Next Generation Tableting Technology

FE55
How do you produce efficiently…

… when you want to cover very different requirements with one machine type?

The FE55 is the only machine in its performance class with which users can manufacture, as standard, more than 90% of all products without additional investment or complex refitting. With up to 87 punches in 1.6 square meters, it offers a unique ratio of punch count to footprint. Therefore, it sets new standards for the three central factors of efficiency in tableting – productivity, flexibility and availability. And the Fette Compacting TRI.EASY design ensures ease of use when operating, refitting or servicing.

Discover the next generation of tableting technology.

TECHNOLOGY stands for everything we offer in production technology – from tablet presses and capsule filling machines through Process Equipment to tableting tools and format parts.

SERVICE covers all the services related to machines, Process Equipment and installations such as spare parts supply, plant modernization and technical field service department.

COMPETENCE is the overarching idea behind all our process-related services. This includes training, product trials, application and Performance Consulting as well as engineering.
Fette Compacting
FE55 – The new standard for efficiency in tableting

Three factors are decisive for efficiency in tablet production: productivity, flexibility and availability. The FE55 sets new standards in each of these areas:

+ Innovative filling system for easy and safe feeding of even complex product blends

+ Up to 50 % higher production output thanks to unique ratio of punch stations to footprint (up to 87 punch stations on 1.6 m²)

+ The only machine of this size for the production of single- and bi-layer tablets as well as offering the possibility of direct compression

+ Unique, patented system for first layer sampling during production

+ Innovative internal tablet discharge for guaranteed smooth production
FE55 – Innovations for your productivity

Innovative compression stations
+ Smooth-running compression rollers for ultra-simple handling
+ Three compression rollers for the ultimate flexibility
+ Single, direct compression and bi-layer compression
+ Direct compressing using a third compression roller
+ Bi-layer tableting with identical compression rollers and filling devices
+ 83% longer compression dwell time in combination with FS19® punches
+ Patented system allows sampling of the first layer in less than four seconds during production
+ Compression rollers can be moved quickly to a parking position for easy turret exchange
+ Extremely easy load cell exchange during product changeovers

Machine design
+ Housing made of FDA-certified high-performance polymer
+ Optimal geometric surfaces for easy handling and fast cleaning
+ All product contact parts are made of stainless steel or FDA/GMP certified materials
+ 360 degree accessibility
+ Window flaps can be opened without disconnecting Process Equipment

Modern Torque-drive
+ High-performance, direct torque drive
+ Maintenance-free and energy-efficient
+ Alternatively external or integrated electrical cabinet for maximum flexibility
+ Power and control sections are separate
+ Electrical cabinet with innovative cooling concept
+ All Process Equipment and machine connections on a single panel

Innovative turret
+ Unique ratio of punch count to footprint guarantees maximum flexibility
+ Compression rollers can be driven into parking position for easy turret change
+ Turret options for all applications
+ Easy turret exchange with cams and segments
+ Fast format changeover thanks to segments installed
+ Coded tablet scraper
+ Turret featuring coding ring for avoiding assembly errors
+ One central, multi-functional connector for oil, air and electricity

Unique tablet discharge
+ Easy operation
+ Fast and safe tablet sorting and sampling for maximum product security
+ Significantly less floorspace thanks to innovative tablet discharge through the column
+ 360 degree accessibility
+ Compact unit without cables or hoses
+ Dust-proof design
+ All product contact parts are made of stainless steel, cleaning is fast and efficient
The Fette Compacting TRI.EASY design permits uniquely easy and reliable operation. The idea behind it: efficiency is only possible when the technology is equally easy in the three dimensions of operating, refitting and servicing.

The TRI.EASY design is oriented precisely around the needs of the user, offering comprehensive help to make every task more straightforward. A short learning curve and significantly more secure handling on the part of the operating personnel, ensure maximum product quality even with the most demanding tasks.

**Features**
- Plug-and-Play design
- Dismantling and assembly without tools
- Machine controller detects the turret configuration
- No external handling system required for turret exchange

**Benefits**
- Very easy handling since adjustments are no longer necessary
- Fast, easy exchange and cleaning
- Parameters are configured automatically
**Maintenance-friendly**
+ Identical compression rollers for all stations
+ Load cells can be changed without removing the gear box
+ High-resolution load cell can be easily installed for special applications

**Product flow**
+ Modern filling devices for maximum productivity
+ Easy to clean thanks to minimal number of components
+ No tools required for assembly or dismantling
+ Optional use of three-chambered Fill-O-Matic
+ Height adjustment via a central slide ensuring absolute repeatability
+ Height-adjustable in steps of 30 μm

**Features**
+ Tablet sample of the first layer can be taken in less than 4 seconds during production

**Benefits**
+ Extremely minimized product loss, yields cost savings

---

**FEATURES**
+ 360 degree accessibility
+ Extremely easy adjustment of the FOM table in 30 μm steps
+ Smooth-running compression rollers, also ideal for low compression forces
+ Pneumatically-adjustable compression rollers for first-layer sampling
+ Significantly lower product loss when sampling of first-layer
+ 250 mm diameter pressure rollers for maximum compression dwell time
+ Control components are separate from power components
+ Fewer plug-in connections mean easier assembly
+ Dust-proof and hermetically sealed electrical cabinet
+ Coded turret allows controller to detect configuration
Fette Compacting HMI – Easy and safe operation guaranteed
The totally redeveloped HMI (Human Machine Interface) of the FE Series lets you keep an eye on all the parameters of the tablet press. The easy, intuitive operation guarantees you maximum efficiency and reliability.

+ 19” touchscreen for the best possible overview
+ Easy operation through full keyboard
+ Dust-protected USB connection
+ No mechanical disc drives
+ Win10® embedded operating system
+ Visual operating software from Fette Compacting
+ SQL Server database
+ Fast access to the most important functions through 12 pictogram buttons
+ All surfaces can be cleaned easily
+ No ventilation slots or openings
+ Ergonomic operator height

**FEATURES** | **BENEFITS**
---|---
+ Clear process graphics showing all necessary parameters | + Easy, intuitive operation through self-explanatory pictograms
+ Backwards compatible hot-keys for machine operation | + Direct access to Fette Compacting presses
+ Individually configurable parameter lists | + Fast, easy machine operation
+ 12 fast-access pictogram buttons | + Direct access to the main functions
+ Terminal made of FDA-certified high-performance polymer | + Smooth, easily cleaned surfaces
+ HMI and software identical for the entire FE Series | + Intuitive operation of the FE Series for the user

**Access to the main turret functions**
+ Missing punches and punches that need to be rejected can easily be selected with a touch
+ Ready-grouped parameters for easy operation
+ Hot-keys for quick adjustment of the most important parameters
+ Drag and drop parameter lists for an individualized view
+ Search function within the parameter list
+ Different input dialogs for particular parameters
+ A comment line can be used for each individual parameter
+ Critical parameters can only be changed in conjunction with another operator (as a second set of eyes)
Optional Containment Package

Maximum operative protection is the key feature of Fette Compacting’s containment concept. The need for the highest possible operative safety during tableting can only be achieved through the right technological solutions and tablet manufacture that is largely automated. A tablet press has to compress powders and granulates securely and efficiently.

The tableting process is fully automated. The containment is never interrupted – from filling the machine right through to the removal of the tablets. In the event that the machine stops it must be possible for the operative to access the tablet press manually from all sides without breaking the containment.

Glove ports and rapid transfer ports in window flaps are the most important techniques for achieving this. The containment system from Fette Compacting has been developed for maximum operative safety and system security. All the glove ports and window flaps are linked into the safety control system, from where they are monitored. Incorrect operation is almost impossible.

Product feed through a containment flap system
+ Receiving frame for decoupling vibrations from the product feed and the flap valve
+ HEPA H13 supply air filter
+ Pressure sensor for continuous, real-time monitoring of the positive pressure for maximum safety
+ Sensor-monitored, switchable vacuum system for preliminary manual cleaning by means of a hand vacuum hose and standard vacuum extraction for production operation

Compression chamber optimally designed for cleaning
+ Reduced dust exposure through optimum compression chamber design
+ Maximum operative protection
+ No dust outside the machine
+ All parameters adjustable from the HMI
+ The compression chamber is dust-proof

Glove ports
+ Safety sensor in every glove port for maximum operative safety
+ Ergonomic design
+ The whole of the interior of the compression chamber can be reached
+ Tools and/or filling cams can be introduced under containment conditions

Rapid Transfer Port
+ The rapid transfer port (RTP) allows material to be introduced to and removed from a containment system
+ Tools, punches and filling cams can be introduced under containment conditions

New window flaps
+ Double safety barrier system
+ Window flap sensors for opening, closing and pneumatically locking the window flaps
+ The individual window flaps are monitored, and their status displayed, at the HMI
<table>
<thead>
<tr>
<th>FEATURES</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ It is possible to avoid the release of dust during manufacture, preparation for cleaning or other interaction under containment conditions, and without interruption of the containment</td>
<td>+ Special safety clothing is not necessary during production, saving both cost and time</td>
</tr>
<tr>
<td>+ No contact with toxic products</td>
<td>+ Operatives are protected from dirt and contamination</td>
</tr>
<tr>
<td>+ Dust-proof compression chamber inside the machine</td>
<td>+ Safe environment during manufacture</td>
</tr>
<tr>
<td>+ Fail-safe operation and control of the machine</td>
<td>+ Maximum operative safety during the entire production process, reduce costs in operation</td>
</tr>
<tr>
<td>+ Fail-safe locking of all four window flaps</td>
<td>+ Ideal, reliable protection</td>
</tr>
</tbody>
</table>
+ Maximum safety through monitoring at the operative level
+ Only authorized operatives can access the containment controls
+ Access to the control system for locking and unlocking
+ Access to the controller for monitoring the glove ports
+ Logging all operative input and changes to the log
+ Sensor for low pressure monitoring
+ Individual locking and unlocking of the window flaps
+ Fail-safe locking of all four window flaps
+ Display of the switchable extraction equipment
+ Can be switched between extraction system in the machine and vacuum hose
+ Audible and visual safety instructions in the event of a leak
+ Individual monitoring system for every glove port
### Standard floor plan

- **Terminal Machine Switch cabinet**
- **Good tablets** Clamp DIN DN50
- **Samples** Clamp DIN DN50
- **Bad tablets** Clamp DIN DN50
- **1709**
- **ca. 859**
- **ca. 2083**
- **ca. 764**
- **1428**
- **Dust extraction tablet press**
  - 600 m³/h
- **Compressed air min.**
  - 6 bar, 550 Ltr./min.
- **Operating voltage**
  - 400 – 480 V, 3 Ph, 50 / 60 Hz
- **Power consumption**
  - 16 kW

### Containment floor plan

- **Cable L = 5m**
- **Cable L = 3m**
- **Compressed air 2x 6 bar**
- **Feeding hopper Ø176**
- **Foundation loading**
- **Pressure air min 6 bar for turret clamping system**
  - + Dosing head
  - + Option: air reject system
- **Main 400 / 440 / 480 V – 50 – 60 Hz**
  - Connection 4 x 10 mm²
- **Dust collector 300 m³/h Clamp DN2,5″**
- **Air inlet Clamp DN4″**
- **1070**
- **Feeding hopper Ø176**
- **Deduster 700 – 900 m³/h**
- **Cable L = 4m**
- **Clamp ISO DN150**

### Tables

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono-layer-compression</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Direct compression</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Bi-layer-compression</td>
<td>1. Layer</td>
<td>2. Layer</td>
</tr>
</tbody>
</table>
## Technical Data

<table>
<thead>
<tr>
<th>Feature</th>
<th>S</th>
<th>S</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of punch stations</strong></td>
<td>87</td>
<td>60</td>
<td>45</td>
</tr>
<tr>
<td><strong>Punch type</strong></td>
<td>FS12®</td>
<td>FS19®/EU19</td>
<td>EU1®/EU1*-441</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FS®/EU19</td>
<td>TSM1®</td>
</tr>
<tr>
<td><strong>Tablet output units/h</strong></td>
<td>min.</td>
<td>78,300</td>
<td>54,000</td>
</tr>
<tr>
<td></td>
<td>max.</td>
<td>626,400</td>
<td>432,000</td>
</tr>
<tr>
<td><strong>Max. compression force 1</strong></td>
<td>kN</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td><strong>Max. compression force 2</strong></td>
<td>kN</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td><strong>Max. compression force 3</strong></td>
<td>kN</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td><strong>Max. tablet diameter</strong></td>
<td>mm</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td><strong>Max. filling depth 1st layer</strong></td>
<td>mm</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2nd layer</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Pitch circle diameter</strong></td>
<td>mm</td>
<td>550</td>
<td>550</td>
</tr>
<tr>
<td><strong>Turret rotation speed</strong></td>
<td>min⁻¹</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>max.</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td><strong>Segment height</strong></td>
<td>mm</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td><strong>Punch shaft diameter</strong></td>
<td>mm</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td><strong>Punch length Upper/lower punch</strong></td>
<td>mm</td>
<td>133.6</td>
<td>133.6 (133.35)</td>
</tr>
<tr>
<td><strong>Upper punch insertion depth</strong></td>
<td>mm</td>
<td>1–4 (8***)</td>
<td>1–4 (8***)</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>mm</td>
<td>1,306 × 1,306 × 2,048 without integrated switch cabinet</td>
<td>1,306 × 1,626 × 2,048 with integrated switch cabinet</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td>Tablet press 4,100 – 4,300 kg, operating terminal 100 kg, switch cabinet 350 kg</td>
<td></td>
</tr>
<tr>
<td><strong>Electrical supply parameters</strong></td>
<td></td>
<td>Operational voltage 400 – 480 V, 50/60 Hz, power consumption 16 kW</td>
<td></td>
</tr>
</tbody>
</table>

Theoretical values or technical limits: These can vary in practice, according to product and application.

Tablet thickness is a size dependent on product and can strongly vary.

* limited by punch properties
** special filling depth available on request
*** 2-layer-operation
Machine monitoring in real time

The SmartInterface by Fette Compacting is a server-based application enabling the monitoring of tablet press production processes via mobile devices (laptop, smartphone etc.). The user can obtain an overview of the current production and machine status at any time and independent of location, and download data and protocols, for example. This helps everyone involved in production to maintain full control of the manufacturing process, enabling them to react immediately and deploy personnel more efficiently. This, in turn, permits analysis of inefficiencies and the possibility to take the appropriate measures. Operators can react faster to deviations as they are informed of the current status at all times. The application is available on all standard web browsers via the company’s intranet. Accordingly, only the user’s own IT security guidelines apply.
The KPI dashboard provides a simple overview of the current production and machine status.

**Monitoring all process data**
The monitoring functions can be used to record and export all process values and utilize them for analyses.

**Key benefits**
+ Retrieve data at any time and from anywhere, even in editable formats such as Excel, without blocking the machine or impacting production
+ Easier machine handling
+ Process acceleration
+ Data update <1s (dependent on the customer network and capacity utilization)
+ Lower risk of contamination of the production area and machine by manual data exchanges on site, e.g. using a USB stick
+ Less ways to the machine and personal protective equipment required
+ Access subject to the customer’s IT security guidelines
+ Access rights also based on HMI access rights
+ No validation-relevant change in case of upgrade

**Technical requirements**
+ Compatible machine types with HMI software level Visual 7 or higher
+ The machine must be integrated in an IT network (TCP/IP).
+ The mobile device must be within the machine network or communication (e.g. via network routes) must be possible.
+ The appropriate firewall rules must be entered for specific connections.

The process graphic offers in-house monitoring of production parameters in real time.

**Process graphic**
Pmax® turret –
more production capacity
without higher investments

<table>
<thead>
<tr>
<th>Machine type</th>
<th>FE35</th>
<th>FE55</th>
<th>FE75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stations</td>
<td>27</td>
<td>33</td>
<td>51</td>
</tr>
<tr>
<td>Max. rotation speed (min⁻¹)</td>
<td>90</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Punch type</td>
<td>EU1®</td>
<td>EU1®</td>
<td>FS12®</td>
</tr>
<tr>
<td></td>
<td>EU1®</td>
<td>EU1®</td>
<td>FS12®</td>
</tr>
<tr>
<td></td>
<td>EU1®</td>
<td>EU1®</td>
<td>FS12®</td>
</tr>
</tbody>
</table>

**Yield (Tablets/h)**

<table>
<thead>
<tr>
<th>FS12® increase up to 40% more output</th>
</tr>
</thead>
<tbody>
<tr>
<td>145,900</td>
</tr>
<tr>
<td>237,600</td>
</tr>
<tr>
<td>367,200</td>
</tr>
<tr>
<td>243,000</td>
</tr>
<tr>
<td>432,000</td>
</tr>
<tr>
<td>626,400</td>
</tr>
<tr>
<td>584,000</td>
</tr>
<tr>
<td>1,080,000</td>
</tr>
<tr>
<td>1,656,000</td>
</tr>
</tbody>
</table>

**FEATURES**

- Optimized punch head
- Higher number of punches per compression
- More punches at the same time under the compression station
- No further machine investments necessary
- Production parameters and characteristics stay unchanged
- Single tablet rejection of bad tablets
- Single compression force measurement even with small tablet diameters

**BENEFITS**

- Long dwell times
- Up to 40% higher output
- Smooth machine running
- Higher return on investment
- No further machine adjustments necessary
- 100% quality assurance through in-process-control
- Approved alternative to multi-tip tooling

**Pmax® turret – more production capacity without higher investments**
Whether round tablets, special shapes, relief moldings, concavities or break lines – Fette Compacting can handle the full range of customer requirements. To ensure maximum output and flexibility, we offer punches in all sizes and types. For customers with special demands on their production, we particularly recommend the FS® products.

It is not just the diameter of the contact area that is critical; but furthermore the optimised transition geometries into the head radius which are featured by our FS® technology transmit the compression forces in an optimum way.

**Fette Compacting – Punch head types**

**FS Technology®**

- FS19®
  - Ø 20
  - Ø 10
  - Ø 4
- EU1®
  - Ø 29
  - Ø 25.35
  - Ø 19
- TSM1®
  - Ø 31.7
  - Ø 12.8
  - Ø 35
- TSM1® domed head (TED19)
  - Ø 31.7
  - Ø 14.6
  - Ø 35
- TED19
  - Ø 31.7
  - Ø 10.6
  - Ø 35

All measurements are in mm.