Baker Perkins

# Industrial Extrusion

# The Best Twin-Screw Design for Powder Coating

Baker Perkins manufactures a comprehensive range of twin-screw extruders precisely engineered for powder coating applications, from small batch to continuous high-output production.

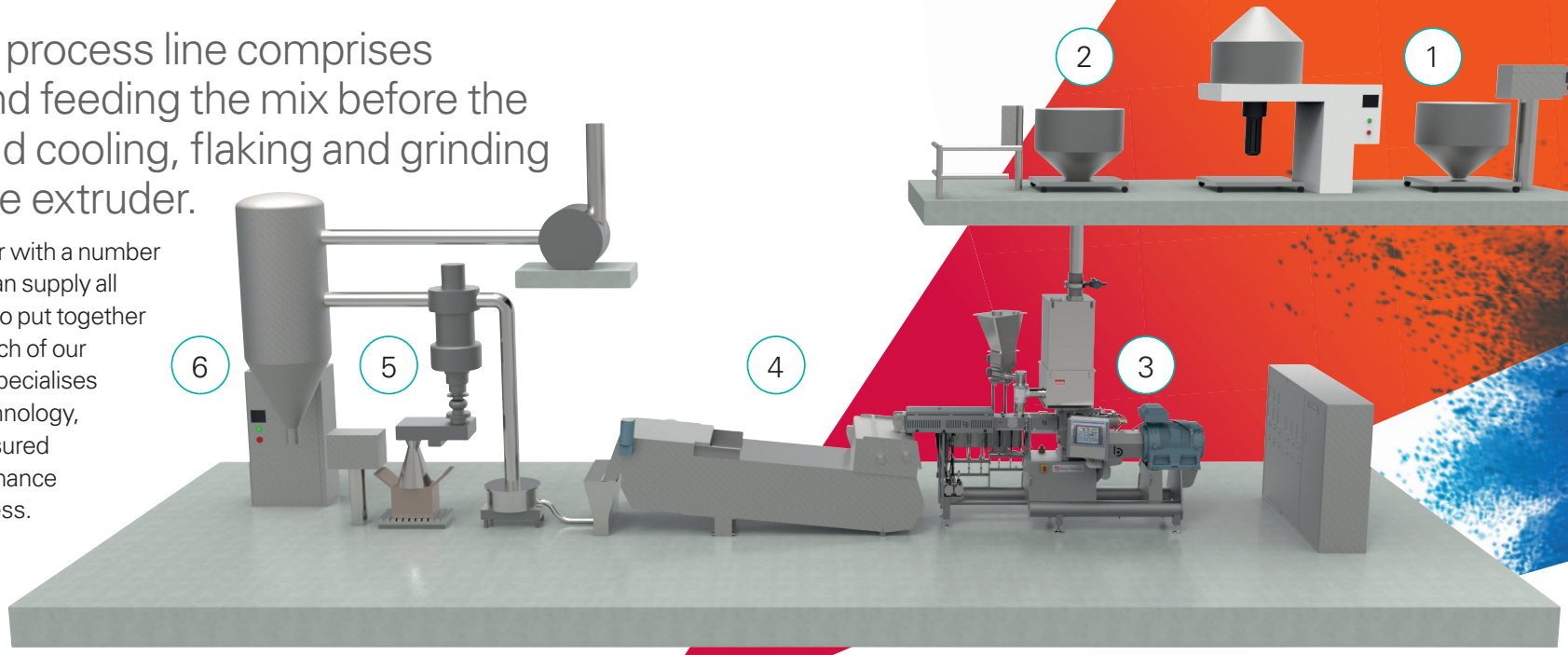
Careful consideration of screw profiles, high free volume geometry and unique, patent-pending innovations such as the MAX³ feed system enable our extruders to process the greatest quantity of product for the minimum of power and cost. They are suitable for all types of powder coating formulations, including epoxy, hybrids, polyester, acrylics and fines recycling.

Baker Perkins was the first company to design and build a twin-screw clamshell machine in 1975. Now acknowledged as the most versatile production process available, we have taken the lead in technological advances ever since, and our best-in-class MPX continuous production extruders now combine a wealth of technical advances pioneered over the years.

# Process

## A complete process line comprises weighing and feeding the mix before the extruder, and cooling, flaking and grinding following the extruder.

Baker Perkins partner with a number of companies who can supply all equipment required to put together a full process line. Each of our partner companies specialises in their particular technology, so customers are assured of consistent performance throughout the process.




### 1 Mixing

Raw materials are converted into a homogeneous mix

### 2 Weighing & Feeding

A range of feed options to suit the process or materials, including:

- Top-feeding gravimetric and volumetric feeders for accuracy with maximum space efficiency
- Side feeders for ultra low-density materials
- Purge feeders for barrel cleaning materials

### 3 Baker Perkins MPX Extruder

### 4 Cooling, Solidifying & Flaking

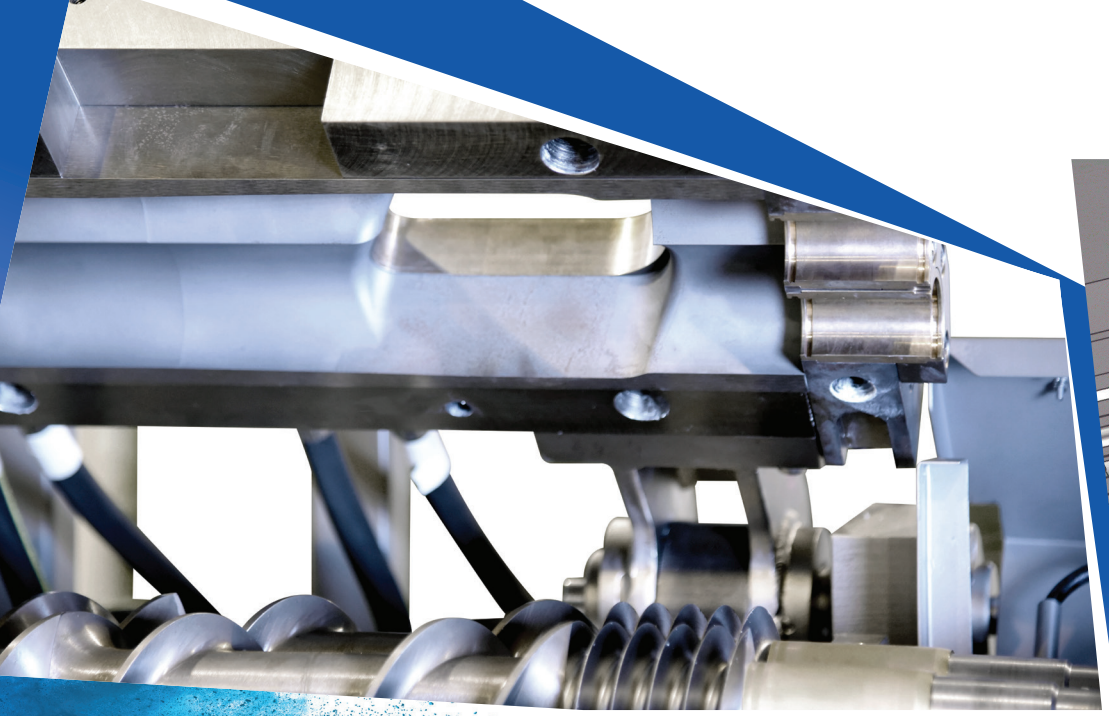
Different cooler options designed for both typical applications and specific industry needs

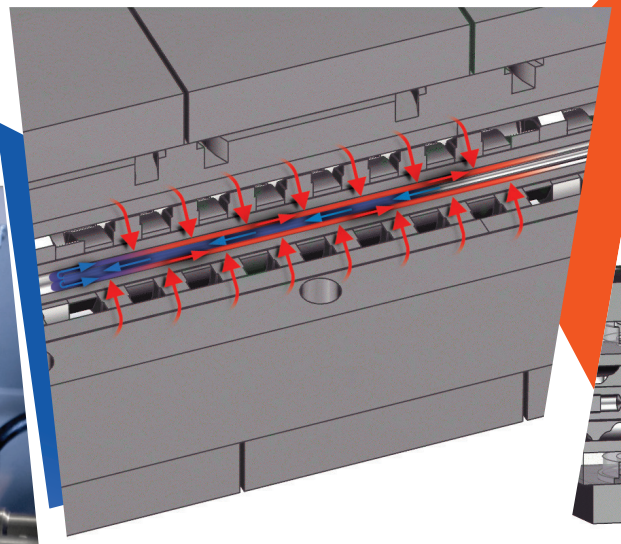
### 5 Grinding

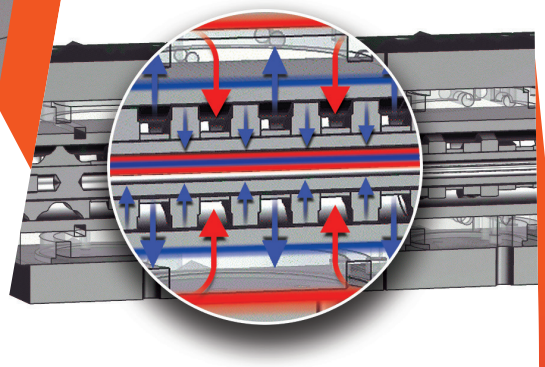
Mills to grind the flaked chips into a powder of a specific particle size and distribution

### 6 Controls

Developed specifically for Baker Perkins' extruders, our advanced, fully integrated control systems provide clear, at-a-glance visualisation of the process, including current status of all major components and parameters







# Features

## MAX³ feed system increases throughput

**The MAX³ feed system successfully addresses the long-standing, industry-wide issue of restricted output and torque surges caused by material building up in the extruder feed port – when particles hit the intake screws and 'bounce' back into the infeed area rather than flowing into the machine.**

Baker Perkins' patent-pending system uses unique feed port and screw designs to improve the flow of material into the extruder barrel and the air out of it. A major benefit is that lightweight, low density materials and fines are handled much more efficiently, eliminating the need for side feeding and its unnecessary floor space, capital and running costs.

MAX³ is available on all MPX production and laboratory extruders; it can be retrofitted to top-feeding machines, and side-fed machines can be converted to top feeding.

## Through-shaft cooling minimises pre-curing

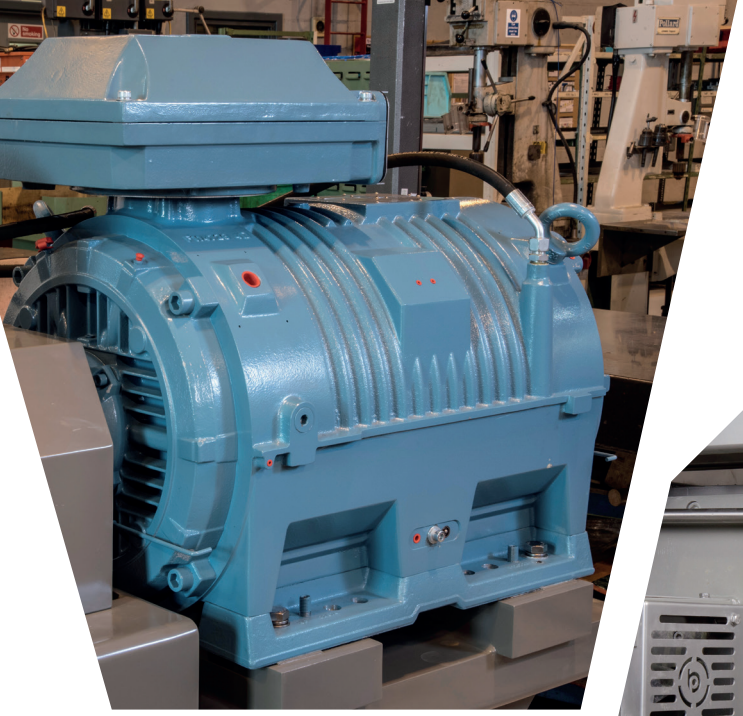
**Through-shaft cooling increases heat removal from the shafts and screw elements, removing hot spots from the mixing edges. To maintain product quality and avoid leaks at the shaft couplings, the cooled water is fed from the rear of the gearbox, rather than introduced at either end of the agitator shafts**.

This unique solution increases reliability and cleanliness and avoids complications such as contamination from leaks, as well as ensuring uniform cooling and eliminating 'hot spots' linked to temperature sensitive materials.

## Advanced heating & cooling decrease response times

**Electric cast slab heaters and advanced water cooling within the barrel work simultaneously to provide consistent temperature control**.

The easy-to-replace slab heaters have electrical elements cast in an aluminium housing to aid accurate temperature control of the barrel.



## Power & torque specifically tuned for powder coating production

**Unlike multi-purpose extruders, Baker Perkins' motors are specifically selected for powder coating applications.**

By specifying the precise power and torque for this application, output can be maximised without wasting energy. The extruder's efficiency and lifespan is increased by reducing wear, and long-term maintenance costs are cut. The water cooled motor is also quieter, cooler and easier to clean than the air cooled alternative.

## Gearbox condition monitoring system reduces downtime

**A condition monitoring system allows owners to easily observe their gearbox's condition using a simple traffic light system.**

This highlights when the extruder is running within recommended limits and when attention may be required, avoiding the costs of unexpected downtime and improving maintenance scheduling.

## Advanced control system with remote support

**Developed specifically for the complete range of Baker Perkins extruders, a touch-screen HMI provides clear, at-a-glance visualisation of the process, including current status of all major components and parameters.**

Automatic management of formula settings ensures exact, unvarying replication of product, eliminating quality variations caused by operator error, while a data collection system records all key process variables. Remote support enables Baker Perkins' engineers to log in to a machine anywhere in the world for fault-finding and software updates.

## Industry 4.0 ready for informed decision making

**All Baker Perkins' powder coating extruders are Industry 4.0 ready.**

Industry 4.0 harnesses data from all the machines, devices, sensors, and people in a manufacturing operation and enables them to communicate with each other via a local network or the internet. This allows operators or autonomous systems to make informed and timely decisions regarding performance, efficiency or maintenance issues.

# Range

## Laboratory and Small Batch Equipment

## MPX19
## Laboratory Extruder

**The MPX19 is a benchtop twin-screw extruder ideal for laboratory and development work.**

The MPX19 features Baker Perkins' clamshell barrel, so production can be stopped at any time with immediate access to view the state of material being processed.

It delivers repeatable results, and enables full, reliable scale-up to production outputs on Baker Perkins' range of larger extruders.


## MPX24
## Integra Small Batch Extruder

**The MPX24 Integra is a small batch extruder designed specifically for thermoset applications.**

A chill roll and flaking unit are fully integrated into the machine for a complete process in a portable machine. Its compact design means that it can be used either in a laboratory for new product development, or in a production environment for tasks such as colour matching and small batch production.

The MPX24 Integra delivers repeatable results that can be consistently reproduced on production scale machines. This ensures that the desired results are obtained first time, improving quality and reducing costs.

## MPX Powder Coating Extruders

| Model | MPX19 | MPX24 | MPX30 | MPX40 | MPX50 | MPX65 | MPX80 |
|---|---|---|---|---|---|---|---|
| Barrel diameter (mm) | 19 | 24 | 30 | 40 | 51 | 65 | 80 |
| Barrel length (L/D) | 15 | 15 | 17.5 | 17.5 | 17.5 | 17.5 | 20 |
| Motor power (kW) | 2 | 9.1 | 16.6 | 40.5 | 63 | 126 | 206 |
| Screw speed (rpm) | 500 | 1,000 | 900 | 900 | 900 | 900 | 900 |
| Typical outputs (kg/h) | 5-25 | 45-100 | 100-250 | 250-550 | 400-1,000 | 800-2,000 | 800-2,000 |

## High Output Continuous Production

## MPX30 – MPX80
## Production Extruders

**A comprehensive range of twin-screw extruders for applications from small batches (100kg/hr) up to high-output (2,900kg/hr) continuous production.**

The extruders have been specifically engineered with features that help to maintain consistent quality while keeping running costs low. High torque-capacity, high free-volume geometry and uniform barrel heating ensure that consistency is maintained under all operating conditions.

Quick start-up, reliable operation and rapid changeover keep operating costs low. All wear parts are long-lasting and easily replaced and, when combined with the ultra-low maintenance drive train, result in minimal maintenance costs.

# Support from Specification to Optimisation

**Baker Perkins' dedicated industrial extrusion team offers support from initial project conception and laboratory trials, through to specification and line commissioning to ongoing process optimisation advice.**

Our experts are available for site visits, product trials and phone support at every stage of a project and beyond, enabling customers to select and maintain the best extruder for their requirements. Over the lifespan of the extruder, Baker Perkins' process support provides:

## Process Refinement

- Refined processes for optimised running
- Superior mixing, screw configurations and cooling profiles
- Enhanced product quality

## Process Troubleshooting

- Adaptation and upgrading of existing equipment
- Prevent the need for double-passing products
- Identify sources of cratering and pinholes
- Eliminate pre-curing of product in the extruder barrel

## Maintenance Advice

- Longer lifespan through reduced wear
- Lower running costs
- Increased throughput and reliability

## innovation centre

**Powder coating manufacturers can use Baker Perkins' Innovation Centre to develop new products and processes, produce samples, and conduct feasibility trials.**

The Innovation Centre at Peterborough includes full powder coating production facilities, including an MPX24 Integra twin-screw extruder, plus grinding, curing and full analytical equipment to process results.

Customers are guaranteed total confidentiality, working with Baker Perkins' experienced technologists. Companies from every part of the world often find that thorough trials provide a reliable basis for trouble-free commissioning of a new plant or launch of a new line.

## lifetime support

**When choosing equipment from Baker Perkins, customers expect and get the best in terms of equipment specification, reliability, end product quality and low cost of ownership.**

Lifetime Support ensures that these expectations are met for as long as the customer operates the equipment.

Lifetime Support includes a variety of services to improve line performance and extend useful life. These range from parts and service through inspections and fault finding to major repairs and rebuilds. There are also upgrades available to key features, including drives and control systems, as well as planned maintenance contracts and optimisation services.

To achieve the highest end-product quality while maintaining performance standards, our continuous development programme utilises extensive customer feedback to enhance our unique combination of process insight and engineering capabilities.

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