

F24F

AIR-CONDITIONING; AIR-HUMIDIFICATION; VENTILATION; USE OF AIR CURRENTS FOR SCREENING (removing dirt or fumes from areas where they are produced [B08B 15/00](#); vertical ducts for carrying away waste gases from buildings [E04F 17/02](#); tops for chimneys or ventilating shafts, terminals for flues [F23L 17/02](#))

Definition statement

This place covers:

Methods and apparatus for air-conditioning, i.e. the supply of air to rooms or spaces by means which provide for the treatment of the air in at least two of the following ways:

- Heating
- Cooling
- Any other kind of treatment, e.g. humidification

Methods and apparatus for humidification of air for rooms or spaces

Methods and apparatus for supplying air or extracting air from rooms or spaces, either by forced movement (for example by fans) or by natural effects (for example convection)

Methods and apparatus for circulating air within rooms or spaces, either by forced movement (for example by fans) or by natural effects (for example convection)

Methods and apparatus for use of air currents for screening, for example of entrances of buildings or of areas where particular operations are performed

Use of energy recovery systems in air conditioning, ventilation or screening

Details, for example control arrangements, safety arrangements, ducting arrangements or air flow control members, which are specially adapted for the methods or apparatus specified above

Devices, systems and methods for changing the air characteristics within a room, a building or spaces, comprising air treatment like air-conditioning, air-humidification, dehumidification of room air, cleaning e.g. filtering of room air, ventilation, use of air currents for screening.

Air treatment to improve the air properties of breathing air for human beings in the room or building.

Relationships with other classification places

As regards air-conditioning, air-humidification and ventilation, this subclass is an application-oriented place that covers methods or apparatus for these processes when specially adapted for rooms or spaces that are primarily intended as dwelling or working-spaces for human beings.

Air-treatment or ventilation that is specially adapted for particular processes or for other particular environments, for example for industrial processes or for housing of animals, is covered in the places for those processes or environments. For examples of such places see the section "Examples of places where the subject matter of this subclass is covered when specially adapted, used for a particular purpose, or incorporated in a larger system" below.

With the exception of humidification, this subclass does not cover the mere treatment of air being supplied to, extracted from, or circulated within, rooms or spaces. Such treatment of air in general, for example heating, cooling, heat-exchange or filtering, is covered in several different places of the CPC, see for example the entries under "Informative References" below.

This subclass does not cover elements or apparatus in general for transporting air or for regulating air flow, for example fans, ducts or valves. Such elements and apparatus are covered in several different places in the CPC, see for example the entries under "Informative References" below.

This subclass does not cover ventilation of garments or furniture or other devices, which is covered by the places for those devices, for example classes [A41](#) - [A47](#) for garments and furniture and class [H01](#) for electrical devices.

Subclass [F24F](#) covers arrangement of cooling and heating. The relative arrangement of merely heating is covered by [F24D](#) and [F24H](#).

Subclass [F24F](#) covers air-conditioning units characterised by the treatment of air. Air-conditioning units characterised by the refrigerant machines or systems per se are covered by [F25B](#).

References

Limiting references

This place does not cover:

Removing dirt or fumes from areas where they are produced	B08B 15/00
Vertical ducts; Channels, e.g. for drainage for carrying away waste gases, e.g. flue gases	E04F 17/02
Chimney or flues	F23L 17/02

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:

Ventilating arrangements for forage silos	A01F 25/22
Devices for ventilating greenhouses	A01G 9/24
Air-conditioning systems for greenhouses	A01G 9/246
Ventilation in animal husbandry	A01K
Controlling humidity in incubators for poultry	A01K 41/04
Treatment rooms with artificial climate for medical purposes	A61G 10/02 , A61G 13/00
Devices for reconditioning breathing air in sealed rooms or for ventilating gas-proof shelters	A62B 11/00
Devices for ventilating gas-proof shelters	A62B 13/00
Containers or portable cabins for affording breathing protection with devices for reconditioning the breathing air or for ventilating	A62B 31/00
Dust-free rooms or enclosures for laboratories	B01L 1/04
Ventilation, air-conditioning, or cooling, specially adapted for passenger or goods spaces of vehicles	B60H
Air curtains at doors or windows of vehicles	B60J 9/04
Ventilation of driving cabins or engine rooms of locomotives or motor railcars	B61C 17/04
Heating, cooling, ventilating, or air-conditioning, specially adapted for rail vehicles	B61D 27/00
Adaptations of ventilation, cooling, heating, or air-conditioning for submarines or other underwater vessels	B63G 8/36

Arrangements of ventilation, heating, cooling, or air-conditioning specially adapted for ships or other waterborne vessels	B63J 2/00
Arrangements or adaptations of air-treatment apparatus for crew, passenger or freight spaces in aircraft	B64D 13/00
Arrangements or adaptations of devices for treatment of the atmosphere in cosmonautic vehicles	B64G 1/46
Drying cabinets or drying chambers having heating or ventilating means	D06F 58/10
Special arrangement or operation of ventilating devices in lavatories	E03D 9/04
Drying building constructions in general or keeping them dry, e.g. by air vents	E04B 1/70
Special adaptations of floors for incorporating ventilation ducts	E04B 5/48
Ceilings having means for ventilation	E04B 9/02
Ventilation of roof coverings	E04D 13/17
Ventilation of tents	E04H 15/10
Ventilation in doors or windows	E06B 7/02
Ventilation of mines or tunnels	E21F 1/00
Cooling or drying of air in mines or tunnels	E21F 3/00
Arrangements for supplying or controlling air or gases for drying solid materials or objects	F26B 21/00
Cooling, ventilating or heating of electric apparatus	H05K 7/20

Informative references

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

Disinfecting or sterilising of air	A61L
Filtering, washing or drying of gases	B01D
Mixing gases with vapours or liquids in general	B01F 3/02
Transportable units for separating dispersed particles from air by electrostatic effect	B03C 3/32
Spraying	B05B , B05D
Production of ozone	C01B 13/10
Heat, sound or noise insulation, absorption, or reflection	E04B 1/74
Air-ducts or air channels in buildings	E04F 17/04
Chimney stacks or similar ducts	E04H 12/28
Fans in general, details of fans	F04D
Pumping installations for air	F04D 25/08 , F04D 29/00
Valves in general	F16K
Devices for venting or aerating enclosures in general	F16K 24/00
Pipes in general, joints, fittings or supports therefor	F16L
Noise absorbers for ducting	F16L 55/02
Thermal insulation for ducting	F16L 59/00
Devices for conducting smoke or fumes, e.g. flues	F23J 11/00

Air supply; draught-inducing; supplying non-combustible liquid or gas, tops for chimneys and ventilating shafts	F23L
Domestic stoves	F24B , F24C
Domestic or space-heating systems	F24D
Hot air central heating systems	F24D 5/00
Fluid heaters, water or air-heaters	F24H
Air heaters having heat generating means	F24H 3/00
Refrigeration in general, details of refrigeration systems	F25B
Combined heating and refrigeration systems	F25B 29/00
Production, working, storing or distribution of ice	F25C
Refrigerators, cold rooms, e.g. for food storage	F25D
Heat exchange apparatus in general, details of heat exchangers	F28C , F28D , F28F
Measuring temperature or quantity of heat in general	G01K
Testing apparatus not otherwise provided for	G01M
Control of flow in general	G05D 7/00
Control of humidity in general	G05D 22/00
Control of temperature in general	G05D 23/00
Ion sources	H01J 27/02 , H01J 37/08
Arrangements for cooling, heating or ventilation of semiconductor or other solid state devices	H01L 23/34 , H01L 31/024
Apparatus for generating ions to be introduced into non-enclosed gases	H01T 23/00
Arrangements in telecontrol or telemetry systems in general	H04Q 9/00

Special rules of classification

Air-humidification as auxiliary treatment in air-conditioning, i.e. in units wherein the air is also either cooled or heated, is covered by groups [F24F 1/00](#) or [F24F 3/14](#), while air-humidification per se, e.g. "room humidifiers", is covered by group [F24F 6/00](#).

Looping references between [B08B 15/00](#) and [F24F](#) have been identified. Until this inconsistency is resolved, the current classification practice in CPC is as follows: [B08B 15/00](#) is a limiting reference for subclass [F24F](#). [F24F](#) is an informative reference for main group [B08B 15/00](#).

Glossary of terms

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

Air-conditioning	Supply of air to rooms or spaces by means which provide for the treatment of the air in at least two of the following ways: heating, cooling, any other kind of treatment, e.g. humidification.
Supplied air	Air entering the room
Exhaust air	Air withdrawn from the room
Ventilation	Supply of air to rooms or spaces, extraction of air from rooms or spaces, or circulation of air within rooms or spaces.

F24F 1/00

Room units for air-conditioning, e.g. separate or self-contained units or units receiving primary air from a central station

Definition statement

This place covers:

- Air-conditioning units placed within a room for cooling the room, i.e. fan coil unit of a split unit. These indoor units can thereby receive primary air from a central station and/or recirculate the air within the room and/or supply outside air.
- Split unit comprising an indoor unit and an outdoor unit.
- Outdoor unit of split unit.
- Self-contained units.

Usually, these room units comprise a refrigerant cycle.

References

Informative references

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

Central station centrally producing cool air for distributing cool air in a plurality of rooms	F24F 3/00
Systems comprising multiple indoor units	F24F 3/065
Dehumidification	F24F 3/14
Filter units per se	F24F 3/1603
Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00 .	F24F 5/00
Humidification	F24F 6/00
Control of room units	F24F 11/30
Vanes or dampers of room units	F24F 13/14 , F24F 13/15
Casing of indoor units and self-contained units	F24F 13/20
Condensate evacuation	F24F 13/222

Glossary of terms

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

Split unit	Air conditioning unit in split configuration, often with the compressor and condenser located in a separate external outdoor unit and the evaporator located in an indoor unit, the two units being connected via refrigerant pipes
Self-contained unit	Air conditioning unit with all apparatus for air treatment installed in a common casing, e.g. compressor, condenser and evaporator

F24F 1/01

in which secondary air is induced by injector action of the primary air

Definition statement

This place covers:

Room units in which secondary air is induced by injector action of the primary air.

References**Informative references**

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

Self-contained room units for air-conditioning	F24F 1/02
Control systems for controlling the temperature of the supplied air by controlling the air supply to heat-exchangers or bypass channels	F24F 11/81
Arrangements for air-circulation by means of induction	F24F 13/26

F24F 3/00

Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment; Apparatus specially designed for such systems (room units [F24F 1/00](#))

Definition statement

This place covers:

Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment; Apparatus specially designed for such systems.

References**Limiting references**

This place does not cover:

Room units	F24F 1/00
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Informative references

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

Room humidifier	F24F 6/00
Mounting arrangement of air filters	F24F 13/28
Disinfection, sterilisation or deodorisation or air	A61L 9/00
Filter unit per se	B01D
Drying of gases	B01D 53/26
Electric filter	B03C
Cogeneration of electricity and heat or cold	F25B
Clean room for semiconductor production	H01L 21/67017

Computer rooms	H05K 7/20
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F24F 3/06

characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units

References

Informative references

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

Arrangement or assembly of components for the regulation of the supply of heating or cooling media for the secondary treatment of air	F24F 11/83
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F24F 5/00

Air-conditioning systems or apparatus not covered by [F24F 1/00](#) or [F24F 3/00](#) {, e.g. using solar heat or combined with household units such as an oven or water heater}

Definition statement

This place covers:

- Exclusively-fluid system, e.g. using water as cooling fluid ([F24F 5/0003](#)),
- Cooling apparatus specially adapted for use in air-conditioning, e.g. using absorption or desorption ([F24F 5/0014](#)), or using cold storage body ([F24F 5/0017](#)) (e.g. PCM material for storage), or using evaporation ([F24F 5/0035](#)).
- Cooling apparatus using the Peltier effect ([F24F 5/0042](#)).
- Cooling apparatus using natural energy ([F24F 5/0046](#)), e.g. solar energy or air from the ground.
- Cooling apparatus using thermal walls ([F24F 5/0075](#)),
- Cooling apparatus using radiation from walls or ceiling ([F24F 5/0089](#)).
- Cooling apparatus combined with domestic apparatus, e.g. boiler, heating system ([F24F 5/0096](#)).

References

Informative references

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

Absorption or desorption for humidification or dehumidification purposes	F24F 3/1411
Air conditioning in containers	B65D 88/74
Apparatus using radiation from walls or ceiling for heating purposes only	F24D 3/14 , F24D 3/16
Hot-water central heating system	F24D 3/18
Solar heat collector	F24S
Production of heat using geothermal energy	F24T
Cooling towers	F28C 1/00
Phase Change Material (PCM) in general	F28D 20/02

F24F 6/00**Air-humidification {, e.g. cooling by humidification}****Definition statement***This place covers:*

Local unit for room humidification by evaporation of water in the air, or by water dispersion or by injection of steam in the air.

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

Humidification systems	F24F 3/14
Cooling using evaporation	F24F 5/0035
Device to humidify the respiration air of patients	A61M 16/16
Spraying apparatus with rotating elements discharging water by centrifugal forces	B05B 3/10
Ultrasonic oscillator	B05B 17/06
Steam generation in boilers	F22B 1/28
Humidifying within a fuel cell	H01M 8/04126

F24F 6/14**using nozzles****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Nozzles per se, spraying in general	B05B
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F24F 7/00**Ventilation {, e.g. by means of wall-ducts or systems using window or roof apertures}****Definition statement***This place covers:*

Systems or apparatus for supplying air to rooms or exhausting air from rooms or circulating air within the rooms.

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

Ventilation control	F24F 11/0001
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Ventilation of animal housings	A01K 1/0047
Hoods preventing escape of fumes from the area where they are produced	B08B 15/02
Ventilation systems of lifts	B66B 11/024
Roof-covering elements	E04D 1/30
Ventilation of roof coverings	E04D 13/17
Ventilation through double windows	E06B 7/02
Ventilation of mines or tunnels	E21F 1/00
Ventilators or fans per se	F04D
Removing cooking fumes	F24C 15/20

Glossary of terms

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

Natural circulation	Air circulation without active fan, e.g. chimney effect, using solar energy or using wind energy
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F24F 7/013

using wall or window fans, displacing air through the wall or window

References

Informative references

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

With heating elements	F24F 3/00 - F24F 3/14
Room ventilators, portable ventilators	F04D 25/08

F24F 7/06

with forced air circulation, e.g. by fan {positioning of a ventilator in or against a conduit}

References

Informative references

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

Ventilators per se	F04D 25/08
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F24F 7/065**{fan combined with single duct; mounting arrangements of a fan in a duct}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Construction of fans	F04D
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F24F 9/00**Use of air currents for screening, e.g. air curtains****Definition statement***This place covers:*

- Air curtain delimiting two different spaces.
- Air curtain in a wall opening delimiting a room from the outside
- The air curtain can be obtained by using more than one jet or band.

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:*

Air curtain for vehicles	B60J 9/04
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Clean air workstation	F24F 3/1607
Means providing sterile air to operating tables in surgery	A61G 13/108
Removing cooking fumes	F24C 15/20
Air curtain in cold rooms	F25D 23/023

F24F 11/00**Control or safety arrangements****Definition statement***This place covers:*Control of HVAC devices or systems ([F24F 11/00](#)).Elements or components of control device, e.g. flap or damper control, ([F24F 11/89](#)).

References

Informative references

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

Air flow control members	F24F 13/08
Tilting members, e.g. louvre	F24F 13/14
Fire prevention or containment	A62C 2/00
Extinguishing or preventing fire	A62C 3/14
Controlling the speed of ventilators by varying driving speed	F04D 27/0261
Control valve per se	F16K
Compressor control	F25B 49/022
Refrigerant flow control	F25B 49/025
Humidity control	G05D 22/00
Humidity control using electrical means	G05D 22/02
Temperature control using electrical means (thermostat)	G05D 23/19

Special rules of classification

Damper control controlling the rate of air-flow:

- If increasing air pressure opens the damper, then classify in [F24F 11/745](#)
- If increasing air pressure closes the damper, then classify in [F24F 11/75](#)

F24F 12/00

Use of energy recovery systems in air conditioning, ventilation or screening (with both heat and humidity transfer between supplied and exhausted air [F24F 3/147](#))

Definition statement

This place covers:

Apparatus and systems with heat-exchange between supplied and exhausted air, e.g. using an air-to-air heat exchanger or using an intermediate fluid, e.g. heat pump.

References

Limiting references

This place does not cover:

Both heat and humidity transfer between supplied and exhausted air	F24F 3/147
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Informative references

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

Heat-exchange in general	F28
Heat-exchange apparatus, not provided for in another subclass, in which the heat-exchange media do not come into direct contact	F28D
Heat-exchange apparatus having plate-like conduit	F28D 9/00

Heat pipes	F28D 15/00
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F24F 13/00

Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening

Definition statement

This place covers:

Details concerning ducting arrangements ([F24F 13/02](#)); Air outlets ([F24F 13/06](#)); Air-flow control members ([F24F 13/08](#)); Casing or covers ([F24F 13/20](#)).

Means for preventing or evacuating condensate ([F24F 13/22](#)).

Means for preventing or suppressing noise ([F24F 13/24](#)).

Arrangement for air-circulation by means of air-induction ([F24F 13/26](#)).

Arrangement for mounting of filter ([F24F 13/28](#)), of heat exchanger ([F24F 13/30](#)).

Mounting means for HVAC devices ([F24F 13/32](#)).

References

Limiting references

This place does not cover:

Ventilating nozzles for vehicles	B60H 1/34
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Informative references

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

Room units in which secondary air is induced by injection action of the primary air	F24F 1/01
Mounting of filtering elements within a casing	B01D 46/0005
Ventilation combined with door or window frames	E06B 7/02
Butterfly valves	F16K 1/22
Support for pipes	F16L 3/00
Flange joints of pipes	F16L 23/00
Noise absorbers in pipes	F16L 55/033
Lighting devices combined with ventilating systems	F21V 33/0088
Method or devices for protecting against noise	G10K 11/16

F24F 13/04

Air-mixing units ([F24F 13/06](#) takes precedence {; room units for the mixing of pre-treated primary air with recirculated or room air [F24F 1/00](#)})

References**Limiting references**

This place does not cover:

Room units for the mixing of pre-treated primary air with recirculated or room air	F24F 1/00
Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser	F24F 13/06

Informative references

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

Mixing gases in general	B01F 3/02
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F24F 13/078

combined with lighting fixtures

References**Informative references**

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

Air-treatment systems with air-flow over lighting fixtures	F24F 3/056
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F24F 13/08

Air-flow control members, e.g. louvres, grilles, flaps or guide plates ([F24F 7/013](#), [F24F 13/06](#) take precedence)

References**Limiting references**

This place does not cover:

Ventilation with forced flow using wall or window fans, displacing air through the wall or window	F24F 7/013
Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser	F24F 13/06

Informative references

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

Roof ventilation	F24F 7/02
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F24F 13/10

movable, e.g. dampers

References

Informative references

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

Valves in general	F16K
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