



FS Technology®

Tableting Tools

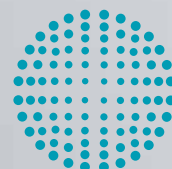
www.fette-compacting.com

TECHNOLOGY



COMPETENCE

SERVICE



**FETTE
COMPACTING**
be efficient

Tableting tools from the machine manufacturer



Tableting tools are the linchpin of the tableting machine and of the entire process. Constant further development of innovative tableting tools is therefore necessary in order to generate maximum performance for users. The optimally harmonized design of tablet press, turret and tableting tool allows Fette Compacting's tableting tools to provide marked increases in the efficiency of your production facility. This leads to longer service lives, lower servicing costs and a reduction in costs for spare parts.

With more than 65 years of experience and knowledge behind the company, Fette Compacting is the world's leading supplier of solutions for industrial tableting technology. In addition to tablet presses, the range also includes tableting tools and process equipment along with maintenance, training and consultation services.

Modern, high-performance punch materials, outstanding surfaces and customized coatings reduce wear and meet the demand for tools with a long service life. Whether it is a question of round tablets, complex tablet geometries, engravings, domes or fracture scores: Fette Compacting can handle an extraordinary range of customer demands.

The range of products covers the entire spectrum of internationally standardized punch implementations. On top of this, the company's internal standards ensure proven solutions to special requirements for maximum machine efficiency.



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.

Tableting tools of the highest quality

Fette Compacting's many years of experience in the comprehensive process of tablet manufacture is a crucial factor for exceptional product quality. An understanding of the interplay between the tablet press and tableting tools, as well as a knowledge of the effect of tableting tools and of the materials to be pressed, provide a secure guarantee of the best possible tablet quality.

The foundation of the company's approach to quality is, furthermore, the maintenance of standards such as DIN ISO 18084, along with the implementation of a GMP-conformant quality management system.

Fette Compacting operates as a comprehensive supplier for the entire quality process, extending from research and development, through production using the latest instrumentation technology, as well as marketing, application consultation, and intensive product training for the customer. Tablet presses and tableting tools are tested extensively in modern test laboratories.

Automated measurement on a 3-D measuring machine is also an important element in the quality process for tableting tools, where the accuracy of fit – i.e. the close match between the punch and the holes in the segments and the associated tight tolerances – is critical. The results of all measurements are logged. The high demand for precision ensures that the punches are 100 percent exchangeable.

Fette Compacting sees itself as a reliable partner for the entire life cycle of tablet presses and tableting tools, and through a consideration of the full commercial picture – the Total Cost Ownership – offers measurable and lasting advantages.



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Fette Compacting innovations – Segments

You can increase the yield of your existing machines by up to 40 percent with the patented segment technology (EP 1316411) from Fette Compacting. This is possible because a significantly higher number of tablet stations can be integrated into a segment turret of the same size.

They replace both the turret's conventional die table and the dies. The die holes are formed directly in the segments. In contrast to conventional die tables, segments can be changed by untightening just two fastening bolts. 3 or 5 segments are needed for each turret, depending on the type of tablet press.

Tablet presses can be swiftly and easily converted to the new technology. The production parameters and the filling behavior remain unchanged, and production data saved can be used. Even the existing punches can be used as before.

Segments make life easier for your operators, too: through a simplified process of segment removal and fitting, a large number of working steps required for product change-over are no longer necessary.

Thoroughly recommendable, users can minimize product loss, achieve higher yields and reduce refitting times by about 70 percent – accompanied by extraordinarily high precision.

BENEFITS

- + Reduced product loss
- + Easier compliance with hygiene requirements
- + Up to 40% more output
- + Great production reliability through easy refitting
- + Service life increased up to threefold through carbide bushes



Fette Compacting innovations – FS[®] punches



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All FS[®] punches feature a head shape optimized for the application. It is flattened and has a smooth curve. This has a positive effect on the entire process. The dwell time increases, and one characteristic of the tablet press is that it is smoother and the wear on the components involved, e.g. on the punches themselves and the pressure rollers, is reduced. As a result of the advantages offered by this Fette Compacting innovation, the quality of every tablet is significantly improved, productivity of your production facility rises, and the working conditions for operators are more comfortable.



FS12[®] (EP 2111972)

- + Up to 40% increased yield
- + Compatible with all machines of the i- and FE Series
- + Higher tablet quality
- + Tablet diameter of up to 11 mm
- + Pressing force to max. 34 kN
- + For Pmax[®] technology
- + Very long pressure dwell time, similar to that of an EU19 punch



FS19[®] (EP 2269813)

- + 30% longer pressure dwell time than EU19
- + Higher tablet quality
- + Higher output with the same quality
- + Less wear
- + Tablet diameter of up to 18 mm
- + Pressing force to max. 94 kN

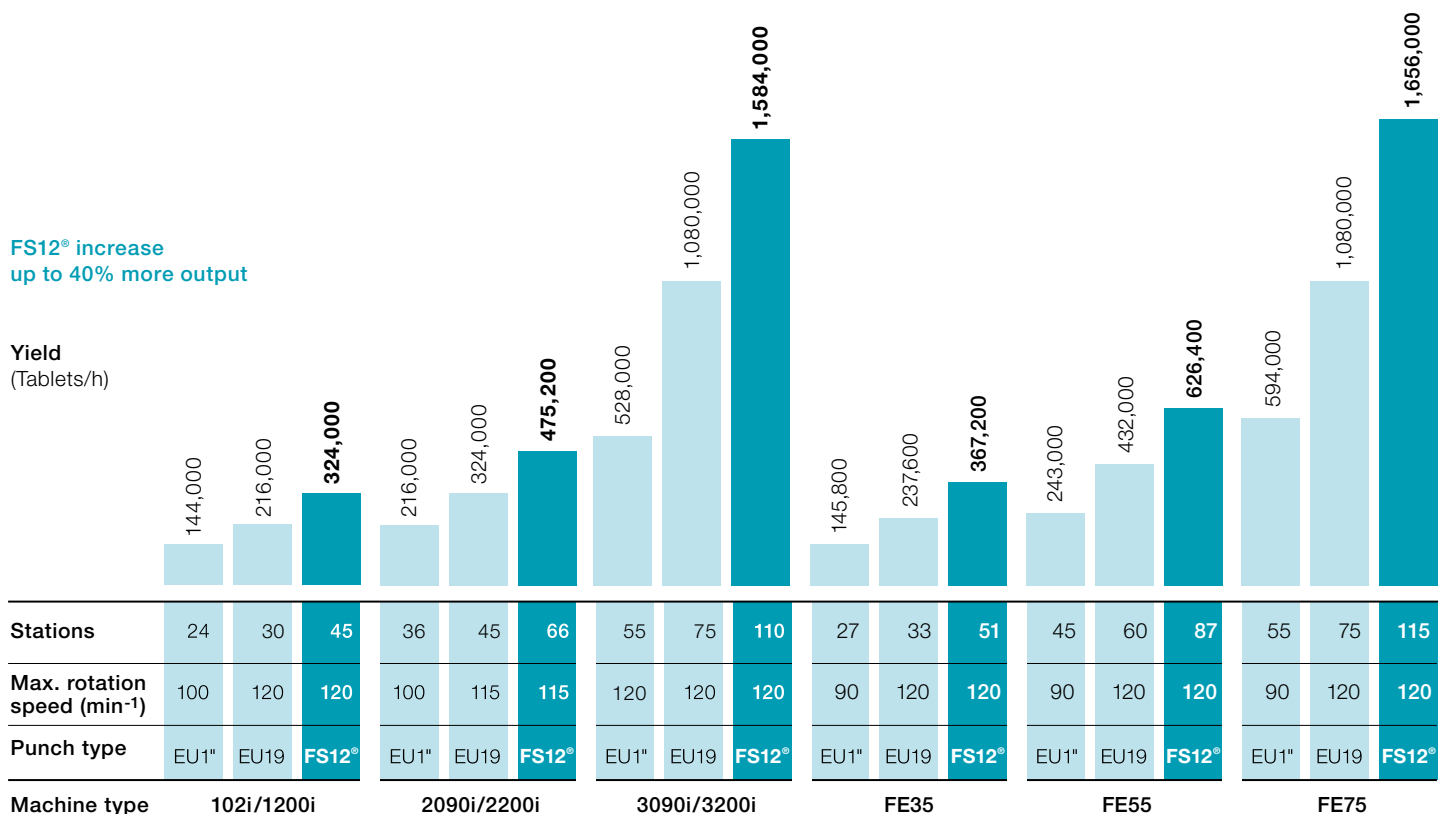


FS[®]45

- + High compression forces
- + Approximately 30% longer pressure dwell time than EU45
- + Large tablets up to 44 mm
- + Higher tablet quality
- + Pressing force to max. 100 kN

FS12[®] increase up to 40% more output

Yield (Tablets/h)

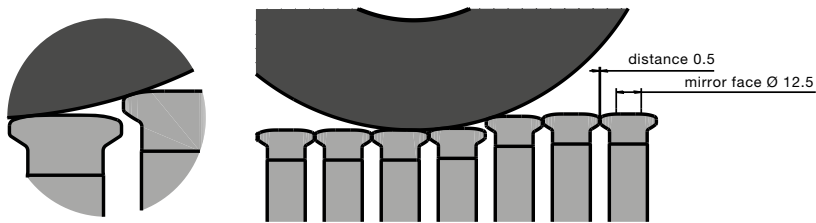


Stations	24	30	45	36	45	66	55	75	110	27	33	51	45	60	87	55	75	115
Max. rotation speed (min⁻¹)	100	120	120	100	115	115	120	120	120	90	120	120	90	120	120	90	120	120
Punch type	EU1 [®]	EU19	FS12 [®]	EU1 [®]	EU19	FS12 [®]	EU1 [®]	EU19	FS12 [®]	EU1 [®]	EU19	FS12 [®]	EU1 [®]	EU19	FS12 [®]	EU1 [®]	EU19	FS12 [®]

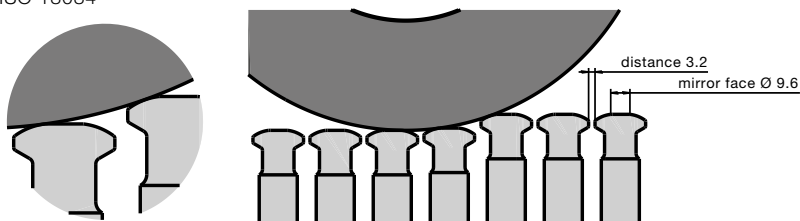
FS Technology[®] in detail

Comparison of a 2090i with 45 stations

FS19[®] Fette Standard



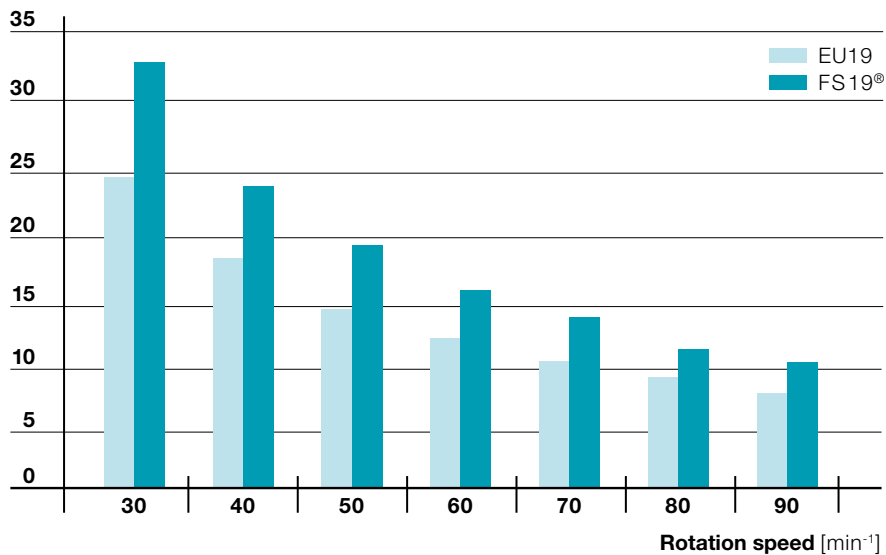
EU19 DIN ISO 18084



Comparison of dwell times between FS Technology[®] and EU formats

Dwell time

[ms]



FEATURES

- + Head shape optimized for the application
- + Larger mirror head
- + Smaller distances between punch heads

ADVANTAGES

- + Long dwell time
- + Reduced wear on pressing tools and machine components
- + Less noise and vibration

BENEFITS

- + Higher tablet quality
- + Higher output
- + Higher productivity
- + More user-friendly

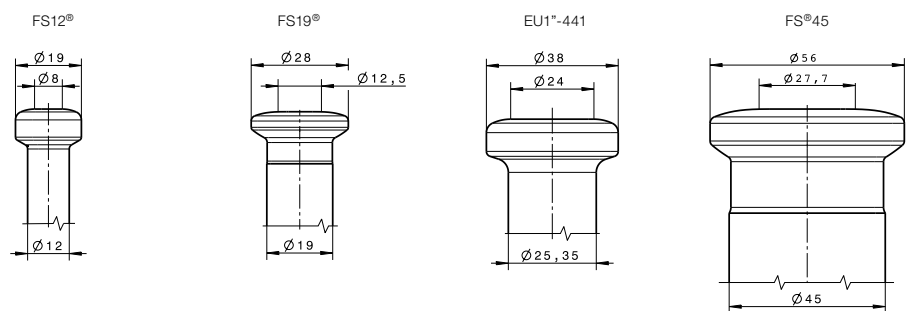


Whether round tablets, special shapes, relief moldings, concavities or break lines – Fette Compacting can handle the full range of customer requirements. To ensure maximum output and flexibility, we offer punches in all sizes and types. For customers with special demands on their production, we particularly recommend the FS® products.

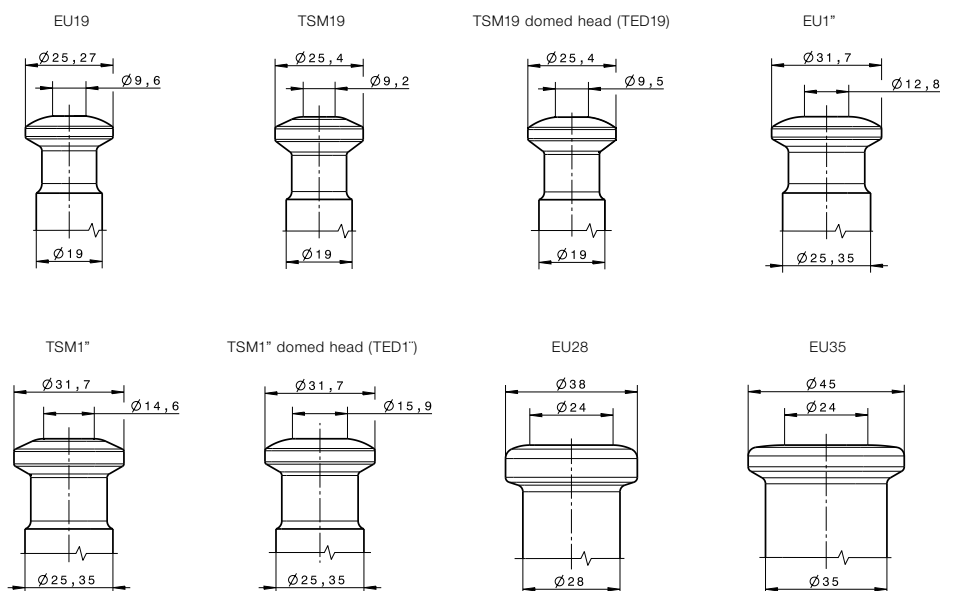
It is not just the diameter of the contact area that is critical; but furthermore the optimised transition geometries into the head radius which are featured by our FS® technology transmit the compression forces in an optimum way.

Fette Compacting – Punch head types

FS Technology®



Standard



All measurements are in mm

Tablet design

The formula for tablets that can be pressed with the greatest efficiency is: round and flat, or lightly domed. Tablets of this shape can easily be filled, dosed, compressed and discharged. The simple design allows production to proceed at maximum rotation speed. This way, manufacturers can efficiently produce even large batches of tablets with constant hardness, strong edges and little tendency to adhesion.

Special shapes are often chosen for the tablet design for marketing reasons: it is important for users to give their tablets unique features with a recognition value. For some active materials, dosing also affects the shape. Domed or spherical shapes are necessary if, for example, the tablets are to be coated. If the quantity of active material is large, a round tablet can be too large to be swallowed with ease. An oval, narrow or oblong format is appropriate in these cases.



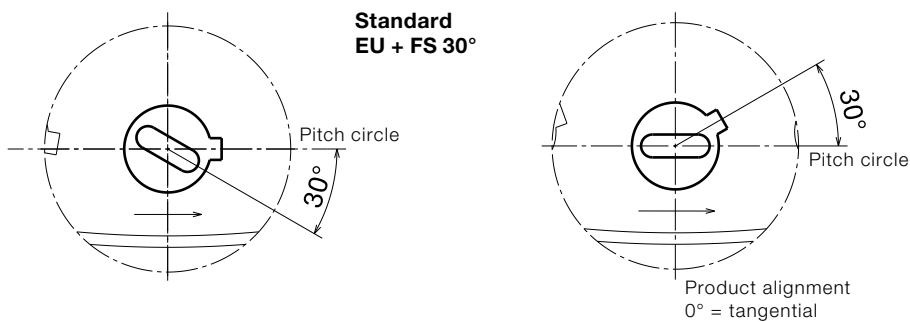
The tableting tool and the tablet press must interact optimally, whatever the tablet shape. Precise calculation of the pressing force using CAD-supported FEM (Finite Element Method) techniques ensures reliable use up to the loading limits of the punch material. This accurate method of calculation, matched to the press shape, is a standardized process, and a fundamental precondition for every product release.



We offer you solutions for every format, and advise you in good time.

Groove and parallel key positions

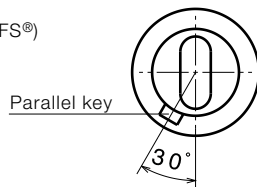
Groove position in turrets and position of the tablet form to keyway



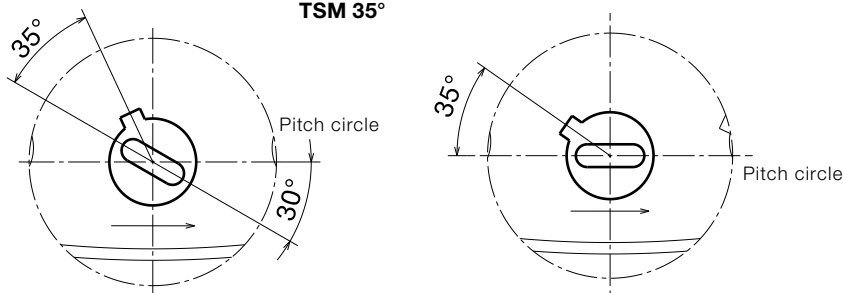
The angle of the parallel key with respect to the rotor, as well as the profile positioning of the parallel key in the punch, are of vital importance to problem-free production, particularly in the case of profiled tablets. These are often damaged when tolerances are poorly matched. The way in which the tablets meet the wiper can be affected by considering these factors. This leads to a higher output of good tablets, and the filling and dosing processes can be affected by the product alignment.

Upper punch for profiled tablets (View of pressing surface)

30°
(Fette Standard EU and FS®)

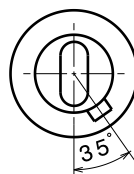


Standard TSM 35°



Upper punch (View of pressing surface)

35°
(Fette Standard TSM)



Materials – Punches

High-quality materials and heat treatment thereof are crucial to the service life of tableting tools. Fette Compacting uses high-alloy, through-hardened tool steels for a range of applications. For this reason, you receive material data sheets in advance, or material certificates at delivery. The optimal material is chosen and the heat treatment matched for various formulations. For this purpose, Fette Compacting makes use of the expertise available in its own hardening shop and coating department.

Tablet punches

Depending on your precise needs resulting from the press material in the production process, we offer you new high-quality punches in three material classes. We would be happy to advise you in the selection of the right material.

Standard punches (FSG-STP)

- + High hardness
- + High resistance to compression
- + Good toughness
- + Low dimensional change
- + High resistance to wear

Inox punches (FSG-IXP)

- + Higher corrosion resistance to FSG-STP for Wash-in-Place (WiP) production

Premium punches (FSG-PRP)

- + High degree of hardness with the same features as the FSG-STP
- + High resistance to wear
- + Very high adhesive wear resistance

	Wear resistance	Corrosion resistance
Standard punch FSG-STP	+	+
Inox punch FSG-IXP	++	+++
Premium punch FSG-PRP	+++	++

Materials – Dies and segments

Efficient production starts with the selection of the optimal material for dies and segments. A variety of specialized materials is available to optimize output, tablet quality and OEE.

In order to align the tools with the characteristics of your product and to prevent future optimization needs, early technical advice by the machine manufacturers is valuable. At Fette Compacting, each new customer design is checked by experienced tooling engineers and optimized according to customer requirements.

Dies

Standard dies (FSG-STD)

- + Higher resistance to corrosion than FSG-STP
- + High resistance to abrasive and adhesive wear
- + High resistance to compression
- + Good ductility
- + Low dimensional change

Inox Dies (FSG-IXD)

- + Non-corroding material for dies, specially for WIP applications
- + High resistance to wear with the same features as the FSG-STD

Dies with carbide bushes (FSG-CID)

- + Extremely hard and wear-resistant

Segments

Standard segments (FSG-STG)

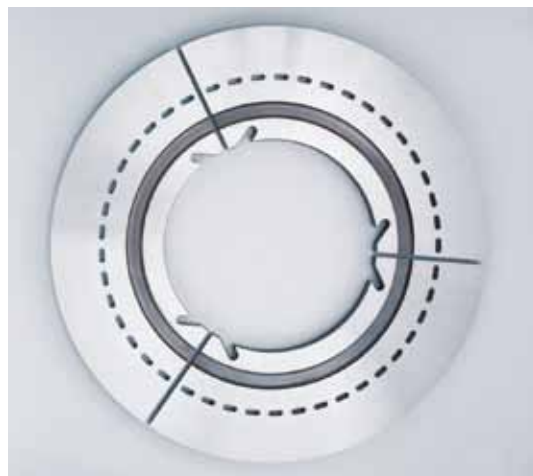
- + Good resistance to wear
- + High resistance to chipping
- + High resistance to compression
- + High hardness
- + Low dimensional change

Inox segments (FSG-IXS)

- + Non-corrosive material for segments, in particular for WIP applications
- + High resistance to wear

Segments with carbide bushes (FSG-CIS)

- + Extremely hard and wear-resistant





Hard chrome plating (FCG-HCP)

- + Improvement in resistance to corrosion
- + Improvement in resistance to wear
- + Reduction in friction and adhesion of the products to the punch



PVD-Chrome (FCG-PCR)

- + More resistant to wear than FSG-HCP
- + Very good adhesion properties compared to FSG-HCP
- + Good corrosion properties

Many difficult applications in pharmaceutical production can be handled through coatings. Products exhibit different properties, such as thermolability, and this leads to stickiness at the punch and the segment. Then again, products may be hard and coarse-grained, making them abrasive and increasing wear. Our coatings offer the right path to stable production for many such cases and challenges.



Chrome nitride (FCG-CRN)

- + Better resistance to wear than FSG-HCP
- + Very good adhesion properties compared to FSG-HCP
- + All-round coating against adhesion and wear



Titanium nitride (FCG-TIN)

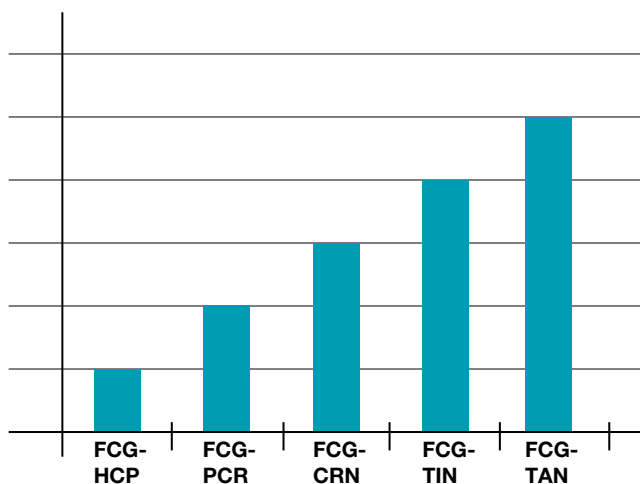
- + High resistance to wear
- + Improved adhesion properties versus FSG-HCP
- + Suitable for highly abrasive products



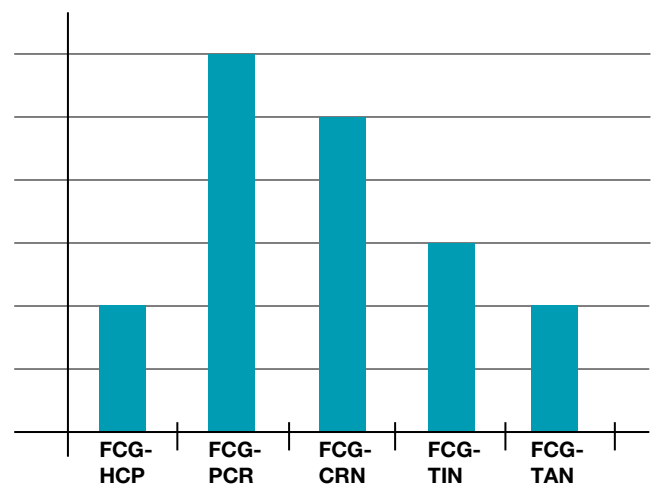
Titanium aluminum nitride (FCG-TAN)

- + Maximum resistance to wear
- + Suitable for crystalline powders such as salts or mineral tablets

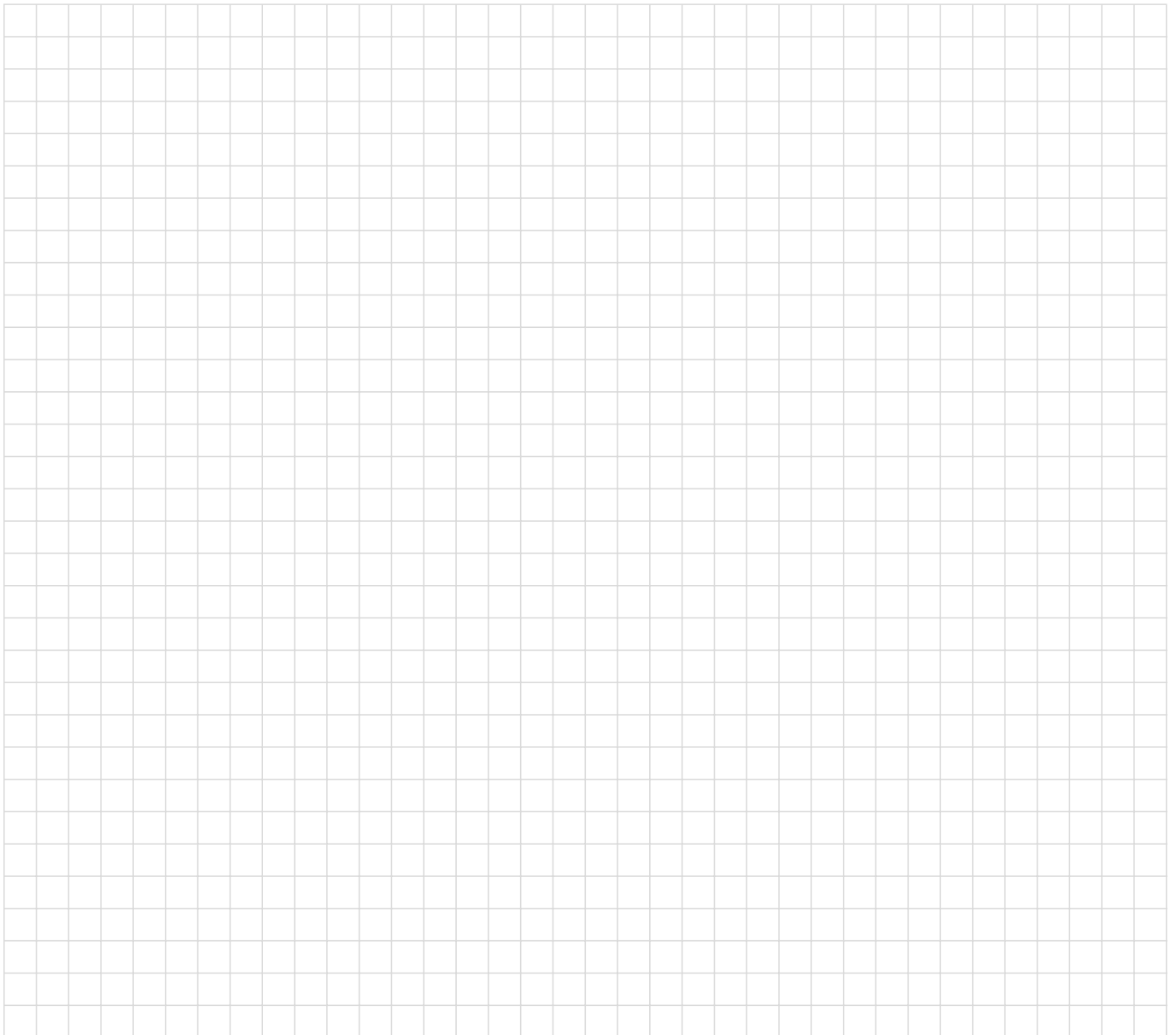
Wear resistance*



Anti-adhesion*



* Properties can vary depending on product



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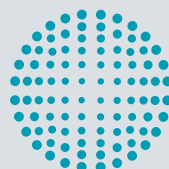
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