



Instant Coffee Extractors from GEA

The taste of quality:
FIC® and CARINE™



For Manufacturers with Good Taste

However you process your coffee beans and whatever the yield, aroma is key. For great-tasting coffee, the more of that aroma you can extract, contain and preserve, the better the final product. Time and temperature play a significant role in determining the quality of the aroma. Short extraction times at moderate/low temperatures deliver high quality extracts.

The best results begin with the best extraction

Offering two versatile extraction technologies with a variety of benefits and advantages, GEA can help you to select the most appropriate solution for your application. The FIC[®] extractor provides a fast, turbulent water flow around the coffee particles to enhance the extraction rate at the desired temperature. The CARINE[™] extractor, employing prolonged extraction times and higher extraction temperatures, has been developed for customers wishing to obtain the highest possible yields.

Extractors designed for High Performance

Eliminating the need for manual operation, the compact and fully automated FIC[®] and CARINE[™] ensure precision processing that meets the world's highest standards. With an integrated PC/PLC (Programmable Logic Controller) system, the FIC[®] and CARINE[™] offer easy operation and uniform extract quality.

Furthermore, every FIC[®] and CARINE[™] component is designed to the highest manufacturing standards for efficient, long-lasting performance.

Having designed and built more than 200 instant coffee plants around the world, GEA is at the forefront of coffee processing technology — and good taste.



*FIC[®] extractor
- bottom view.*



FIC[®] extractor - top view.

Cost-Effective Performance

Coffee beans are an expensive commodity, so getting the most out of your extraction process is critical.

Fast Extraction, High Quality: FIC®

The extremely efficient FIC® delivers a high yield (up to 53%) with better quality attributes than other equipment. In addition, the FIC® performs 50% faster than conventional manual extraction methods.

The fully automated, continuous FIC® extraction system comprises eight percolator vessels that operate in a flowing battery design. What's more, this highly flexible system can perform in a variety of different modes for a wide range of coffee types.

Operators can choose between one, two or all three modes of operation — and easily change from one mode to another — to create a finished product that meets the specific requirements of your market and application.

Considering the best finished product starts with the best extraction — and the best extraction is closely tied to extraction time — the FIC® ensures you're always up to speed. The FIC® can do it all.

Flexibility, High Yield: CARINE™

Compared with the FIC®, the CARINE™ extraction plant is equipped with 10 percolator columns. The two additional columns operate at a higher temperature, 185–195 °C, resulting in the highest possible yields of approximately 60%.

After the high temperature treatment, the extract is cooled to approximately 160 °C to avoid the formation of off-notes. Following the extraction (hydrolysis) process, the extract is harvested at a temperature of 140 °C before cooling, and the freshly roasted coffee is separated at moderate temperatures of approximately 130 °C to obtain a high-quality aroma extract.

If required, the CARINE™ can also operate in FIC® mode to obtain a higher quality end product. As such, users have the option of maximizing yield or maximizing quality in FIC® mode, depending on the requirement and application. For ultimate flexibility, the CARINE™ is the plant of choice.



FIC[®] Extraction Plant

Key Points

- Three modes of operation
- Process capacities of 125–1500 kg/h
- Full- and pilot-scale plant available
- Fast extraction
- High quality

Examples of FIC[®] performance

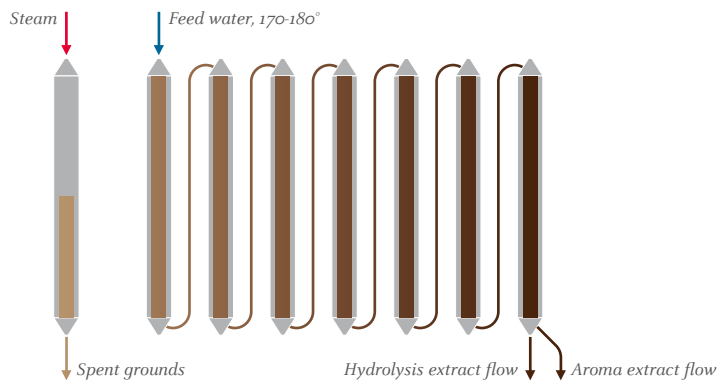
Coffee type	100% robusta	100% arabica
Extraction yield*	53%	47%

* Based on dry matter

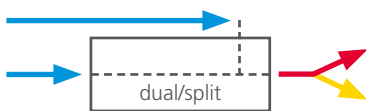
The traditional instant coffee mode



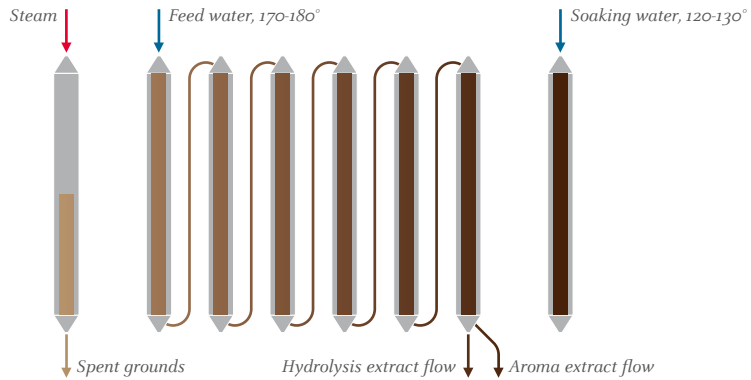
High velocity single/split: for quality coffee



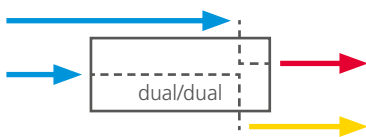
The most common mode for instant coffee production



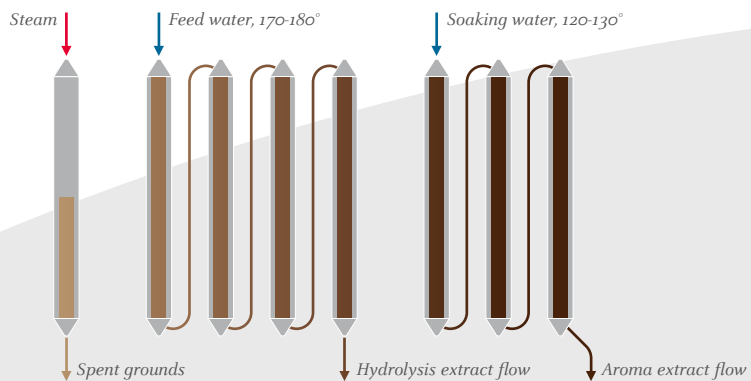
High velocity dual/split: for high-quality coffee



The mode for premium instant coffee production



High velocity dual/dual: for premium coffee



Producing the highest quality of coffee requires the greatest water usage.

CARINE™ Extraction Plant

Key Points

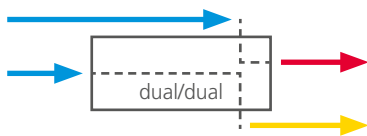
- High yields
- Extremely versatile
- Can also operate in FIC® mode
- High temperature operation
- High quality

Examples of CARINE™ performance

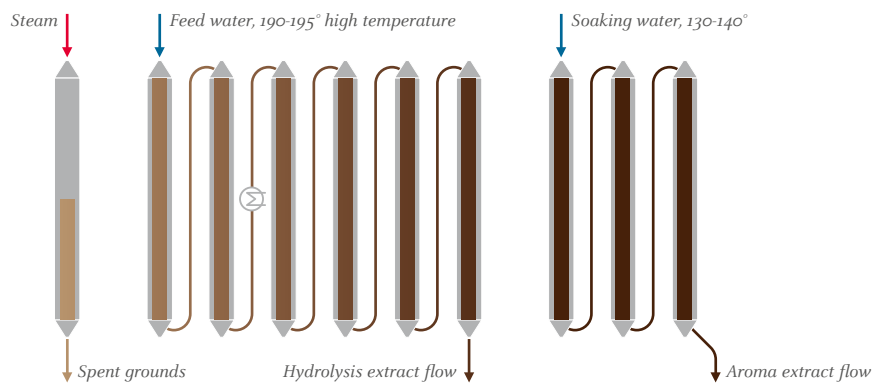
Coffee type	100% robusta	100% arabica
Extraction yield*	60%	54%

* Based on dry matter

The mode for highest yield instant coffee production



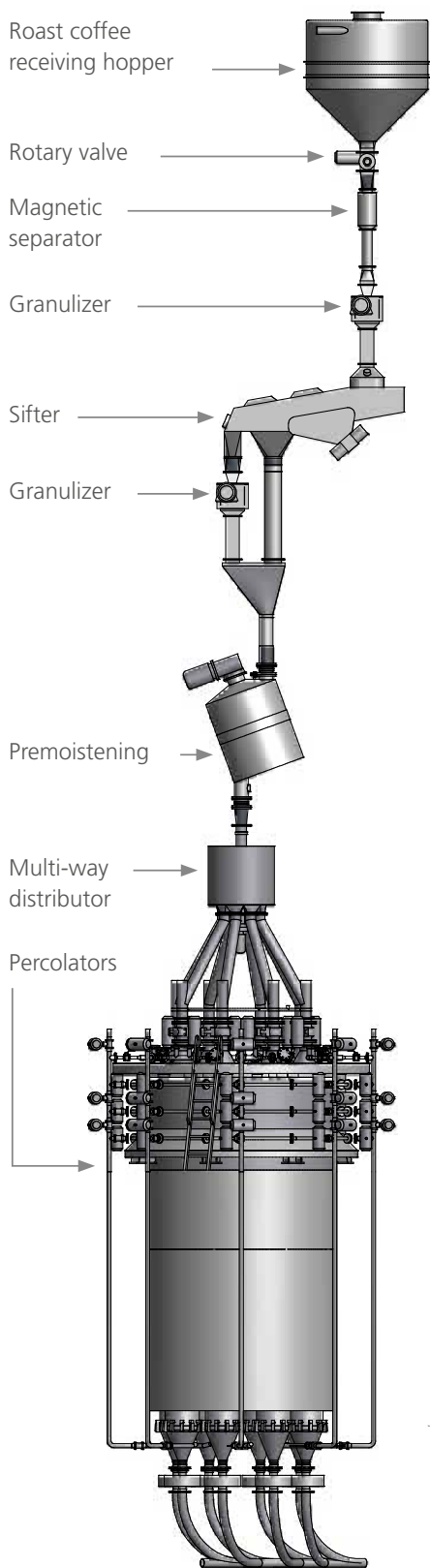
Producing the highest yield of coffee requires 10 columns and higher temperature.



Optimizing the Extraction Process

1. First, the roasted coffee must be ground to a carefully selected particle size to achieve the right water flow and extraction yield. Two grinding stages with an intermediate screening produce a controlled and narrow particle distribution.
2. Effective extraction requires that all coffee particles come into contact with the process water. The roasted and ground coffee is therefore prewetted in a mixer to ensure uniform wetting, prevent channeling of the extraction water and to help degas the coffee particles to avoid foam formation.
3. The extractors are then filled with the prewetted coffee; at the same time, air is removed from the extractors to ensure adequate packing of the coffee and a high vacuum is used to remove any remaining gas.
4. The FIC® uses a very efficient, high-speed, double extraction process at temperatures below 120 °C, which means that the aroma compounds can be separated in as little as 15–20 minutes. The resulting aroma extract is of extremely high quality. In the CARINE™, the cycle time is approximately 25–30 minutes and takes place at a temperature of 140 °C.
5. The hydrolyzed compounds in the coffee are subsequently extracted. Utilizing water speeds that are twice as fast as (and more turbulent than) conventional extractions, process times are much shorter, resulting in better quality extracts and higher efficiency levels. The high temperature extractions in the CARINE™ take place in two columns.
6. The design of the extractors and the preparation of the roasted and ground coffee make higher liquid velocities and shorter extraction times possible. The FIC® offers faster-than-conventional extraction times of roughly 120 minutes whereas the CARINE™ offers higher yields and process times of circa 200 minutes.





Equipped with 10 columns, the extremely versatile CARINE™ operates at high temperatures for maximum yield applications.

Offering process capacities of 125–1500 kg/h, the FIC® is fast, multipurpose plant that delivers high quality product.



We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

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