MORE 4.0

Modular Oil Recovery Extractor

FRUIT AND VEGETABLE PROCESSING

jbtc.com

New and Improved MORE 4.0

The next generation Modular Oil Recovery Extractor version 4.0 embodies many new features that improve safety, simplify operation, reduce maintenance and expand connectivity.

The JBT Modular Oil Recovery Extractor, or MORE, is an integral part of the modern industrial citrus cold-pressed essential oil recovery system. The function of the MORE is to optimize the primary extraction of high quality essential oils by producing a lighter and cleaner oil emulsion which easily separates to achieve the maximum yield.
The MORE can be adjusted electronically by the processor to adapt to the fruit flow, conditions, and characteristics of the citrus fruit being processed. Post-installation remote support is offered by JBT via internet connection to the MORE.

New Control System

- Better and simpler safety circuit reducing risks and meeting all new safety standards
- Better performance through improved automation
- Better, more intuitive operator control with new high-resolution operator display
- Better network connectivity by using Ethernet networking protocol
- Remote access for configuration and troubleshooting

Networked Sensors and Instrumentation

- Enables precise flow and surge bin level control
- Real time weight control for yield monitoring
- Local and remote configuration for fast support response
- Intelligent alarms reported to the HMI and iOPS gateway
- Recipes and data logging for main process variables

iOPS-Ready

- iOPS® Intelligent Operations by JBT, the solution for the Industry 4.0 (IoT / IIoT)
- Cloud-based performance optimization platform
- Management information of the equipment and the oil processing system available through an internet browser, on the iOPS web portal, on your computer or even mobile devices

Modular Oil Recovery Extractor

The primary application for the MORE is for lemon oil recovery

- Lemon oil is a highly valued commodity
- Oil recovery from the juice extractors alone may be insufficient; the MORE improves oil recovery quality and yield versus the standard extraction process
- The thick peel of the lemon facilitates the scarification process

Secondary applications for the MORE include orange, grapefruit or lime oil recovery. Oil reduction in orange juice may be accomplished with the MORE; however, potential losses in juice yield must be carefully considered.

Principle of Operation

Scarification of the fruit peel is the principle of operation

- Through scarification, the oil is released into water creating an oil-rich, easily separable emulsion
- How is scarification achieved?
  - A set of serrated discs are packed on a stainless steel shaft
  - Plastic spacers and scraper discs are placed between the serrated discs
  - While passing on the rolls, fruit peel is scarified releasing the oil from the cells
- Oil is recovered as Cold Pressed Oil, often referred to as CPO

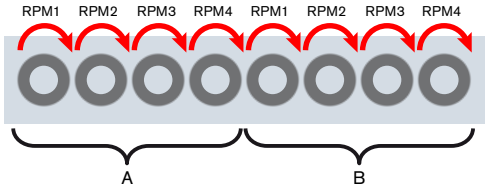
Why “modular?”

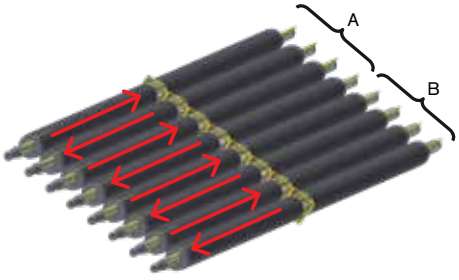
The modular concept allows control of the aggressiveness, thus balancing efficient scarification without excessively sacrificing the fruit structure

- This is important in order to avoid losses of juice yield during extraction and in keeping the emulsion “clean”
- Each four rolls are considered a module and each module has certain characteristics:
  - Each roll has a different rotational speed
  - Each roll travels axially in the opposite direction regarding the adjacent roll (reciprocating movement)
- Why are four rolls a module?
  - Provides good balance between complexity of the mechanism and scarification efficiency
- The combination of rotational speed and axial movement provides the desired aggressiveness
- Axial movement “tumbles” the fruit and assures that irregularly shaped fruit are fully scarified
- The optimal set of rotational speeds and number of strokes for the axial movement is dependent upon the fruit size and condition
  - Fruit flow travels on the modules and, depending on the feeding rate and aggressiveness of the rolls, the correct scarification is achieved

Modular in terms of rotational speed and reciprocating motion

- The MORE has ten modules and 40 rolls
- Up to five axial speeds and eight rotational speeds can be selected





Operating Specs

- Fruit is fed in batches with incoming fruit pushing fruit along the roller bed
- Feeding rate, or residence time on the rolls associated to the aggressiveness, will determine the level of oil removed from the peel and fruit throughput
  - Certain ancillary equipment is required for proper feeding and optimal emulsion collection
- The Surge Bin can store up to 900 kg (20 x 45 kg boxes) of fruit
- The Bucket Elevator has adjustable speed, handling from 5 -16 MT/hour of lemons and from 8 - 30 MT/hour of oranges
- The opening of the pneumatic gate can be adjusted relative to the number of buckets
  - Allows residence time for the fruit seated on the first module before the next batch of fruit pushes it along, ex.: the pneumatic gate opens at each three buckets
- Fruit leaving the MORE goes to the roller dryer and is sprayed with water in order to collect any remaining emulsion left on the peel surface
- Emulsion Collection Tank (660 gal) receives the emulsion from the MORE and Dryer.

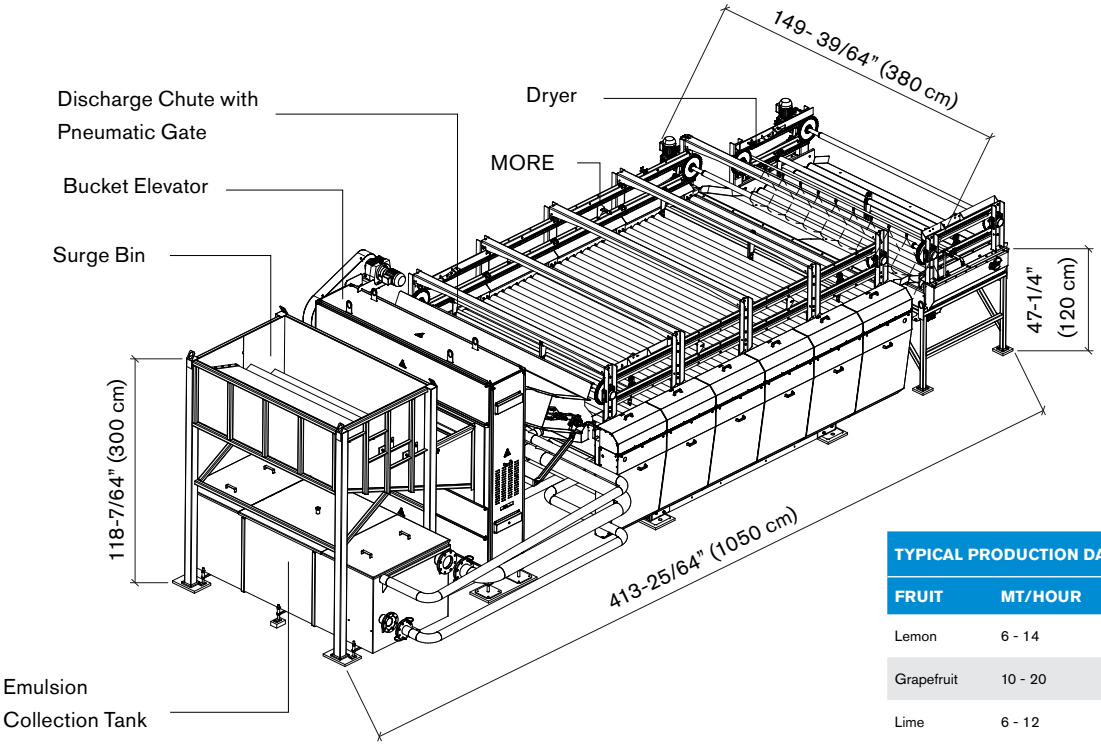
System Utilities Requirements

Power 18 kW

Operational Parameters

- Increase in throughput ▶ decrease in oil recovery
- Not recommended for fruit less than 45 mm (1¾") in diameter as there is an increased risk of fruit being trapped between rolls causing breakage and/or contaminating the emulsion
- Oil extraction efficiency at the MORE is a function of the following variables:
  - Fruit (variety, condition, softness, peel thickness)
  - Scarification aggressiveness
  - Fruit feed rate
  - Time interval between cleanings
  - Condition of serrated discs and scrapers
  - Proper flow of yellow water and water
- Oil emulsion should be filtered through a finisher before sending it to the centrifuges
- Overall plant oil recovery efficiency is not dependent only on the MORE, but on the entire system

Approximate Specifications



TYPICAL PRODUCTION DATA		
FRUIT	**MT/HOUR**	**% OIL EXTRACTED**
Lemon	6 - 14	87 - 92
Grapefruit	10 - 20	80 - 85
Lime	6 - 12	85 - 90

COUNT ON JBT TO HELP PROTECT YOUR INVESTMENT

JBT's greatest value in PRoCARE® services comes from preventing unexpected costs through smart, purposeful, and timely maintenance based on unmatched knowledge and expertise. PRoCARE service packages are offered as a maintenance agreement in various service levels, depending on your production and cost management requirements.

iOPS Smarter. Made Simpler. PRoCARE

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