Confectionery Process Systems

Welcome to BCH Limited

Established in 1835, BCH has developed a world-wide reputation as a manufacturer of high quality process systems for the food and confectionery industries.

By investing in engineering technology and process knowledge, our skilled engineers together with food technologists, have created a technical centre of food expertise at BCH.

Complete turnkey solutions backed by over 180 years of experience

BCH specialise in turnkey systems for the manufacture of a large range of food and confectionery products. Our process equipment is ideal for the production of liquorice, 100% fruit products, caramel, syrups, jams and preserves.

We also provide advanced cook/cool technology for the production of chilled and frozen meals, sauces, fillings and fruit toppings.

Our extensive range of skills, machinery and workshops enable us to undertake bespoke and tailor made equipment to be built within strict completion deadlines.

We offer a total 'in-house' service for the design, manufacture, installation and commissioning of complete process systems, incorporating the most up-to-date modern process and control technology available.

Full turnkey or stand-alone equipment is available from laboratory size to full scale production.

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Investing in the future

To assist our worldwide customers with meeting the many challenges faced in today's fast changing food industry, our unique Innovation Centre is available for assistance with new product and process development, as well as equipment evaluation before initial investment proceeds.

The Centre houses a wide range of equipment, services and facilities, all of which are supported by in-house personnel with a wealth of knowledge to provide support in process design, food science, engineering and software.

BCH know-how enables all of our clients to develop new and exciting products, to test feasibility, then up-scale production – ultimately enabling the end product to reach the wider marketplace at a much faster pace.

Liquorice & Starch Gel Process System

BCH produced their first liquorice press in 1835 and have been manufacturing equipment for liquorice and starch gel applications ever since.

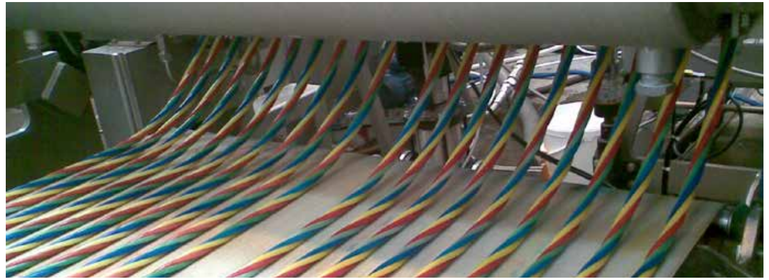
In 1968, a breakthrough in the design of equipment for the production of liquorice products resulted in the BCH final moisture liquorice system. This original design was for batch processing which was later developed into a continuous production system, thus reducing labour and handling requirements.

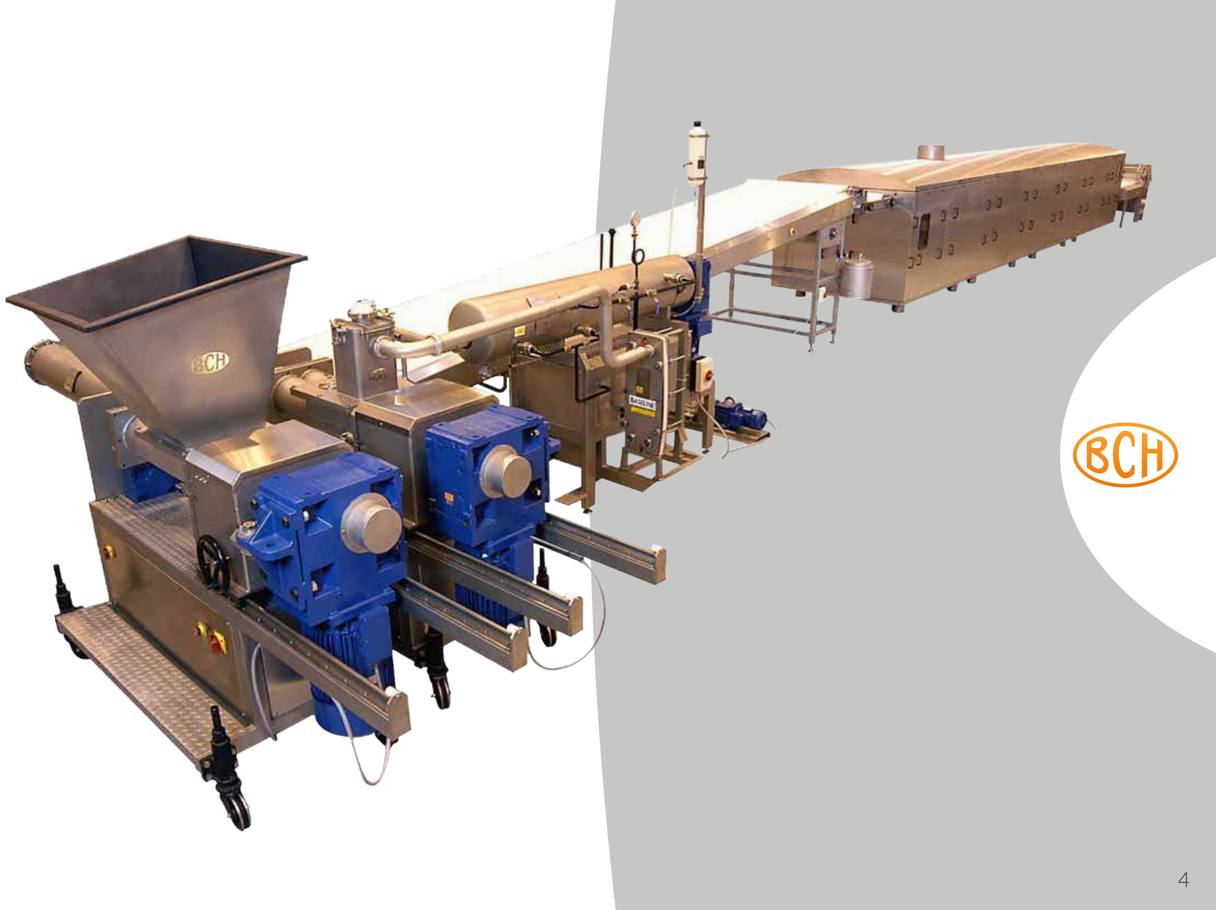
Further expansion to the range incorporated co-extrusion technology which allows the combination of liquorice and sugar paste products. By modifying the recipe and process further, it is possible to incorporate fruit juices or purees to allow for the production of a more natural product.

Today's production lines incorporate the latest developments in electronics control and modern design.

Flexible confectionery liquorice is manufactured from wheat flour, starch, sugar, molasses, glucose syrups, fruit purees and flavourings that are blended together to make a slurry. The resultant slurry is cooked, thus allowing the starch particles to expand and turn into a paste. The liquorice can then be extruded into various shapes through a wide range of die profiles.

BCH continue to provide systems for the production of liquorice, using either a batch or continuous process in line with consumer demand.





Kitchens

Slurry Mixing Vessel

Features:

- Stainless steel mixing vessel
- Mounted on load cells for automatic weight control of ingredients
- Steam jacket for automatic temperature control
- Contra-rotating agitator
- Automatic discharge valve
- Valve and pipe arrangements (to accommodate all liquid and dry ingredients)

Slurry Holding Vessel

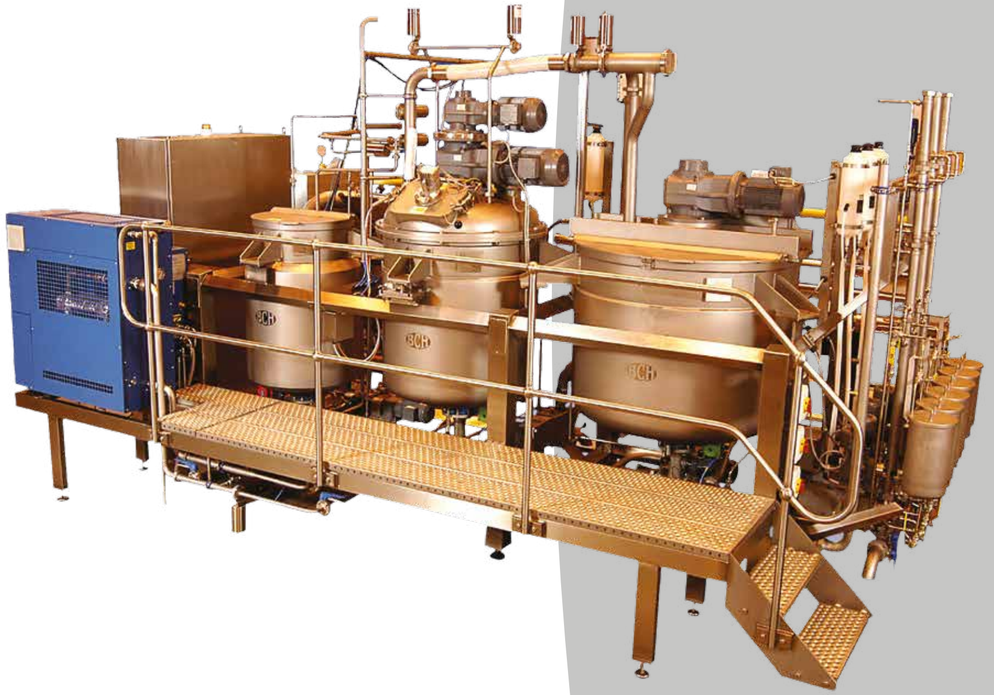
Features:

- Stainless steel holding vessel
- Hot water jacket (for automatic temperature and level control)
- Agitator
- Automatic discharge valve (with product screening facility)

Rework Processing System

Stainless steel mixing vessel for the processing of start-up and shut-down waste, and manually added minor ingredients.

- Mounted on load cells for automatic weight control
- Hot water jacket
- Agitator
- Automatic discharge valve

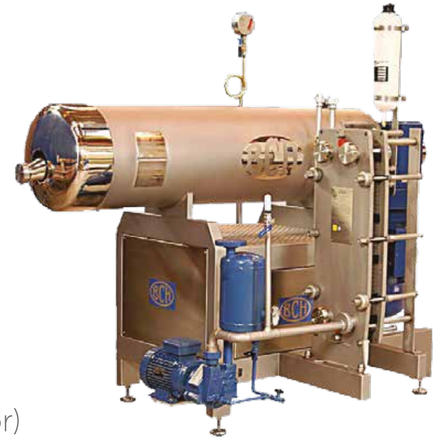


Cooking

Continuous Liquorice Production System

A batch of continuous slurry is automatically weighed and mixed in the slurry mixer at temperatures of between 50-60°C, with a moisture content of 20%. It is then transferred to the holding vessel by pump and in-line emulsifier. The slurry is held at temperature in the holding vessel and agitated, prior to being pumped on demand into the continuous cooker.

The Viscotator Scraped Surface Cooker raises the temperature of the slurry to achieve gelatinisation, the consistency being controlled by auto steam pressure control and product back pressure valve.



Continuous Cooker (Viscotator)

The Viscotator is designed to continuously cook or cool a wide range of food and confectionery products using a scraped surface heat exchanger design. It offers maximum process versatility with the ability to continuously cook or cool both viscous and particulate food products.

Due to its superior heat transfer performance, the Viscotator can be employed in the continuous processing of many pumpable fluids or slurries.

With a spiral flow water jacket or a direct expansion refrigerant jacket, the Viscotator is also suited to the cooling of a range of food and confectionery products.

- Soups
- Sauces
- Custards
- Spreads
- Caramel
- Liquorice
- Pet foods

Features:

- All stainless steel construction
- Self-draining vertical or horizontal heat exchange tube mounting
- Rotor directly driven by geared motor (power and speed selected to match product and process)
- Simple and safe rotor extraction with protected cartridge type mechanical seal
- High thermal efficiency
- Good product movement in the heat exchange area and minimal build up on the scraper blades
- Maximise cooling/heating medium flow efficiency with different jacket options
- Rotor options allow for minimum shear to foods containing particulates

Batch Cooking (FM Cooking)

Liquorice slurry with a water content of around 30-35% is supplied from the BCH liquorice slurry mixing vessel, prior to transfer to the Final Moisture (FM) Cooker.

The FM Cooker is a stainless steel mixing vessel mounted on load cells to determine the input and output weight, thereby giving the final moisture content of the cooked paste.

Features:

- Steam jacket for automatic temperature control
- Contra-rotating agitator with efficient cooker scraper design (ensuring that the paste has fully gelatinised and has reduced the final moisture content to 18% prior to transfer to the extruder).
- Discharge via large automatic valve for transfer to the BCH extruder
- Valve and pipe arrangements to accommodate all liquid and dry ingredients

Colour & Flavour Addition

BCH provide colour and flavour dosing stations which can supply up to four independent colours and flavours to the line. Mixing is achieved through high pressure mixing chambers with all additions monitored and maintained through the plant control system.

Colour mixing is achieved through high pressure static mixers fitted on the inlet side of the flow divider.

Sugar Paste Production

BCH's sugar paste system comprises of a sugar mucilage cooker and a Z-arm duplex trough mixer. The resultant sugar paste is fed to a side flow extruder to produce the combination extrusion of sugar and liquorice paste.

The mucilage cooker is a steam jacketed vessel with an anchor type stirrer which can be complemented by a high shear mixer. The combination of these two mixers together with the steam heating, results in a fully homogenous syrup mix.

The vessel is load cell mounted with microprocessor and recipe controls. The syrup is transferred to the Z-arm duplex trough mixer by a positive displacement pump and jacketed pipework. Icing sugar is fed into the mixer, and together with the sugar syrup the resultant mix produces a sugar paste. The Z-arm duplex trough mixer is robustly designed to give a thorough mixing action, prior to tipping into empty mobile bins.

The mobile bins are transferred to the extruder and mechanically tipped into the feed hopper of the sugar paste extruder.

The liquorice and sugar paste extruders would require the addition of a specially designed die head to produce a dual extrusion of liquorice and sugar paste in a number of combinations.

Z Blade Mixer

BCH manufacture a range of stainless steel Z-arm mixers from 75kg to 500kg capacity. The mixers are equipped with direct driven inverter speed controlled rotors.

- Sugar Paste
- Gums
- Spreads
- Chemical Process

Options

- Vacuum or positive pressure process
- Water or steam jackets
- Insulation
- Load cell operation
- Screw discharge
- Stainless steel or mild steel painted construction

Extrusion

BCH's food and confectionery extruders are manufactured in stainless steel to a hygienic and robust design.

Primarily designed to handle liquorice, starch gels, fruit twists and sugar pastes, these extruders can also handle viscous food pastes and gels.

- High boil syrups
- Caramels
- Liquorice
- Fudges
- Nougat/Praline
- Gels
- Fat-based products

Side Flow Extruders

The extruders are manufactured with 75, 130, or 200mm diameter screws to achieve throughputs of between 50-1,500 kg/hr via a side flow die configuration. The side flow dies will extrude over widths from 300-1200mm at right angles to the screw axis. Side flow dies can be designed to extrude sheets, ropes and twisted ropes in solid, hollow or co-extruded form.

The side flow design provides a cost effective, high output system with good uniformity of product weight across the die width. This uniformity is achieved by careful design of the screw across the die mouth; regulating/throttling plates/screws on the dies and for some products, a positive displacement pump on each rope.

The extruders are usually mounted on rails to position the dies over a retracting nose piece on the BCH high performance cooling tunnels. For die changing and cleaning, the extruders can be wheeled off line.

The main barrel of the extruder is water jacketed to minimise start up times, maximise extrusion efficiency and in the case of the twin screw mixer extruder, provide heat transfer.

Continuous or Batch Fed Extruders

The extruder is fitted with a small vacuum inlet hopper to receive liquorice directly from the continuous cooker (Viscotator). The vacuum hopper enables the extrusion of a cooler, drier and firmer liquorice product. When fitted with a larger feed hopper, batch fed product is possible.

Twin Screw Mixer Extruder

This type of extruder enables the mixing of colours, flavours and acid into a cooked liquorice base. Using this type of extruder, colour and flavour contamination of the premix and cooking equipment is eliminated, enabling rapid colour changes, minimal loss of flavour, minimal sugar inversion and starch gel breakdown. The extruder is fitted with a screw extraction system for rapid and easy cleaning.

This mixer extruder is an efficient continuous mixer for multiphase products, such as sugar paste, seeded chew syrups and cereal bar mixes.

4 Colour 4 Flavour Extruders

Suitable for any viscous product:

- Sugar paste
- Caramel
- Fudge
- Chocolate
- Nougat
- Chew

The process begins with a neutral cooked product being fed into a high pressure, low shear extruder. The product is split into 4 channels, each of which can be individually coloured and flavoured.

Up to 40 ropes can be extruded onto the BCH cooling/drying tunnel each of which contains the 4 colours in equal metered proportions.

The flow control of each colour channel to each rope is automatic, and no manual regulation of the machine is required, leading to quick start-up and guaranteed rope weight control.

Rope can be extruded in a huge variety of shapes and designs including twisted, straight, flat strap, squares and stars. They can also have hollow or filled centres.

- Labour saving with quick start-up
- Unique CIP System reducing energy costs
- Flexible and fast colour change

Co-extrusion

To complement the range of extrusion solutions, the addition of further equipment gives the flexibility of manufacturing co-extruded products.

There are a large range of combinations such as liquorice/sugar paste and liquorice/pectin gel.

Co-Extrusion - Liquorice/Sugar Paste

BCH also offer a solution for the production of sugar paste which comprises of a sugar mucilage cooker and a Z-arm duplex trough mixer. The resultant sugar paste supplies the side flow extruder in order to produce the combination extrusion of sugar and liquorice paste.

The mucilage cooker is a steam-jacketed vessel with an anchor type stirrer which can be complemented by a high shear mixer. The combination of these two mixers together with the steam heating, results in a fully homogenous syrup mix.

The vessel is load cell mounted with microprocessor and recipe controls. The syrup is transferred to the Z-arm duplex trough mixer by a positive displacement pump and jacketed pipework. Icing sugar is fed into the mixer, and together with the sugar syrup the resultant mix produces a sugar paste. The Z-arm duplex trough mixer is robustly designed to give a thorough mixing action, prior to tipping into empty mobile bins.

The mobile bins are transferred to the extruder and mechanically tipped into the feed hopper of the sugar paste extruder.

The addition of a specially designed die head is used for the production of liquorice and sugar paste in a number of combinations.

Co-Extrusion - Liquorice/Pectin Gel

The liquorice/pectin gel application is achieved through the addition of mixing and holding vessels combined with a local colour and flavour dosing station. There is a feed pump to the extrusion assembly which is configured in the same way as that of sugar paste.

Continuous Fruit Cooking & Extrusion Systems

BCH has developed a new 100% fruit cooking and extrusion system for the manufacture of healthy snack products. This is in response to the latest customer trends for natural, organic and clean ingredient labels.

The system is a combination of BCH's MaxiVap Evaporator technology, (used for long running caramel plants) and liquorice extrusion technology.

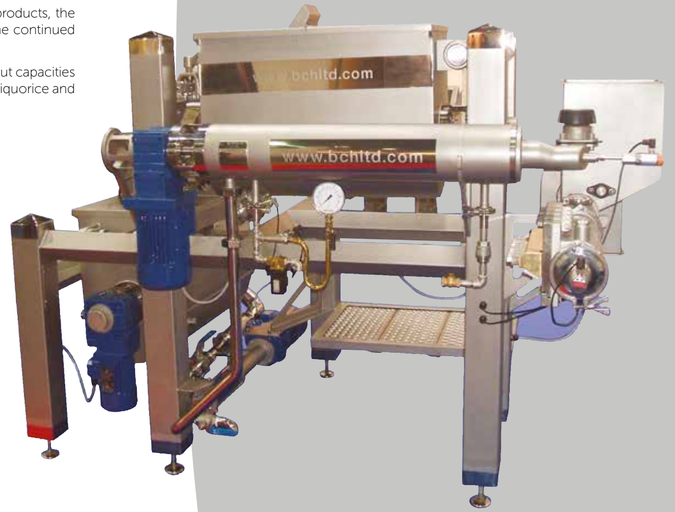
The fruit cooling and extrusion system enables the evaporation of high moisture fruit mixes to typically 85% solids, at which point they have the consistency of soft dough which can then be extruded. This then enables the production of a healthy snack bar using 100% fruit ingredients which can be co-extruded in a variety of different colours, shapes and flavours.

Micro Extrusion Lines

The BCH micro confectionery extrusion line is a new user-friendly and cost effective solution, ideal for start-up companies or mature companies who wish to gain a foot hold in this sector without committing to a large financial outlay. For larger manufacturers, it is also suitable for recipe development and marketing sample production.

In addition to its ability to extrude traditional confectionery products, the Micro Extrusion Line has been designed to accommodate the continued move towards more responsible healthy-eating attitudes.

The Micro Extrusion line has a 300mm product width for output capacities of up to 150kg/hr of liquorice product and up to 300kg/hr of liquorice and sugar paste co-extrusion.



Cooling Tunnels & Process Conveyors

Originally designed for the specialist high temperature and rapid cooling requirements of extruded liquorice confections, BCH has launched a modular range of conveyors and tunnels for the efficient transport, cooling and conditioning of food products.

A BCH cooling tunnel or process conveyor can be incorporated into a full process line using a fast and simple installation.

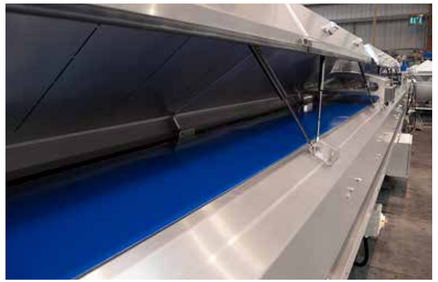
The conveyor widths are available from 300-2000mm in modular stainless steel sections and apply a hygienic design for easy access and cleaning.

The cooling tunnels use a high velocity air cooling with water cooled tables or parallel air flow cooling above and below the belt.

Features:

- Modular construction
- Hygienic design
- Ease of installation
- Specialist conveyor design
- Process cooling design
- The standard air conditioning unit can accommodate up to 70kW of cooling capacity
- Brine or direction expansion (DX) refrigeration systems (optional)
- Air circulation volumes 2.7M^3/sec can be handled in the standard configuration
- Optional de-humidification by air re-heating or dehumidifiers
- High performance cooling via carefully pitched air knives
- Gentle cooling velocities achieved by flow and counter flow air directions
- Under belt cooling available by means of pressurised water cooling coils in copper

Optional customised features are available.



Multi-Tier Cooling and/or Drying Tunnel

The cooling/drying tunnel has been designed with efficiency and hygiene in mind. It is fabricated throughout in stainless steel with an open grid plastic modular belt. The tunnel is fitted with stainless steel, (optionally insulated), easily removed covers giving access to product areas and ductwork.

The 3 tier construction has a structure of stainless steel pipework, which not only acts as the frame for the tunnel, but also the ductwork delivering air through laser cut slots at 20m/sec onto the product. The slots extend the full width of the belt and are positioned every 400mm down the conveyor length on each of the one or more tiers.

The pipework is made in dairy pipe with tri-clover fittings for easy disassembly for cleaning if required.

Each tier is fitted with an open structure plastic modular belt running on plastic chevron strips. Each tier is individually speed controlled for process control. Any product dust/debris is allowed to fall through the open structure and collect on the open, flat stainless steel floor where it can be easily removed.

Hot and moist air rises and the tunnel is designed to use natural convection currents to achieve maximum cooling and drying efficiency. The cooled and/or dried air enters at the base of the tunnel, and is blown up through the product and removed for re-conditioning from the top of the tunnel.

Benefits:

- Reduces floor space
- Easy access to product and to clean
- Achieves maximum cooling and drying efficiency

Glazing & Sanding

BCH offer equipment for the glazing/oiling of traditional liquorice products, and the sugar/sour (Pica Pica) coating of fruit flavoured liquorice products.

Glazing Unit

Glazing units are installed within the cooling section of the line for liquorice ropes to pass through an alcohol/wax batch at 45-60°C.

Downstream cooling allows the excess alcohol to evaporate off leaving only the wax coating behind.

Sanding Unit

The Sanding Unit is located between the cooling tunnel and guillotine and consists of a steam spray cabinet, sugar application conveyor and sugar feeder.

Features:

- Enclosed infeed section with spray device to moisten product surface
- Secondary section belt with base layer coating
- Feed hopper for curtain application with thickness control

Caramel

BCH is at the forefront of caramel production technology and is a specialist provider of both batch and continuous production methods which minimise 'burn on'.

Our latest continuous system can run non-stop for 14 days without cleaning. This new system has split the Maillard reaction into two sections, allowing independent control of moisture content and colour/flavour development.

Our famous "Low Type" cookers have long been regarded as the industry standard for batch production, many of our customers citing that truly high quality products can only be made on this machine.

Another exciting BCH development is the extrusion of caramel for continuous biscuit lines; this highly accurate depositing method can be linked to our continuous caramel production system for a complete process solution. BCH also offer a caramel enrober, cooling tunnels and guillotines as part of our complete caramel portfolio.

Confectionery Guillotines

Products:

- Chocolate / Caramel
- Sausage Rolls
- Sponge
- Straps
- Liquorice
- Marshmallow

BCH offer Standard, Automatic, High Speed and Ultrasonic Cut Guillotines to maximise the flexibility of any production line. Manufactured with the latest stainless steel hygienic design, they are user friendly, easy to clean and maintain and are competitively priced.

The range is specially designed to cut both soft and sticky products without adhering to the blade and with minimal crumbling of product.

Guillotines can be modified to suit specific customer requirements.

Features:

- Cuts speeds of 0-200 cuts/min
- Automatic cut length control from 10mm to 10m via HMI on control panel
- Automatic belt tracking
- Automatic blade advance width product to maintain square cut
- Belt speed and cut length adjustable directly from HMI while guillotine is in production
- All stainless steel and aluminium construction
- Guillotine blade of hard, mirror polished stainless steel running between spring steel scrapers or PTFE coated with Nylon scrapers
- Adjustable height product hold down bars for product up to 25mm high

Optional Features:

- Continuous cut mode for cut speeds up to 580 cuts/min
- Two axis servo motion control for cut speeds up to 420 cuts/min and belt speeds up to 20m/min for full horizontal axis motion control
- Ultrasonic knife for sticky/fragile products for cut speeds up to 100 cuts/min and belt speeds up to 20m/min
- All installations are PLC controlled

Drop Rollers

- Lab & production model
- Hand driven
- Motorised
- Water cooled

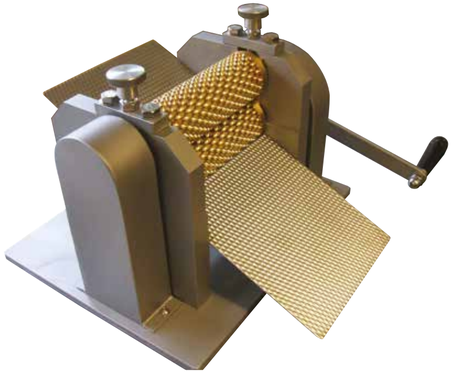
BCH produces a comprehensive range of drop rolling machines for all hard candy, toffee and gum manufacturers. They have been sold around the world since they were first manufactured in 1835.

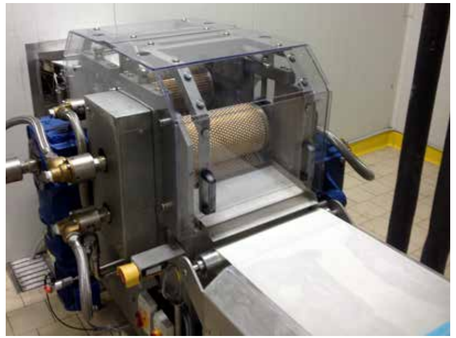
There are a large variety of sizes available from a 1kg sample product machine to a 600kg/hr machine.

Rollers are manufactured from phosphor bronze as standard and simple designs are available in stainless steel and PTFE coated rollers. Additional rollers can be purchased with any pattern and are interchangeable.

Benefits:

- Hand operated or motor driven
- Hygienic design for easy access and cleaning
- Versatile – rollers are easy to replace
- Custom built rollers to your specification
- Water cooled rolls when motor driven



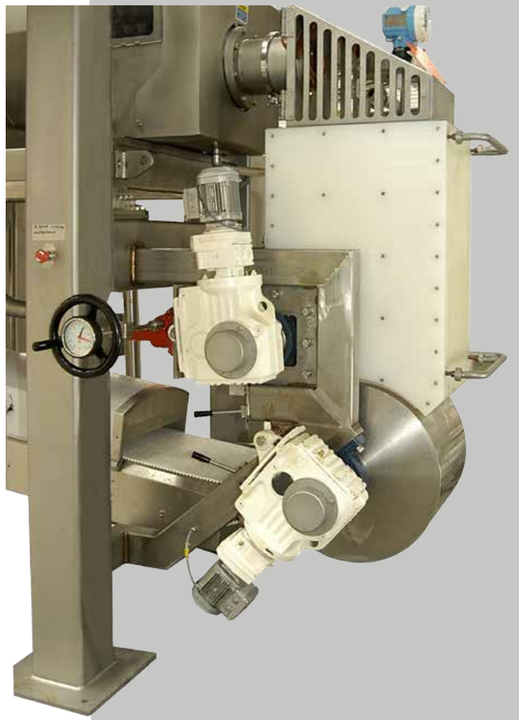


Slab Formers

- Caramels
- Fudges
- Nougats
- Pastes

Features:

- High efficiency water cooling channels
- Jacketed feed hopper
- Adjustable gap control
- Quick remove scrapers



Coating Pans

BCH manufacture traditional style pans for the coating of hard candy with either chocolate or sugar, or for candies requiring a high acidity coating. They are a tilting design with a motorised rotating mechanism.

The pans can be manufactured in capacities up to 500kg, and come in either a standard or tulip shape.

BCH has seen many improvements to the design of this type of pan over the years making it more adaptable, efficient and easier to use than ever.

Ultra Coater

- Biscuits
- Wafers
- Fudge

The BCH 'Ultra Coater' Enrober is used for the full and half coating of confectionery with caramel, jams, fats, jellies, fondants and crèmes.

Fabricated in stainless steel, the 'Ultra Coater' is designed to handle water-based coating that require regular and easy cleaning. Viscosity can be carefully controlled via temperature and humidity controls.

Coating pans can also be fitted with spray manifolds for the application of thin coatings such as oils, liquid fats and glazes.

Features:

- Full or half coating of biscuits, cakes and confectionery
- Multi-layered extrusion onto biscuit bases
- Rice crispy coating & recovery equipment
- CIP built-in
- Humidity & temperature control

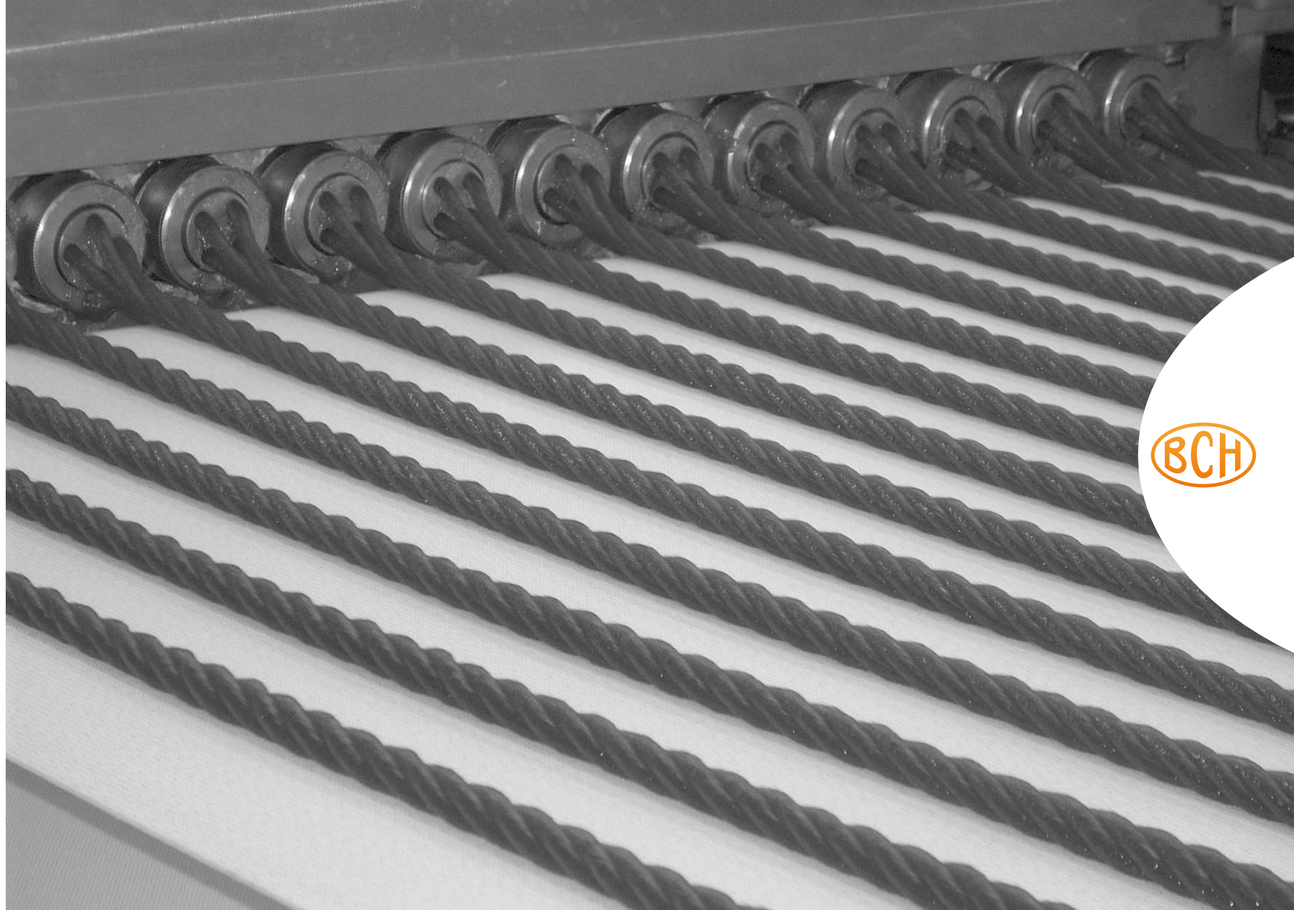
Process Automation

Calling on our vast experience in the confectionery industry, our electrical and software engineers will develop a control system using the most up-to-date technology available.

The system will specifically match the process requirements of any individual plant, whether it is a stand-alone relay control panel or a complete networked plant requiring a turnkey solution.

The software can be developed for use on any of the leading PLC manufacturer's equipment. A full SCADA package can be added to include recipe management, real time and historical trending, batch reports and complete system overview if required.

- System design from basic concept
- Control panel design and building
- Software design
- In-house testing and pre-commissioning
- On-site installation
- On-site commissioning
- Technical support and training



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