

## **50            Milling and comminuting, including treatment prior to milling; after-treatment of grist by sifting and mixing; separation of mill dust from the used air**

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**50a            Processes and apparatus for pre-treatment of grain and cereals prior to milling**

**50b            Milling processes and mills, including auxiliary equipment for grain and cereals [soft milling processes]**

**50c            Processes and devices for comminuting and grinding of various materials**

**50d            Screening and sifting devices in general, cleaning machines for mill products**

**50f            Mixing machines for dry materials**

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**50a            Processes and apparatus for pre-treatment of grain and cereals prior to milling** (preparation of dough from grain 2b; preservation, sterilisation of grain 53c; cleaning and sorting of fruits and vegetables 50d)

50a-1            Dry preparation of grist: separation of iron particles and other coarse foreign matter (1b)

50a-2/01        Wet preparation of grist: washing, wetting, softening, and similar processes for grain treatment (45e-22/02; 45e-27/00; 89a-1; 1a-5 – 1a-7)

50a-2/10        Heat preparation of grist: conditioning of grain (53c-6; 53k-2/01), for direct preparation of dough (2b-5)

50a-3/10        Grain husking, topping, brushing and polishing machines (34b-7; 45e-41/00) with disks

50a-3/20        with rolls

50a-3/30        with worms

50a-4            with beater and blade arrangement (50c-8/01 – 50c-8/30; 50d-2)

50a-5            with brushes

50a-6/01        of miscellaneous types

50a-6/10        Grain treatment processes and apparatus for husk loosening (chemical treatment 53c-6/02)

50a-6/30        Husk stripping for direct recovery of flour (for direct dough preparation 2b-5)

50a-7            Feeding and discharging devices for husking machines (50b-5/01 – 50b-5/40); groats mills

**50b            Milling processes and mills, including auxiliary equipment for grain and cereals [soft milling processes]** (coffee grinders 34b-8/20; chocolate 53l-11/01 – 53l-11/60; soap 23f)

50b-1/01        Soft milling processes (53k-2; for direct production of dough 2b-5)

50b-1/10        Milling diagrams for soft milling

50b-1/20        Milling installations for soft milling processes

50b-2/10        Milling operations and disk mills

50b-2/10        with vertical shaft (50c-16/01; 50c-16/10)

50b-2/20        with horizontal shaft (50c-16/01; 50c-16/10)

50b-3/01        Millstones and milling disks

- 50b-3/10 Beaters and beater fasteners, millstone bushings and thrust bearings  
50b-4 Devices for ventilation, moistening, cooling or heating mill rooms and milling tools
- Feeding devices (50a-7) and bag filling devices (81a)  
50b-5/01 of miscellaneous types  
50b-5/10 with rotating feeding elements [feeding rollers]  
50b-5/40 Sampling devices, directly mounted on milling machines (42I-17; 42I-18)
- 50b-6 Engaging and disengaging devices, as well as auxiliary apparatus for milling machines including alarm signal devices  
50b-7 Fire and explosion protection devices for milling and comminuting machines and conduits (10b-9/06)
- 50b-8/01 Roll mills for soft milling with multiple rolls (50c-13/10; 53I-11/20)  
50b-8/20 Roll mills with rolls and mill block (50c-13/20; 53I-11/20)  
50b-9/01 Rolls for roll mills  
50b-9/02 Bearings for rolls  
50b-10/01 Coarse reduction mills  
50b-10/10 Scrapers, guide plates and other auxiliary devices  
50b-11/01 Miscellaneous milling devices  
50b-10/30 Cutting and splitting machines  
50b-13/01 Sharpening tools for millstones (67a; 87b-1)  
50b-13/10 Sharpening machines for millstones (67a; 87b)  
50b-13/20 Sharpening and fluting machines for milling rollers
- 50c Processes and devices for comminuting and grinding of various materials** (grain 50b; coffee, spices 34b; soap 23f; differential comminution as a preliminary to processing 1a; plastics 39a; clay 80a; sugar cane 89b; meat 66b; moulding sand 31c; wood 38i; 55a; chocolate 531; cellulose and paper pulp 55c)
- 50c-1/01 Jaw crushers with unilaterally acting crushing jaws  
50c-1/10 Jaw crushers with bilaterally acting crushing jaws  
50c-1/20 Jaw crushers with rotating jaws  
50c-2/01 Cone crushers with eccentric motion of grinding elements  
50c-2/10 Vertical-shaft disk crushers  
50c-2/20 Horizontal-shaft disk crushers  
50c-3 Breaking devices with breaking points  
50c-4/01 Crushing roll mills with multiple rolls, also for bones (45e-39/20; 45e-35/24; 50c-13/10)  
50c-4/05 Roll squeezers (50c-13/10)  
50c-4/10 Single-roll crushing units, also for bones (45e-39/20; 45e-35/24; 50c-13/10)  
50c-5 Worm crushers and mills (meat grinders 66b-2/01 – 66b-2/15; vegetable grinders 34b-1, 34b-3/01 – 34b-3/80, 34b-6/01)  
50c-6 Edge grinders (1a-35; 53I-11/30; 55c-10/10; 80a-2/01)  
50c-7 Bell-type mills and cone crushers with concentric motion of grinding element
- Centrifugal mills: beater mills, hammer mills, impact mills  
50c-8/01 with radial delivery of ground material and horizontal shaft  
50c-8/10 with axial delivery of ground material and horizontal shaft  
50c-8/20 with beaters acting on rolls  
50c-8/30 with several cooperating beater rolls  
50c-8/40 with attached sifter  
50c-8/45 Sifter mills for milling units of pulverised fuel furnaces (furnace engineering section of mill furnaces 24I-2; mill drying 50c-17/10)  
50c-8/47 Feeding devices for milling units of mill furnaces (50b-5/01; 50b-5/10; 50c-19/01; 50c-19/20; 50c-19/30; 24h)

50c-8/50	with vertical shaft
50c-8/90	Centrifugal mills of miscellaneous types
50c-9/01	Horizontal-shaft beater rod and stud mills
50c-9/10	Vertical-shaft beater rod and stud mills
50c-10	Pounding and stamp mills (10a-14; 55c-10/01; 80a-14/15 – 80a-14/25; 84c-4; 84c-3/00; 84c-7/00)
50c-11/01	Centrifugal pendulum mills
50c-11/10	Mortar mills
50c-11/20	Mills with spring-mounted rolls
50c-12/01	Centrifugal ball and roll mills with actuating star piece
50c-12/10	Ball or roll squeezer mills
50c-12/20	Magnetically, hydraulically or centrifugally driven centrifugal ball roll mills, except those in 50c-18/20
50c-13/01	Drag mills
50c-13/10	Fine-grinding mills with multiple rolls (23f; 50b-8/01; 50c-4/01; 50c-4/05; 53l-11/20)
50c-13/20	Fine-grinding mills with roll and grinding block (23f; 50b-8/20; 50c-4/10; 53l-11/20)
50c-14	Ring mills
50c-15/01	Sifter ball mills
50c-15/10	Drum and tubular mills
50c-15/20	Compound mills
50c-15/25	Drum or tubular mills with several chambers eccentrically mounted with respect to the rotation axis
50c-15/30	Grinding bodies for ball drum, tubular, or compound mills
50c-15/40	Drum or tubular mills with single grinding bodies, chains, hammers, etc.
50c-15/50	Bearings, couplings, packings, drives for tubular or drum mills (47h-20)
50c-16/01	Grinding and comminuting devices with opposed disks (50b-2)
50c-16/10	Grinding and comminuting devices with grinding disks that are not coaxial with each other or with the grinding rollers
50c-16/20	Toothed disk mills
50c-17/01	Grinding and comminuting devices of various structure
50c-17/10	Complete plants for comminuting and grinding also with devices for drying the ground material or for combined grinding and drying
50c-17/20	Grinding and comminuting units of various types with loose grinding elements, not provided for in 50c-12/01, 50c-15/01, 50c-15/10, 50c-15/20, 50c-15/40, 50c-17/25
50c-17/25	Oscillating mills of various types, also with loose grinding elements (50c-3/01; 50c-3/20; 42s; 81e-45 – 81e-59)
50c-17/30	Impact comminutors (24l-2)
50c-17/40	Milling and comminuting processes
50c-17/60	Glazing mills and agitating drums for production of bronze
	<b>Pulverising devices: colloidal mills</b>
50c-18/01	Miscellaneous
50c-18/10	Gyratory mills
50c-18/20	Rotary centrifugal mills
	<b>Feeding devices for comminuting and grinding apparatus, general, when structure is not determined by the type of the grinding or comminuting device</b>
50c-19/01	Miscellaneous (50b-5/01)
50c-19/10	with rotating working elements (50b-5/10)
50c-19/20	Devices whose operation is determined by the sifting air stream
50c-19/30	Devices operating in dependence of the mill charge

- 50d Screening and sifting devices in general, cleaning machines for mill products** (bar sieves and riddles, grates and sieves only for preparation [classification and separation of various components] of ores, fuel, and various minerals, refuse 1a-1 – 1a-21, 1a-28/01 – 1a-32, 1a-40; manufacture of sieves 7c-11, 49b, 86e; gases 24g-6/01, 26d-1/20; moulding sand 31c-6/03; household 34d-5, 34f-11/06, 34l-4/01, 34l-4/02, 34l-7/01, 34l-18/01; laboratory 42l-13/04; drives for oscillating systems, general 42s; tobacco 44b-15/02, 79a-2/12; potato harvesting machines 45c-7/01 – 45c-7/02, 45c-10/01 – 45c-10/03, 45c-11/02, 45c-12/01 – 45c-12/03, 45c-14/01 – 45c-14/02, 45c-15/00 – 45c-19/18; for other agricultural purposes including grain 45e-12 – 45e-21/23, 45e-7/32 – 45e-7/38, 45e-7/44; milk 45g-5/08 – 45g-5/09, 45g-9/02; manufacture of milling cutters 49b-5/16; paper 54e-2/01 – 54e-3, 55d-5/01 – 55d-5/20, 55d-8/01 – 55d-8/50, 55d-10/01, 55d-10/02, 55d-11/01 – 55d-11/40, 55d-18; dyestuffs 75c-13/02; porcelain sieves 80a-4/05, 80a-52; inflammable liquids 81e-139; centrifugal machines 82b-3/01 – 82b-3/02, 82b-18; dredging sieves 84d-5/03, 84d-7/06; sewage 85c-6/06; weaving industry 86c-1/01 – 86c-7, 86f-1; preparation of sugar juice 89c-7)
- Drum sieves
- 50d-1/01 Drum sieves rotating about a horizontal or slightly inclined axis
- 50d-1/50 Horizontal sifter drums and troughs containing rotating or reciprocating brushes, scrapers or centrifuge (50a-4; 50a-5; 50b-10/01)
- 50d-2 Vertical sifter drums with rotating centrifuge (50a-4; 50a-5; 50b-10/01)
- Oscillating plane sifters
- 50d-3/01 Flat sieves with reciprocating oscillating movement approximately in direction of conveying of processed materials (47h-21; 81e-45; 81e-51 – 81e-54)
- 50d-3/10 Flat sieves with reciprocating oscillating movement approximately normal to the direction of conveying
- 50d-3/20 Flat sieves with reciprocating oscillating motion normal to the sieve plane
- 50d-3/30 Flat sieves with oscillating movement in a closed circuit, normal to the sieve plane and parallel to the direction of conveying of processed material
- 50d-3/40 Flat sieves with oscillating movement in a close circuit, normal to the sieve plane and the direction of conveying
- 50d-3/50 Flat sieves with multiple oscillating movements in various directions
- 50d-3/70 Drives and counterbalancing devices for oscillating sifters covered by groups 50d-3/01 – 50d-4/0 (42s; 47h-21; 81e-45; 81e-51 – 81e-54)
- 50d-4/01 Flat sieves with a circular oscillating movement approximately in the sieve plane [plane sifter and reciprocating screen] in suspended arrangement
- 50d-4/02 Suspended oscillating elements
- 50d-4/10 Plane sifter and reciprocating screen mounted on oscillating supports
- 50d-4/11 Oscillating supports
- 50d-4/20 Braced plane sifters and reciprocating screens without oscillating supports
- 50d-4/50 Drives, couplings and counterweights for plane sifters and reciprocating screens
- Other types of sieves
- 50d-5/01 Rocking sieves, tilting sieves, wobble sieves
- 50d-5/10 Plane sifters having a rotational movement in the sifting plane or reciprocating along arcs of circle
- 50d-5/20 Fixed plane sifters provided with scrapers or the like to move the material (50a-5)
- 50d-5/30 Fixed inclined sieves, also trajecting screens
- 50d-5/40 Cone, funnel, mushroom, or cup-shaped sieves

50d-5/50	Belt-type sieves
50d-5/80	Other types of sieves
	<b>Sifter elements</b>
50d-6/01	Sifter elements in general
50d-6/05	Plane sifter and reciprocating screen elements (lubrication devices for plane sifters 47e-2)
50d-6/10	Sifter structures, fastening and tensioning devices
50d-6/20	Sieve cleaning devices with scrapers and brushes
50d-6/22	Pivot-mounted brushes
50d-6/24	Travelling brushes
50d-6/30	Sieve cleaning by knocking, sieve cleaning processes
	<b>Air sifters</b>
50d-7/01	Circulation sifters (1a-28/01)
50d-7/10	Circulation sifters with separate separator
50d-7/50	Gravity air sifter
50d-7/70	Air sifters with rotary centrifugal disk or basket trajected by sifter air flowing against or perpendicularly to direction of centrifugation
	<b>Other sifting and sorting devices, processes and systems</b>
50d-8/01	Sifting and sorting devices of miscellaneous construction (1a-1 – 1a-14; 45e)
50d-8/50	Electric sifters
50d-9	Sifting and sieving processes and systems
	<b>Cleaning machines</b>
50d-10	Middlings cleaning machines with sieve
50d-11	Middlings cleaning machines without sieve
	<b>Cleaning and sorting of grain (treatment prior to grinding 50a)</b>
50d-12	Cleaning and sorting machines with flat sieves and air streams
50d-13	Cleaning and sorting machines with flat sieves without air streams
50d-14/01	Flat sieves
50d-14/50	Cleaning devices for sieves
50d-15/01	Cleaning and sorting machines with rotating drum sieves
50d-15/50	Cleaning and sorting machines with drum sieves, brushes or beaters
50d-16	Cleaning and sorting machines with honeycomb drums [trieurs]
50d-17	Endless-belt separating and sorting machines
50d-18/01	Centrifugal separating and sorting machines
50d-18/10	Air stream cleaning and sorting machines
50d-18/20	Hydraulic cleaning and sorting
50d-18/30	Magnetic or electric cleaning and sorting
50d-18/40	Worm sorting machines
50d-18/50	Cleaning and sorting machines of special type
50d-19/01	Device for separating stones from grain
50d-19/10	Feeding devices for cleaning and sorting machines (feeding devices for mills 50b-5/01 – 50b-5/10)
50d-19/20	Sampling devices (for milling machines 50b-5/40)
	<b>Cleaning and sorting of fruits and vegetables</b>
50d-20/01	Cleaning and sorting machines with flat sieves
50d-20/02	Cleaning and sorting machines with drum sieves
50d-20/03	Roller-type cleaning and sorting machines
50d-20/04	Cleaning and sorting machines with endless belts, ropes, etc., also with sorting belts
50d-20/05	Cleaning and sorting using liquid current
50d-20/06	Sorting according to weight

50d-20/07      Cleaning by means of brushes  
 50d-20/08      Separation of stones  
 50d-20/09      Cleaning and sorting devices of special structure and for material other than fruit

**50e      Dry dust separation in the milling and comminuting industry, and for general purposes** (wet cleaning 12e; preparation of air 36d-1/40; disinfecting filters 30i-5/01; cleaning of flue gases 24g-6/01 – 24g-7/30; of coal and other gases 26d-5; air purification for internal combustion engines 46c2-49; air purification for wood processing machines 38e-12; vacuum cleaners 34c-5/20 – 34c-5/80; dust separation from ore, fuel, etc. 1a-28/01 – 1a-28/20; collecting vessels for separated material 81e-67)

50e-1      Dust separating processes and apparatus  
 50e-2      Gravity dust separators  
 50e-2/01      Gravity dust separators  
 50e-2/50      Dust separation by gas deflection and dust centrifugation by inertia  
 50e-3/01      Centrifugal dust separators  
 50e-3/10      Cyclones  
 50e-3/20      Centrifugal dust separators with rotating elements  
 50e-3/30      Shock and impact surface dust separators  
 50e-4      Dust separators with filters, cloth filters excluded  
 50e-4/01      Dust separators with filters, cloth filters excluded  
 50e-4/50      Dust separators with rotating sieve or filter drum

Cloth filter dust separators

50e-5/01      of bag form  
 50e-5/10      of star form  
 50e-6      of tubular form  
 50e-7      of other forms  
 50e-8      Miscellaneous structural details of dust separators

**50f      Mixing machines for dry materials** (for solids and liquids 12e-4/01; for moulding sand 31c-6/01 – 31c-6/08; for chocolate 53l-11/01 – 53l-11/50; for ceramic production 80a-7/01 – 80a-7/55; for dough 2b-1/01 – 2b-6/04; for pulp used in paper production 55a-5/01; for liquid and semi-liquid paints 75c-13/03)

Rotary mixing containers

50f-1/01      Drum mixers with containers rotating about a horizontal axis  
 50f-1/02      Trough mixers with containers rotating perpendicularly or at an angle to the axis

Fixed mixing containers

50f-2/01      with mixing tools rotating about a horizontal axis  
 50f-2/30      with mixing tools rotating about a vertical axis  
 50f-2/60      with circulation of the material handled  
 50f-3      Fixed containers in which mixing is achieved by movable draw-off devices  
 50f-4      Centrifugal mixers  
 50f-5      Other mixing devices, processes and apparatus, structural details