F22G

SUPERHEATING OF STEAM

Definition statement

This place covers:

This subclass covers general aspects of, or methods for, generating superheated steam. Methods of steam superheating characterised by the form of heating method and by location, arrangement and disposition, constructional features of steam superheaters, control systems for controlling superheat temperature and all component parts or details of steam superheaters are covered. Thereby this subclass is limited in only methods of, or apparatus for, the generation of superheated steam for heating or power purposes.

Relationships with other classification places

Methods of steam generation and steam boilers are classified in F22B.

Economisers and all aspects concerning feed water supply and circulation of feed water in boilers are classified in F22D.

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.

The generation of vapour in cores of nuclear reactors is classified in G21.

References

Informative references

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

Steam accumulators specially adapted for superheated steam	F01K 1/10
Plants with steam conversion	F01K 3/002
Plants having heaters one heater being a fired superheater	F01K 3/183
Plants having heaters with heating by live steam for superheating or reheating	F01K 3/265
Boilers heated electrically	F22B 1/28
Boilers of once-through type built-up from tubes receiving water at one end and delivering superheated steam at the other end of the tubes	F22B 29/06
Boilers with separate combustion apparatus for the boiler and the superheater respectively	F22B 31/04
Steam-separating arrangement in boilers	F22B 37/26
Removing solid combustion residues from passages or chambers beyond the fire	F23J 3/00
Central heating systems operating with superheated steam	F24D 1/06
Compression machines, plants or systems with non-reversible cycles comprising superheaters	F25B 40/06
Cleaning of internal or external surfaces of heat-exchange or heat-transfer conduits, e.g. water tubes or boilers	F28G
Nuclear moderator wherein one zone is a superheating zone	G21C 5/22

Reactors with engines with the engine working fluid superheated by the reactor coolant	G21D 5/14
Reactors with engines with the engine working fluid superheated by a separate heat source	G21D 5/14

Special rules of classification

Attention is drawn to the definition of superheated "steam" and superheated "vapour". In cases where a specific entry for vapour is missing, documents related to special superheated vapours are classified in groups where only superheated "steam" is explicitly mentioned.

Glossary of terms

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

desuperheater	reduction of superheated steam temperature
attemperator	reduction of superheated steam temperature by bringing superheated steam into direct contact with water or steam or mixtures thereof
steam conditioners	reduction of superheated steam to the needed temperature

F22G 1/00

Steam superheating characterised by heating method

Definition statement

This place covers:

Superheaters and methods of generation of superheated steam characterised by the heating method, such as the heat being supplied by steam, by hot flue gases from a furnace or a steam boiler, by radiation, by chemical radiation or by a separate heat source independent from heat supply of the steam boiler, including electrically heated superheaters. Furthermore methods of creating superheated steam by throttling such as reducing the pressure or direct superheaters such as devices and methods for mixing steam with furnace gases or other combustion products are classified in this main group

Relationships with other classification places

Methods of steam generation, where there is not mentioned, that the generated steam is superheated and characterised by form of heating method are classified in F22B 1/00.

References

Informative references

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

Controlling superheat temperature with water injection in combination with steam pressure reducing valves	F22G 5/126
Plants characterised by the use of steam or heat accumulators with steam conversion	F01K 3/002
Plants characterised by the use of steam or heat accumulators having heaters using nuclear heat with a fired superheater	F01K 3/183
Plants characterised by the use of steam or heat accumulators having heaters using heat from a specified chemical reaction	F01K 3/188

Steam engine plants using mixtures of steam gas (direct evaporator or superheater)	F01K 21/047
Plants with steam as working fluid created by combustion of hydrogen with oxygen	F01K 25/005
Steam production by combustion of hydrogen with oxygen	F22B 1/003
Steam boilers heated electrically	F22B 1/28
Steam boilers of furnace-tube type	F22B 7/00
Steam separating arrangements with separator reheaters	F22B 37/266

Special rules of classification

When superheated steam is created only by the exothermic combustion of oxygen and hydrogen, then the groups F22B 1/003 and F01K 25/005 should also be considered.

F22G 1/14

using heat generated by chemical reactions

References

Informative references

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

Apparatus or devices using heat produced by exothermal chemical reactions other than by combustion, not otherwise provided for	F24V 30/00

F22G 1/165

{by electricity}

References

Informative references

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

Steam generation in boilers heated electrically, in general	F22B 1/28

F22G 3/00

Steam superheaters characterised by constructional features; Details or component parts thereof

Definition statement

This place covers:

Constructional features and details of component parts of steam superheaters such as steam tube arrangements, superheater drain arrangements, steam tubes with steam flowing in opposite direction in one pipe, annular steam tubes, steam superheaters with heating tubes, headers and collectors of superheaters. Furthermore, arrangements for the protection of superheater elements and connecting or sealing of superheater tubes are covered.

Relationships with other classification places

Component parts or details of steam boilers are classified in F22B 37/00, which contains much more entries than F22G 3/00.

References

Informative references

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

Steam superheaters characterised by their location	F22G 7/00
Water tube boiler built-up from sets of spaced double-walled water tubes of return type	F22B 23/00
Water tube boiler built-up from sets of tubes with internally-arranged flue tubes (annular steam tubes)	F22B 25/00
Details and accessories of water tubes in steam boilers	F22B 37/10
Drums, headers and accessories therefor	F22B 37/22
Arrangements on drums or collectors for fixing tubes or for connecting collectors to each other	F22B 37/225
General aspects of enclosed heat-exchangers	F28D

F22G 3/001

{Steam tube arrangements not dependent of location}

References

Informative references

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

Steam superheaters characterised by location, arrangement or disposition	F22G 7/00

F22G 5/00

Controlling superheat temperature

Definition statement

This place covers:

Methods and devices for controlling superheat steam by regulating flue gas flow, by circulating flue gases, by displacing superheater sections, by attemperating the superheated steam (i.e. spraying water into steam), by indirectly cooling or heating the superheated steam in auxiliary enclosed heat-exchangers, by by-passing steam around superheater sections. Furthermore, applications of combustion-control devices and combined control procedures for controlling superheat temperature are covered.

References

Informative references

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

Steam superheating with the heat being supplied by steam	F22G 1/005

Steam superheating with provisions for superheating by throttling (pressure reduction)	F22G 1/10
Spray mixers	B01F 25/70
Plants characterised by the use of steam or heat accumulators with steam conversion	F01K 3/002
Control systems for steam boilers	F22B 35/00
Control of steam boilers by flue gas dampers	F22B 35/001
Control of steam boilers by circulating flue gases	F22B 35/002
Control of steam boilers by injecting water	F22B 35/104
Control systems of steam boilers with auxiliary heating surfaces	F22B 35/107
Control of temperature in general	G05D 23/00

F22G 5/12

by attemperating the superheated steam, e.g. by injected water sprays

References

Informative references

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

Mixing gases with liquids	B01F 23/20
Flow mixers, e.g. spray-mixers	B01F 25/00, B01F 25/70

F22G 7/00

Steam superheaters characterised by location, arrangement, or disposition

Definition statement

This place covers:

Steam superheaters, which are characterised by their location, arrangement or disposition, like superheaters being located in locomotive boilers, in fire tubes, in jackets around fire tubes, in furnace tubes, in fire boxes, in smoke boxes, in flues or in water-tube boilers.

Relationships with other classification places

Methods of steam generation and steam boilers are classified in F22B

References

Informative references

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

Steam locomotives	F01K 15/025
Steam boilers of drum type	F22B 5/00
Steam boilers of furnace tube type	F22B 7/00
Steam boilers of fire tube type	F22B 9/00
Steam boilers of combined fire tube type and water tube type	F22B 11/00
Steam boilers of fire box type	F22B 13/00

Steam boilers of water tube type	F22B 15/00, F22B 17/00, F22B 19/00, F22B 21/00, F22B 23/00, F22B 25/00
Instantaneous of flash steam boilers	F22B 27/00
Steam boilers of forced flow type	F22B 29/00
Modifications of boiler construction	F22B 31/00