Liquorice / Starch Gel Production

Contents

About BCH

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

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.

Our UK site also houses an Innovation Centre. The Centre boasts 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 provide assistance with new product and process development as well as equipment evaluation before initial investment.

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

Liquorice & Starch Gel Process Systems

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.

Today's production lines incorporate the latest developments in efficiency, hygiene, automation and modern design. Liquorice is manufactured from wheat flour, starch, sugar, molasses, glucose syrups, fruit purées and flavourings that are blended together to make a slurry. The resultant slurry is cooked, thus allowing the starch particles to expand and gelatinise. The liquorice can then be extruded into various shapes, colours and flavours through a wide range of configuration options.

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

Confectionery Kitchens

BCH provide a wide range of confectionery kitchens capable of producing various types of liquorice and starch gels.

A typical confectionery kitchen can contain the following equipment;

Pre-Mix Vessel

This stainless steel mixing vessel is mounted on load cells for automatic weight control of ingredients and allows both automatic and manual loading of dry and liquid ingredients.

The vessel is steam jacketed for automatic temperature control and is designed for precise, homogeneous mixing. Delivery to the next process can be achieved via pumping, gravity, or vacuum matched to the process , and it can be fitted with a product screening facility.

Batch Cooking

Made from stainless steel, this machine is typically steam jacketed and can cook under atmospheric, pressure or vacuum conditions as required. Cooking operations can be to a weight, time, temperature or total sugar solids (Brix). An agitator provides continuous mixing of the product.

Continuous Cooking

Our technical team will design a process matched continuous cooking system suitable for cooking the product to the highest quality and efficiency.

BCH manufactures scraped surface cookers (Viscotator) for low, medium, and high-temperature cooking, as well as under pressure conditions.

Our Maxivap cookers operate under vacuum conditions where moisture is removed from the mass to achieve required conditions. A high-speed agitator ensures continuous product movement.

Holding Vessel

This stainless steel machine can be jacketed with steam or hot water, as required and provides a buffer prior to transfer to the next process on demand for efficient, continuous operation. An agitator mixes the product, and automatic discharge valves are fitted with a product screening facility, if required.

Rework Processing System

The optional Rework Processing system, made from stainless steel, is designed for the processing of start-up / shut-down waste.

Mounted on load cells for automatic weight control, the option of steam or hot water jacket for precise temperature is also included. An automatic discharge valve facilitates easy disposal / emptying.

Batch vs Continuous Cooking

BCH offer both batch and final moisture liquorice cooking solutions for a wide variety of liquorice products from traditional black liquorice to co-extruded, multi colour liquorice.

Batch Cooking (FM Cooking - Final Moisture)

The batch cooking method is good for traditional liquorice production or where a single colour/flavour liquorice is produced in large batches.

The FM (Final Moisture) 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 mass.

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.

A refining system can also be incorporated into this line to improve the texture.

Benefits

- Even product dispersion
- Fully gelatinised paste
- Clean jacket surface
- Automatic process control system

Continuous Liquorice Production System

The continuous liquorice production system provides a solution that reduces labour and handling requirements.

A batch of continuous slurry is automatically weighed and mixed in the slurry mixer. It is then transferred to the holding vessel by pump.

The slurry is prepared in a pre-mix vessel and transferred to the holding vessel.

The slurry is held at temperature in the holding vessel and agitated, prior to being pumped at a constant rate into the continuous cooker.

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

Benefits

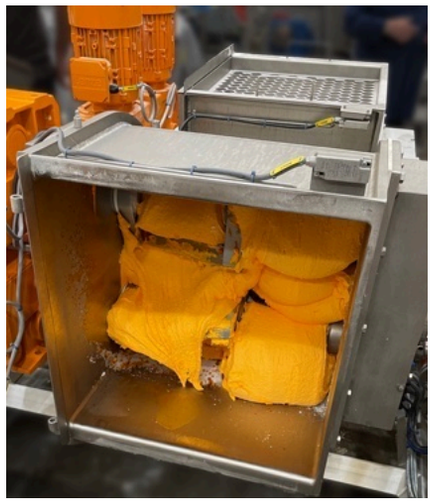
- More options for product shape and design
- Faster throughputs
- Labour reducing
- Energy efficient
- CIP (Clean In Place)

Sugar Paste Production

Commonly used in co-extruded liquorice products for added flavour, sugar paste is made using fine powdered sugar, mixed with a binding syrup, typically made from sucrose and glucose.

BCH's sugar paste production system typically comprises of a syrup/mucilage cooker and a Z-arm duplex mixer, with or without discharge screw.

The resultant sugar paste is fed to a side flow extruder to produce the combined extrusion of sugar paste and liquorice as required.



Syrup Mucilage Cooker

The mucilage cooker is a steam jacketed vessel with an anchor type stirrer together with steam heating, resulting in a fully homogenous syrup mix.

The vessel is load cell mounted with recipe controls. The syrup is transferred to the Z-Arm duplex mixer by a positive displacement pump and jacketed pipework.

Z-Arm Mixer

The Z-arm duplex mixer is robustly designed to give a thorough mixing action, prior to discharging into empty mobile bins.

Icing sugar is fed into the mixer, together with the sugar syrup, colour, flavour and other inclusions to form a sugar paste mass.

BCH manufacture a range of stainless steel Z-Arm mixers. The mixers are equipped with direct driven inverter speed control for the production of sugar paste.

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

A specially designed manifold and die configuration can be added to produce co-extrusion liquorice and sugar paste in a wide range of combinations.

A second sugar paste extruder can be introduced to allow for two colours of sugar paste to be formed on the line.

Viscotator

The Viscotator is designed to continuously cook liquorice products using a scraped surface heat exchanger design.

Depending on the recipe the Viscotator is capable of reaching temperatures between 120°C - 135°C before it reaches the Extruder.

The Viscotator provides maximum process versatility due to its superior heat transfer performance. The design ensures minimal build up on the scraper blades due to good product movement.

A range of power and speed options are available dependent upon the product and this is matched specially to the process, allowing for better batch success.

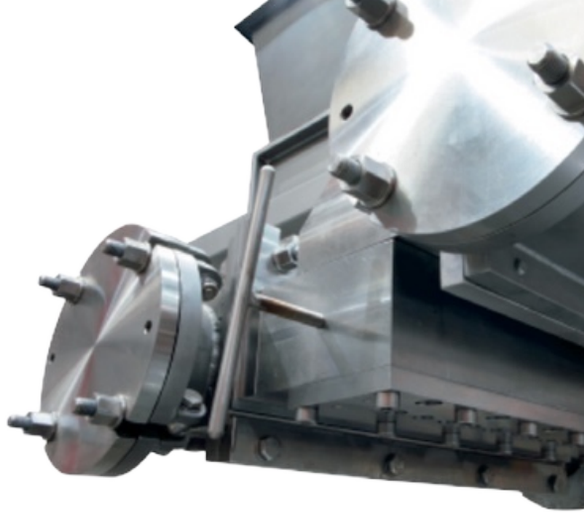
Features

- All stainless steel construction
- High thermal efficiency
- Self draining vertical or horizontal heat exchange tube mounting
- Fully CIP-able (Clean In Place)

Product Sizes

Range	Output
300	50 kg / hr
900	250 kg / hr
1200	500 kg / hr
1800	1000 kg / hr

Co-Extrusion

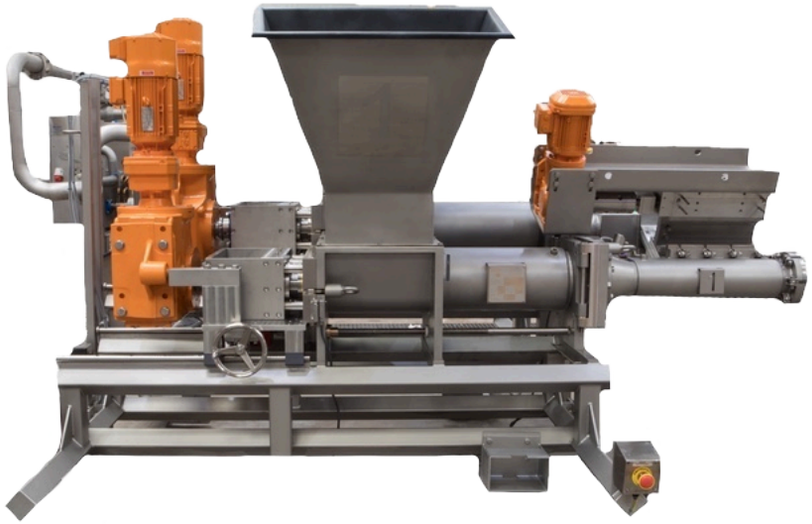


To complement the range of extrusion solutions, the addition of further equipment gives the flexibility of manufacturing co-extruded products.

A variety of options can be achieved from different colours, flavours and shapes. The BCH confectionery equipment provides the ability to add co-extruded forms to liquorice production after initial investment, to allow for product expansion and variety.

Liquorice / Sugar Paste

Liquorice / Sugar paste co-extruded products are achieved by joining a liquorice extruder and paste extruder using a specially designed manifold to combine the liquorice and paste in the required format.



Liquorice / Pectin Gel

Liquorice products can be co-extruded with a pectin gel centre filling.

The pectin gel is pumped into a manifold attachment in the liquorice system at a constant rate to achieve an even filling to each extruded rope.

Colour & Flavour Addition

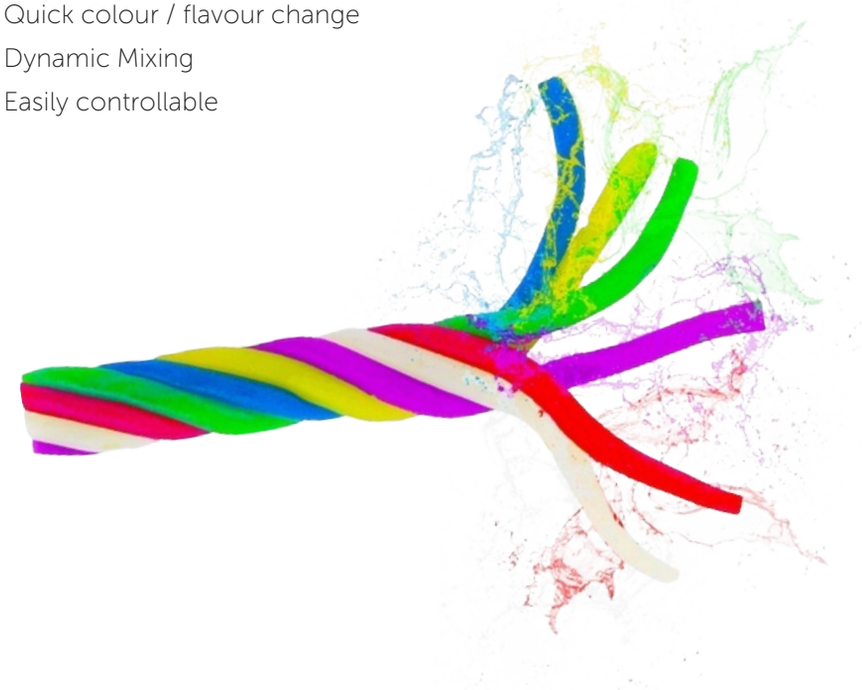
BCH provide colour and flavour dosing stations which allow up to six independent colour and flavours to be supplied to one line.

Mixing is achieved through the DMS range of dynamic mixing systems to provide a homogeneous mass of colour and flavour.

Control and monitoring of dosing is achieved via the line control system.

Benefits

- In line addition
- Quick colour / flavour change
- Dynamic Mixing
- Easily controllable



Multi-Colour Multi-Flavour Extrusion

The multi colour multi flavour system is capable of providing up to 6 individual colours and flavours. Utilising the BCH Twin Screw Extruder a neutral cooked product is fed into the extruder before being split into individual channels with colour / flavours precisely metered into each individual channel and mixed in-line.

- Labour saving with quick start-up
- Unique CIP System reducing energy costs
- Flexible and fast colour changes
- Eliminates colour & flavour contamination of the premix
- Equal and uniform colour and flavour streams.

Extrusion

BCH'S confectionery extruders are primarily designed to handle liquorice and starch gels and are manufactured in line with customer requirements for a large variety of liquorice shapes and sizes.

Incorporating a BCH extruder into your production capacities allows for equal weight control, limited contamination of different colours and flavours, as well as providing a wide variety of shapes, centres and flavours/colours in liquorice products.

The extruder range can also be expanded after initial investment to include more options for liquorice production.

Twin Screw Extruder

The BCH Twin Screw Extruder is designed to receive continuously cooked liquorice for extrusion at higher pressures.

- Gentle product handling and low shear pressure development.
- Screw extraction system for rapid and easy inspection.
- Extended running time & low maintenance
- Hygienic design
- CIP option available
- Low energy consumption
- Precise continuous pressure
- Quick start up times
- Labour saving

Side Flow Extruders

Typically used for centre fillings / co extrusion applications or for the extrusion of batch cooked liquorice.

- Cost effective
- High output
- Good uniformity of product weight
- Minimal start up times (water jacketed main barrel)

Micro-Extrusion Lines

The Micro Extrusion Line has been designed to accommodate the continued move towards more responsible healthy eating attitudes.

It offers output capacities of up to 150 kg/hr for liquorice and 300 kg/hr for liquorice and sugar paste co-extrusion.

- User friendly
- Cost Effective
- Suitable for recipe development and marketing samples

Flow Divider

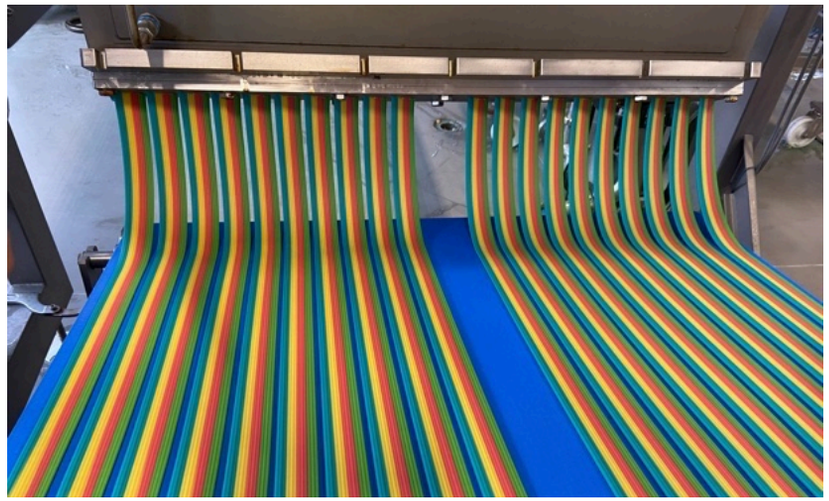
A BCH Flow Divider is designed to provide uniform weight control of individual product streams to be extruded easily and effortlessly, allowing for more consistent product across the belt.

The BCH flow divider is used in conjunction with our extruder range to deliver uniform weight control of product streams to each of the product lanes during liquorice production.

Featuring individual product channels, the flow divider is available in various sizes each with their own drive. This generates equal flow across the manifold, to feed the liquorice evenly through each individual channel.

Features & Benefits

- Fully automated weight distribution of product channels
- Exclusively for liquorice extrusion (up to 6 colours) - extruded simultaneously
- Die plates easily interchangeable with a variety of shapes and sizes available
- Die plates manufactured in house to customer requirements



Cooling Tunnels & Process Conveyors

Extruded Liquorice confections require specialist temperature and humidity control and rapid cooling requirements. Our range of conveyors and tunnels allow for efficient cooling and conditioning.

A BCH cooling tunnel or process conveyor can be incorporated into a full process line using a fast and simple installation. Manufactured throughout in stainless steel, this hygienic design is constructed using a modular design. The Cooling Tunnels also have ease of access for cleaning.

Using high velocity air cooling along with a water cooled table or parallel air flow cooling above and below the belt.

Dependent on customer specifications, conveyor widths are available in a range of sizes from 400 - 1600mm in modular stainless steel sections.

Multi-Tier Cooling and/or Drying Tunnel

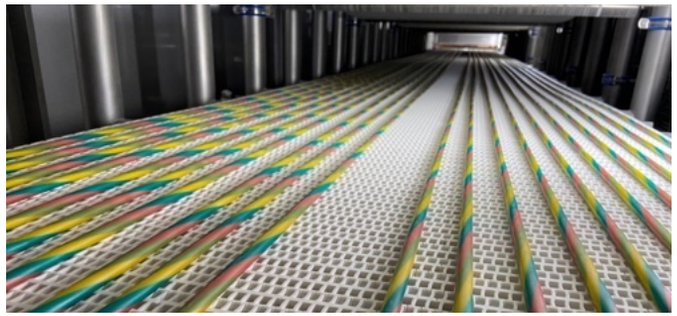
Whether space is an issue or there is a need for a bigger production capacity , BCH have designed a multi-tier cooling / drying tunnel, for maximum efficiency, while reducing floor space.

Fabricated throughout in stainless steel and with hygiene in mind, a 3 or 5 tier construction is available.

Tiers are fitted with an open structure plastic modular belt on plastic chevron strips. Individual speed settings of each tier is included for maximum process control.

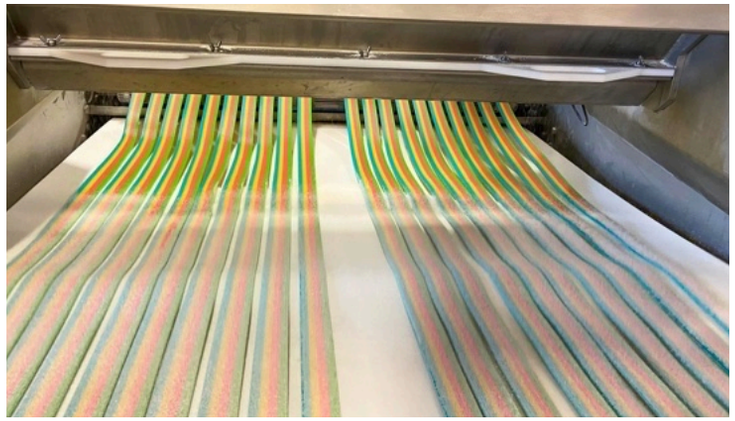
Hot and moist air rises and the tunnel is designed to use natural convection currents to achieve cooling and drying efficiency. The cooled and/or dried air enters at the base of the tunnel, and is blown up through the product and removed for re-conditioning at the top of the tunnel.

Product dust and debris is allowed to fall through the open structure and collect on the open stainless steel floor where it can be easily cleaned.



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

Glazing units or dip baths are installed within the cooling section of a liquorice line to allow the extruded ropes to pass through a glazing medium wax bath.

Downstream cooling allows the excess glazing medium to evaporate off leaving only the wax coating behind, this provides the perfect surface to make sure the product doesn't stick together when packaged.

Sanding

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

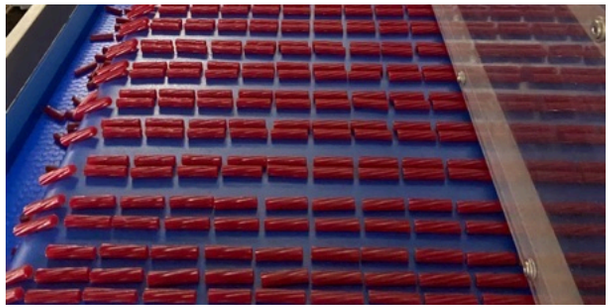
The addition of a sanding unit allows for the capability of a range of sugar / sour coated products.

Features

- Enclosed infeed section to moisten the product surface
- Secondary section belt with base layer coating
- Feed hopper for curtain application with thickness control
- Vacuum hopper
- Self Contained
- Modular Design

Confectionery Guillotines

BCH offer automatic, high speed and ultrasonic cut Guillotines to maximise the flexibility of any liquorice production line.



The guillotine range from BCH allows for even more options in liquorice production.

The belt speed and cut length can be adjusted directly from the HMI screen, even while the guillotine is in production. This eliminates the need to pause production, saving time and costs.

Manufactured with the latest stainless steel hygienic design, they are user-friendly, easy to clean and maintain.

Features

- Cut speeds of 0-500 cuts/min
- Automatic cut length control from 5mm to 10m via HMI on control panel
- Automatic belt tracking
- Adjustable height product hold down bars to accomodate a wide range of product heights.
- Belt speed and cut length adjustable directly from HMI while guillotine is in production
- Optional blade oiling system
- Optional ultrasonic cutting solution

The guillotine can be modified to suit specific customer requirements.

Types of Guillotine cuts

- Pieces
- Spaghetti
- Ropes
- Strap
- Co-Extruded Allsorts

CIP (Clean In Place) Systems

As our customers are driven to improve their hygiene protocols to satisfy their requirements, BCH have worked very closely to develop a clean in place system that allow the feed line from the liquorice line to be cleaned in place.

Our liquorice line is provided with a high-pressure, high-volume CIP recirculation & scavenge pump complete with interconnecting hygienic pipework. The system will re-circulate hot wash water through the cooker, extruder and flow divider/die assembly.

The waste water is collected in a mobile return water tank which is fitted with a removable screen filter so solids can be separated from the water, and the water passed back through the tank into the CIP pump for continuous recirculation.

Our sugar paste equipment has been designed for simple disassembly to allow cleaning to take place off line.

The liquorice dies are also cleaned as part of the process, the dies are simply removed after cleaning and are ready for the next time they are needed – this saves a significant amount of labour costs when considering total cost of ownership.

CIP recirculation process

Advantages

- Fast product and dye change overs
- No need to strip liquorice equipment down for cleaning
- Fully guarded CIP and collection tank
- Cleaning chemicals can be used and disposed of in a safe manor

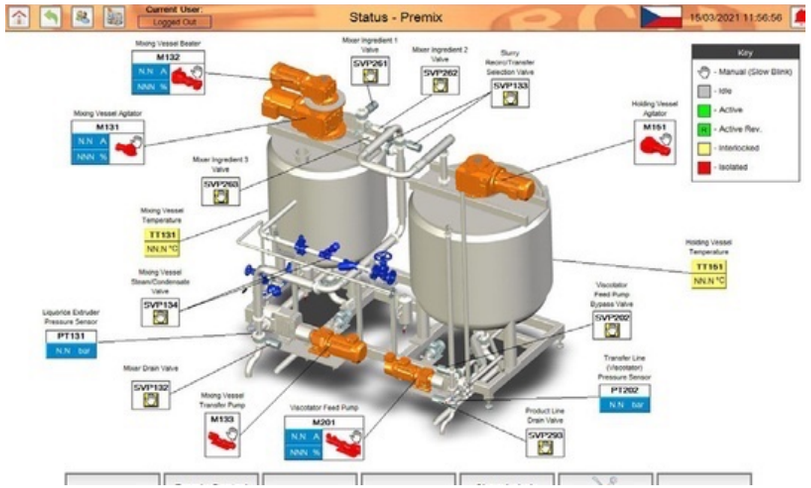
Our Services

Process Automation

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

The system will specifically match the process requirements of any individual plant, whether it is a standalone basic relay control panel or an intelligent networked plant requiring a turnkey solution.

The software can be developed for use on any of the leading PLC manufacturers' equipment. A full package can be added to include recipe management, real time and historical trending, batch and CIP reports, and cloud based monitoring/data storage if required.



Spares & Service

BCH is fully committed to providing all of its customers with a world class after-sales service. As part of this service, we offer a full range of replacement parts for both new and existing plant and equipment, as well as service, commissioning and installation packages.

The OEM spare parts supplied are of guaranteed quality to ensure our equipment remains achieving optimum performance. We also work hard to ensure fast delivery of parts to minimise production disruption.

Our service department is on hand to offer assistance with the installation of spare parts on site, as well as providing health checks on equipment.

BCH also offer installation and commissioning packages on equipment to ensure machinery is fitted correctly and to a high standard, so production can begin quickly.

BCH Ltd

Spring Place
Millfold
Whitworth
Lancashire
OL12 8DN
UK

+44 (0)1706 852122

info@bchltd.com

www.bchltd.com