COOKERS FOR CATIONIC STARCHES
PREPARATION, TYPE JC (capacity 50 - 300 kg/h)

Example of equipment for cationic starches

Hopper for cooker (filling from paper bags, 25 kg)
Screw conveyer
Reactor
Electric cabinet, control system
Dosing screw
Pump
Slurry unit with an agitator

These cookers run in a manual or fully automatic mode; they are designed for continuous cooking of cationic, potato and corn starches for application into thick paper stock or for ASA sizing agents preparation.
Standard capacity of equipment: 50 - 300 kg/h.

Starch storage tank:
- hopper integrated in a cooker frame; filled from paper bags or “Big-Bags”
- low-capacity silo connected directly to cooker, filled from “Big-Bags”
- low-capacity silo installed separately from cooker and connected to dosing screw through screw conveyer
- large-capacity silo: 50/85/100/120 m³, made of GPRS material

Cooker conception:
- integrated compact unit (all cooker parts integrated in a carrying frame)
- split conception (the slurry unit is installed below the cone of large-capacity silo and connected to the cooker with pipeline)
- cookers with or without subsequent storage tank
- cooker controlled by single-purpose programmable relay
- cooker controlled by CPU and touch LCD panel
- option: visualisation in paper machine DCS or on dedicated PC station located in PM operation room

Key cooker components for cationic starches preparation, type JC:
- powder starch storage tank (see above)
- precise starch dosing equipment (screw doser driven by geared electric motor, speed regulation by frequency converter)
- slurry unit with accessories (equipment for agitation of starch with water using an effective agitator with dispersive effect)
- cooking unit with accessories (regulation of saturated steam injection, cooking tube, dilution circuit for final correction of outgoing concentration)
- electric elements and control system
- cooker carrying frame

Cooker type JC-60-R, silo with pneumatic conveying, 85 m³
Capacity: 6 - 60 kg/h
Cationic, oxidized starches
**Functional description of cooker for cationic starches preparation, type JC**

Powder cationic starch is stored in one of the storage tanks. From here, it is continuously dosed into a slurry unit with a water supply. The slurry concentration depends on the starch content in water. The slurry is continuously conveyed by a screw pump to a cooking part of the cooker. In this cooking part, saturated steam is injected into a jet chamber followed by a cooking pipe. The steam volume and cooking temperature are regulated by a regulation circuit. The cooking pipe is designed not only for potato but also for corn starches so that the starch slurry is always properly cooked.

After the cooking pipe, there is a static mixer for cold water supply where final concentration of cooked solution can be set according to technological requirements. The quantity of diluting water is controlled by a control loop. The diluted and cooled starch solution in the required concentration can be stored either in a storage tank or it is directly dosed in to the technological process. Usage of a storage tank brings some technological advantages and provides dosing of cationic starch in more dosing points.

Machine design and work safety are in compliance with EU standards.

**Technical parameters:**

- **Principle of cationic starch preparation:** continuous cooking of cationic starches
- **Cationic starch of all types:** wheat, corn, potato
- **Starch moisture:** max. 20 %
- **Cooking time of cationic starches:** 2 min
- **Output concentration:** 1 - 4 % cationic starch solution
- **Exactness of cooked starch concentration:** sigma = 0,2 %
- **Instrument air:** 5 bar, dew point -20 °C
- **Heating medium:** saturated steam p = 4 - 5 bar abs.
- **Industrial water:** p = 3,5 bar
- **Rinse water:** drained into sewage

**Cookers capacities available:**

- 50 - 150 kg/h dry solids
- 100 - 300 kg/h dry solids
- 200 - 400 kg/h dry solids
- 300 - 500 kg/h dry solids
- 350 - 600 kg/h dry solids
- 600 - 1,000 kg/h dry solids

**Rate of capacity change:** dQ = 5 kg/min or stepwise

**Installed power input:**

- 12 - 26 kW, 3x 400 VAC 50 Hz
- 0,8 m³ hopper always in cooker
- 0,8 m³ hopper in the dispersing station
- 1,6 m³ in "Big-Bag" station, incl. monorail and hang cross

**Starch stored in large-capacity silos:** for a consumption of 300 - 500 kg/h or more, silos with capacity 80 - 250 m³ with pneumatic discharging from a tank truck are recommended.

**Cooked starch storage tank:** 4 m³ with low-speed agitator and 2 screw pumps

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**The whole process of cationic starch preparation is monitored by the control system providing:**

- constant slurry concentration
- possible regulation of slurry concentration according to technological requirements
- reproducible mode of continuous cooking
- reproducible output parameters of cooked starch (concentration)
- automatic start/stop switch according to external signals
- automatic rinse mode before process start and after process termination
- according to required range and configuration of control system it is possible to regulate an output capacity manually or through external signals (e.g. locked with PM capacity)
**COOKERS CONFIGURATION FOR CAPACITY 50 - 1,000 kg/h**

- **STARCH STORAGE**
- **CATIONIC STARCH COOKER**
- **COOKED STARCH STORAGE TANK**
- **DILUTION FILTERS I**
- **FILTERS II**
- **ASA DISPERSERS**
- **TOP LAYER**
- **BOTTOM LAYER**

**Direct Application into Paper Stock**

**Cooker Configuration Details**

- **Cooker with integrated pumping chamber, type JC-80** (no screw pump used)
- **Cooker, type JC-250-M**
  - Capacity: 40 - 250 kg/h
  - Cationic starches

**Flow Diagram**

**WATER**

**STEAM**

**Layout Example**
### CAPACITIES AND TYPE SIZES OF COOKERS, TYPE JC

<table>
<thead>
<tr>
<th>Type</th>
<th>Output (kg/h)</th>
<th>Concentration (%)</th>
<th>Capacity (kW)</th>
<th>L1 (m)</th>
<th>L2 (m)</th>
<th>V1 (m)</th>
<th>V2 (m)</th>
<th>S (m)</th>
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#### DESCRIPTION OF PARTICULAR TYPES

**TYPE A:**
- **Cooker, type JC-XXX-M:** Cooker with a capacity regulation, manual dilution water flow regulation. Hopper 0.8 m³. Equipment with no other peripheries.

**TYPE B:**
- **Cooker, type JC-R-XXX-XX:** Cooker with a capacity regulation, automatic dilution water flow regulation. Automatic regulation of counter-pressure in reactor. Hopper 0.8 m³. Equipment with no other peripheries.

**TYPE C:**
- **Cooker, type JC-R-XXX-SS:** Cooker with a capacity regulation, automatic dilution water flow regulation. Automatic regulation of counter-pressure in reactor. An automatic dispersing station with a screw conveyor to a hopper.

**TYPE D:**
- **Cooker, type JC-R-XXX-BS:** Cooker with a capacity regulation, automatic dilution water flow regulation. Automatic regulation of counter-pressure in reactor. An automatic “Big-Bag” station with screw conveyor to the hopper, equipped with an el. tackle and jib arm for handling of “Big-Bags”.

**TYPE E:**
- **Cooker, type JC-R-XXX-SS-VB:** Cooker with a capacity regulation, automatic dilution water flow regulation. Automatic regulation of counter-pressure in reactor. An automatic dispersing station with a screw conveyor to a hopper. Storage tank 4 m³ with an agitator, 2 screw dosing pumps.

**TYPE F:**
- **Cooker, type JC-R-XXX-BS-VB:** Cooker with a capacity regulation, automatic dilution water flow regulation. Automatic regulation of counter-pressure in reactor. An automatic “Big-Bag” station with a screw conveyor to a hopper, equipped with el. tackle and jib arm for “Big-Bags” handling. Storage tank 4 m³ with agitator, 2 screw dosing pumps.

**TYPE G:**
- **Cooker, type JC-R-XXX-PM-VB:** Cooker with a capacity regulation, automatic dilution water flow regulation. Automatic regulation of counter-pressure in reactor. Silo PM 85 for discharging from tank truck 50 t / 85 m³, ø 3.000 x 17.700 mm with screw conveyor to hopper, automatic. Storage tank 4 m³ with an agitator, 2 screw dosing pumps.
**EXAMPLES OF TECHNOLOGICAL LINES WITH COOKERS, TYPE JC**

**Cooker, type JC**
- technological line for cationic starches preparation, line capacity 50 - 500 kg/h, capacity regulation, no additional chemical additives, 0,5 - 2 min, 120 - 140 °C

**standard hopper**

**Cooker, type JC**
- technological line for cationic starches preparation, line capacity 50 - 500 kg/h, capacity regulation, no additional chemical additives, 0,5 - 2 min, 120 - 140 °C

**low-capacity silo**

**Cooker, type JC**
- technological line for cationic starches preparation, line capacity 50 - 500 kg/h, capacity regulation, no additional chemical additives, 0,5 - 2 min, 120 - 140 °C

**large-capacity silo**