IF Series

IFC
(Intelligent Flavour System Cold)

SPI Developments Ltd

spi
Fluid Control Experts
a Tembo company

IFC System Overview:

The IFC Intelligent Flavour Cold Application System is built around a mobile base unit that can be connected to different machines and applicators as required.

It has the capability of delivering cold liquids into a product, using a high precision micro-gear pump driven by a microprocessor based control system. This ensures consistent liquid delivery per product at the correct dosage, regardless of host machine speed.

The base unit can be connected to other SPI Intelligent modules to give a flexible platform for applying multiple liquids to products during manufacture.

The module tracks the host machine speed via an SPI supplied high resolution encoder to ensure that the system delivers flavour to the product at a rate proportional to machine speed, within a very high tolerance.

The system delivers liquid via a hose to an applicator suitable for the type of product required.

Key Features:

· Microprocessor control system, with options for open or closed loop control logic
· Micro-gear pump, driven by a servo motor via a magnetic coupling
· Coriolis Flow meter to measure liquid flow rate and ensure the system is operating within tolerance.
· 20Litre stainless steel flavour tank.
· High resolution IPC touch screen operator control module
· Filter system to protect the system from foreign matter in the flavour.
· “Plug n play” interface system to allow easy connection to other modules

IFC Advantages:

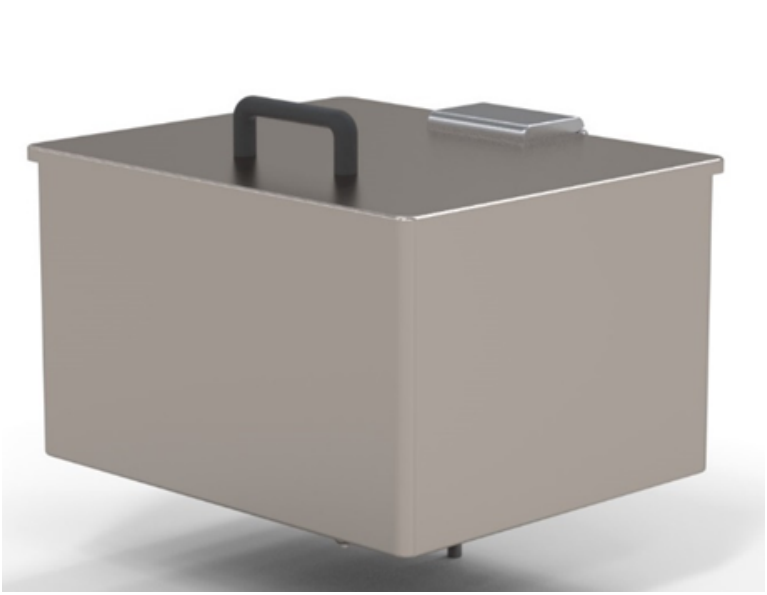
The IFC is a modular system that allows many different system specifications to be created to suit end-user requirements, giving great flexibility to manage end-product and host machine changes.

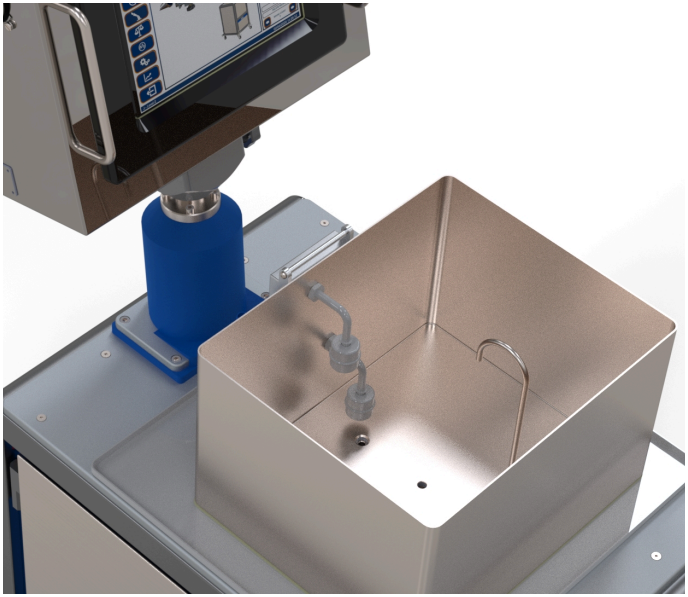
We believe the IFC system will offer the end-user the following advantages:

- Dispenses liquid with high accuracy and consistency, as a rate proportional to the parent machine speed
- Includes a filter system to prevent any foreign material being applied with the flavour to the filter
- Provides a clean and safe method of applying flavour to the product, with minimal environmental and machine contamination.
- Includes a Coriolis flowmeter to allow operation with open or closed loop control at very low flow rates, and ensures automatic calibration of the system at the full range of flow rates
- Easy switch between standard and flavoured product.
- Easy installation onto host machine, with minimal electrical interfacing required.
- Easy to move between different host rod making machines
- Many different types of applicator available depending on product requirements.
- Easily connected to other SPI “Intelligent” modules to create a multiple liquid application system
- The equipment is compliant with current CE regulations and UKCA

Hopper:

Liquid Tank:





Specification:

The cold flavour hopper is designed to hold cold flavours and release the liquid in a controlled manner.

The hopper contains two level sensors which operate as follows:

Upper sensor opens – warning delivered to operator to refill tank. If the system stops with this sensor uncovered, the system will not restart until the tank is refilled.
Lower sensor opens – the system shuts down immediately to prevent liquid running out and air getting into the system.

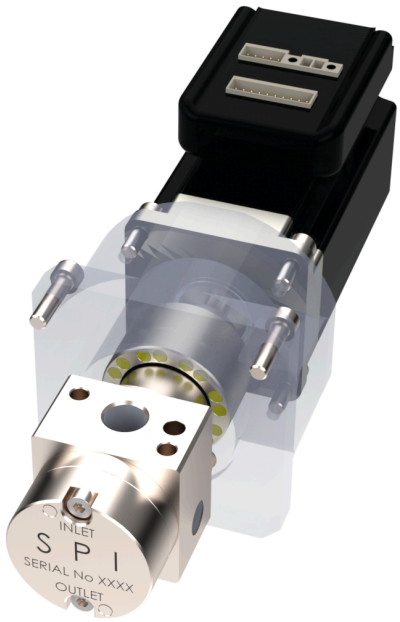
Bulk refill options are also available if automatic tank refilling is required. Please consult SPI for more details.

Intelligent Pump Module

The IFC includes an “intelligent pump motor” module, with the following features

- Integrated pump motor control microprocessor
- Micro precision gear pump assembly
- Magnetic coupling between pump and motor
- Servo motor drive for the pump
- Divert valve assembly to allow liquid flow to be automatically be switched between flow to the rod maker and recirculation mode
- Easily removable filter cartridge which protects the filter from dirt ingress

Different capacity gear pumps can be supplied depending on output requirements



Recirculation Mode:

When the system is an automatic mode and the host machine is not running, the pump will continue to run but the liquid will be diverted back into the tank. This ensures that the liquid remains fully mixed and of consistent quality.

Coriolis Flowmeter:

The IFC is fitted with a Coriolis flowmeter to suit either high flow rates (30-600g/min) or low flow rates (5-30g/min). This flow meter provides a multistage calibration routine which ensures that the flavour pump is calibrated automatically for all possible flow rates and host machine speeds.

The Coriolis flow meter provides the following advantages over a geared flowmeter:

- Automatic pump calibration instead of manual pump calibration
- Allows pump capacity and performance to be monitored and warning provided when maintenance is required.
- Allows multistage calibration routine which ensures that the flavour pump is calibrated automatically for all possible flow rates and host machine speeds, improving application accuracy during acceleration and deceleration
- Allows for either open or closed loop control of the flavour pump to ensure increased accuracy of flow during production
- Increased reliability as it is not affected by foreign particles in the fluid

Filtration:

The system contains an easily removable filter cartridge to prevent foreign material getting through to the product.

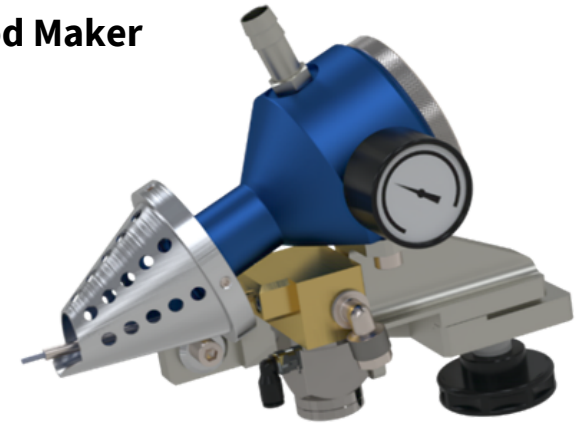
Flavour Application Options:

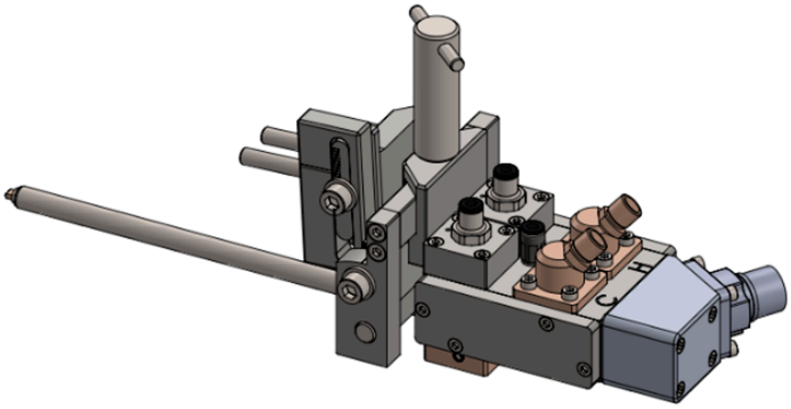
Replacement Stuffer Jet / Applicator for Filter Rod Maker

The application of the flavouring is normally done via an injector nozzle which feeds flavour into the centre of the tow, as it leaves the transport jet.

A new SPI transport jet and mounting is included with the IFC, so that the applicator module can be correctly mounted. The mounting allows the transport jet to be retracted away from the tongue and swung out to allow for easy system calibration and cleaning.

Injection nozzle:
1.0mm and 1.5mm diameter nozzle tubes are supplied as standard to allow the tube to be matched to the required flavour flow, thus ensuring a consistent application rate.



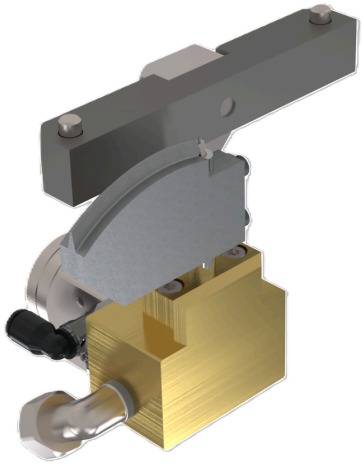


Dual Flavour into Filter Rod Tow

SPI also offer a dual flavour applicator (heated or cold) allowing for two different flavours to be simultaneously injected into the filter rod.

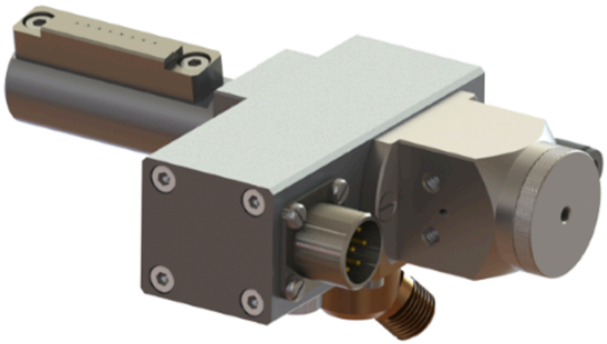
Flavour Application Options:

Flavour application to Tobacco - Post Ecreteur discs



The applicator is mounted below the rail and the nozzle protrudes up into the gap between the inner and outer rails. The angle of the applicator nozzle can be adjusted as required (limited by space available).

The tip of the nozzle is protected from wear by a “shoe” which prevents tobacco choking and ensures that the flavour is applied as close to the centre of the tobacco as possible, thus reducing flavour contamination on the host machine.

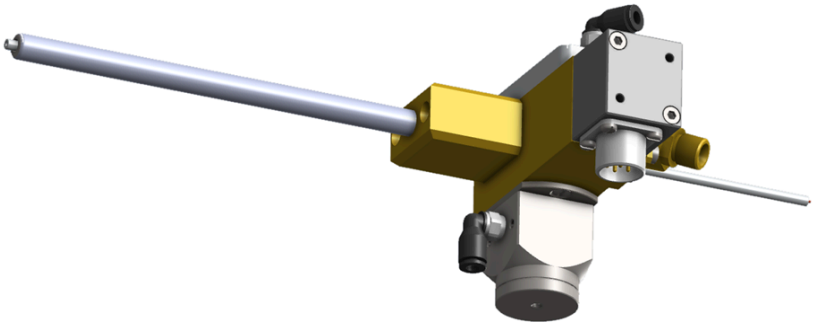


Cigarette / Filter Paper

SPI also offer the option for applying flavour to the cigarette or filter paper
A multi-line applicator is fitted to the paper run on the front of the host machine, designed to ensure no gaps in the flavour lines. The applicator has X-Y position micro-adjustment to ensure the correct line positions.

Filter Thread Feed

A version of the filter stuffer jet/flavour applicator module with thread feed can also be supplied, allowing the flavour and thread to be inserted into the filter together. This ensures that the correct amount of flavour is always applied, regardless of flavour carrying capacity of the thread. System options include thread break detection with host machine shut down, bobbin holders and other variations.



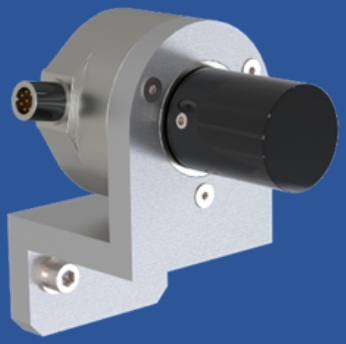
Data Analysis:

The system collects running data at user specified intervals (typically every few seconds) and also records all events, such as alarm stoppages, calibrations and specification changes.

This data collected by the system can be downloaded via USB or Ethernet connections for later analysis.

Alternatively, a data analysis and presentation package is available from SPI as an extra cost option.

Interface Between IFH and Rod Maker:



The SPI flavour equipment and the rod maker will have the following connections:

Applicator and mountings-

Flavour applicator and mounting are mounted on the rod maker.

Speed measurement-

The IFH system uses a standard SPI paper encoder fitted to the host machine paper run.

Intelligent Machine Interface (IMI)-
SPI will supply an IMI interface module as part of the system. This allows the following electrical connections between the rod maker and the IFC:

A. Single phase power supply - from Host Machine to IFC
B. Start signal - from Host Machine to IFC
C. Stop signal - from IFC to Host Machine (IFC will stop rod maker under fault conditions)
D. Eject signal - from IFC to Host Machine

HMI Control Screen

The IFC includes a high-resolution HMI touch screen module, mounted on the top of the main unit, which allows the operator to set up and control the system, changing such factors as flow rates, temperature and other machine settings. It uses Embedded Windows software as an operating system

It also provides the following:

- Datalogging capability for live machine run data and also events, such as alarms, calibration etc
- Live monitoring and display of flow rates, machine speeds and other parameters
- Remote access capability to allow remote support and troubleshooting by SPI

Modular Systems:

SPI's range of flavour and adhesive systems, including the IFC, have been designed in such a way that they are fully modular.

The result of this unique design is that multiple systems can be interconnected using bespoke link cables and they can be operated from a single HMI screen.

Systems can be connected to each other as illustrated in the image provided or can be physically removed from each other but connected via a link cable. This second method is ideal for scenarios where the flavour system is a mobile device but, for example, an adhesive system is installed upon a rod making machine.

On powering the devices, the HMI will automatically scan for connected systems and will perform an autoconfiguration routine to ensure that the HMI displays the relevant live data and permits setting changes to be made for each system.

In the image, an IFH has been connected to an IFC unit and this allows heated and cold flavours to be dispensed to any form of flavour applicator or multiple applicators.

Technical Specification:

Unit Size	850mm long x 500mm wide x 1500mm high (not including hoppers)
Flavour Types	Cold Flavours
Tank Capacity	20 Litres
Max Flow Rate	Approximately 600g/min. Higher flow rates are achievable upon request.
Flowmeter	Coriolis flow meter to suit normal operating flow rate
Application Accuracy	< +/- 1%
Parent Machine Rod Speed	Up to 600m/min
Flavour Application Method	SPI Replacement Stuffer Jet / Flavour Applciator into Tobacco Stream / onto Plug Wrap Paper
Product Ejection	The unit can provide a signal to the host maker control module, to allow product to be ejected by the maker under the correct conditions.
Control System	The unit uses a dedicated microprocessor control module to give high pump and application accuracy. The control panel is accessed via an easily removable side panel on the unit.
Electrical Supply	Single phase supply required, with the customer responsible for providing this voltage. Live, Neutal and Earth Required.
Air Supply	5 bar supply required, with minimal consumption
Safety/Guarding	The guarding of the equipment systems is designed to meet the latested Machinery Safety Standards and conform to current machinery requirements.
Noise	Levels are minimal and significantly below 70dB
Documentation	The equipment will be delivered with a full set of documentation in electronic form. The documentation will be in English, with other languages available if required.
CE Compliance	The equipment will be fully compliant with all the relevant European Directives and Standards and will be supplied with CE Certificates of Conformity. If local regulations apply different standards, the stricter ones will be applied. In particular the following standards.directives will be respected: - Machinery Directive: 98/37/CE Electromagnetic Compatibility Directive: 89/336/CEE Low Voltage Directive: 73/23/CEE Safety of Machinery: EN12100 1&2 Emergency Stop: EN418 Electircal Equipment of Machines: EN60204-1 EMC Emission Standard: EN61000-6-4 EMC Immunity Standard: EN61000-6-2 Risk Assesment: EN1050

SPI Developments Ltd
1, Eden Close
Hellaby Industrial Estate,
Rotherham
South Yorkshire
S66 8RW, United Kingdom

Tel: +44 (0) 1709 541143
Web: www.spidevelopments.com
Email: enquiries@spidevelopments.com
Registered in England: Number 453 2216
VAT Registered Number: GB 727836012

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