



JET COOK™

ADVANCED HIGH-SPEED COOKING TECHNOLOGY

www.dcnorris.com






CUTTING-EDGE TECHNOLOGY







FOOD, BEVERAGES, WET PET FOOD



Jet Cook™ Technology delivers fast, flexible and efficient liquid food, beverage and wet pet food processing solutions, utilising high performance steam technology to enhance your manufacturing business.

The system offers significantly reduced processing times and dramatically cuts clean in place requirements, without compromising on quality or flavour. Jet Cook is a revolutionary fluid processing solution that can homogenise, emulsify, entrain, pump and heat with impressive performance.

-  **Reduced Cooking/Processing Times**
- typically by 50% or more.
-  **Energy Reduction of Approximately 52%**
- compared to traditional cooking methods.
-  **Improved Product Quality & Particulate Integrity**
- quick heating and mixing/reduced thermal impact/no moving parts.
-  **Reduced Processing Stages**
- mixing, heating, pumping and homogenising ingredients completed simultaneously.
-  **Reduction in Ingredient Quantities**
- starch, gums, dairy and spices (recipe dependent).

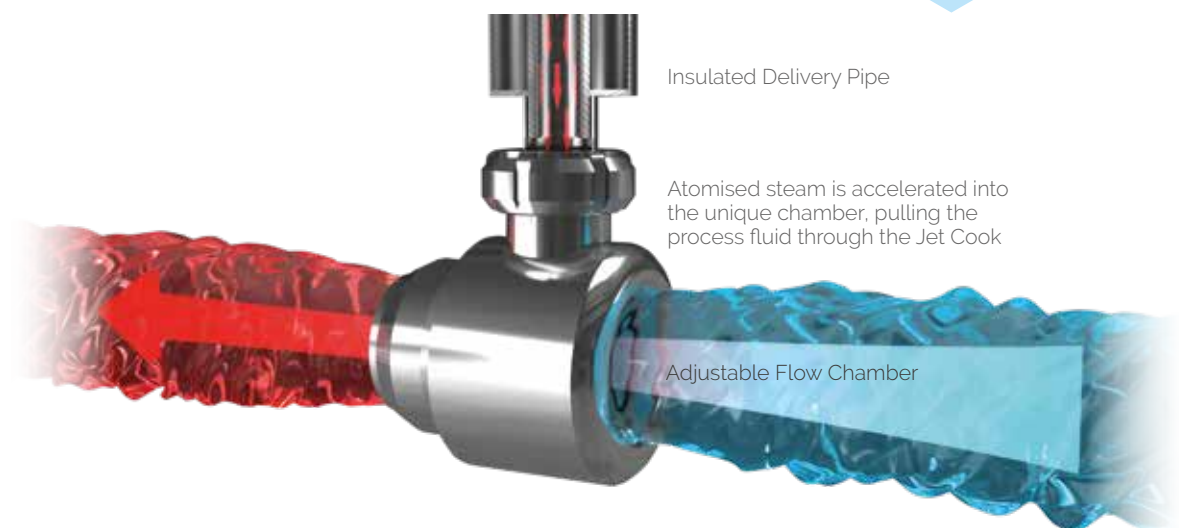
-  **Flexibility**
- purpose-built system or retro-fitted to an existing system.
- turnaround small and large batches of smooth and particulate sauce very quickly.
-  **Reduced Batch Contamination**
-  **Reduced Amount of Cleaning & Chemicals**
- no moving parts or burn-on contamination.
-  **Increased Throughputs**
-  **Small Footprint**
-  **Cost-Effective**



Steam is accelerated and atomised, creating 7 trillion droplets of water a second at high pressure directly into the product through DCN's patented steam conditioning chamber and annular nozzle arrangement. As the steam collapses it creates a partial vacuum and pulls the product through the system back into the vessel whilst simultaneously heating, mixing and pumping. Manufacturers can benefit from rapid heating and huge energy savings as 99.5% of the energy is collapsed directly into the product.

Scientific trials have shown that 52.5% less energy was used when cooking with Jet Cook compared to cooking the same product in conventional kettles. Calibrated steam flow meters were used to measure the flow and capture the data.

Systems installed globally -
including Australia, Middle East, USA, Japan, Mexico, Azerbaijan, Europe, Central and Southern Africa.



WHY ARE PRODUCTS IMPROVED WITH JET COOK?

Long heating and cooking can destroy essential minerals and vitamins, Jet Cook's quick heating ensures their properties are retained.

The speed of heating facilitates rapid inactivation of detrimental enzymes capable of causing off flavours, odours and discoloration (e.g. oxidases and lipases from fresh fruits, vegetables and meats).

The high-speed entrainment of herbs and spices enhances extraction of flavour and aroma compounds.

There is the potential for a reduction in ingredient quantities such as starch, salt, gums, dairy and



spices. Hyper swelling the starch cells ensures more flavours attach to its larger surface area, giving better flavour distribution and mouth feel.

Low and high volume powders can be entrained directly into the low pressure dispersion zone via the entrainment hopper, giving a large effective surface area with very short residence times. The powder and liquids are now simultaneously mixed, heated, pumped and hydrated in a controlled manner.



DID YOU KNOW?

Jet Cook could remove the equivalent of 23 London double decker buses of fat and salt from Sainsbury's Italian sauces and soups in 12 months!

(Research undertaken as part of a UK Government Innovate Grant.)

STRAWBERRY TOPPING

Solution:

Jet Cook System:

1. Jet Cook In-Tank unit rapidly heats and mixes the base ingredients, including hydrocolloids to achieve a smooth glossy base for the fruit.
2. The strawberries are added to the gel base and can be gently moved through the unit and around the vessel. They can be heated without damage due to a 50mm bore.

Outcome:

Superb particulate integrity, a high gloss finish and fresh taste. No burn-on, fish-eyes or gel balls which are typically seen when hydrocolloids are put directly into the water. Production time was halved, and there was no need to clean-down between batches.



RAGU

Solution:

Jet Cook, Braising Bar Technology and Multi Aperture Drainage System (MADS)

1. Sear meat using Braising Bar to seal in moisture. Remove excess fat using the MADS.
2. Add onions to the meat and sweat using the Braising Bar. Remove excess liquid from the onion.
3. Add tomato paste, passata, diced tomatoes, water and herbs – heat to 98°C using in-tank Jet Cook.
4. Hold for 10 minutes.

Outcome:

A rich restaurant-quality Ragù with great particulate integrity of the meat and tomatoes. Batch production time is more than 50% quicker. The nutritional benefits of the ingredients and the vibrant colours of the herbs were preserved and yields were improved.

“The cooking time was incredibly quick and the quality of the pieces of fruit was excellent. The flexibility of the product range we can now produce is remarkable.”

Mr Vugar Hebovov
Chief Automation Manager,
Azersun Holding, Azerbaijan





BÉCHAMEL SAUCE

Solution:

Jet Cook System and Powder Entrainment:

1. Add water, milk and cream to the kettle.
2. Add flour, salt, starch and powders to the entrainment hopper. Powder is inducted into the main vessel ensuring there are no lumps or agglomerations.
3. Starch and powder entrained directly into the liquid (milk, cream, water) using DCN's patented Powder Entrainment System, which will simultaneously heat, mix and add the required non-mechanical shear to the product. By controlling the shear, different textures can be achieved – smooth or a more floury finish.

Outcome:

There are a range of issues with bulk production of béchamel including burn-on, poor viscosity and varied texture. This is due to the methods used to hydrate the starch and activate the flour; if these are not strictly controlled then repeatability and consistency cannot be guaranteed.

A single Jet Cook unit produced a top quality 1000kg batch in 30 minutes. The data collected from the trial included ingredient addition stages, temperatures, shear and timings which can then be programmed into Recipe Manager Software, ensuring repeatability every time going forward.

"We purchased our first Jet Cook System for the production of meat and particulate sauces for ready meals. We then ordered another two systems within six months."

Robert Graham
General Factory Manager – Greencore, UK





POWDER ENTRAINMENT

The new high-speed Jet Powder Entrainment system can entrain 600kg of powders in approximately two minutes. The patented hopper and injector nozzle creates ultimate vacuum to disperse powders into liquid without any agglomerations or fish-eyes. These may appear when powders such as milk powder, whey powder and hydrocolloids are added directly into the liquid. Our design ensures there are no blockages in the powder hopper which can occur if there is wetting of the powders.

The action of the steam collapsing into the liquid phase provides a controllable homogenising effect, and powders can be fully entrained into the liquid phase in a rapid and controlled manner without the need for additional mixing.

Due to the simultaneous heating and mixing effect with the Jet Nozzle, we achieve superior hydration of starches and gums as well as even distribution throughout the liquid.

This process is ideal for high powder content products such as condensed milk, fortified milk drinks, maheu, bushera, dairy and non-dairy drink pre-mixes.

It can also eliminate the need to pre-slurry active powders such as salt, starch and gums by utilising a unique powder entrainment facility, combining multi-stage processes into one system.



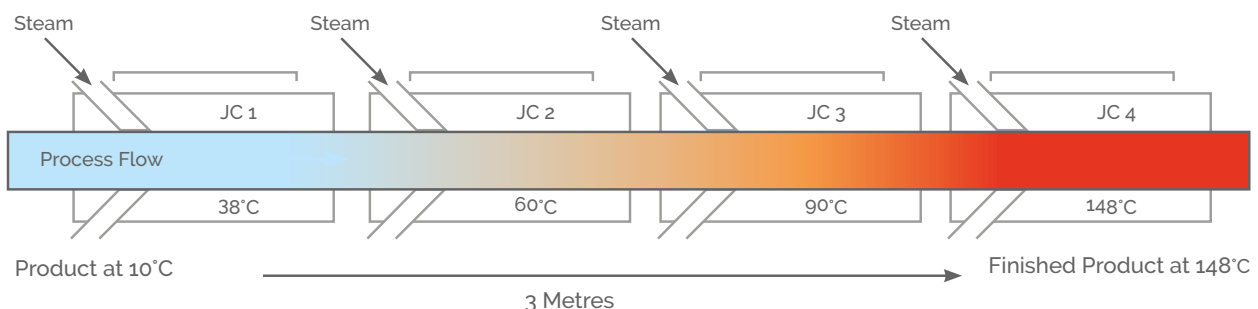
MULTI IN-LINE SYSTEM

This unique system combines as many as 4 of our Jet Cook Units in sequence. Each unit is individually controlled to add the required amount of heat and shear to give the desired finished product results.

Our Multi In-Line Systems can heat, pump and mix products in a single pass at flow rates between 1000ltrs and 20,000ltrs p/h giving a temperature increase of 110°C in 3 metres. This type of system is being used for the production of products such as condensed milk, sauces and maheu in the Middle East, Asia and Africa.

In a recent installation we replaced 10 meters of heat exchangers with a single system. We reduced the customer's waste product in the pipework from 150kg to just 5kg.

As with all our Jet Cook Systems there is zero burn-on so unlike the traditional heat exchanger it can operate for many hours without cleaning.



Multi In-line System consisting of 4 Jet Cooks - liquid product taken from 38°C to 148°C in a single pass at flow rates of up to 1000 litres per hour.

"It's been invaluable having a partner with such wide experience and also one that is happy to work with us to deliver against our particular needs."

Charlie Bigham
Owner - Charlie Bigham's, UK

Charlie Bigham's



RECIPE MANAGER

Recipe Manager Software package provides a simple-to-use and flexible method of controlling a recipe-driven production process. The user-friendly system allows customers to create ingredient listings, step-by-step procedural recipes and user access security with all recipes stored to a relational database.

Data collected includes ingredient addition stages, temperatures, shear and timings. These can be programmed into Recipe Manager Software ensuring repeatability every time. The system maintains full records of kettle yields, allowing barcode identification from preparation through to packaging, and ensures all HACCP controls are met.



BRAISING BAR

The Braising Bar is ideal for those recipes which require a preliminary step such as caramelising of onions, searing of meat, crackling spices or creating a roux for sauces.

The bar coats a thin layer of the product onto the hot kettle surface to aid braising/ caramelising before the addition of the other ingredients. If the recipe requires a roux base, the flour and fat mixture can be cooked out to the desired texture.



MADS

Multiple Aperture Discharge System (MADS) is a solution for removing liquids/fats from products during the initial cooking process to improve particulate integrity, flavour and texture.

During the processing of caramelising onions, a large amount of water is given up by the onions, which traditionally sits on the bottom of the vessel and causes the onions to boil rather than braise. This is also undesirable with meats when the customer is looking for a seared look and texture.

The liquid is drained through the base of the vessel and can be collected and added back to the product with starch if a sauce-style product is required.



VAPOUR REDUCTION SYSTEM

The vapour reduction system enables you to reduce the processing time of "reduction" cook products such as jam, marmalade, stocks, demi-glace and broths by up to 65%.

Steam is pulled from the vessel via a nozzle attachment in the lid of the vessel, and then pulled through a heat exchanger and collapsed into a liquid. The liquid can then be directed to the drain.

This is also ideal as an odour abatement system to remove unwanted steam and odours from the factory when cooking products such as onions or spicy foods.



HIGH SHEAR EMULSIFIER

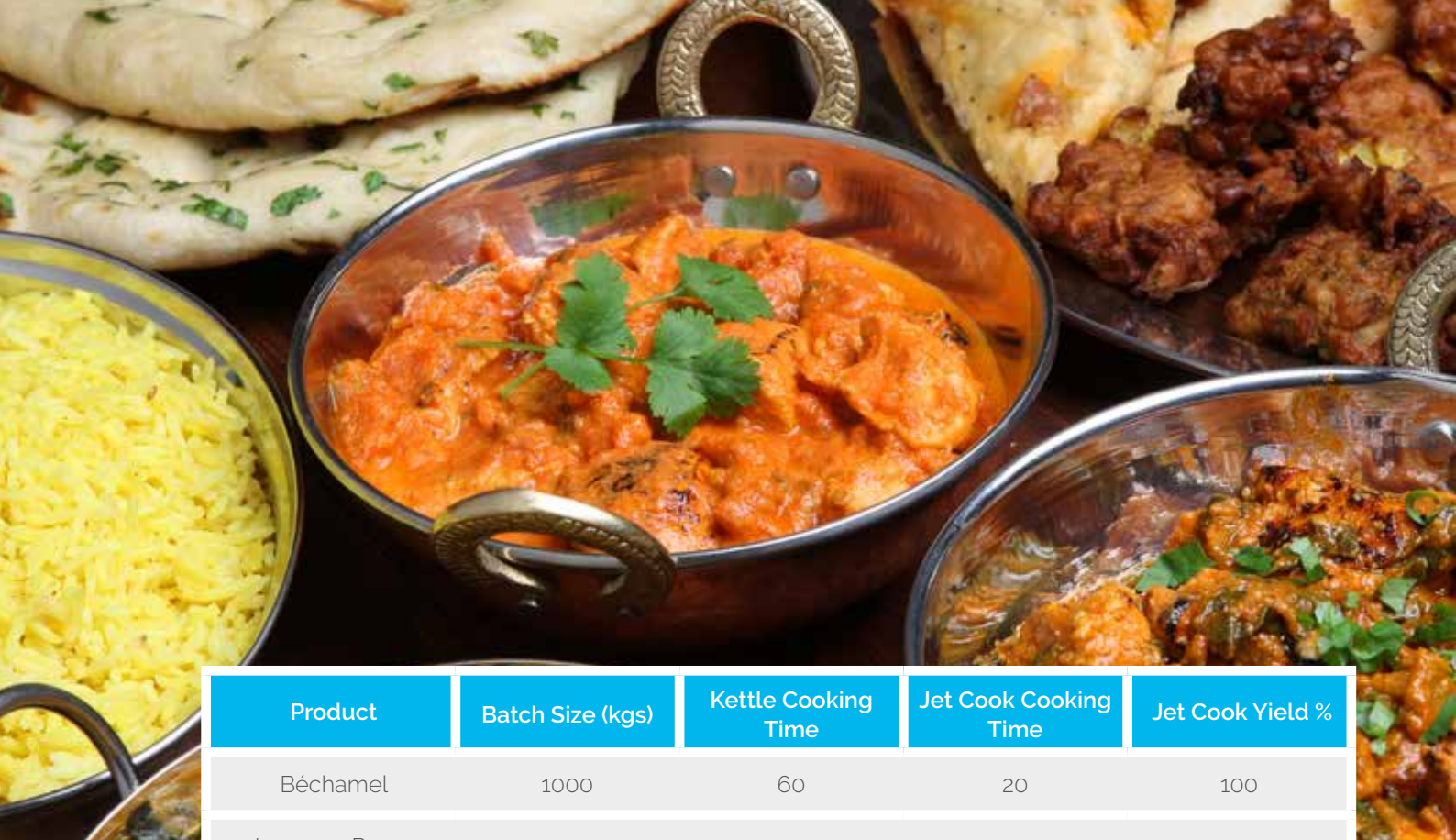
Emulsifies and homogenises powders and solids in the same processing vessel used to cook products. This removes the need for any external/bolt-on emulsifiers, and has the benefit of ensuring that no product is lost in the pipework. The emulsifier head can easily be changed to achieve a coarse or a fine finish.

"Production times
are much quicker, whilst giving
excellent finished product quality."

Nigel McGinn,
Kettle Cuisine, USA

KETTLE  **CUISINE.**

cooking data



Product	Batch Size (kgs)	Kettle Cooking Time	Jet Cook Cooking Time	Jet Cook Yield %
Béchamel	1000	60	20	100
Lasagne Ragu	1500	100	50	105
Tomato Ketchup	500	30	10	100
BBQ Sauce	500	30	10	100
Sweet Chilli Sauce	1000	45	20	105
Tomato & Basil Soup	1000	45	25	105
Dairy Custard	750	60	18	108
Sweet & Sour Sauce	1000	60	20	105
Tikka Masala	1000	100	35	100
Steak & Ale Pie Filling	1000	120	65	100
Porridge	500	60	18	105
Vegan Casserole	1000	90	40	100

Typical comparison times for conventional cooking vs Jet Cook

DCN has conducted over 4000 trials with Jet Cook, covering ready meals, soups, sauces, beverages, desserts and pie fillings (savoury and fruit).

PRODUCT DEVELOPMENT

Kitchen

Testing and product development are crucial to the success of your business. To demonstrate our commitment to you, we have invested heavily in development kitchens in the UK, South Africa, and have more planned for the future.

The kitchens are fully equipped with a range of DCN equipment for Cook-Chill and Jet Cook trials along with a leisure area that can be used for testing, training and discussion.

Here we can rigorously test equipment, cook, and cool customer products in a food factory environment.

Services available include steam, chilled water, glycol, compressed air, refrigeration and vacuum cooling.

Our experienced team is always on hand to assist in recipe and process development to give customers the opportunity to fully assess their products and equipment prior to investment.

Once an order has been placed and completed we can also use the test kitchen to conduct full pre-delivery trials to ensure the equipment is running to its full potential. Customers can also use this as a great opportunity to be fully trained on their equipment in advance of delivery and installation.





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food processing innovation