

89 Sugar and starch production

89a	Washing, conveying and storage devices for beets and potatoes
89b	Comminution of sugar beets and sugar cane; treatment of extracted beet pulp
89b	(IPC: C13C) Cutting mills; Shredding knives; Pulp presses
89c	Extraction of juice from sugar beets, sugar cane, and the like; purification of sugar juices and solutions
89c	(IPC: C13D) Production and purification of sugar juices
89d	Processing of raw and refined sugar, including evaporation and boiling
89d	(IPC: C13F) Preparation and processing of raw sugar, sugar, and syrup
89e	Evaporators and boilers
89e	(IPC: C13G) Evaporation apparatus; Boiling pans
89g	Machines for cutting and chipping sugar
89g	(IPC: C13H) Cutting machines for sugar; Combined cutting, sorting and packing machines for sugar
89h	Desugarisation of molasses
89h	(IPC: C13J) Extraction of sugar from molasses
89i	Glucose, invert sugar, milk sugar and maltose
89i	(IPC: C13K) Glucose; Invert sugar; Lactose; Maltose; Other sugars
89k	Starch and dextrin
89k	(IPC: C13L) Starch; Dextrine; Similar carbohydrates

89a	Washing, conveying and storage devices for beets and potatoes
89a-1	Machines for washing sugar beets and potatoes for sugar and starch extraction (machines for washing beets for animal feed 45e-22/01, 45e-27/00; for grain 50a-2/01)
89a-2	Stone, mud and weed traps for sugar beet washers and flumes
89a-3	Conveying devices for sugar beets and potatoes, especially flumes (45e-30/06)
89a-4	Storage facilities for sugar beets (53g-5/02; 45e-29/01 – 45e-29/09; 45e-25/00)
89a-1/00	Machines for washing sugar beets and potatoes for sugar and starch extraction (machines for washing beets for animal feed 45e-22/01, 45e-27/00; for grain 50a-2/01)
89a-2/00	Stone, mud and weed traps for sugar beet washers and flumes
89a-3/00	Conveying devices for sugar beets and potatoes, especially flumes (45e-30/06)
89a-4/00	Storage facilities for sugar beets (53g-5/02; 45e-29/01 – 45e-29/09; 45e-25/00)
89b	Comminution of sugar beets and sugar cane; treatment of extracted beet pulp
89b-1	Sugar beet slicing machines (cutting machines for beets for animal feed 45e-35 – 45e-38, 45e-33/00 – 45e-35/10)
89b-2	Cutting machines for sugar cane (presses for sugar cane 89c-8)

- 89b-3 Other comminuting devices for sugar beets, e.g. graters and presses (juice presses for sugar beets 89c-8)
- 89b-4 Slicing knives and vats for slicing machines
- 89b-5 Screw and cone presses for extracted sugar pulp
- 89b-6 Other devices for the treatment of extracted sugar beet pulp, e.g. endless-belt presses

89b (IPC: C13C) Cutting mills; Shredding knives; Pulp presses

89b-1/00 Reducing the size of material from which sugar, or like carbohydrate is to be extracted (for extraction of starch 89k-1/02)

- 89b-1/02 . Cutting sugar cane
- 89b-1/04 . . Shredding sugar cane
- 89b-1/06 . Slicing sugar beet
- 89b-1/08 . Knives; Adjustment or maintenance thereof

89b-3/00 Pressing water from material from which sugar, starch or like carbohydrate has been extracted

- 89b-3/02 . between perforated moving belts

89c Extraction of juice from sugar beets, sugar cane, and the like; purification of sugar juices and solutions

- 89c-1 Methods for the extraction of juice
- 89c-2 Use of chemicals in the extraction of juice; beet extraction with alcohol and the like
- 89c-3 Juice-extracting apparatus, intermittently fed
- 89c-4 Juice-extracting apparatus, continuously fed
- 89c-5 Valves for juice-extracting apparatus and pipes
- 89c-6 Closures for juice-extracting apparatus
- 89c-7 Screens, screen tubes and the like, for juice-extracting apparatus
- 89c-8 Presses for sugar beets and sugar cane
- 89c-9 Accessories for juice-extracting apparatus
- 89c-10 Separation of sugar juice by means of lime and the like
- 89c-11 Sugar-juice purification by mechanical or thermal treatment
- 89c-12 Sugar-juice purification by means of chemicals in general
- 89c-13 Sugar-juice purification by means of reducing or oxidising agents
- 89c-14 Sugar-juice purification by means of bone black and filtering powder
- 89c-15 Sugar-juice purification by electrolysis
- 89c-16 Saturation of sugar juice: by means of carbon dioxide or sulphurous acid
- 89c-17 Sampling, measuring and operation testing in connection with sugar extraction

89c (IPC: C13D) Production and purification of sugar juices

89c-1/00 Production of sugar, i.e. saccharose, juices

- 89c-1/02 . Expressing juice from sugar cane or similar material, e.g. sorghum saccharatum
- 89c-1/04 . . combined with inhibition
- 89c-1/06 . . Sugar-cane crushers
- 89c-1/08 . Extraction of sugar from sugar beet with water
- 89c-1/10 . . continuous processes
- 89c-1/12 . . Details of extraction apparatus, e.g. arrangements of pipes or valves
- 89c-1/14 . using extracting agents other than water, e.g. alcohol or salt solutions

89c-3/00 Purification of sugar juices (mechanical separation of solids from liquids 12d)

- 89c-3/02 . using alkaline earth compounds
- 89c-3/04 . . followed by saturation
- 89c-3/06 . . . with carbon dioxide or sulphur dioxide
- 89c-3/08 . by oxidation or reduction
- 89c-3/10 . . using sulphur dioxide or sulphites
- 89c-3/12 . using adsorption agents, e.g. active carbon

89c-3/14	. using ion-exchange materials
89c-3/16	. by physical means, e.g. osmosis
89c-3/18	. by electrical means
89c-17	Sampling, measuring and operation testing in connection with sugar extraction
89d	Processing of raw and refined sugar, including evaporation and boiling (evaporators, boilers 89e; centrifuges 82b)
89d-1	Evaporation and boiling of sugar juice (boiling processes for chemical purposes 12a; evaporators, boilers 12a, 89e)
89d-2	Crystallisation of sugar juice (rock candy 89d-3; crystallisation in general 12c-2)
89d-3	Manufacture of rock candy
89d-4	Miscellaneous apparatus for the processing of raw sugar
89d-5	Sugar purging processes using centrifuges (purging centrifuges 82b-3/03)
89d-6	Sugar purging by means other than centrifuges
89d-7	Washing loose sugar crystals by means of chemicals
89d-8	Production of refined sugar in the form of loaves (centrifugal moulds 82b-1)
89d-9	Sugar pressing
89d-10	Runoff recycling and re-dissolving of raw sugar
89d-11	Sugar drying and storing (82a)
89d	(IPC: C13F) Preparation and processing of raw sugar, sugar, and syrup
89d-1/00	Thickening, evaporating, or boiling sugar juice (boiling apparatus 12a; evaporators 12a; centrifuges 82b)
89d-1/02	. Crystallisation; Crystallising apparatus
89d-1/04	. Separating crystals from mother liquors
89d-1/06	. . by centrifugal force
89d-1/08	. . Washing residual mother liquor from crystals
89d-1/10	. . . in centrifuges
89d-1/12	. . Recycling mother liquor or wash liquors
89d-1/14	. . Dissolving and refining raw sugar
89d-3/00	Miscellaneous sugar products (sucrose syrups 53k-1/20; glucose-containing syrups 89i-1/00)
89d-3/02	. formed by moulding sugar
89d-5/00	Drying sugar (storing sugar 81e)
89e	Evaporators and boilers (evaporation and boiling processes 89d)
89e-1	Surface evaporators: spray-type evaporators, plate-shaped evaporators, evaporator with rotating heating elements (12a)
89e-2	Circulation evaporators and boilers (12a)
89e-3	Multiple element evaporators (12a)
89e-4	Heating elements for evaporators (12a)
89e-5	Miscellaneous auxiliary devices for evaporators: foam steamers, pipe cleaners, juice traps, condensers, and the like (12a-1; 12a-2; 14g-12; 14g-13)
89e	(IPC: C13G) Evaporation apparatus; Boiling pans
89e-1/00	Evaporators or boiling pans adapted to be specially applicable for sugar solutions
89e-1/02	. Heating equipment
89e-1/04	. Other details, e.g. for preventing foaming for catching juice
89e-1/06	. combined with measuring instruments for effecting control of the process

89g Machines for cutting and chipping sugar

- 89g-1 Sugar cutting and chipping machines (cutting of sugar goods 53I-10)
 89g-2 Sugar cutting and chipping machines in connection with sugar sorting and packing devices

89g (IPC: C13H) Cutting machines for sugar; Combined cutting, sorting and packing machines for sugar**89g-1/00 Combined cutting, sorting and packing machines for sugar****89g-3/00 Cutting machines for sugar****89h Desugarisation of molasses**

- Desugarisation of molasses
 89h-1 by osmosis
 89h-2 by precipitation of sugar lime - separation methods
 89h-3 with lime by washing the sugar lime - elution methods
 89h-4 by means of strontium compounds
 89h-5 by means of barium compounds
 89h-6 by means of lead oxide
 89h-7 Miscellaneous processes for the processing of molasses, except 89h-1 – 89h-6

89h (IPC: C13J) Extraction of sugar from molasses**89h-1/00 Production of saccharose from final molasses**

- 89h-1/02 . by chemical means
 89h-1/04 . . by precipitation as alkaline earth metal saccharates
 89h-1/06 . . using ion exchange
 89h-1/08 . by physical means, e.g. osmosis

89i Glucose, invert sugar, milk sugar and maltose (biological saccharification of starch and cellulose-containing substances 6b-3/01)

- 89i-1/01 Extraction of sugar [grape sugar] from starch
 89i-1/02 Extraction of sugar and sugar solutions from wood, peat and the like (53g-4/01)
 89i-2 Extraction of invert sugar, also in the production of artificial honey, milk sugar, and maltose

89i (IPC: C13K) Glucose; Invert sugar; Lactose; Maltose; Other sugars (chemical synthesis of sugars 12o)**89i-1/00 Glucose; Glucose-containing syrups**

- 89i-1/02 . by saccharification of cellulosic materials (manufacture of fodder 53g)
 89i-1/04 . . Purifying
 89i-1/06 . by saccharification of starch or raw materials containing starch
 89i-1/08 . . Purifying
 89i-1/10 . Crystallisation

89i-3/00 Invert sugar**89i-5/00 Lactose****89i-7/00 Maltose****89i-9/00 Other sugars, e.g. fructose, mannose****89k Starch and dextrin (22i)**

- 89k-1 Comminution of starch raw materials
 89k-2 Extraction and purification of starch (centrifuges 82b)
 89k-3 Moulding and drying of starch
 89k-4 Treatment of the starch extraction wastes

89k-5 Soluble starch and dextrin, and adhesives prepared therefrom (other adhesives 22i)

89k (IPC: C13L) Starch; Dextrine; Similar carbohydrates (biological synthesis of starch or dextran 6b; compositions based on starch or its derivatives or its degradation products, e.g. dextrine, 39b1-25/02)

89k-1/00 Extraction and purification of starch, including concentration of starch suspensions

89k-1/02 . Preparatory treatment, e.g. crushing of raw materials (machines for preliminary washing 89a)

89k-1/04 . Drying; Forming

89k-1/06 . Working-up residues from the starch extraction

89k-1/08 . Modified or degraded starch; Bleaching of starch (starch derivatives 39b1)

89k-1/10 . . Dextrin

89k-3/00 Extraction and purification of other reserve carbohydrates, e.g. glycogen, inulin, laminarin