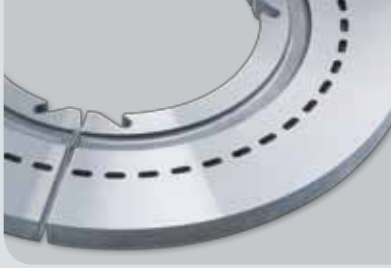


Efficiency for

Tablet Manufacturing

www.fette-compacting.com

TECHNOLOGY
COMPETENCE
SERVICE

FETTE COMPACTING
be efficient

Fette Compacting – be efficient!

Fette Compacting is the world's leading provider of integrated solutions for industrial tablet production. Since 2016, the product portfolio offered by the technological and global market leader has been supplemented to include highly-efficient capsule filling machines. The company specializes in high-performance machines for the pharmaceutical industry. The company's head office and global control center is in Schwarzenbek near Hamburg. Fette Compacting is represented across the globe in more than 40 countries.

Fette Compacting is the only manufacturer of tablet presses, capsule filling machines and tableting tools, operating a global competence network with five fully-equipped and digitally-networked competence centres in Germany, the USA, Brazil, India and China.

Fette Compacting is part of the LMT Group – a medium-sized, family-owned group of companies. The group also includes LMT Tools, a leading manufacturer of precision tools for industrial processing of construction materials, and the LMT Finance & Shared Service, which is responsible globally for the company's central functions.

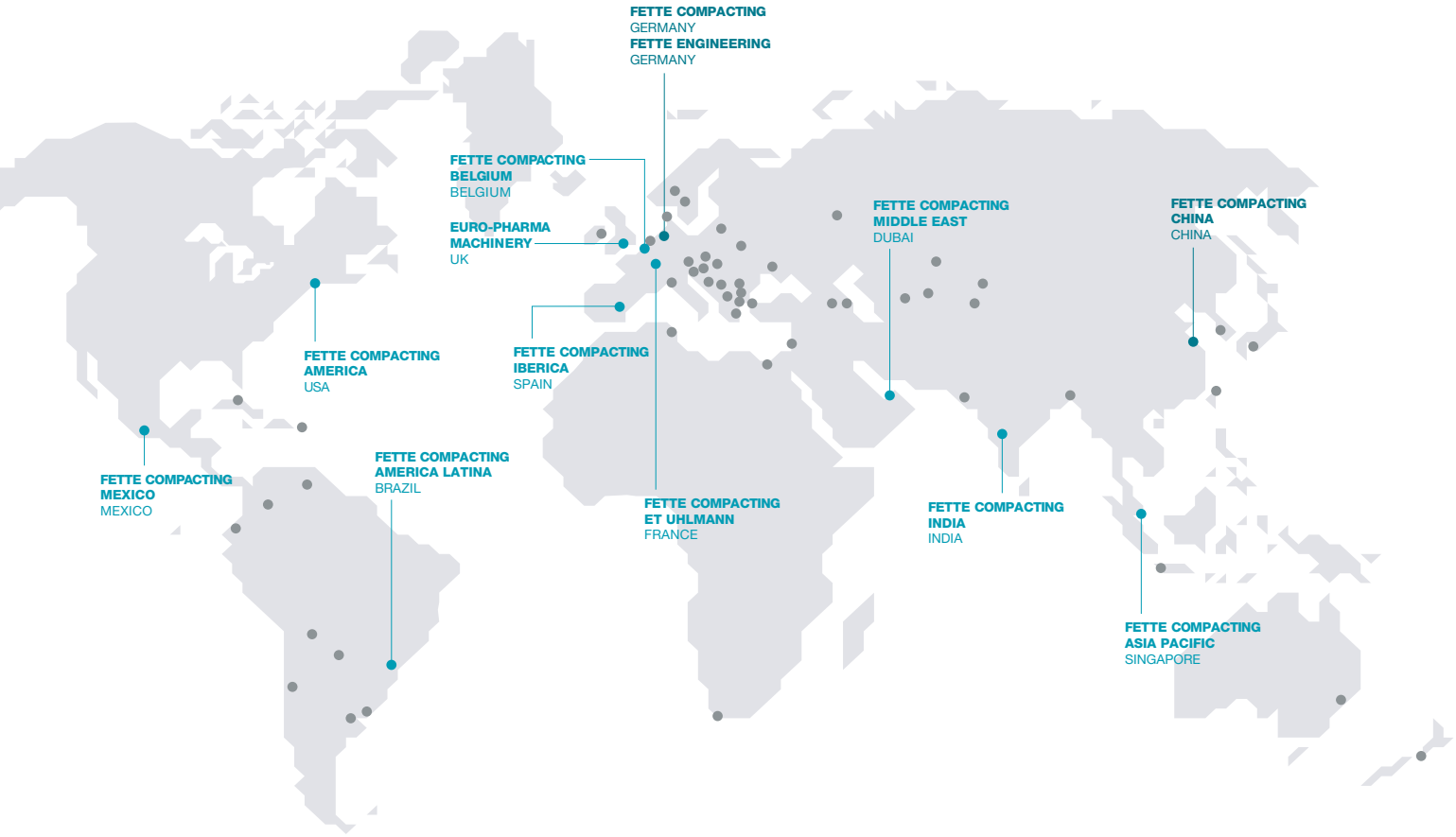
EFFICIENCY GUIDE

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.

Competence Centers on a global level



- Fette Compacting subsidiaries
- Fette Compacting production sites
- Fette Compacting Sales Partner

Fette Compacting has its head office and principal production plant in Schwarzenbek near Hamburg. A global network consisting of subsidiaries in Latin America (Campinas, Brazil), China (Nanjing), France (Noisy Le Grand), India (Goa), Spain (Madrid), South-east Asia (Singapore), the USA (Rockaway, New Jersey), Mexico (Mexico, DF), UAE (Dubai), United Kingdom (Bordon, Hampshire), Belgium (Mechelen) and over 40 agencies in other countries ensure that local customers get the products and after-sales service they need.

Fette Compacting has specially equipped Competence Centers in various cities with training facilities where customers' staff can acquire the sort of practical know-how that enhances production safety.

Fette Compacting is also the only manufacturer employing a technical sales force with specialized knowledge in all aspects of tableting. With its 100 globe-trotting salesmen backed by 40 other staff members at its national agencies, Fette Compacting always has qualified service technicians close at hand for every single one of its customers.

1 USA (Rockaway, New Jersey)
2 Brazil (Campinas)
3 India (Goa)
4 China (Nanjing)
5 Germany (Schwarzenbek)

FE Series

Flexibility and constistens availability are key factors for successful and efficient pharmaceutical production. The FE35 combines all the benefits of Fette Compacting's new FE Series with the shortest product changeover time in its class. User benefit from the highest system availability and maximum investment security for its size.

FE35

Segments (S)		S	S	S	S
Number of punch stations		51	33	27	24
Punch type		FS12®	FS19®/EU19 FS®/EU19 TSM19	EU1" TSM1"	EU1"-441
Tablet output units/h	min.	45,900	29,700	24,300	21,600
	max.	367,200	237,600	145,800	129,600
Max. compression force 1*	kN	33	80	80	80
Max. compression force 2*	kN	33	80	80	80
Max. tablet diameter	mm	11	18	25	25
Max. filling depth	mm	22	22	22	22
Pitch circle diameter	mm	325	325	325	325
Turret rotation speed min.	mm^{-1}	15	15	15	15
max.	mm^{-1}	120	120	90	90
Die-/segment height	mm	25	25	25	25
Punch shaft diameter	mm	12	19	25.35	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)	133.6
Upper punch insertion depth	mm	1–4	1–4	1–4	1–4
Dimensions	mm	1,026 × 1,042 × 2,043 without integrated switch cabinet 1,336 × 1,042 × 2,043 with integrated switch cabinet			
Weight	kg	Tablet press 2,800–3,000 kg, operating terminal 100 kg, switch cabinet 350 kg			
Electrical supply parameters		Operating voltage 400–480 V, 50/60 Hz, power consumption 14 kW			

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

The FE55 is the only machine of its size that produces, as standard, more than 90 percent of all tablet types without additional investments or complex conversions. This is made possible by means of the three compression stations which are integrated in the machine. The press is capable of producing single- and bi-layer tablets, as well as, offering direct compression.

FE55

Segments (S)		S	S	S
Number of punch stations		87	60	45
Punch type		FS12®	FS19® / EU19 FS® / EU19 TSM19	EU1"/ EU1"-441 TSM1"
Tablet output units/h	min.	78,300	54,000	40,500
	max.	626,400	432,000	243,000
Max. compression force 1*	kN	33	100	100
Max. compression force 2*	kN	33	100	100
Max. compression force 3*	kN	33	100	100
Max. tablet diameter	mm	11	18	25
Max. filling depth 1st layer	mm	22	22	22
2nd layer	mm	8	8	8
Pitch circle diameter	mm	550	550	550
Turret rotation speed min.	mm^{-1}	15	15	15
max.	mm^{-1}	120	120	90
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	12	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1–4 (8**)	1–4 (8**)	1–4 (8**)
Dimensions	mm	1,306 × 1,306 × 2,048 without integrated switch cabinet 1,306 × 1,626 × 2,048 with integrated switch cabinet		
Weight	kg	Tablet press 4,100 – 4,300 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 16 kW		

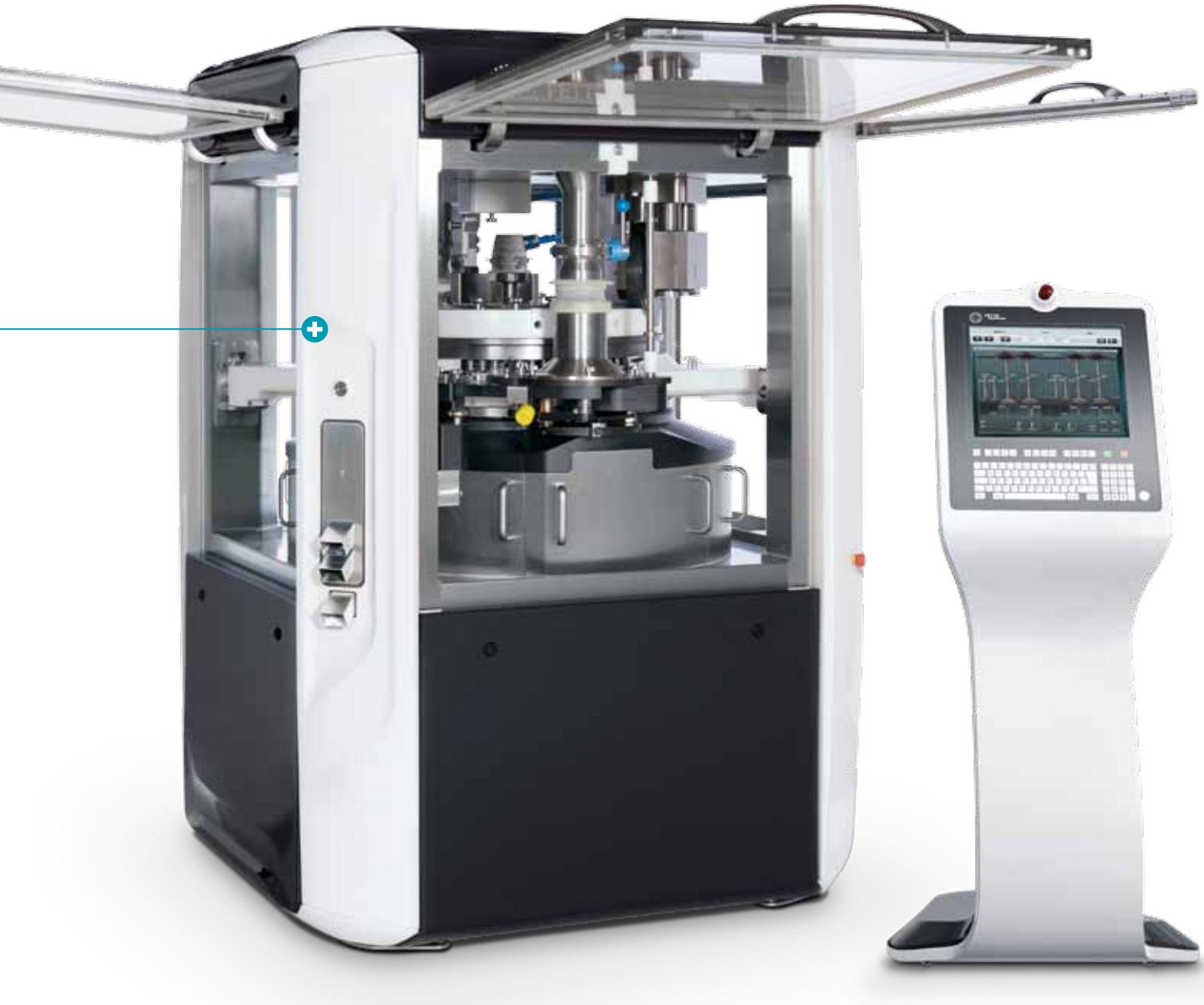
Theoretical values or technical limits: These can vary in practice, according to product and application.
Tablet thickness is a size dependent on product and can strongly vary.
* limited by punch properties; ** 2-layer-operation

The production of large batches is one of the most demanding tasks in tableting. The FE75 is setting new standards in this area. With a maximum output of more than 1.6 million tablets per hour and a footprint of only 2 m^2, it offers an optimal ratio of production capacity to space.

FE75

Segments (S)		S	S	S
Number of punch stations		115	75	55
Punch type		FS12®	FS19® / EU19 FS® / EU19 TSM19	EU1"/ EU1"-441 TSM1"
Tablet output units/h	min.	207,000	135,000	99,000
	max.	1,656,000	1,080,000	594,000
Max. compression force 1*	kN	33	100	100
Max. compression force 2*	kN	33	100	100
Max. compression force 3*	kN	33	100	100
Max. compression force 4*	kN	33	100	100
Max. tablet diameter	mm	11	18	25
Max. filling depth 1st layer	mm	22	22	22
2nd layer	mm	8	8	8
Pitch circle diameter	mm	710	710	710
Turret rotation speed min.	mm^{-1}	15	15	15
max.	mm^{-1}	120	120	90
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	12	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1–4 (8**)	1–4 (8**)	1–4 (8**)
Dimensions	mm	1,463 × 1,463 × 2,046 without integrated switch cabinet 1,463 × 1,778 × 2,046 with integrated switch cabinet		
Weight	kg	Tablet press 5,300 – 5,500 kg, Operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 16 kW		

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; ** 2-layer-operation



The 102i tablet press is the ideal solution for tablet production in the lab and for galenic applications. Scaling-up is simple because the structure of the compression rolls is identical to those of the production tableting machines. All parameters obtained in the lab can be transposed directly to the productionscale machines.

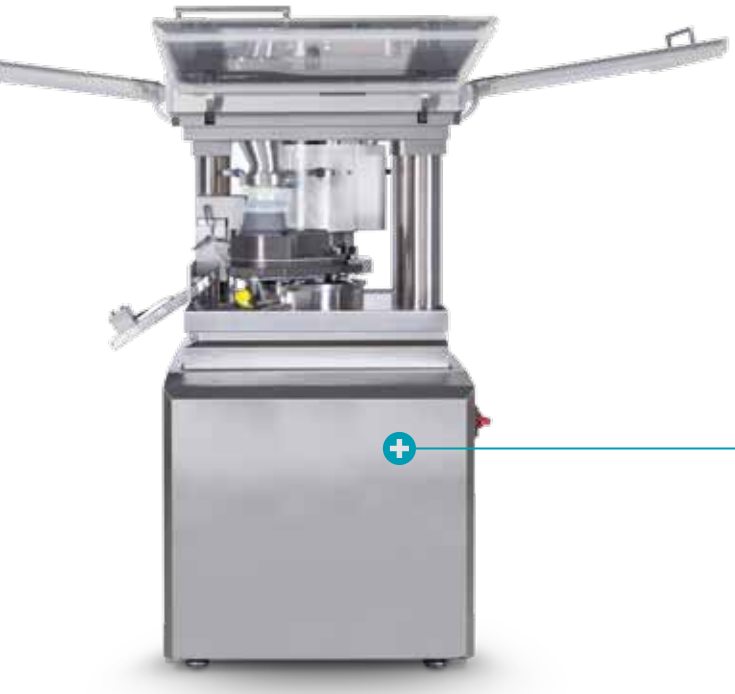
ø max. 25 mm

Tablet

Number of layers	mono-, bi- or triple-layer
Max. tablet output	230,400 tablets/h
Max. tablet output Pmax®	324,000 tablets/h
Max. tablet diameter	25 mm

Die (D) / Segments (S)		D	D	D	D	D
Number of punch stations		6	6	16 (8+8)	16 (8+8)	20
Punch type		FS19®/EU19 FS®/ EU19 TSM19 B	EU1" TSM1" D	FS19®/EU19 FS®/ EU19 TSM19 B	EU1" TSM1" D	EU1"/ EU1"-441 TSM1" D
Tablet output units/h	min	9,000	9,000	24,000 (12,000)	24,000 (12,000)	30,000
	max	43,200	36,000	96,000 (48,000)	96,000 (48,000)	120,000
Max. compression force 1*	kN	80	80	80	80	80
Max. compression force 2*	kN	80	80	80	80	80
Max. tablet diameter	mm	16	25	18	25	25
Max. filling depth 1st layer	mm	20	22	20	22	22
Pitch circle diameter	mm	280	280	280	280	280
Turret rotation speed min.	min^{-1}	25	25	25	25	25
max. (laboratory operation)	min^{-1}	120 (150)	100 (100)	100 (100)	100 (100)	100 (100)
Die diameter	mm	30.16	38.1	30.16	38.1	38.1
Die-/segment height	mm	22.225	23.8	22.225	23.8	23.8
Punch shaft diameter	mm	19	25.35	19	25.35	25.35
Punch length Upper/lower punch	mm	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1– 4 (8**)	1– 4 (8**)	1– 4 (8**)	1– 4 (8**)	1– 4 (8**)
Dimensions	mm	920 × 1,136 × 1,875				
Weight	kg	Tablet press 1,700 – 2,500 kg, operating terminal 100 kg				
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 8,4 kW				

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; ** multi-layer-operation

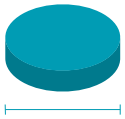


102i

	D	D	D	S	S	S	S
	32	30	24	21	24	30	45
	FS19®/EU19 FS®/ EU19 TSM19 BBS	FS19®/EU19 FS®/ EU19 TSM19 BB	FS19®/EU19 FS®/ EU19 TSM19 B	EU1"-441	EU1" TSM1"	FS19®/EU19 FS®/ EU19 TSM19	FS12®
	48,000	45,000	36,000	31,500	36,000	45,000	67,500
	230,400	216,000	172,800	126,000	144,000	216,000	324,000
	80	80	80	80	80	80	33
	80	80	80	80	80	80	33
	11	13	18	25	25	18	11
	20	20	20	22	22	22	22
	280	280	280	280	280	280	280
	25	25	25	25	25	25	25
	120 (150)	120 (150)	120 (150)	100 (150)	100 (150)	120 (150)	120 (150)
	22	24	30.16	–	–	–	–
	22.225	22.225	22.225	25	25	25	25
	19	19	19	25.35	25.35	19	12
	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)	133.6	133.6 (133.35)	133.6 (133.35)	133.6
	1–4 (8**)	1–4 (8**)	1–4 (8**)	1–4 (8**)	1–4 (8**)	1–4 (8**)	1–4 (8**)

Medium

The 1200i, 2200i and 3200i tableting machines of the Medium range are ideal as workhorses for production of mono- and bi-layer tablets manufactured by standardized processes. They all have a manually-operated turret exchange system.



Tablet

Number of layers	mono-layer
Max. tablet output	230,400 tablets/h
Max. tablet output Pmax®	324,000 tablets/h
Max. tablet diameter	25 mm

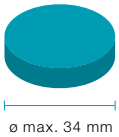
Die (D) / Segments (S)		D	D	D	D
Number of punch stations		32	30	24	20
Punch type		FS19®/EU19 FS®/ EU19 TSM19 BBS	FS19®/EU19 FS®/ EU19 TSM19 BB	FS19®/EU19 FS®/ EU19 TSM19 B	EU1"/ EU1"-441 TSM1" D
Tablet output units/h	min.	48,000	45,000	36,000	30,000
	max.	230,400	216,000	172,800	120,000
Max. compression force 1*	kN	80	80	80	80
Max. compression force 2*	kN	80	80	80	80
Max. tablet diameter	mm	11	13	18	25
Max. filling depth	mm	20	18	20	22
Pitch circle diameter	mm	280	280	280	280
Turret rotation speed min.	mm^{-1}	25	25	25	25
max. (laboratory operation)	mm^{-1}	120	120	120	100
Die diameter	mm	22	24	30.16	38.1
Die-/segment height	mm	22.225	22.225	22.225	23.8
Punch shaft diameter	mm	19	19	19	25.35
Punch length Upper/lower punch	mm	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1 – 4	1 – 4	1 – 4	1 – 4
Dimensions	mm	920 × 1,136 × 1,875			
Weight	kg	Tablet press 2,400 – 2,500 kg, operating terminal 100 kg			
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 8,4 kW			

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

1200i

	S	S	S	S
	45	30	24	21
	FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1" TSM1"	EU1"-441
	67,500	45,000	36,000	31,500
	324,000	216,000	144,000	126,000
	33	80	80	80
	33	80	80	80
	11	18	25	25
	22	22	22	22
	280	280	280	280
	25	25	25	25
	120	120	100	100
	–	–	–	–
	25	25	25	25
	12	19	25.35	25.35
	133.6	133.6 (133.35)	133.6 (133.35)	133.6
	1 – 4	1 – 4	1 – 4	1 – 4

2200i



Tablet

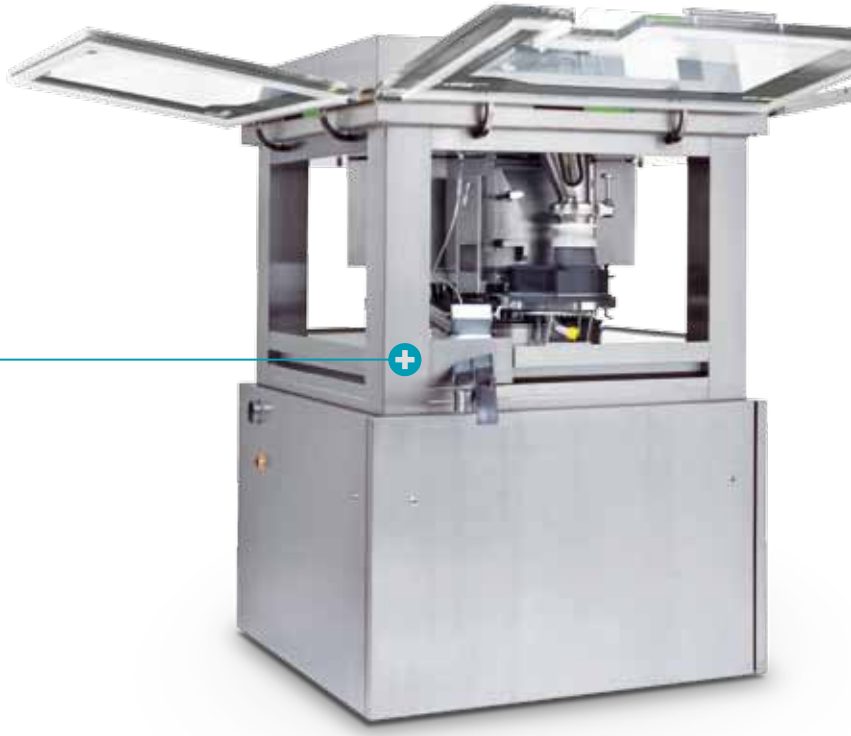
Number of layers	mono-layer
Max. tablet output	338,400 Stk./h
Max. tablet output Pmax®	475,200 Stk./h
Max. tablet diameter	34 mm

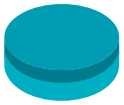
Die (D) / Segments (S)		D	D	D	D
Number of punch stations		47	43	36	30
Punch type		FS19®/EU19 FS®/ EU19 BBS	FS19®/EU19 FS®/ EU19 TSM19 BB	FS19®/EU19 FS®/ EU19 TSM19 B	EU1"/ EU1"-441 TSM1" D
Tablet output units/h	min.	42,300	38,700	32,400	27,000
	max.	338,400	309,600	259,200	180,000
Max. compression force 1*	kN	100	100	100	100
Max. compression force 2*	kN	100	100	100	100
Max. tablet diameter	mm	11	13	18	25
Max. filling depth	mm	20	20	20	22
Pitch circle diameter	mm	410	410	410	410
Turret rotation speed min.	min^{-1}	15	15	15	15
max.	min^{-1}	120	120	120	100
Die diameter	mm	22	24	30.16	38.1
Die-/segment height	mm	22.225	22.225	22.225	23.8
Punch shaft diameter	mm	19	19	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1–4	1–4	1–4	1–4
Dimensions	mm	1,220 × 1,220 × 2,022			
Weight	kg	Tablet press 3,200–3,500 kg, operating terminal 100 kg, switch cabinet 350 kg			
Electrical supply parameters		Operating voltage 400–480 V, 50/60 Hz, power consumption 11,5 kW			

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

	D	S	S	S	S
	22	66	45	36	33
	EU35	FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1" TSM1"	EU1"-441
	19,800	59,400	40,500	32,400	29,700
	105,600	475,200	324,000	216,000	198,000
	100	33	100	100	100
	100	33	100	100	100
	34	11	18	25	25
	26	22	22	22	22
	410	410	410	410	410
	15	15	15	15	15
	80	120	120	100	100
	52	–	–	–	–
	30	25	25	25	25
	35	12	19	25.35	25.35
	133.6	133.6	133.6 (133.35)	133.6 (133.35)	133.6
	1–4	1–4	1–4	1–4	1–4

3200i





ø max. 34 mm

Tablet

Number of layers	mono-layer
Max. tablet output	1,137,600 Stk./h
Max. tablet output Pmax®	1,584,000 Stk./h
Max. tablet diameter	34 mm

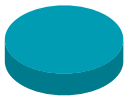
Die (D) / Segments (S)		D	D	D	D
Number of punch stations		79	73	61	49
Punch type		FS19®/EU19 FS®/ EU19 BBS	FS19®/EU19 FS®/ EU19 TSM19 BB	FS19®/EU19 FS®/ EU19 TSM19 B	EU1"/ EU1"-441 TSM1" D
Tablet output units/h	min.	142,200	131,400	109,800	88,200
	max.	1,137,600	1,051,200	878,400	470,400
Max. compression force 1*	kN	100	100	100	100
Max. compression force 2*	kN	100	100	100	100
Max. compression force 3*	kN	100	100	100	100
Max. compression force 4*	kN	100	100	100	100
Max. tablet diameter	mm	11	13	18	25
Max. filling depth	mm	20	20	20	22
Pitch circle diameter	mm	680	680	680	680
Turret rotation speed min.	min^{-1}	15	15	15	15
max.	min^{-1}	120	120	120	80
Die diameter	mm	22	24	30.16	38.1
Die-/segment height	mm	22.225	22.225	22.225	23.8
Punch shaft diameter	mm	19	19	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)
Dimensions	mm	1,390 × 1,390 × 2,024			
Weight	kg	Tablet press 4,200 – 4,500 kg, operating terminal 100 kg, switch cabinet 350 kg			
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 17 kW			

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; ** 2-layer-operation

	D	S	S	S	S
	37	110	75	55	45
	EU35	FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1"/ EU1"-441 TSM1"	EU35
	66,600	396,000	135,000	99,000	81,000
	355,200	1,584,000	1,080,000	528,000	432,000
	100	33	100	100	100
	100	33	100	100	100
	100	33	100	100	100
	100	33	100	100	100
	34	11	18	25	34
	22	22	22	22	22
	680	680	680	680	680
	15	15	15	15	15
	80	120	120	80	80
	52	–	–	–	–
	30	25	25	25	25
	35	19	19	25.35	35
	133.6	133.6	133.6 (133.35)	133.6 (133.35)	133.6
	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)

Premium

The tableting machines of the Premium range are the ideal solution for the production of high unit quantities of mono-layer (2090i) and bi-layer (3090i) tablets. These machines have an automatic turret clamping system and maintenance free servomotors for the adjustment of the pressure rollers. Used together with the Pmax turret, the 3090i can produce more than 1.3 million tablets per hour.



Tablet

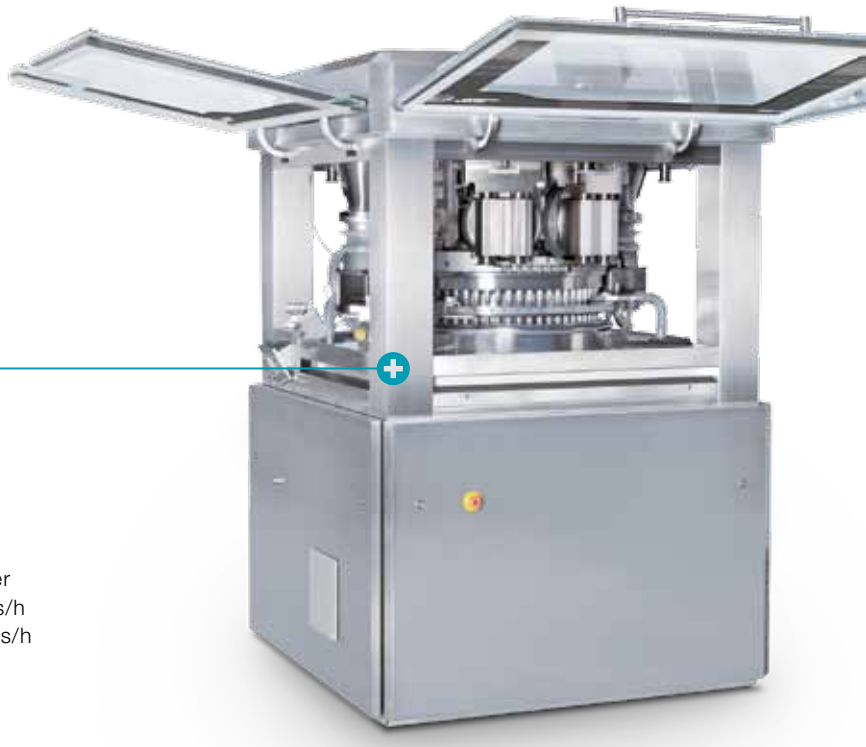
Number of layers	mono-layer
Max. tablet output	338,400 tablets/h
Max. tablet output Pmax®	475,200 tablets/h
Max. tablet diameter	25 mm

Die (D) / Segments (S)		D	D	D	D
Number of punch stations		47	43	36	30
Punch type		FS19®/EU19 FS®/ EU19 BBS	FS19®/EU19 FS®/ EU19 TSM19 BB	FS19®/EU19 FS®/ EU19 TSM19 B	EU1"/ EU1"-441 TSM1" D
Tablet output units/h	min.	42,300	38,700	32,400	27,000
	max.	338,400	309,600	259,200	180,000
Max. compression force 1*	kN	100	100	100	100
Max. compression force 2*	kN	100	100	100	100
Max. tablet diameter	mm	11	13	18	25
Max. filling depth	mm	18	18	18	22
Pitch circle diameter	mm	410	410	410	410
Turret rotation speed min.	mm^{-1}	15	15	15	15
max.	mm^{-1}	120	120	120	100
Die diameter	mm	22	24	30.16	38.1
Die-/segment height	mm	22.225	22.225	22.225	23.8
Punch shaft diameter	mm	19	19	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1–4	1–4	1–4	1–4
Dimensions	mm	1,220 × 1,220 × 2,022			
Weight	kg	Tablet press 3,300–3,500 kg, operating terminal 100 kg, switch cabinet 350 kg			
Electrical supply parameters		Operating voltage 400–480 V, 50/60 Hz, power consumption 11,5 kW			

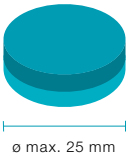
Theoretical values or technical limits: These can vary in practice, according to product and application.
Tablet thickness is a size dependent on product and can strongly vary.
* limited by punch properties

2090i

	S	S	S	S
	66	45	36	33
	FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1" TSM1"	EU1"-441
	59,400	40,500	32,400	29,700
	475,200	324,000	216,000	198,000
	33	100	100	100
	33	100	100	100
	11	18	25	25
	22	22	22	22
	410	410	410	410
	15	15	15	15
	120	120	100	100
	–	–	–	–
	25	25	25	25
	12	19	25.35	25.35
	133.6	133.6 (133.35)	133.6 (133.35)	133.6
	1 – 4	1 – 4	1 – 4	1 – 4



3090i



Tablet

Number of layers	mono- or bi-layer
Max. tablet output	1,137,600 tablets/h
Max. tablet output Pmax®	1,584,000 tablets/h
Max. tablet diameter	25 mm

Die (D) / Segments (S)		D	D	D	D
Number of punch stations		79	73	61	49
Punch type		FS19®/EU19 FS®/ EU19 BBS	FS19®/EU19 FS®/ EU19 TSM19 BB	FS19®/EU19 FS®/ EU19 TSM19 B	EU1"/ EU1"-441 TSM1" D
Tablet output units/h	min.	284,400	131,400	109,800	88,200
	max.	1,137,600	1,051,200	878,400	470,400
Max. compression force 1*	kN	100	100	100	100
Max. compression force 2*	kN	100	100	100	100
Max. compression force 3*	kN	100	100	100	100
Max. compression force 4*	kN	100	100	100	100
Max. tablet diameter	mm	11	13	18	25
Max. filling depth 1st layer	mm	18	18	18	22
2nd layer	mm	8	8	8	8
Pitch circle diameter	mm	680	680	680	680
Turret rotation speed min.	mm^{-1}	15	15	15	15
max.	mm^{-1}	120	120	120	80
Die diameter	mm	22	24	30.16	38.1
Die-/segment height	mm	22.225	22.225	22.225	23.8
Punch shaft diameter	mm	19	19	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)
Dimensions	mm	1,390 × 1,390 × 2,024			
Weight	kg	Tablet press 4,500 – 4,700 kg, operating terminal 100 kg, switch cabinet 350 kg			
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 17 kW			

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; ** 2-layer-operation

	S	S	S
	110	75	55
	FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1"/ EU1"-441 TSM1"
	396,000	270,000	99,000
	1,584,000	1,080,000	528,000
	33	100	100
	33	100	100
	33	100	100
	33	100	100
	11	18	25
	22	22	22
	8	8	8
	680	680	680
	15	15	15
	120	120	80
	–	–	–
	25	25	25
	19	19	25.35
	133.6	133.6 (133.35)	133.6 (133.35)
	1 – 4 (8**)	1 – 4 (8**)	1 – 4 (8**)

CONTAINMENT
GUARD

protecting your efficiency

Containment solutions

Pharmaceutical manufacturers are increasingly processing highly-active and toxic substances. This in turn increases the demand on EHS protection systems. To meet these requirements, Fette Compacting offers tailored system solutions for tablet production under containment conditions.

The standard platform for dust-proof production is represented by the FE55 and FE75 tablet presses which can be fitted with an optional containment package. The solutions for higher containment requirements use machines in the containment & WiP i series with isolator technology. Automatic cleaning of the tablet presses significantly reduces the exposure of machine operators and shortens downtimes. When processing highly-toxic substances, users can rely on containment and WiP tablet presses with integrated process equipment in the isolator.

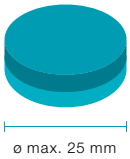
All solutions comply with the comprehensive safety philosophy pursued by Fette Compacting in which containment is integrated in the process cycle.

These include for example the following standards:
- no dust released during production and preparation for cleaning,
- no contact with toxic products,
- waterproof and dustproof compression compartment,
- manual pre-cleaning,
- maximum safety in the workplace,
- protection of operators throughout the entire production process.

The containment guard is the world's first quality seal for marking the retention efficiency of containment tableting equipment. It is based on a standardized test procedure where the retention efficiency of the entire plant, including process equipment, is confirmed on the basis of SMEPAC (Standardized Measurement of Equipment Particulate Airborne Concentration).
Fette Compacting supplies the containment guard measurement results to its customers. They form the basis for subsequent risk assessments by the customer and significantly reduce the effort associated with measurements after installation.
Furthermore, Fette Compacting offers comprehensive services and consulting specifically coordinated matching to the containment guard. Users benefit from safe, simple and swiftly available solutions along the entire life cycle of the plant as a whole.

2090i WiP & Containment

FE55 with optional Containment Package



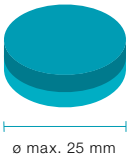
Tablet

Number of layers	mono- or bi-layer
Max. tablet output	626,400 tablets/h
Max. tablet diameter	25 mm

Segments (S)		S	S	S
Number of punch stations		87	60	45
Punch type		FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1"/ EU1"-441 TSM1"
Tablet output units/h	min.	78,300	54,000	40,500
	max.	626,400	432,000	243,000
Max. compression force 1*	kN	33	100	100
Max. compression force 2*	kN	33	100	100
Max. compression force 3*	kN	33	100	100
Max. tablet diameter	mm	11	18	25
Max. filling depth 1st layer	mm	22	22	22
2nd layer	mm	8	8	8
Pitch circle diameter	mm	550	550	550
Turret rotation speed min.	mm^{-1}	15	15	15
max.	mm^{-1}	120	120	90
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	12	19	25.35
Punch length Upper/lower punch	mm	133.6	133.6 (133.35)	133.6 (133.35)
Upper punch insertion depth	mm	1–4 (8**)	1–4 (8**)	1–4 (8**)
Dimensions	mm	1.306 × 1.306 × 2.048 without switch cabinet		
Weight	kg	Tablet press 3,700 – 3,900 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 16 kW		

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; ** 2-layer-operation

FE75 with optional Containment Package



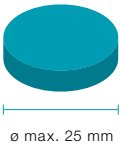
Tablet

Number of layers	mono- or bi-layer
Max. tablet output	1,656,000 tablets/h
Max. tablet diameter	25 mm

Segments (S)		S	S	S
Number of punch stations		115	75	55
Punch type		FS12®	FS19®/EU19 FS®/ EU19 TSM19	EU1"/ EU1"-441 TSM1"
Tablet output units/h	min.	207,000	135,000	99,000
	max.	1,656,000	1,080,000	594,000
Max. compression force 1*	kN	25	100	100
Max. compression force 2*	kN	25	100	100
Max. compression force 3*	kN	25	100	100
Max. compression force 4*	kN	25	100	100
Max. tablet diameter	mm	11	18	25
Max. filling depth 1st layer	mm	22	22	22
2nd layer	mm	8	8	8
Pitch circle diameter	mm	710	710	710
Turret rotation speed min.	mm^{-1}	15	15	15
max.	mm^{-1}	120	120	90
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	12	19	25.35
Punch length Upper/lower punch	mm	133,6	133,6 (133,35)	133,6 (133,35)
Upper punch insertion depth	mm	1–4 (8**)	1–4 (8**)	1–4 (8**)
Dimensions	mm	1,463 × 1,463 × 2,046 without switch cabinet		
Weight	kg	Tablet press 5,500 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 16 kW		

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; ** 2-layer-operation

1090i WiP



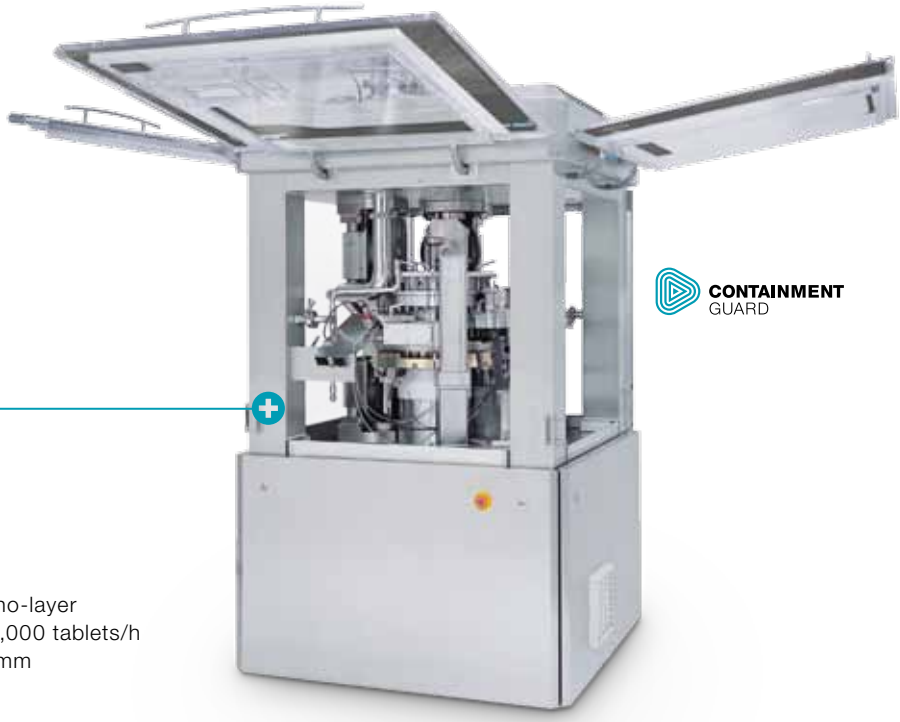
Tablet

Number of layers	mono-layer
Max. tablet output	216,000 tablets/h
Max. tablet diameter	25 mm

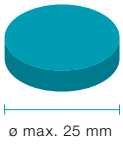
Segments (S)		S	S	S
Number of punch stations		30	24	21
Punch type		FS19®/EU19 FS®/ EU19 TSM19	EU1" TSM1"	EU1"-441
Tablet output units/h	min.	45,000	36,000	31,500
	max.	216,000	144,000	126,000
Max. compression force 1*	kN	80	80	80
Max. compression force 2*	kN	80	80	80
Max. tablet diameter	mm	18	25	25
Max. filling depth	mm	22	22	22
Pitch circle diameter	mm	280	280	280
Turret rotation speed min.	mm^{-1}	25	25	25
max. (laboratory operation)	mm^{-1}	120	100	100
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	19	25.35	25.35
Punch length Upper/lower punch	mm	133.6 (133.35)	133.6 (133.35)	133.6
Upper punch insertion depth	mm	1–4	1–4	1–4
Dimensions	mm	960 × 960 × 2,034		
Weight	kg	Tablet press 2,100 – 2,400 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 7,7 kW		

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

2090i WiP



CONTAINMENT GUARD



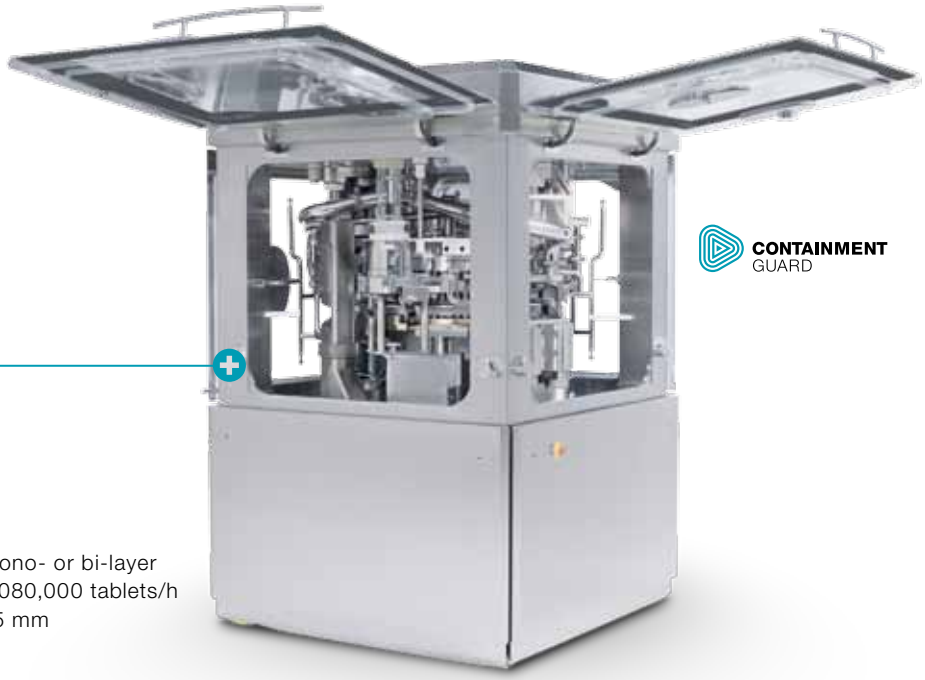
Tablet

Number of layers	mono-layer
Max. tablet output	324,000 tablets/h
Max. tablet diameter	25 mm

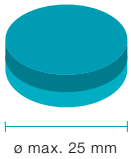
Segments (S)		S	S	S
Number of punch stations		45	36	33
Punch type		FS19®/EU19 FS®/ EU19 TSM19	EU1" TSM1"	EU1"-441
Tablet output units/h	min.	40,500	32,400	29,700
	max.	324,000	248,400	198,000
Max. compression force 1*	kN	100	100	100
Max. compression force 2*	kN	100	100	100
Max. tablet diameter	mm	18	25	25
Max. filling depth	mm	22	22	22
Pitch circle diameter	mm	410	410	410
Turret rotation speed min.	mm^{-1}	15	15	15
max.	mm^{-1}	120	120	100
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	19	25.35	25.35
Punch length Upper/lower punch	mm	133.6 (133.5)	133.6 (133.35)	133.6
Upper punch insertion depth	mm	1–4	1–4	1–4
Dimensions	mm	1,220 × 1,220 × 2,022		
Weight	kg	Tablet press 3,400 – 3,600 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 13 kW		

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

3090i WiP



CONTAINMENT GUARD



Tablet

Number of layers	mono- or bi-layer
Max. tablet output	1,080,000 tablets/h
Max. tablet diameter	25 mm

Segments (S)		S	S	S
Number of punch stations		75	55	55
Punch type		FS19®/EU19 FS®/ EU19 TSM19	EU1" TSM1"	EU1"-441
Tablet output units/h	min.	135,000	99,000	99,000
	max.	1,080,000	528,000	528,000
Max. compression force 1*	kN	100	100	100
Max. compression force 2*	kN	100	100	100
Max. compression force 3*	kN	100	100	100
Max. compression force 4*	kN	100	100	100
Max. tablet diameter	mm	18	25	25
Max. filling depth 1st layer	mm	22	22	22
2nd layer	mm	8	8	8
Pitch circle diameter	mm	680	680	680
Turret rotation speed min.	mm^{-1}	15	15	15
max.	mm^{-1}	120	80	80
Die-/segment height	mm	25	25	25
Punch shaft diameter	mm	19	25.35	25.35
Punch length Upper/lower punch	mm	133.6 (133.5)	133.6 (133.35)	133.6
Upper punch insertion depth	mm	1–4 (8**)	1–4 (8**)	1–4 (8**)
Dimensions	mm	1,390 × 1,390 × 2,024		
Weight	kg	Tablet press 4,700 – 5,000 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 18 kW		

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; ** 2-layer-operation

Food & Chemicals

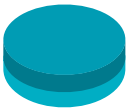
3090i H2
The “H” suffix indicates that the machine has an especially high structure, which is an important feature for production of very large tablets such as bouillon cubes for the food sector or detergent tablets for dishwashers.

The 3090i H2 is specially designed for the technical chemical industry and combines higher productivity with enhanced operating safety, even when abrasive substances are being processed. Its segment technology and direct-torque drive guarantee very high productivity with mono-layer, multi-layer and ring tablets, for example catalysts and annular battery cores.

Die (D) / Segments (S)		M	M	M
Number of punch stations		57	45	37
Punch type		EU32	EU35	EU45
Tablet output units/h	min.	34,200	27,000	22,200
	max.	342,000	270,000	222,000
Max. compression force 1*	kN	160	160	160
Max. compression force 2*	kN	160	160	160
Max. compression force 3*	kN	160	160	160
Max. compression force 4*	kN	160	160	160
Max. tablet diameter	mm	31	34	44
Max. filling depth	mm	56	56	56
Pitch circle diameter	mm	820	820	820
Turret rotation speed min.	mm^{-1}	5	5	5
max.	mm^{-1}	50**	50**	50**
Punch shaft diameter	mm	32	35	45
Punch length upper punch	mm	221.6	221.6	221.6
lower punch	mm	435.6	435.6	435.6
Upper punch insertion depth	mm	3–12	3–12	3–12
Dimensions	mm	1,560 × 1,560 × 2,640		
Weight	kg	Tablet press 5,000 – 5,300 kg, operating terminal 100 kg, switch cabinet 350 kg		
Electrical supply parameters		Operating voltage 400 – 480 V, 50/60 Hz, power consumption 18,5 kW		

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; ** depends on application

3090i H2



ø max. 44 mm

Tablet

Number of layers	bi-layer
Max. tablet output	336,000 tablets/h
Max. tablet diameter	44 mm

	S	S	S
	56	56	40
	EU32	EU35	EU45
	33,600	33,600	24,000
	336,000	336,000	240,000
	160	160	160
	160	160	160
	160	160	160
	160	160	160
	31	34	44
	40	40	40
	820	820	820
	5	5	5
	50**	50**	50**
	32	35	45
	221.6	221.6	221.6
	435.6	435.6	435.6
	3–12	3–12	3–12

Process Equipment

Downstream processes

+ Vertical dedusters
  High-quality production solutions through the use of dedusting and soft deburring – also available in combination with a metal detector

+ Metal detectors
  Maximum running time of tablet presses due to reliable and fully automatic rejection of metallic contaminated products

+ Gratex
  Soft dedusting and deburring directly at the tablet press

In-process control

+ Weightmaster
  Cost-optimized process equipment for in-process control of tablet weight

+ Checkmaster
  Excellent tablet quality through fully automatic measurement of the most important tablet characteristics: weight, thickness, hardness and diameter – completely integrable into the production process

In-process control

+ NIR-Checkmaster
  At line measurement of API (active pharmaceutical ingredient) through NIR-Checkmaster defines new standards for in-process control. The automated analysis of the active ingredient content enables the real-time release of the produced tablets.

+ UTS-NIR Extended Checkmaster
  Next to the functionalities of the Checkmaster, this unit offers the measurement of the active ingredient content as well as the active ingredient dispersion.

+ Autotest 4 with “EasyTouch”
  Tablet testing system that can fully be validated and automatically positions the tablet for measurement of weight, thickness, diameter and hardness

Process Equipment

Process

+ Magnesium Stearate Spraying System (PKB)
  Process equipment to coat the pressing tools with magnesium stearate or similar lubricant instead of including the lubricant in the tablet formulation itself

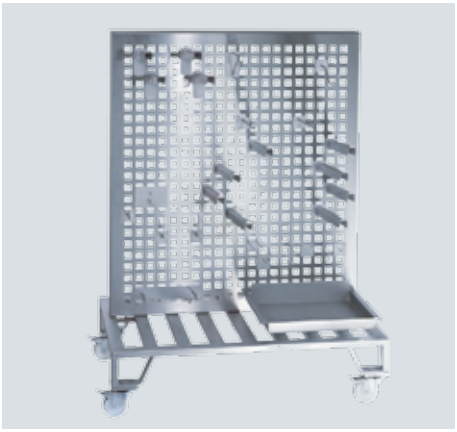
Containment and WiP

+ Isolator
  Completely sealed and safe use of in-process control and process equipment when compressing highly active and toxic pharmaceutical ingredients

Handling and Turrets

Supplies

+ Handling system
  This motorized turret handler allows a single operator to exchange the turret ergonomically and safely



+ Parts butler
  The job of Fette Compacting's parts butler is the classic task of holding dismantled parts during servicing and product changeover cycles, while saving space and maintaining good order at the same time

+ Turrets
  Fette Compacting turrets convince through highest quality and can be used flexibly to the respective application

+ Service carts
  The accurately fitting turret holder ensures secure fastening, allowing the operator to carry out all the work required on the turret which is freely accessible from every side

+ Tool Box
  The TRI.EASY Box System consists of three different box types for punches, segments and dies that ensure these tools can not only be stored and transported safely, but also cleaned with lower risk of damage

Tableting tools

Tableting tools are the linchpin of the tablet press. Fette Compacting makes these tools itself, and therefore offers products ideally suited to any tablet press. Knowledge of the interplay between the tablet press and the punch is essential for the processes of both production and optimization.

In addition to punches manufactured to the usual international standards (DIN ISO 18084 and the TSM Tableting Specification Manual), the range of the company's products also includes proven solutions for special needs. Only top quality materials and coatings are used by Fette Compacting's tool fabrication facility. Fette Compacting also makes punches of special steels, using modified working procedures, for special product types and for Wash-in-Place applications.

Tablet design

Whether it's a question of round tablets, complex shapes, engravings, domes or fracture scores – the company can handle an enormous range of customer demands. Quality has the number one priority in the production of tablet-making tools. We consult with and advise our customers at an early stage, to create the optimum marriage between production requirements and design wishes. Shape, therefore, does not affect tablet production.

Head shapes

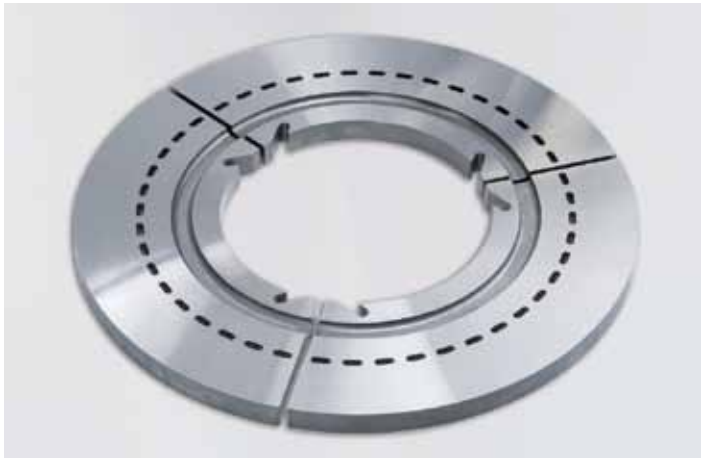
Fette Compacting offers specially developed head shapes for complex production requirements. This involves a continuous adaption of tableting tools to developments in the machines. Fette Compacting has thus become a leader in the further development of head geometries.

EU1"-441

The unusual material properties of some formulations make them difficult, if not impossible, to press with conventional press punches. The EU1"-441, however, often permits profitable pressing where other manufacturers give up.

As a result of its modified head form, the pressure dwell time can be extended by nearly 50%, allowing extremely difficult product formulations to be pressed.

Lower noise, reduced vibration and less wear are other advantages offered by this punch.



Segment technology
Segments are patented technology from Fette Compacting (EP 1316411). They replace the turret's conventional die tables as well as the dies themselves. The holes are fabricated directly in the segments. In contrast to conventional die tables, segments can be exchanged by undoing no more than two fastening bolts and clamping wedges. Each turret needs 3 or 5 segments, depending on its size.

Tablet presses can be upgraded to the new technology easily and quickly. The production parameters and the filling behavior remain unchanged, and stored production data can still be used. The punches keep their former shape, remain standardized, and can be used in the same way as before.

The associated refit allows users to minimize product loss, achieve higher yields, and to reduce refitting times by around 17 percent.

Pmax® turrets with patented FS12® punches (EP 2111972)
Pmax® turrets with FS12® are at the heart of the highest-performance tablet presses in the world. Having a shaft diameter of 12 mm, FS12® punches are smaller than their conventional equivalents. This means that the distance between die holes can be reduced, and the number of stations on the turret increases. The modified punch head ensures optimized pressure dwell time, unusually smooth machine running, and reduces vibration.

Upgrading to Pmax® turrets lets users increase the yield of their tablet presses by up to 40 percent without heavy investment.

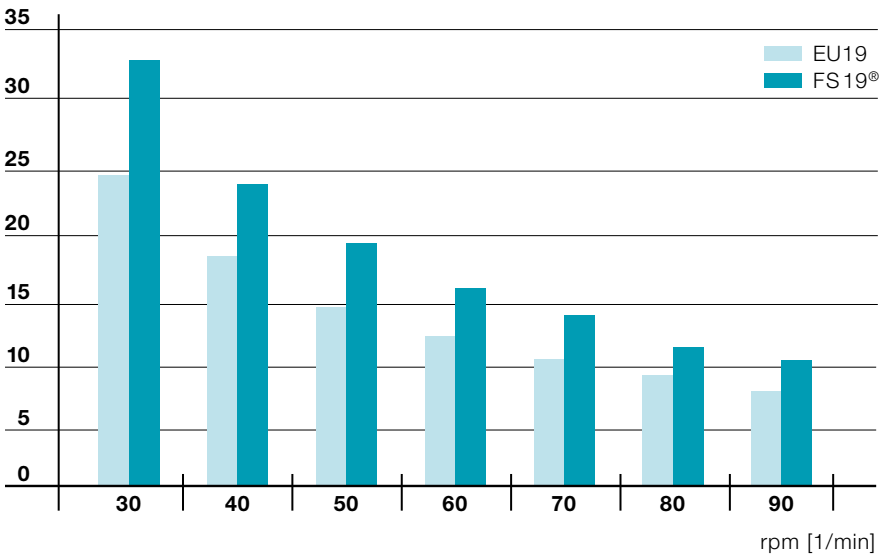
FS19® punch
dwell time redefined

The patented head rounding (patent number DE 10 2009 031 367 B3) allows an increased dwell time by 33% per punch.

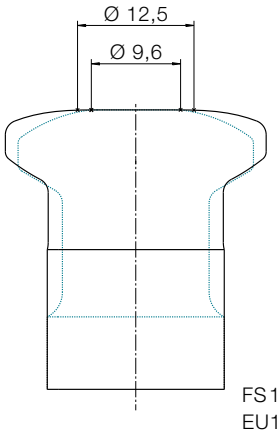
Advantages of the FS19® punch head:
+ 33 % longer compression dwell time
+ Increased output by faster rotation speed
+ Higher compression forces
+ Smooth machine running
+ Less vibration

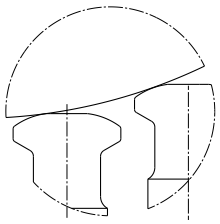
+ Punch head diameter 19 mm

Compression dwell time diagram

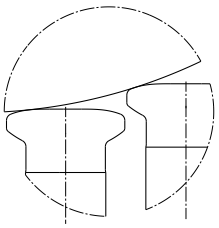


Compression transmission range/compression dwell time





EU19
DIN ISO 18084



FS19®

Rolling based on the punch head

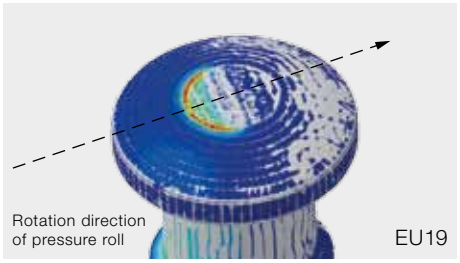
EU19 FS® punch – easy exchange of the standard tool format

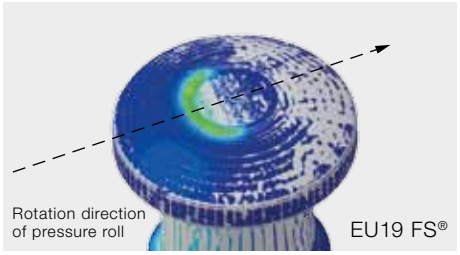
+ Consistent force distribution across the punch head

+ EU19 can be replaced by EU19 FS® without modifying the machine

EU/TSM formats are standard for tableting tools. As an alternative, tablet manufacturers use the FS® format offered by Fette Compacting which offers longer service life and dwell times as well as smoother running of the press. These previously separate worlds have now been merged: in the form of the EU19 FS® format registered for patent, designers at Fette Compacting have applied FS® technology to the standard format. An EU19 punch can now be directly replaced by an EU19 FS® punch – with the same processing properties. All existing cams can still be used. But this change has some significant effects: the punch service life increases and loads are distributed more evenly across the punch head.

The improved service life displayed by the EU19 FS® is attributable to the geometry of the punch head: the transition between the contact area and the flat head follows a 4th degree polynomial function – representing a consistent further development of FS® technology. This leads to lower initial force on entry due to the flat head. Fette Compacting has integrated an additional indentation in the top of the punch head. The result is an improvement in this improves both the contact conditions between the pressure roller and the flat punch head, as well as the stability of the punch structure.





EU19 and EU19 FS® comparison
FEM (Finite Element Method) simulations demonstrating of an active force of 50 kN:

the EU19 FS® (bottom) exhibits significantly lower stresses in the transition between the plane flat head and the centre of the punch head.

■ high stress ■ medium stress ■ low stress

BENEFITS

+ 50 % longer service life compared to EU19 / TSM19
+ EU19 FS® leads to smoother running compared to EU19 / TSM19
+ Less wear
+ All existing cams can continue to be used and the process parameters remain the same
+ Longer service life of pressure rollers and all the other parts that come into contact with the punches

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