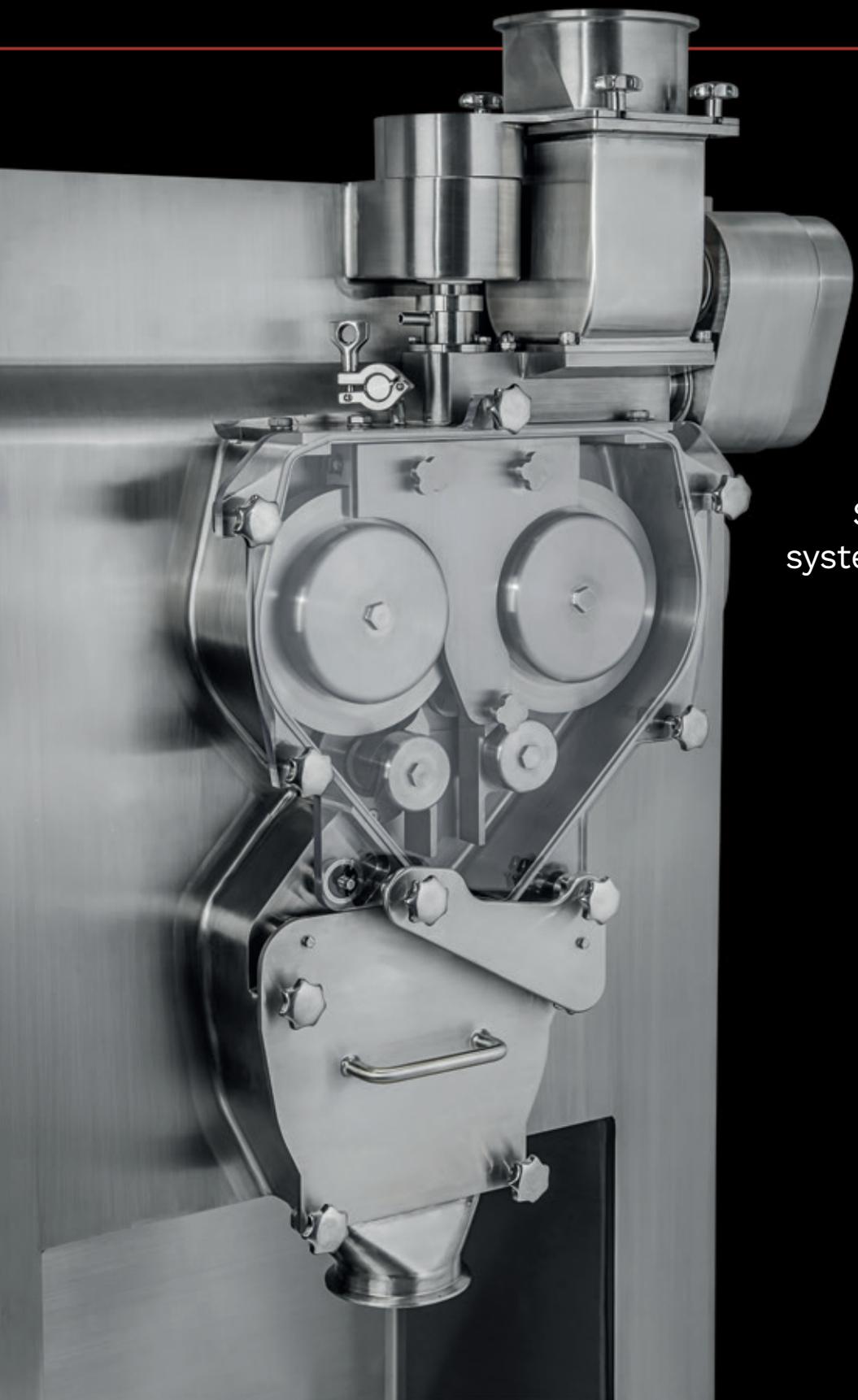


CCS SERIES

CONTAINED
COMPACTION
SYSTEMS



Scalable dry granulation
systems for pharmaceutical,
chemical and food
applications

FITZPATRICK®

FITZPATRICK CCS SERIES

THE PERFECT CONTAINED COMPACTION SOLUTION

Fitzpatrick is committed to improving the performance and profitability of our customers' powder processing operations.

We continually invest in customer-driven innovative solutions and provide long-term global support via our highly technical customer service and spare parts network.

Scalability from lab to full production

Fitzpatrick's CCS Series offers a truly scalable equipment growth path. As customers progress from research and development all the way through to full production, results obtained on the smaller models are fully transferable to the larger systems.

Learn more, page 6.

Simple controls aiding an automated, repeatable process

Fitzpatrick's CCS Series is delivered with intuitive, easy-to-understand software powering fully automated controls, thereby removing the risk of human error.

Learn more, page 8.

Class-leading product design and manufacturing, built to last

Fitzpatrick's longevity and diverse process experience has helped to steer the design of world-class products and enhanced engineering capabilities.

Learn more, page 10.

Improved profitability with minimal maintenance and reduced downtime

Fitzpatrick's CCS Series has been designed with the user in mind. Equipment is simple to maintain with fewer parts to remove during cleaning cycles, maximizing up-time.

Learn more, page 12.

RECOGNIZED AS A WORLD LEADER
IN ROLL COMPACTION EQUIPMENT
FOR DRY GRANULATION





MARKET LEADING DESIGN IMPROVES END PRODUCT CONSISTENCY

1 Scalable compaction production from 200 g to 400 kg/hr

2 Precise dosing from automatically adjusting feed screw

3 Pre-compression screw provides uniform feed to the rolls

4 Precision parallel floating rolls ensure uniform compaction force for ribbon consistency

5 Fewer parts result in reduced maintenance and production downtime

6 Manual or automatic control through operator interface

7 Wider selection of milling options over competitor products due to variety of rotor and screen combinations

8 Optional Product Containment System minimizes exposure and prevents contamination

9 Optional in-wall configuration for maintenance outside clean room



SCALABILITY

FROM LAB TO FULL PRODUCTION

Fitzpatrick's CCS Series offers a truly scalable equipment growth path. As customers progress from research and development all the way through to full production, results obtained on the smaller models are fully transferable to the larger systems.

Additionally, the intuitive software and built-in security and administrative controls are consistent throughout the CCS Series range.

As your production requirements grow, the CCS Series grows with you, without the need for additional training.



CCS220

Ideal for R&D proof of concept

Roll Dimension: 2 x 20 cm

CCS320

Ideal for small volume / pilot production

Roll Dimension: 3 x 20 cm

- Consistent roll diameter enables superior scale-up to production machines.
- Compact, and easily mobile.
- Lab / pilot conversion kits allow for reciprocal conversion between CCS220 and CCS320 models, depending on whether higher pressure or higher capacity is required.



CCS520

For mid-sized production-scale capacity

Roll Dimension: 5 x 20 cm

- Suitable for both free-standing or in-wall installations.
- In-wall installation minimizes clean room space requirements and allows for internal maintenance access without the need for PPE.
- Optional Product Containment System (PCS) minimizes operator exposure to active ingredients and prevents product loss or contamination.

CCS720

Designed for large production-scale capacities

Roll Dimension: 7.5 x 20 cm

CCS1025

The maximum volume capacity in the CCS range

Roll Dimension: 10 x 25 cm

- With the in-wall installation the Technical Area is entered from the back for ease of use, without the need for PPE.
- Optional Product Containment System (PCS) ensures minimal operator exposure to active ingredients and helps to prevent product loss or contamination.

SIMPLE CONTROLS

AIDING AN AUTOMATED, REPEATABLE WORKFLOW

Fitzpatrick's CCS Series is delivered with intuitive, easy-to-understand software powering fully automated controls, thereby removing the risk of human error.

Each CCS Series machine comes with a set of pre-defined settings and optimized adjustments built in, all based on Fitzpatrick's 80+ years of experience and innovation in the design and manufacture of size reduction, roll compaction, and process systems.

Fitzpatrick has programmed software that includes admin / user level security clearance, ensuring lower level operators cannot change recipe-based settings or cause unexpected errors.

CCS machines perform consistently and deliver product that meets our customer's highest expectations. Product delivery is precise and results are easily repeated – mandatory for the demanding needs of today's validated workflows.

PLC / operator interface

Allows for manual or automatic operation. Process data acquisition including batch reporting, historical trending and event logging. Simple path to validation documentation and support.

Security of process

Multiple levels of password security allow admin and operator level secured functionality. 21 CFR part 11 solutions.

Large HMI display

Fully instrumented touch screen with large-sized display ideally suited for cleanroom operators wearing cleanroom suits and gloves.

Flexible configuration

CCS units are suitable for mounting in-wall, free-standing, portable or in an isolator / flow booth. In-wall installations minimize clean room space requirements and allow for internal maintenance access without the need for cleanroom attire.



SIMATIC HMI

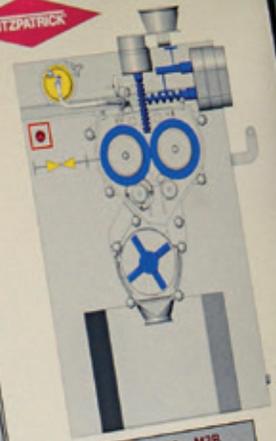
TOUCH

FITZPATRICK

- Security Log in
- Security Log out
- Run-Time Reset
- Safety Reset
- Automatic Start
- Automatic Stop

Current Stage: 0 of 6

- System is Off
- Hydraulic Unit is Off
- Rolls Control is Enabled
- Rolls Gap Control is Enabled
- Rolls Gap Correction is Disabled
- Vacuum De-aeration Control is Disabled
- Control Cabinet is not Operational



CCS320 - M3B

Run-Time: 2:04:00 H:M:S

- Rolls Force
- Rolls Gap
- WTP
- Alarm Summary
- System
- Recipe
- Historical Trend
- User Setup
- Alarm History
- Emergency Stop

Current User:	Batch Time Setpoint:	0.18	0 Min
Recipe Name: Recipe 1	Datalog Name:	Batch 2	
Date/Time: 2/19/2019 1:00:12 PM	Datalog Record #:	0	
HFS Speed: 0.0 RPM	Mill Speed:	0.0 m/s	0 RPM
HFS Current: 0 %FLA	Mill Current:	0 %FLA	0 A/10m
HFS Speed: 0.0 RPM	Rolls Force:	0 %FLA	
HFS Current: 0 %FLA	Rolls Force Motor Current:	0 %FLA	
Rolls Speed: 0.0 RPM	Rolls Gap:	0.05 mm	
Rolls Current: 0 %FLA	Vacuum De-aeration Flow:	0.0 LPM	

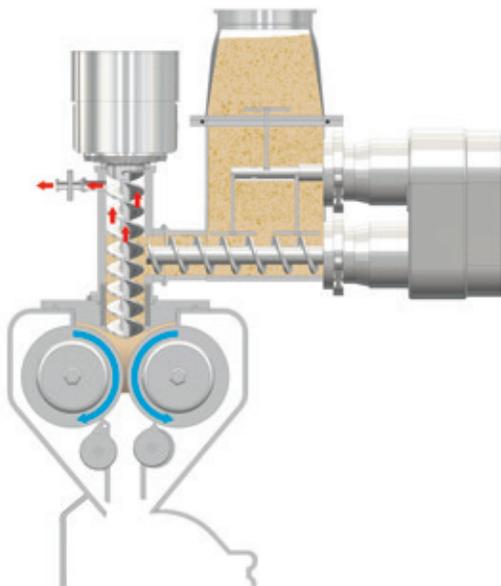
SIEMENS

10:03:09 AM Connection established: HMI_Connection_Station 192.168.1.100...

Technical features

For more information on the market-leading features of the CCS range, see page 10.

CLASS-LEADING PRODUCT DESIGN AND MANUFACTURING, BUILT TO LAST



Independently controlled two screw feed design

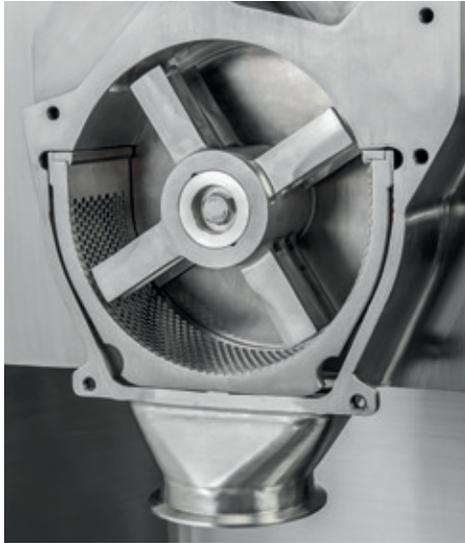
CCS Series machines have been designed with a dual-feed system. The horizontal feed screw meters a consistent flow of powder to the process. The high-speed vertically mounted pre-compression screw provides deaeration and pre-compression of product before it passes through the compaction stage, helping to achieve a more consistent ribbon density.

Our wide range of screens and rotor configurations in the milling step enable us to achieve the desired PSD for your specific process.

FITZPATRICK'S LONGEVITY AND UNMATCHED DIVERSE PROCESS EXPERIENCE HAS HELPED TO STEER THE DESIGN OF WORLD-CLASS PRODUCTS AND ENHANCED ENGINEERING CAPABILITIES



Counter-Rotating Rolls For Precise Controllable Compaction



Knife Rotor For “In Air” Impact of Harder Compacts



Bar Rotor For Slow-Speed “Shearing” of Compact

Compaction

The powder is fed between two counter-rotating rolls and pressed, creating a dense, compact ribbon. Factors controlling the compaction process are roll surface, diameter & width, peripheral speed, roll force & gap. The hydraulic system with floating roll produces a precise force which ensures a uniform compact.

Uniquely configurable milling options

Fitzpatrick has developed the greatest selection of rotor and screen combinations and has made them available for the CCS range. These uniquely configurable options can solve most powder conditioning requirements and achieve the tightest particle size distributions of any manufacturer.

Test our class-leading solutions

Let us help you validate and optimize your roll compactor process. We have fully equipped lab testing centers and we have demonstration and rental units available to perform your own proof-of-concept trials or optimize your compaction process parameters.

Optimized granulation process

The CCS Series is built to perform and last, maximizing investment and offering the longest lifespan for your production needs. Customers that adopt the CCS Series quickly realize the highest possible ROI.

Sealed processing area

Lastly – with operator safety being paramount – the CCS Series ensures the highest levels of product containment, decreasing risk of occupational exposure to active ingredients as part of your production process.

IMPROVED PROFITABILITY WITH MINIMAL MAINTENANCE AND REDUCED DOWNTIME

Our technical support group provides:

- Consultation and optimization of your processing workflow
- Regulatory validation assistance and support
- Operational and maintenance training of your personnel



Fitzpatrick's CCS Series has been designed with the user in mind. Equipment is simple to maintain with fewer parts to remove during cleaning cycles, maximizing up-time. Also, with very few wear parts, regular maintenance is fast and simple.



Benefits of cGMP design

- Potentially increase batches per shift by 50% with fewer parts to handle during product changeovers.
- Cleaning mode automatically spreads rolls apart for faster, safer and easier roll access.
- Save time and labor costs with reduced number of steps and component adjustment.
- Optional Wash-In-Place (WIP) and automated cleaning cycle reduces downtime.

CLEANING MODE AUTOMATICALLY
SPREADS ROLLS APART FOR FASTER,
SAFER AND EASIER ROLL ACCESS



Improve safety and access with through-wall installation

CCS through-wall installations allow for internal maintenance access without the need for cleanroom attire to enter potentially hazardous cleanroom environments.

Unrivalled support

If you need help, Fitzpatrick employs a global network of support personnel.

Our Application Engineers can assist you with product testing and laboratory analysis, and can help select the correct equipment for your application. Engineers can also provide shoulder-to-shoulder support during your production scale-up.

TECHNICAL DATA

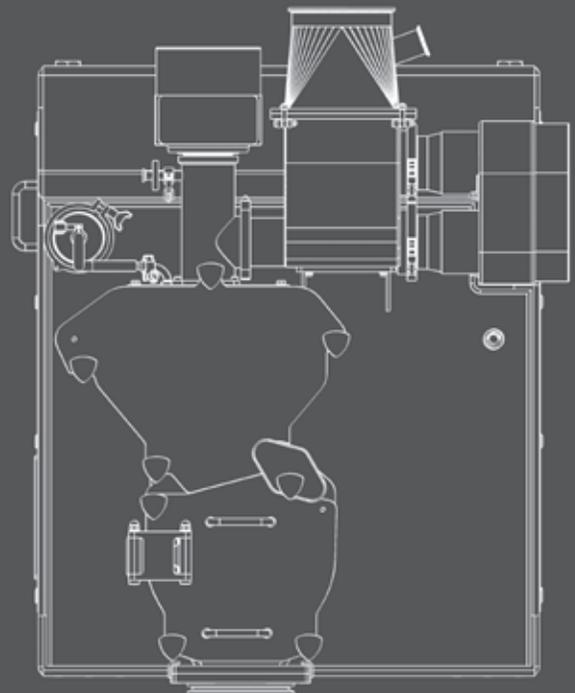
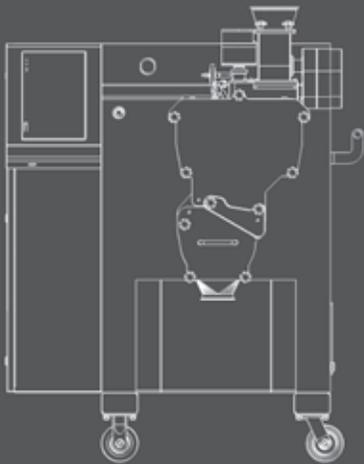
220 / 320

Roll Force	kN/cm	220: 26 320: 17
Roll Dimension	cm	220: 2 x 20 320: 3 x 20
Roll Gap	mm	1-6
Capacity	kg/hr kg/hr	220: up to 25* 320: up to 75*
Dimensions	L x W x H mm	1245 x 940 x 1600
Weight	kg	861
Noise	dB	<75
Power	kW (HP)	2.7 (4)

520 / 720

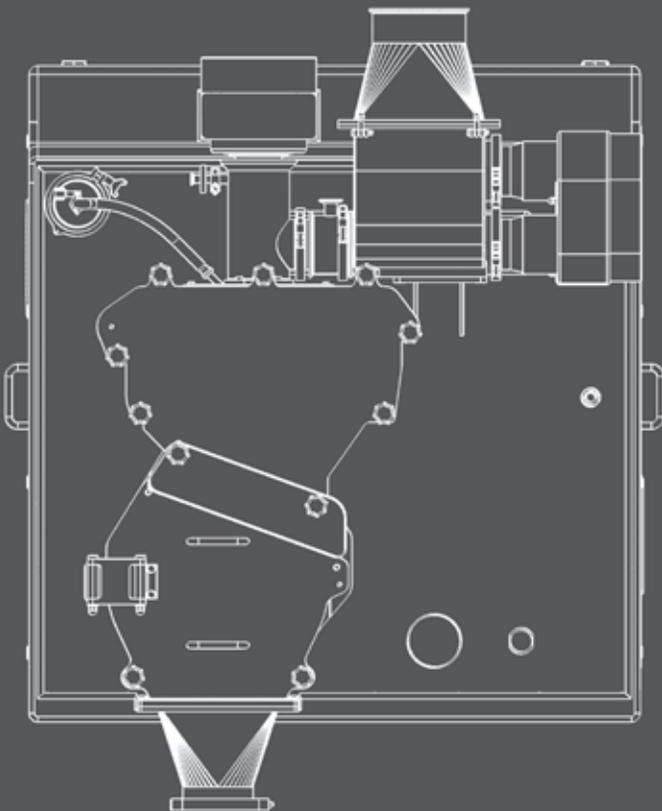
Roll Force	kN/cm	520: 26 720: 17
Roll Dimension	cm	520: 5 x 20 720: 7.5 x 20
Roll Gap	mm	1-6
Capacity	kg/hr kg/hr	520: up to 150* 720: up to 250*
Dimensions	L x W x H mm	1143 x 1829 x 1422
Weight	kg	2268
Noise	dB	<75
Power	kW (HP)	8.8 (12)

* Capacity is dependent upon material properties and process objectives.



1025

Roll Force	kN/cm	20
Roll Dimension	cm	10 x 25
Roll Gap	mm	1-6
Capacity	kg/hr	up to 400*
Dimensions	L x W x H mm	1148 x 1930 x 1575
Weight	kg	3855
Noise	dB	<75
Power	kW (HP)	16.8 (22.5)



Product Containment

1 $\mu\text{g}/\text{m}^3$ capability with patented Product Containment System (PCS).

Sealed technical area: double lip seal ensures containment when primary seal is removed for cleaning.

The CCS Series is designed to fully contain all product in the processing and receiving sections of the machine. This tightly sealed design allows for the optional PCS to be added at the discharge. The PCS draws a slight vacuum in the process environment to provide maximum containment.

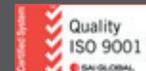
Optional <1 $\mu\text{g}/\text{m}^3$ through glovebox design.

Safety

Configurable installations: In-wall, free-standing, portable or in an isolator / flow booth.

Interlocked safety switches maximizes operator safety.

Accreditations



FITZPATRICK

WORLD-LEADING EXPERTISE AND SUPPORT



At Fitzpatrick we are committed to improving the performance and profitability of our customer's powder processing operations.

Our customers are supported by world-leading applications and development experts, and we continually invest in customer-driven innovative solutions to address market needs.

We are committed to offering long-term support services through a highly-technical customer service and spare parts network team.

Discover and experience the Fitzpatrick difference!

● Headquarters

● IDEX MPT Centers of Excellence

Representation in over 80 countries worldwide

IDEX Material Processing Technologies



Dry Granulation
Hammer Milling



Lean Powder Handling
Batching, Mixing & Packing



High-Pressure
Fluid Processing



Conical Milling
High-Shear Mixing

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