

## F22D

### PREHEATING, OR ACCUMULATING PREHEATED, FEED-WATER FOR STEAM GENERATION; FEED-WATER SUPPLY FOR STEAM GENERATION; CONTROLLING WATER LEVEL FOR STEAM GENERATION; AUXILIARY DEVICES FOR PROMOTING WATER CIRCULATION WITHIN STEAM BOILERS

#### Definition statement

*This place covers:*

This subclass covers general aspects of, or methods for, preheating or accumulating feed water for steam generation. All devices in a power plant or a steam boiler for heating water in liquid form, like economisers or water preheaters and accumulating water for preheating purposes, controlling and regulating the water level in said water accumulators, feed-water supply like automatic water feeding and controlling methods are covered. Furthermore safety feed water supply and arrangements of feed water pumps are also covered.

#### Relationships with other classification places

Water heaters in general are classified in [F24H](#). Generation of steam or vapour is classified in [F22B](#), devices and methods for superheating steam in [F22G](#). Steam engine plants where engine aspects predominate are classified in [F01K](#), domestic central heating systems using steam are classified in [F24D](#), heat exchange or heat transfer in general is classified in [F28](#).

#### References

##### Informative references

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

Cooking vessels	<a href="#">A47J 27/00</a>
Apparatus for making beverages	<a href="#">A47J 31/00</a>
Baking, Roasting, Grilling, Frying	<a href="#">A47J 37/00</a>
Machines for cleaning floors, carpets, furniture, walls, or wall coverings with arrangements for steam generation	<a href="#">A47L 11/4086</a>
Water heater arrangements for cleaning windows	<a href="#">A47L 15/4285</a>
Bathing devices for special therapeutic or hygienic purposes	<a href="#">A61H 33/00</a>
Degasification of liquids or water	<a href="#">B01D 19/00</a> , <a href="#">C02F 1/20</a>
Cleaning by methods involving the use or presence of liquid steam	<a href="#">B08B 3/00</a>
Treatment of water, waste water, or sewage	<a href="#">C02F 1/00</a>
Washing machines with steam generation	<a href="#">D06F 39/008</a>
Hand irons	<a href="#">D06F 75/00</a>
Use of steam extracted from the engine for feed-water purposes	<a href="#">F01K 7/34</a>
Use of two or more feed-water heaters in series	<a href="#">F01K 7/40</a>
Use of desuperheaters for feed water heating	<a href="#">F01K 7/42</a>
Water heaters for domestic or space-heating systems	<a href="#">F28D 21/0005</a>
Controlling in general	<a href="#">G05</a>
Water heaters heated by electric, magnetic or electromagnetic fields	<a href="#">H05B 6/804</a>

## Glossary of terms

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

Economiser	heat exchanger for heating feed water normally beyond the boiling point improving the boiler's efficiency
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## F22D 1/00

### Feed-water heaters, i.e. economisers or like preheaters

#### Definition statement

*This place covers:*

General aspects and constructional features of devices or heat exchangers for heating water normally beyond the boiling point in order to improve the boiler's efficiency arranged in a flow path up stream of an evaporator. This group covers also economisers and preheaters with water tube arranged in the boiler furnace, in fire tubes or in flue ways, with water tubes arranged outside the boiler furnace and heated for example in a separate heat exchanger. Furthermore also water and air preheating systems, combinations of exhaust-steam and smoke-gas water preheater and preheaters incorporating thermal de-aeration are covered.

#### Relationships with other classification places

Heat exchangers and types thereof are classified in [F28C](#) and [F28D](#), details of heat-exchange and heat-transfer apparatus are classified in [F28F](#).

#### References

##### Informative references

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

Control of feed-water heaters	<a href="#">F22D 5/00</a>
Thermal de-aeration of water per se	<a href="#">B01D 19/00</a>
Liebig degassing water	<a href="#">C02F 1/20</a>
Valves for venting	<a href="#">F16K 24/04</a>
Heat exchange apparatus in boiler for heating air supplied for combustion	<a href="#">F22B 31/08</a>
Safety devices for boilers in general	<a href="#">F22B 37/42</a>
Hollow fire-bars, grates, or the like used as water tubes	<a href="#">F23H 3/02</a>

## Glossary of terms

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

Economiser	feed water heater
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## F22D 3/00

### Accumulators for preheated water

#### Definition statement

*This place covers:*

Accumulators and storage vessels for water which is heated in an economiser arranged within the combustion chamber or combined with steam accumulators and thereby heated by steam or connected directly to boilers by water conduits. Water accumulators with preheated water specially adapted for locomotives and control devices are also covered by this group.

#### References

##### Informative references

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

Control of feed water heaters; water-level and feeding	<a href="#">F22D 5/00</a>
Plants characterised by the use of steam or heat accumulators	<a href="#">F01K 3/004</a>
Vehicles being a steam locomotive	<a href="#">F01K 17/025</a>
Steam boilers of fire-box type, locomotive boilers	<a href="#">F22B 13/06</a>

## F22D 5/00

**Controlling water feed or water level; Automatic water feeding or water-level regulators (steam traps [F16T](#); measuring or indicating instruments [G01](#); for indicating water level [G01F](#); level control in general [G05D 9/00](#))**

#### Definition statement

*This place covers:*

Devices and methods for controlling the supply of feed water and the feed water level using intermediate compartments, pivoting buckets, receptacles outside of the boiler and devices with float actuated valves, responsive to thermal expansion and contraction, with electric switches. Also regulators with varying the speed or delivery pressure of feed pumps and automatic feed-control systems are covered by said group.

#### Relationships with other classification places

Documents concerning measuring volume, volume flow, mass flow or liquid level are classified in [G01F](#) and documents concerning level control in general in [G05D 9/00](#).

#### References

##### Limiting references

*This place does not cover:*

Steam traps	<a href="#">F16T</a>
Measuring or indicating instruments	<a href="#">G01</a>
For indicating water level	<a href="#">G01F</a>
Level control in general	<a href="#">G05D 9/00</a>

**Informative references**

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

Control devices for feed water heaters with water tubes arranged in the boiler furnace	<a href="#">F22D 1/12</a>
Arrangements of feed water pumps	<a href="#">F22D 11/02</a>
Control devices of plants characterised by condensers	<a href="#">F01K 9/023</a>
Control system for two or more steam generators including feeding	<a href="#">F22B 35/008</a>
Applications and arrangements of alarm or automatic safety devices for steam boilers	<a href="#">F22B 37/42</a>

**F22D 7/00****Auxiliary devices for promoting water circulation (adaptation of boilers for promoting water circulation [F22B 37/34](#))****Definition statement**

*This place covers:*

Devices in for promoting or enhancing water circulation like saddles, deflecting plates, Venturi arrangements, injectors for water or steam, rotary devices like for example pumps, said devices also specially adapted for locomotive boilers. Control devises of said devices are also covered by said group.

**Relationships with other classification places**

Pumps in general are classified in [F04B](#), [F04C](#), [F04D](#) and [F04F](#)

**References****Limiting references**

*This place does not cover:*

Adaptation of boilers for promoting water circulation	<a href="#">F22B 37/34</a>
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**Informative references**

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

Control devices for feed water heaters with water tubes arranged in the boiler furnace	<a href="#">F22D 1/12</a>
Vehicles being a steam locomotive	<a href="#">F01K 17/025</a>

**F22D 11/00****Feed-water supply not provided for in other main groups****Definition statement**

*This place covers:*

All other aspects of feed water supply, which are not covered by the other main groups, like for example emergency feed water supply, arrangements of feed water cleaning, when the water is cleaned between condenser and boiler and arrangements of feed water pumps

### Relationships with other classification places

Pumps in general are classified in [F04B](#), [F04C](#), [F04D](#) and [F04F](#)

### References

#### Informative references

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

Feed water heater with direct heat transfer like mixing water with steam	<a href="#">F22D 1/28</a>
Water and air preheating systems	<a href="#">F22D 1/36</a>
Auxiliary devices or apparatus for promoting water circulation	<a href="#">F22D 7/00</a>
Arrangements or modifications of condensate or air pumps	<a href="#">F01K 9/02</a>
Regenerating steam by compression done by an injection apparatus	<a href="#">F01K 19/08</a>
Treating live steam, other than thermo-dynamically, cleaning and filtering	<a href="#">F01K 21/06</a>
Applications and arrangements of alarm or automatic safety devices for steam boilers	<a href="#">F22B 37/42</a>

### Special rules of classification

Only feed water supply devices and methods for which there is no entry in the main group [F22D 7/00](#) are to be classified in [F22D 11/00](#).