage heaters
• using heat pumps. This class covers arrangements in which the refrigerant of the heat pump flows directly through the radiator or the heating panel and transfers heat to the space to be heated without an intermediate hot water central heating circuit being located between the heat pump loop and the space to be heated.
References

Informative references

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

| Fluid heaters using heat pumps, the fluid being a liquid, comprising storage means | F24H 4/04 |

F24D 17/00

Domestic hot-water supply systems

Definition statement

This place covers:

Domestic hot-water supply systems using

- solar energy
- heat pumps
- conventional heating means
- combination of different kinds of heating means.

Domestic hot-water supply systems comprising arrangements for preventing the occurrence or proliferation of microorganisms in the water

Domestic hot-water supply systems comprising recirculation systems.

Relationships with other classification places

Treatments of water for preventing the occurrence of microorganisms in general is covered by C02F 1/00. Devices for preventing the contamination of domestic plumbing installation are covered in E03C 1/00.

References

Informative references

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

| Combined with domestic- or space-heating systems | F24D 1/00 - F24D 15/00 |
| Arrangement or mounting of control or safety devices for water heating systems and for domestic hot water | F24D 19/10 |
| Treatment of water, waste water, or sewage | C02F 1/00 |
| Methods or layout of installations for water supply | E03B 1/00 |
| Water main or service pipe systems | E03B 7/00 |
| Domestic plumbing installations for fresh water or waste water, Sinks | E03C 1/00 |
| 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 5/00 |
| Fluid heaters using heat pumps | F24H 4/00 |
| Use of solar heat, e.g. solar heat collectors | F24S |
| Combined heating and refrigeration systems, e.g. operating alternately or simultaneously | F25B 29/00 |
| Heat pumps | F25B 30/00 |
Special rules of classification

Hot-water central heating systems combined with systems for domestic hot water supply are covered by F24D 3/08.

**F24D 19/00**

Details (of water or air heaters F24H 9/00; of heat-exchange or heat-transfer apparatus, of general application F28F)

**Definition statement**

*This place covers:*

Details concerning the heating system and the central heating radiators, in particular:

- Arrangements for connecting central heating radiators to circulation pipes
- Details related to central heating radiators: e.g. humidifiers for radiators, fan arrangements, magnets for attaching a cover, etc.
- devices for preventing or removing corrosion, slime or scale
- devices for preventing damage by freezing
- arrangement of mountings or supports for radiators
- casings, cover lids or ornamental panels, for radiators
- arrangements for drainage, venting or aerating
- arrangement or mounting of control or safety devices.

**Relationships with other classification places**

Details concerning the heater, i.e. the device generating the heat, as such are covered by F24H 9/00.

Central heating radiators as such are covered in F28D 1/00.

Arrangements for connecting heat exchanger in general to flow lines are covered by F28F 9/0246.

Arrangements for connecting different sections within a heat exchanger, e.g. radiators, are covered by F28F 9/26.

Mounting arrangements for special applications fixed on a central heating radiator are classified in the relevant subclass:

- Towel racks: A47K 10/06
- Towel grips or hooks: A47K 10/12
- drying lines for attachment to central heating radiators: D06F 57/127.

Arrangements for drainage, venting or aerating specially adapted for heating systems are covered in this group.

Draining valves or venting valves being used elsewhere are classified in the relevant subclass in F16K.

Arrangements for control of temperature and algorithm therefore are also covered by G05D 23/00.
References

Limiting references

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Informative references

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

| Grips, hooks or the like for hanging-up towels (on a central heating radiator) | A47K 10/12 |
| Degasification of liquids | B01D 19/00 |
| Filters | B01D 29/00 |
| Anodic or cathodic protection | C23F 13/00 |
| Supporting means for linen or garments to be dried or aired on attachments or suspension to central heating radiators | D06F 57/12 |
| Priming, Preventing vapour lock | F04D 9/00 |
| Devices, e.g. valves, for venting or aerating enclosures | F16K 24/00 |
| Construction of housing, use of materials therefore | F16K 27/00 |
| Devices or appurtenances for use in, or in connection with, pipes or pipe systems | F16L 55/00 |
| Regulating fuel supply | F23N 1/00 |
| Control or safety systems or apparatus | F24F 11/00 |
| Central heating radiators as such | F28D 1/00 |
| Measuring quantity of heat conveyed by flowing mediums, e.g. in heating systems | G01K 17/06 |
| Control of temperature | G05D 23/00 |

Special rules of classification

Central heating radiators comprising additional heating means located within the radiator are covered by F24D 13/04.

Details of the control for heating systems are covered by the relevant subgroup in F24D 19/00.

Arrangements for connecting central heating radiators to circulation pipes are covered by F24D 19/0002.

Devices for preventing or removing corrosion, slime or scale are covered by F24D 19/0092.

Arrangements of mounting or support for central heating radiators are covered by F24D 19/02.
F24D 19/08
Arrangements for drainage, venting or aerating (valves for venting or aerating F16K 24/00)

References
Limiting references
This place does not cover:

| Valves for venting or aerating | F16K 24/00 |

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

| Valves for drainage | F16K |

F24D 19/10
Arrangement or mounting of control or safety devices (only the heater being controlled F24H 9/20)

References
Limiting references
This place does not cover:

| Arrangements where only the heater is controlled | F24H 9/20 |

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

| Control valves | F16K |

Special rules of classification
Looping references between F24D 19/10 and F24H 9/20 have been identified. Until this inconsistency is resolved in IPC, the current classification practice in CPC is as follows: Please follow the limiting reference as it is in F24D 19/10. The limiting reference in F24H 9/20 is an informative reference.