

SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

F27 FURNACES; KILNS, OVENS OR RETORTS

Note(s) [7]

- This class covers:
 - furnaces, kilns, ovens, retorts, open sintering apparatus and other similar apparatus for heat treatment of materials or articles, and details or accessories therefor, in general;
 - the arrangement of electrical heating elements in or on furnaces.
- This class does not cover:
 - combustion apparatus per se, i.e. apparatus for direct combination of oxygen gas and a burnable substance;
 - electrical heating elements per se;
 - processes carried on within the furnaces.
- In this class, the following term is used with the meaning indicated:
 - "furnaces" covers kilns, ovens, or retorts.

F27B FURNACES, KILNS, OVENS OR RETORTS IN GENERAL; OPEN SINTERING OR LIKE APPARATUS

Note(s)

Attention is drawn to the Notes following the title of class F27.

Subclass index

FURNACES WITH STATIONARY CHARGE

Shaft furnaces.....	1/00
Horizontal furnaces.....	3/00, 5/00
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STATIONARY FURNACES WITH MECHANICALLY-MOVED CHARGE.....9/00

ROTARY FURNACES.....7/00, 13/00

OTHER FURNACES; COMBINATIONS.....15/00, 17/00, 19/00

OPEN SINTERING OR LIKE APPARATUS.....21/00

1/00 Shaft or like vertical or substantially vertical furnaces [1, 2006.01]

- 1/02 • with two or more shafts or chambers, e.g. multi-storey [1, 2006.01]
- 1/04 • • Combinations or arrangements of shafts [1, 2006.01]
- 1/06 • of other than up-draught type [1, 2006.01]
- 1/08 • heated otherwise than by solid fuel mixed with charge [1, 2006.01]
- 1/09 • • heated electrically [4, 2006.01]
- 1/10 • Details, accessories or equipment specially adapted for furnaces of these types [1, 2006.01]
- 1/12 • • Shells or casings; Supports therefor [1, 2006.01]
- 1/14 • • • Arrangements of linings [1, 2006.01]
- 1/16 • • Arrangements of tuyères [1, 2006.01]
- 1/18 • • Arrangements of dust collectors [1, 2006.01]
- 1/20 • • Arrangement of devices for charging [1, 4, 2006.01]
- 1/21 • • Arrangement of devices for discharging [4, 2006.01]

- 1/22 • • Arrangements of heat-exchange apparatus [1, 2006.01]

- 1/24 • • Cooling arrangements [1, 2006.01]

- 1/26 • • Arrangements of controlling devices [1, 2006.01]

- 1/28 • • Arrangements of monitoring devices, of indicators, of alarm devices [1, 2006.01]

3/00 Hearth-type furnaces, e.g. of reverberatory type (F27B 9/00-F27B 15/00, F27B 21/00 take precedence); Electric arc furnaces [1, 4, 2006.01]

- 3/02 • of single-chamber fixed-hearth type [1, 2006.01]
- 3/04 • of multiple-hearth type; of multiple-chamber type; Combinations of hearth-type furnaces [1, 2006.01]
- 3/06 • with movable working chambers or hearths, e.g. tiltable [1, 2006.01]
- 3/08 • heated electrically, e.g. electric arc furnaces, with or without any other source of heat [1, 2006.01]
- 3/10 • Details, accessories or equipment, e.g. dust-collectors, specially adapted for hearth-type furnaces [1, 2006.01]

- 3/12 • • Working chambers or casings; Supports therefor [1, 2006.01]
- 3/14 • • • Arrangements of linings [1, 2006.01]
- 3/16 • • • Walls; Roofs [1, 2006.01]
- 3/18 • • Arrangement of devices for charging [1, 4, 2006.01]
- 3/19 • • Arrangement of devices for discharging [4, 2006.01]
- 3/20 • • Arrangements of heating devices [1, 2006.01]
- 3/22 • • Arrangements of air or gas supply devices [1, 2006.01]
- 3/24 • • Cooling arrangements [1, 2006.01]
- 3/26 • • Arrangements of heat-exchange apparatus [1, 2006.01]
- 3/28 • • Arrangement of controlling, monitoring, alarm or like devices [4, 2006.01]

- 5/00 **Muffle furnaces; Retort furnaces; Other furnaces in which the charge is held completely isolated** (furnaces through which the charge is moved mechanically or in which the charge moves by gravity F27B 9/00) [1, 2006.01]
- 5/02 • of multiple-chamber type [1, 2006.01]
- 5/04 • adapted for treating the charge in vacuum or special atmosphere [1, 2006.01]
- 5/05 • • in vacuum [5, 2006.01]
- 5/06 • Details, accessories or equipment specially adapted for furnaces of these types [1, 2006.01]
- 5/08 • • Arrangements of linings [1, 2006.01]
- 5/10 • • Muffles [1, 2006.01]
- 5/12 • • Arrangement of devices for charging [1, 4, 2006.01]
- 5/13 • • Arrangement of devices for discharging [4, 2006.01]
- 5/14 • • Arrangements of heating devices [1, 2006.01]
- 5/16 • • Arrangements of air or gas supply devices [1, 2006.01]
- 5/18 • • Arrangement of controlling, monitoring, alarm or like devices [4, 2006.01]

- 7/00 **Rotary-drum furnaces, i.e. horizontal or slightly inclined** [1, 2006.01]
- 7/02 • of multiple-chamber or multiple-drum type [1, 2006.01]
- 7/04 • • with longitudinal divisions [1, 2006.01]
- 7/06 • adapted for treating the charge in vacuum or special atmosphere [1, 2006.01]
- 7/08 • externally heated [1, 2006.01]
- 7/10 • internally heated, e.g. by means of passages in the wall [1, 2006.01]
- 7/12 • tiltable [1, 2006.01]
- 7/14 • with means for agitating or moving the charge [1, 2006.01]
- 7/16 • • the means being fixed relatively to the drum (F27B 7/04 takes precedence) [1, 2006.01]
- 7/18 • • the means being movable within the drum [1, 2006.01]
- 7/20 • Details, accessories or equipment specially adapted for rotary-drum furnaces [1, 2006.01]
- 7/22 • • Rotary drums; Supports therefor [1, 2006.01]
- 7/24 • • • Seals between rotary and stationary parts [1, 2006.01]
- 7/26 • • Drives [1, 2006.01]
- 7/28 • • Arrangements of linings [1, 2006.01]
- 7/30 • • Arrangements of partitions [1, 2006.01]

- 7/32 • • Arrangement of devices for charging [1, 4, 2006.01]
- 7/33 • • Arrangement of devices for discharging [4, 2006.01]
- 7/34 • • Arrangements of heating devices [1, 2006.01]
- 7/36 • • Arrangements of air or gas supply devices [1, 2006.01]
- 7/38 • • Arrangements of cooling devices [1, 2006.01]
- 7/40 • • • Planetary coolers [4, 2006.01]
- 7/42 • • Arrangement of controlling, monitoring, alarm or like devices [4, 2006.01]

- 9/00 **Furnaces through which the charge is moved mechanically, e.g. of tunnel type** (rotary-drum furnaces with means for agitating or moving the charge F27B 7/14); **Similar furnaces in which the charge moves by gravity** [1, 2006.01]
- 9/02 • of multiple-track type; of multiple-chamber type; Combinations of furnaces [1, 2006.01]
- 9/04 • adapted for treating the charge in vacuum or special atmosphere [1, 2006.01]
- 9/06 • heated without contact between combustion gases and charge; electrically heated [1, 2006.01]
- 9/08 • • heated through chamber walls [1, 2006.01]
- 9/10 • • heated by hot air or gas [1, 2006.01]
- 9/12 • with special arrangements for preheating or cooling the charge [1, 2006.01]
- 9/14 • characterised by the path of the charge during treatment; characterised by the means by which the charge is moved during treatment (for treating continuous lengths of work F27B 9/28) [1, 2006.01]
- 9/16 • • the charge moving in a circular or arcuate path [1, 2006.01]
- 9/18 • • • under the action of scrapers or pushers [1, 2006.01]
- 9/20 • • the charge moving in a substantially straight path [1, 2006.01]
- 9/22 • • • under the action of scrapers or pushers (F27B 9/26 takes precedence) [1, 2006.01]
- 9/24 • • • being carried by a conveyor [1, 2006.01]
- 9/26 • • • on or in trucks, sleds, or containers [1, 2006.01]
- 9/28 • for treating continuous lengths of work [1, 2006.01]
- 9/30 • Details, accessories or equipment specially adapted for furnaces of these types [1, 2006.01]
- 9/32 • • Casings [1, 2006.01]
- 9/34 • • • Arrangements of linings [1, 2006.01]
- 9/36 • • Arrangements of heating devices [1, 2006.01]
- 9/38 • • Arrangement of devices for charging [1, 4, 2006.01]
- 9/39 • • Arrangement of devices for discharging [4, 2006.01]
- 9/40 • • Arrangements of controlling or monitoring devices [1, 2006.01]

- 11/00 **Bell-type furnaces** [1, 2006.01]

- 13/00 **Furnaces with both stationary charge and progression of heating, e.g. of ring type or of the type in which a segmental kiln moves over a stationary charge** [1, 2006.01]
- 13/02 • of multiple-chamber type with permanent partitions; Combinations of furnaces [1, 2006.01]
- 13/04 • of single-chamber type with temporary partitions [1, 2006.01]
- 13/06 • Details, accessories or equipment specially adapted for furnaces of this type [1, 2006.01]
- 13/08 • • Casings [1, 2006.01]

13/10	• • • Arrangements of linings [1, 2006.01]	15/09	• • Arrangement of devices for discharging [4, 2006.01]
13/12	• • Arrangements of heating devices [1, 2006.01]	15/10	• • Arrangements of air or gas supply devices [1, 2006.01]
13/14	• • Arrangement of controlling, monitoring, alarm or like devices [4, 2006.01]	15/12	• • Arrangements of dust collectors [1, 2006.01]
14/00	Crucible or pot furnaces; Tank furnaces [1, 4, 2006.01]	15/14	• • Arrangements of heating devices [1, 2006.01]
14/02	• with tilting or rocking arrangements (F27B 14/04 takes precedence) [1, 2006.01]	15/16	• • Arrangements of cooling devices [1, 2006.01]
14/04	• adapted for treating the charge in vacuum or special atmosphere [1, 2006.01]	15/18	• • Arrangements of controlling devices [1, 2006.01]
14/06	• heated electrically, e.g. induction crucible furnaces, with or without any other source of heat (F27B 14/04 takes precedence) [1, 2006.01]	15/20	• • Arrangements of monitoring devices, of indicators, of alarm devices [1, 2006.01]
14/08	• Details specially adapted for crucible, pot or tank furnaces [1, 4, 2006.01]	17/00	Furnaces of a kind not covered by any of groups F27B 1/00-F27B 15/00 (structural combinations of furnaces F27B 19/02) [1, 2006.01]
14/10	• • Crucibles [1, 2006.01]	17/02	• specially designed for laboratory use [1, 2006.01]
14/12	• • • Covers therefor [1, 2006.01]	19/00	Combinations of different kinds of furnaces that are not all covered by any single one of main groups F27B 1/00-F27B 17/00 [1, 2006.01]
14/14	• • Arrangements of heating devices [1, 2006.01]	19/02	• combined in one structure [1, 2006.01]
14/16	• • Arrangement of devices for charging [4, 2006.01]	19/04	• arranged for associated working [1, 2006.01]
14/18	• • Arrangement of devices for discharging [4, 2006.01]	21/00	Open or uncovered sintering apparatus; Other heat-treatment apparatus of like construction [1, 2006.01]
14/20	• • Arrangement of controlling, monitoring, alarm or like devices [4, 2006.01]	21/02	• Sintering grates or tables [1, 2006.01]
15/00	Fluidised-bed furnaces; Other furnaces using or treating finely-divided materials in dispersion [1, 2006.01]	21/04	• Sintering pots or sintering pans [1, 2006.01]
15/02	• Details, accessories or equipment specially adapted for furnaces of these types [1, 2006.01]	21/06	• Endless-strand sintering machines [1, 2006.01]
15/04	• • Casings; Supports therefor [1, 2006.01]	21/08	• Details, accessories or equipment specially adapted for sintering or like apparatus [4, 2006.01]
15/06	• • • Arrangements of linings [1, 2006.01]	21/10	• • Arrangement of devices for charging [4, 2006.01]
15/08	• • Arrangement of devices for charging [1, 4, 2006.01]	21/12	• • Arrangement of devices for discharging [4, 2006.01]
		21/14	• • Arrangement of controlling, monitoring, alarm or like devices [4, 2006.01]
F27D	DETAILS OR ACCESSORIES OF FURNACES, KILNS, OVENS OR RETORTS, IN SO FAR AS THEY ARE OF KINDS OCCURRING IN MORE THAN ONE KIND OF FURNACE		

Note(s)

Attention is drawn to the Notes following the title of class F27.

Subclass index

CONSTRUCTIONAL FEATURES.....	1/00
HANDLING OR SUPPORTING THE CHARGE.....	3/00, 5/00, 15/00
PREHEATING CHARGES; COOLING; USING WASTE HEAT OR WASTE GASES.....	13/00, 9/00, 15/02, 17/00
ARRANGEMENT OF ELECTRIC HEATING ELEMENTS.....	11/00
ARRANGEMENT OF CONTROL, MONITORING OR SAFETY DEVICES.....	19/00, 21/00
OTHER FEATURES; OTHER DETAILS.....	7/00, 25/00, 27/00, 99/00

1/00 Casings; Linings; Walls; Roofs [1, 2006.01]

- 1/02 • Crowns; Roofs [1, 2006.01]
- 1/04 • characterised by the form of the bricks or blocks used [1, 2006.01]
- 1/06 • • Composite bricks or blocks [1, 2006.01]
- 1/08 • • • Bricks or blocks with internal reinforcement or metal backing [1, 2006.01]
- 1/10 • Monolithic linings; Supports therefor [1, 2006.01]
- 1/12 • incorporating cooling arrangements [1, 2006.01]
- 1/14 • Supports for linings (supports for monolithic linings F27D 1/10) [1, 2006.01]
- 1/16 • Making or repairing linings [1, 2006.01]

- 1/18 • Door frames; Doors, lids or removable covers [1, 2006.01]

3/00 Charging; Discharging; Manipulation of charge [1, 2006.01]

- 3/02 • Skids or tracks for heavy objects [1, 2006.01]
- 3/04 • Ram or pusher apparatus [1, 2006.01]
- 3/06 • Charging or discharging machines on travelling carriages [1, 2006.01]
- 3/08 • Screw feeders; Screw dischargers [1, 2006.01]
- 3/10 • Charging directly from hoppers or shoots [1, 2006.01]

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- 3/12 • Travelling or movable supports or containers for the charge [1, 2006.01]
- 3/14 • Charging or discharging liquid or molten material [1, 2006.01]
- 3/15 • Tapping equipment; Equipment for removing slag [1, 2006.01]
- 3/16 • Introducing a fluid jet or current into the charge (F27D 3/18 takes precedence) [1, 3, 2006.01]
- 3/18 • Charging particulate material using a fluid carrier [3, 2006.01]
- 5/00 Supports, screens or the like for the charge within the furnace [1, 2006.01]**
- 7/00 Forming, maintaining or circulating atmospheres in heating chambers [1, 2006.01]**
- 7/02 • Supplying steam, vapour, gases or liquids [1, 2006.01]
- 7/04 • Circulating atmospheres by mechanical means [1, 2006.01]
- 7/06 • Forming or maintaining special atmospheres or vacuum within heating chambers (supplying steam, vapour, gases or liquids F27D 7/02) [1, 2006.01]
- 9/00 Cooling of furnaces or of charges therein** (casings, linings, walls or roofs incorporating cooling arrangements F27D 1/12) [1, 2006.01]
- 11/00 Arrangement of elements for electric heating in or on furnaces [1, 2006.01]**
- 11/02 • Ohmic resistance heating [1, 2006.01]
- 11/04 • • with direct passage of current through the material being heated [1, 2006.01]
- 11/06 • Induction heating, i.e. in which the material being heated, or its container or elements embodied therein, form the secondary of a transformer [1, 2006.01]
- 11/08 • Heating by electric discharge, e.g. arc discharge [1, 2006.01]
- 11/10 • • Disposition of electrodes [1, 3, 2006.01]
- 11/12 • with electromagnetic fields acting directly on the material being heated [1, 2006.01]

- 13/00 Apparatus for preheating charges; Arrangements for preheating charges [1, 2006.01]**
- 15/00 Handling or treating discharged material; Supports or receiving chambers therefor [1, 2006.01]**
- 15/02 • Cooling [1, 2006.01]
- 17/00 Arrangements for using waste heat; Arrangements for using, or disposing of, waste gases [1, 2006.01, 2025.01]**
- 17/10 • Arrangements for using waste heat [2025.01]
- 17/12 • • using heat storage [2025.01]
- 17/13 • • • using regenerative heat exchangers [2025.01]
- 17/15 • • using boilers [2025.01]
- 17/17 • • for preheating fluids, e.g. air or gases [2025.01]
- 17/18 • • for preheating solid materials [2025.01]
- 17/20 • Arrangements for treatment or cleaning of waste gases [2025.01]
- 17/22 • • for removing solid constituents [2025.01]
- 17/25 • • • using cyclones [2025.01]
- 17/28 • • for cooling waste gases [2025.01]
- 17/30 • Arrangements for extraction or collection of waste gases; Hoods therefor [2025.01]
- 19/00 Arrangement of controlling devices [1, 2006.01]**
- 21/00 Arrangement of monitoring devices; Arrangement of safety devices [1, 2006.01]**
- 21/02 • Observation or illuminating devices [1, 2006.01]
- 21/04 • Arrangement of indicators or alarms [1, 2006.01]
- 25/00 Devices for removing incrustations [2010.01]**
- 27/00 Stirring devices for molten material** (charging or discharging liquid or molten material F27D 3/14) [2010.01]
- 99/00 Subject matter not provided for in other groups of this subclass [2010.01]**