

## F28C

**HEAT-EXCHANGE APPARATUS, NOT PROVIDED FOR IN ANOTHER SUBCLASS, IN WHICH THE HEAT-EXCHANGE MEDIA COME INTO DIRECT CONTACT WITHOUT CHEMICAL INTERACTION (safety devices in general [F16P](#); fluid heaters having heat generating means [F24H](#); with an intermediate heat-transfer medium coming into direct contact with heat-exchange media [F28D 15/00](#) - [F28D 19/00](#); details of heat-exchange apparatus of general application [F28F](#))**

### Definition statement

*This place covers:*

Heat exchangers involving heat transfer between different media without separating wall, e.g. cooling towers.

### References

#### Limiting references

*This place does not cover:*

Mixers	<a href="#">B01F</a>
Chemical or physical processes	<a href="#">B01J</a>
Fluid heaters having heat generating means	<a href="#">F24H</a>
Regenerative heat exchangers	<a href="#">F28D 17/00</a> , <a href="#">F28D 19/00</a>
Latent heat storage in direct contact with a heat exchange medium or another latent heat storage medium	<a href="#">F28D 20/02</a>

## F28C 1/00

**Direct-contact trickle coolers, e.g. cooling towers (building construction [E04H 5/12](#); enclosed spaces cooled by trickle [F25](#); components parts of trickle coolers [F28F 25/00](#); {indirect-contact cooling towers [F28B 1/06](#)})**

### Definition statement

*This place covers:*

Heat exchangers in which one medium trickles freely over a material and is brought into direct contact with a cooling medium. e.g. ambient air.

Cooling towers are classified according to the type of flow: counter-current, cross-current or both.

This group covers also:

- The use of cooling towers for discharging exhaust gases.
- Means for recovering heat from exhaust steam.
- Noise suppressing means.
- Freezing prevention means.
- Combination wet/ dry sections (hybrid cooling towers).
- Means for preventing mist formation above cooling towers.

## References

### Limiting references

*This place does not cover:*

Building construction of cooling towers	<a href="#">E04H 5/12</a>
Enclosed spaces cooled by trickle	<a href="#">F25</a>
Dry cooling towers	<a href="#">F28B 1/06</a>
Indirect contact heat exchangers in which one medium trickles freely over conduits	<a href="#">F28D 3/00</a>
Indirect evaporative cooler	<a href="#">F28D 5/00</a>
Component parts of trickle coolers	<a href="#">F28F 25/00</a>

## F28C 3/00

### Other direct-contact heat-exchange apparatus

#### Definition statement

*This place covers:*

Direct contact heat exchangers without trickling of one heat exchange medium, e.g. direct contact between two gases, between two liquids or between a liquid and a gas without or with change of state; one of the heat exchange medium being a fluent solid, e.g. direct contact fluidized bed.

## References

### Limiting references

*This place does not cover:*

Preservation of food by heating loose materials	<a href="#">A23L 3/16</a>
Evaporating with heated gases or vapours or liquids in contact with a liquid	<a href="#">B01D 1/14</a>
Distillation or related exchange processes in which liquids are contacted with gaseous media, e.g. stripping	<a href="#">B01D 3/00</a>
Mixing gases with liquids	<a href="#">B01F 23/20</a>
Devices using other cold materials	<a href="#">F25D 3/00</a>
Furnaces, ovens with cooling grates, endless belts, rotary drums	<a href="#">F27D 15/02</a>
Direct contact condensers	<a href="#">F28B 3/00</a>
Indirect contact fluidized bed	<a href="#">F28D 13/00</a>