Welcome to Frewitt

FREWITT

Topics

- Were we come from
- Long history of Innovation
- Markets & Customers
- Product Portfolio
- SwissNess

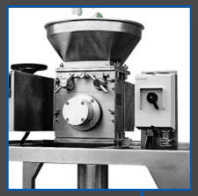
Were we come from?

- 1946 Founding of FREWITT SA in Fribourg Switzerland
- by **Fré**déric **Witt**wer

- 50's Launch first Oscillating Mill
- 70's Launch first Hammer Mill
- 1995 Introduction of ATEX 95
- 2004 Launch of first Crusher
- 2006 Launch first ConiWitt
- 2009 Launch of DelumpWitt

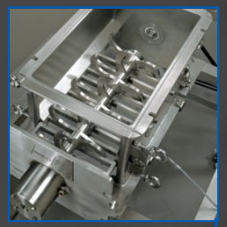
Long history of Innovation

1946 Oscillating mill MG-Line 1953



1960-ff Conical mill TC-Line

1970-ff Crusher CC-310



1980-ff Conical mill TC-Lab

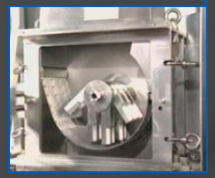
1990-1996 Crusher CCD-450

1997 Conical mill ConiWitt-Line

1998 DelumpWitt **Patented**

1999 Sieve mill TurboWitt-Line

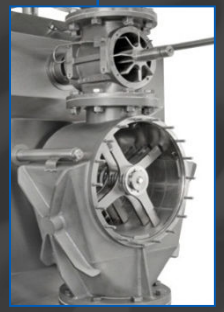
2000 Hammer mill MGH-Line



2001 Sieve mill SG-Line

2002 Oscillating mill MF-Line

2003 Hammer mill MFH-Line



2004 Oscillating mill MF-Lab

2005 2006 2007 2008 Hammer mill HW-Lab

2009 2010 2011 Oscillating mill OscilloWitt-Line **Patent pending**

2012 ?

Long history of Innovation

2000 — Screw conveyor CDS -Line

2003 — Screw extractor DAFP-Line

2005 — Extracting device ProFi-Sword

2008 — Dosing Device ProFi-Valve 80

2010 — Dosing device Servo-Dos

2012 — Dosing Device ProFi-Valve 150

2004 — ProFi-Lun

2006 — ProFi-Bant

2007 — Continuous liner ProFi-Liner

2009 — Dosing Device ProFi-Accurate

2011 — Dedusting System ProFi-Clean

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

Areas of Applications (Laboratory & R&D)

Pharmaceutical Industry

- APIs
- Excipient

Chemical Industry

- raw materials
- Intermediates
- fine chemicals

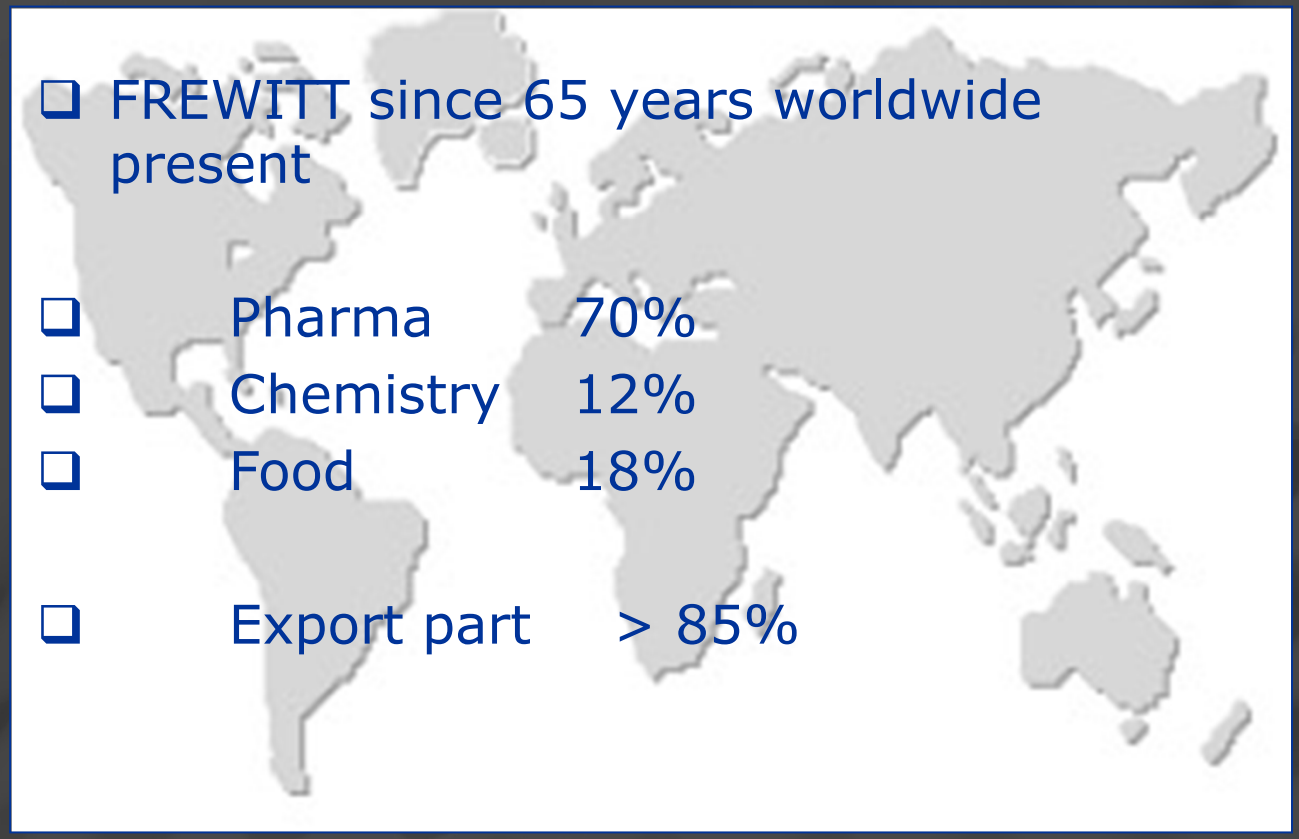
Food Industry

- Ingredients
- additives

Other fields

energy materials, polymers, tobacco industry, nuclear industry, coal industry, paper industry, material recycling,

Markets and Customers

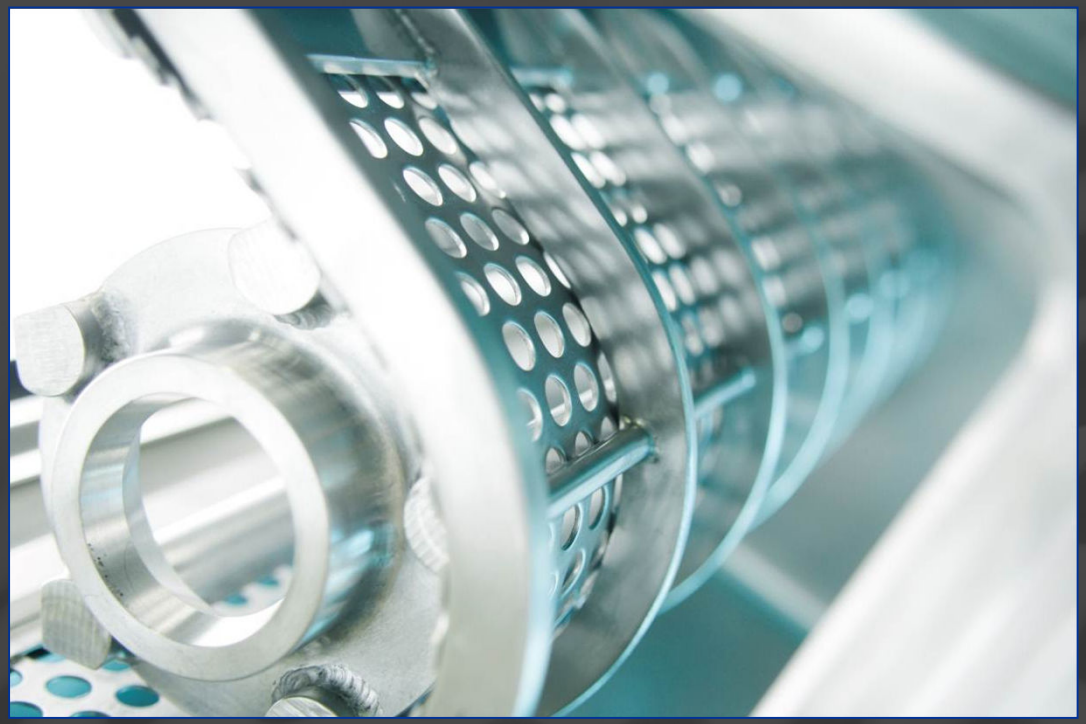


- FREWITT since 65 years worldwide present

- Pharma 70%
- Chemistry 12%
- Food 18%

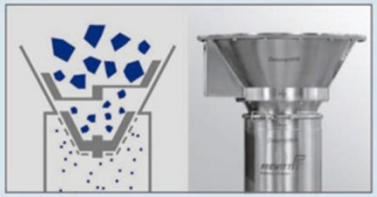
- Export part > 85%

Equipment's



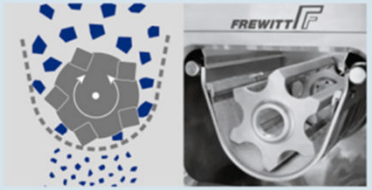
Areas of Applications (Milling & Sieving)

DelumpWitt



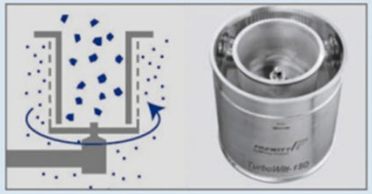
Particle size: 60 cm – 500 µm

Oscillating sieve mill
OscilloWitt 3-6



5 cm – 250 µm

Rotary sieve mill
TurboWitt C20-C25



1 cm to 1 mm – 150 µm

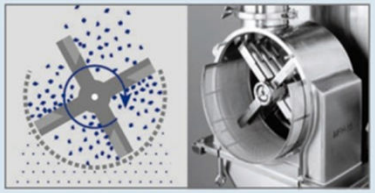
Crusher
CC-310 · CCD-450

30 cm – 2 cm

Conical sieve mill
ConiWitt 150-200-250 · TC-Lab

2 cm – 150 µm

Hammer mill
MFH-6 · MFH-15 · HammerWitt-Lab



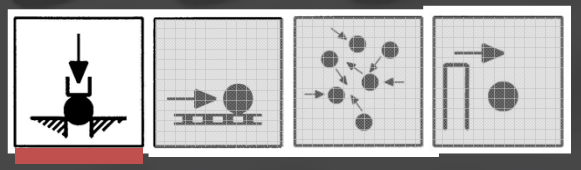
1 cm – 30 µm

60 cm — 15 cm — 1.5 cm — 1.5 mm — 30 µm

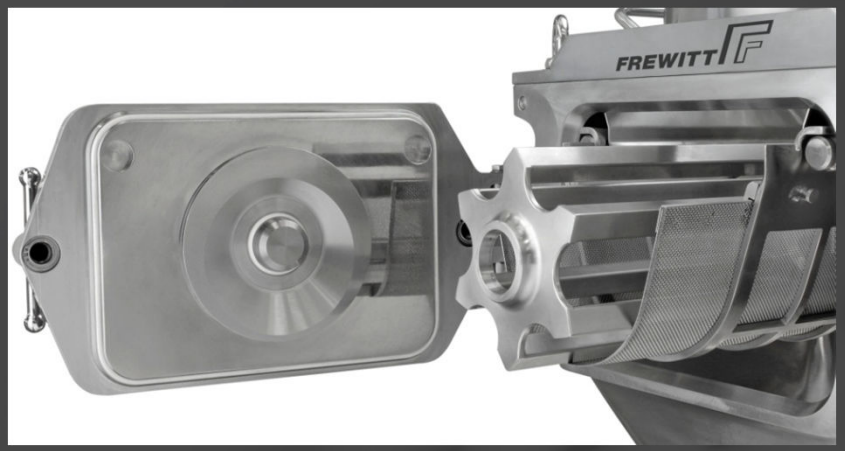
Pre-Crusher

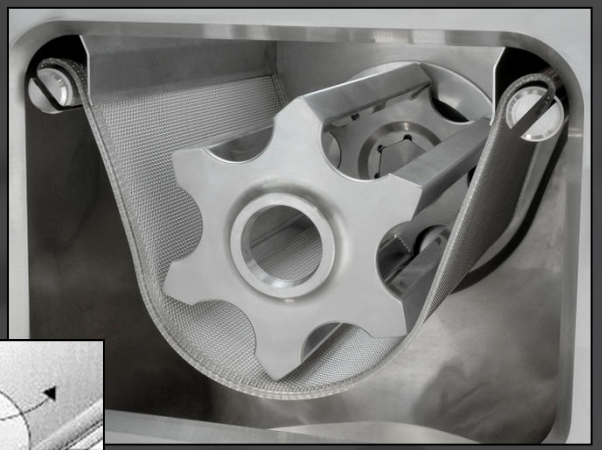
60 cm → 2 cm

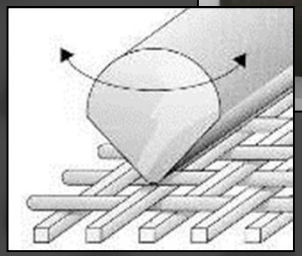
n_{max} (milling factor) = 5...15



Oscillating sieving mills

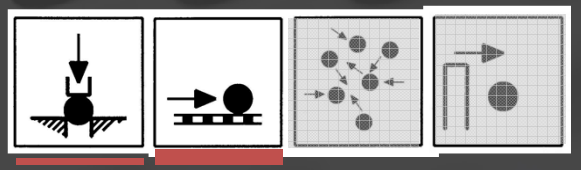






~5 cm → 250µm

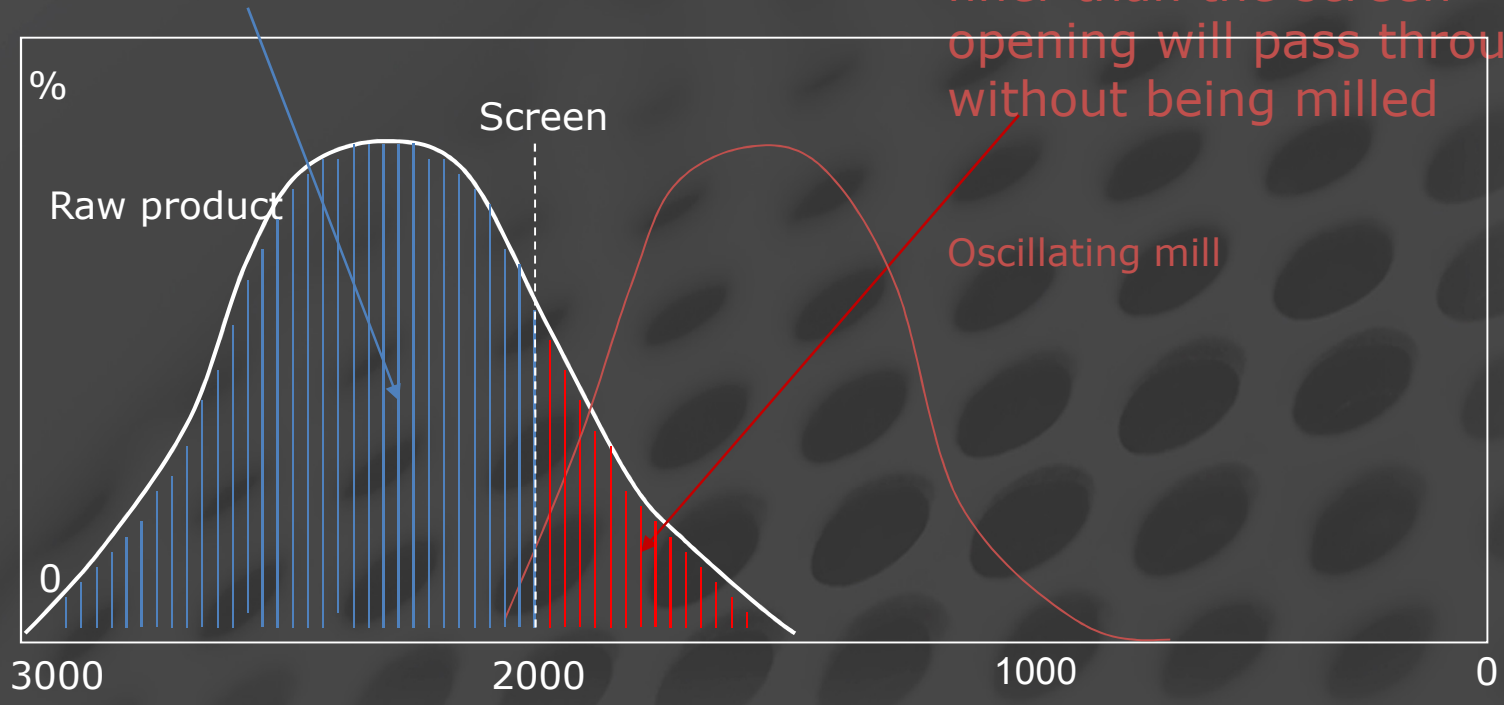
n_{max} (milling factor) = 5...10



Particle size & distribution of oscillating sieving mills

Big particles will be milled

Most particles in the raw product which are already finer than the screen opening will pass through without being milled



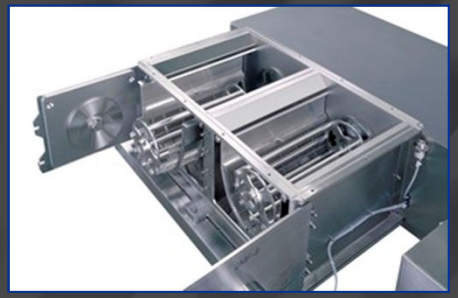
Oscillating sieving mills

OscilloWitt-6 on mobile stand

Oscillating Sieve Mill

OscilloWitt-6 integrated into the process flow

OscilloWitt-3 housing with rotor



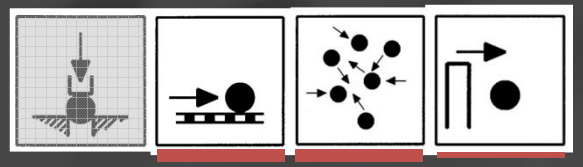
2 x MF-8 Sieve Mill

Laboratory Sieve Mill

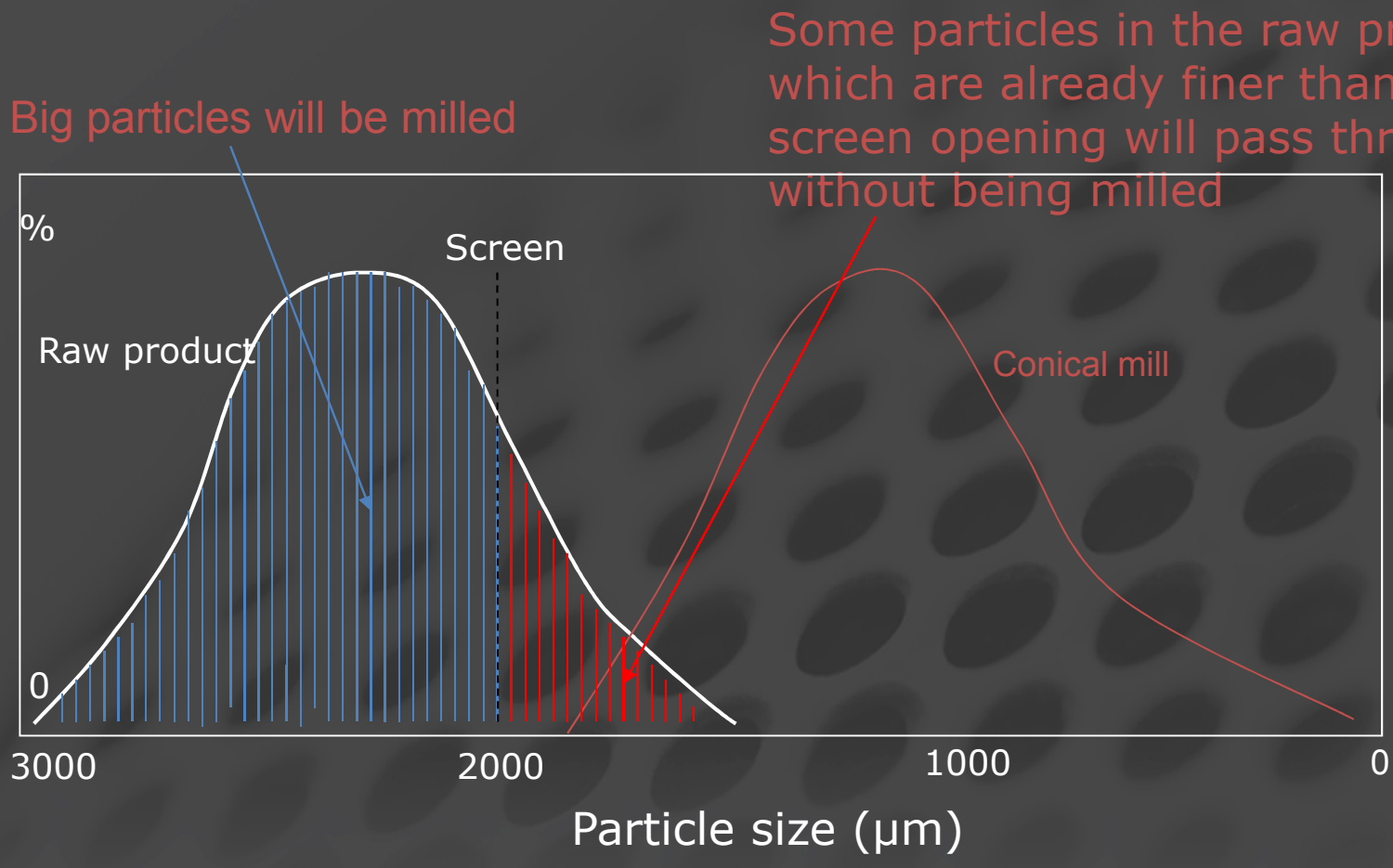
Conical sieving mills

1 cm → 150µm

n_{max} (milling factor) = 5...15



Particle size & distribution Conical sieving mills



Conical Mills & Sieves

ConiWitt-200 on mobile stand

Conical Sieve mill with Interchangeable Milling Head

ConiWitt-150 installed through the wall

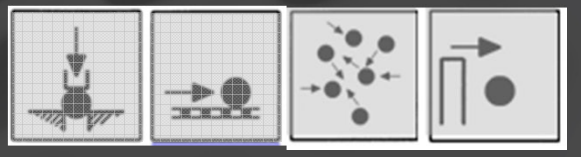
ConiWitt with short arm

ConiWitt-250 with rotating assembly

Conical Sieve Mill TC-Lab

Rotating sieving mills Rotary sifter

1 cm → 150µm
(Deagglomeration by centrifugal force no milling)



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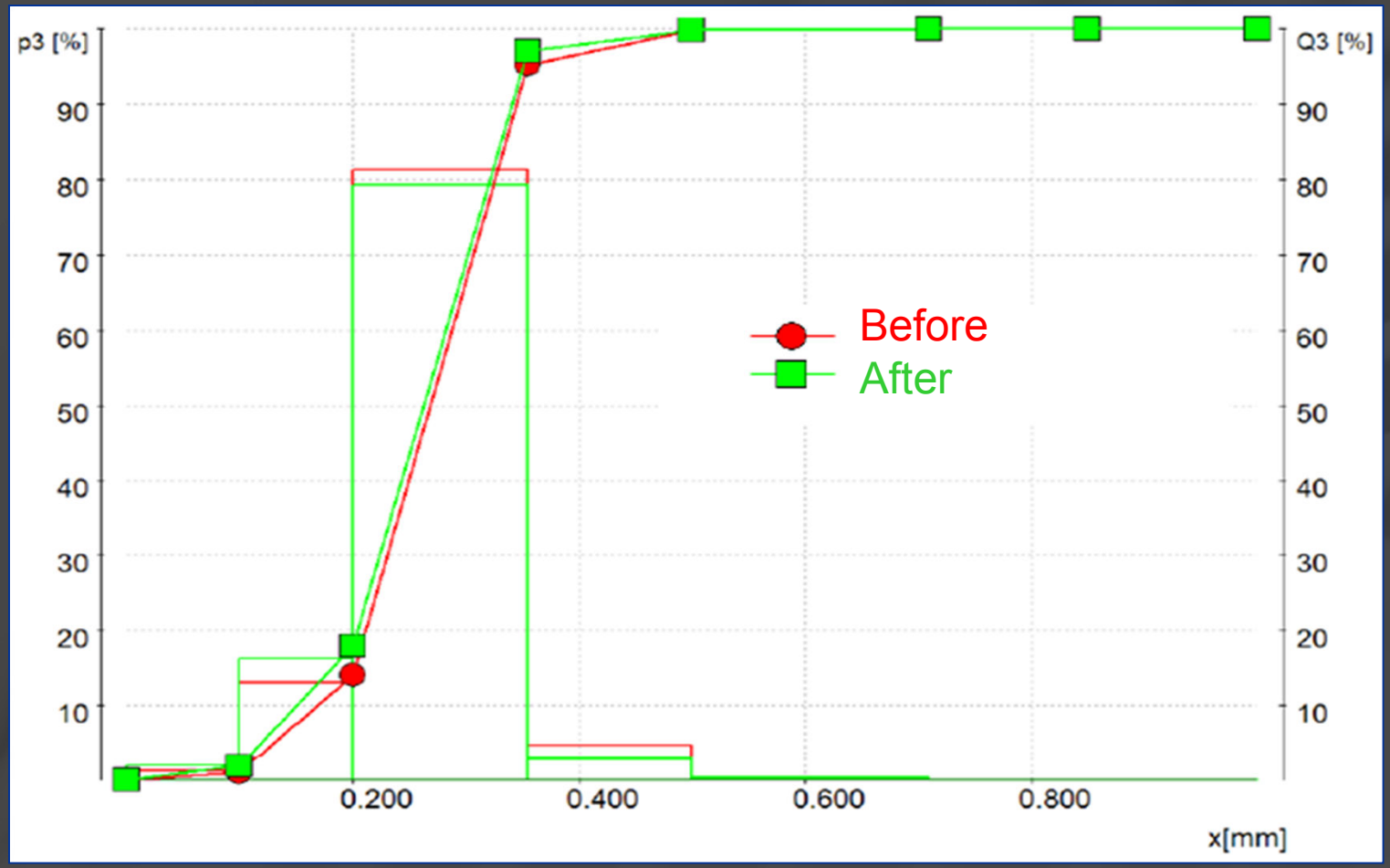
TurboWitt-C20, ■ 2 mm, 1780 rpm.



Advantages of Rotating sieving mills

Very high throughput

Deagglomeration without Milling Security screening

The rotary sifter

TurboWitt-C25 on mobile stand

The rotary sifter

TurboWitt combination with the ConiWitt 200 and elevator

TurboWitt housing with stator

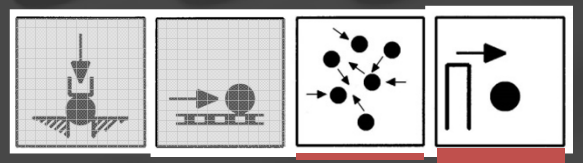
TurboWitt-C25

Inline Installation with inlet-and outlet compensator ATEX conform, pivot arm

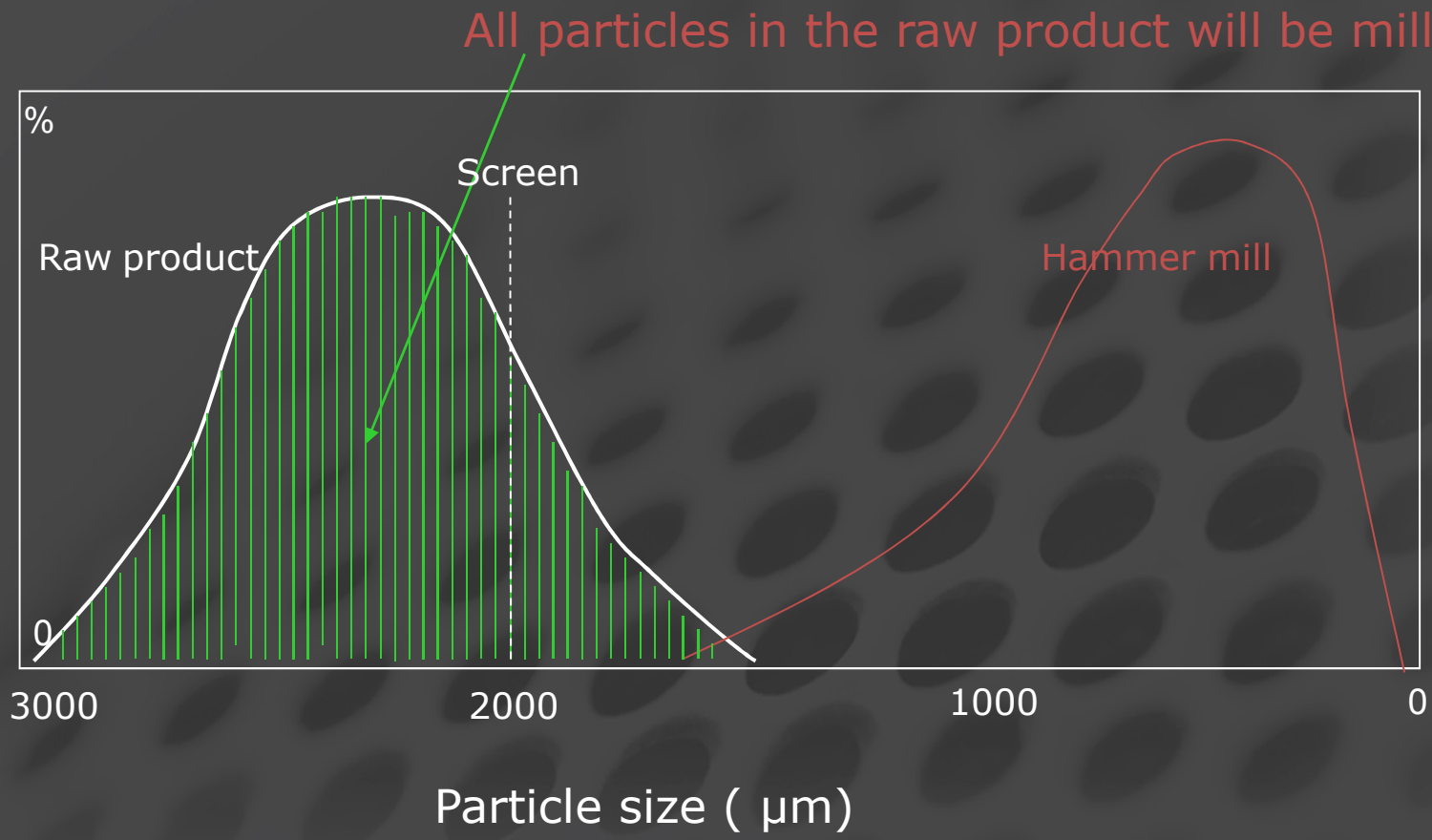
Hammer mills

~2 cm → 30µm

n_{max} (milling factor) = 10...20



Particle size & distribution on Hammer mills



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How to avoid over-pressure in milling chamber:

Frewitt de-dusting system type ProFi-Clean 90

Hammer Mills

HammerWitt-Lab

Pressure shock resistant
Hammer mill MFH-6

Hammer mill MFH-15

DelumpWitt – new solutions for manufacturing processes

The innovative answer

The fastest way from 25 - 40 kg solid blocks to 500 mm powders

- one operator,
- two process steps
- one machine

The Modular System

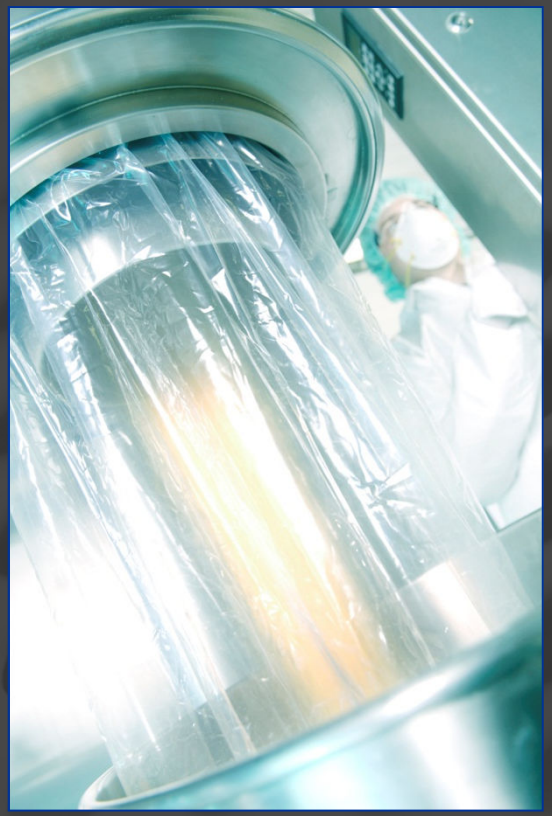
FREWITT

A general guideline on how to choose milling machine and tools

<table>
<tr><td rowspan="2">Target size (D99)</td><td colspan="8">Product</td></tr>
<tr><td colspan="3">Brittle</td><td colspan="3">Hard</td><td colspan="2">Tough</td><td>Fibrous</td><td>Elastic greasy</td></tr>
<tr><td>30 - 100 µm</td><td colspan="3">MFH
Hammer
Conidur</td><td colspan="3" rowspan="3">MFH
Hammer, high-impact
Conidur</td><td colspan="2" rowspan="3">MFH
Knife
Conidur</td><td rowspan="2">Challenge!</td><td rowspan="5">Use cold media to increase brittleness</td></tr>
<tr><td>100 - 300 µm</td><td colspan="2">MFH
Hammer</td><td>OscilloWitt
Sieve frd</td></tr>
<tr><td>300 - 400 µm</td><td colspan="2" rowspan="3">MFH
Hammer
Conidur
■</td><td rowspan="3">CW
●</td><td rowspan="3">OscilloWitt
Sieve frd fcr</td></tr>
<tr><td>400 - 600 µm</td><td rowspan="3">MFH
Knife
Conidur
Rasp</td></tr>
<tr><td>600 - 800 µm</td><td colspan="2">MFH
Hammer, high-impact
Conidur</td><td rowspan="2">OscilloWitt
Sieve fcr</td><td rowspan="2">MFH
Knife
Conidur</td><td rowspan="2">OscilloWitt
Sieve fcr</td></tr>
<tr><td>> 800 µm</td><td>MFH
Hammer
high-impact
Conidur</td><td>CW
Rasp</td></tr>
</table>

Remark: Products which flow poorly (light, electrostatic, greasy, humid) after milling are challenging!

Modules for installation



Everything for bulk solids

ProFi-Sword

ProFi-Dos

ConiWitt

ProFi-Accurate

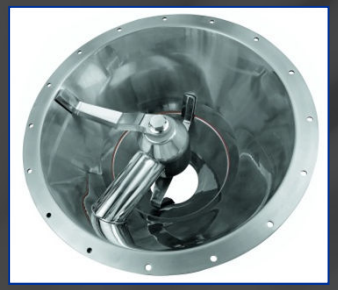
ProFi-Clean

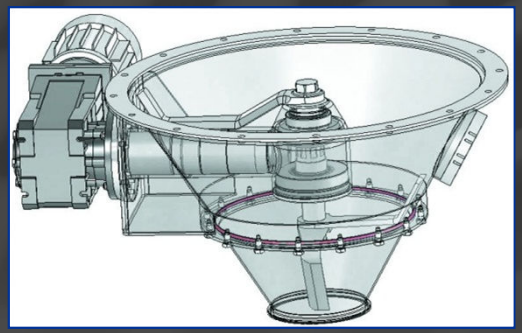
ProFi-Liner

ProFi-Sword (Discharge device)

Brief overview

- Powder delivered in free-flow
- Dust-proof discharge aided with three rotating blades or “swords” (with different shapes) gently maintain the product in constant movement (fluidization)
- Contamination of the product is avoided thanks to the secure drive, bearing, and seal concept
- The bottom blades are adapted and aligned to the outlet pipe
- Delivery of heavy powder (bridging, sticking, settling)
- Available in ATEX





ProFi-Valve and ProFi-Accurate (Dosing device)

Brief overview

- Precise dosing devices
- The ProFi-Valve consists of a pneumatically or servomotor operated gate valve
- Three different dosing phases (coarse, medium, fine) assure precise dosing
- Ideal for install in high precision dosing equipment as an OPEN/CLOSE shutoff mechanism
- Available in ATEX

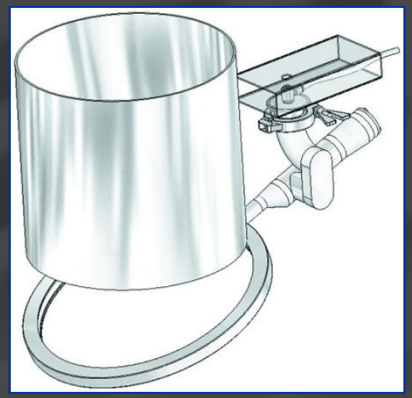
ProFi-Valve

ProFi-Accurate

ProFi-Bant (Bag holding device)

Brief overview

- Pneumatic dust-proof bag Holding Device
- Dust-proof connections prevent contamination of the product
- Operates independently of other power sources such as electricity (all that is needed is compressed air for the inflatable gasket)
- Suitable for filling paper and plastic bags as well as Big Bags
- Quick and easy cleaning
- Available in ATE



ProFi-Lun (Bag holding device)

Brief overview

- Manuel dust-proof Big Bag Holding Device
- This manually-operated connection device can also be used in areas where there is no additional power source such as compressed air or electricity
- Stainless steel construction, compliant with ATEX directive 94/9/EG
- Compact, space-saving. hygienic design

ProFi-Clean (De-dusting filter)

Brief overview

- Manuel dust-proof Big Bag Holding Device
- This manually-operated connection device can also be used in areas where there is no additional power source such as compressed air or electricity
- Stainless steel construction, compliant with ATEX directive 94/9/EG
- Compact, space-saving. hygienic design

ProFi-Liner

Brief overview

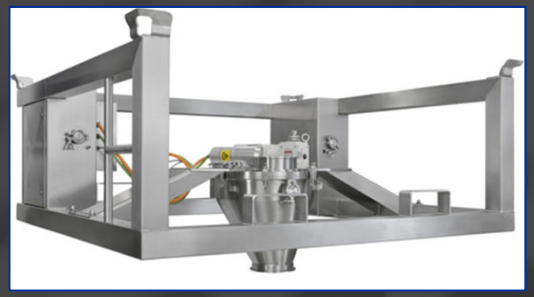
- Safety in Filling: The gravimetric filling of solids requires a closed system for OEB level 4 containment
- During the process infiltrated air is removed, dusts are sucked out of the drum, and the film is sealed according to containment specifications by a cutting and sealing mechanism.
- This unit of ProFi-Liner ensures an OEB level 4 (OEL 1-10 µg/m³) containment
- ATEX Zones compatible and conform of the EU-directive requires 89/391EWG through the closed systems during filling of dangerous substances completely
- Operators are also safe without personal protective equipment (PPE) against contamination

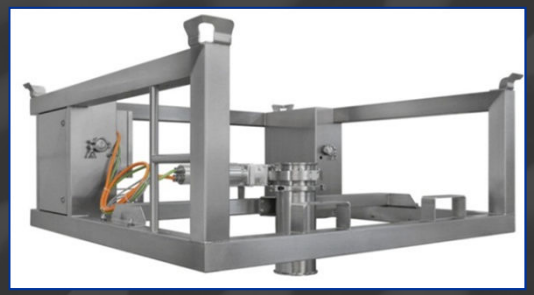
R & D / Laboratory

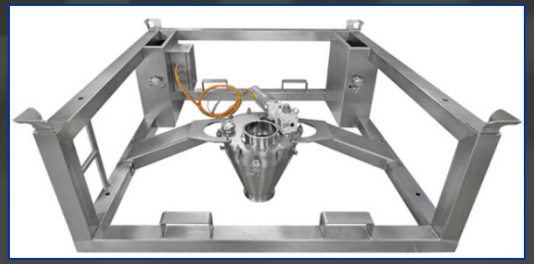
Other fields

Use our Technical Applications Center for your tests to improve your processes, to apply new know-how, in order to increase quality, efficiency, and profitability.

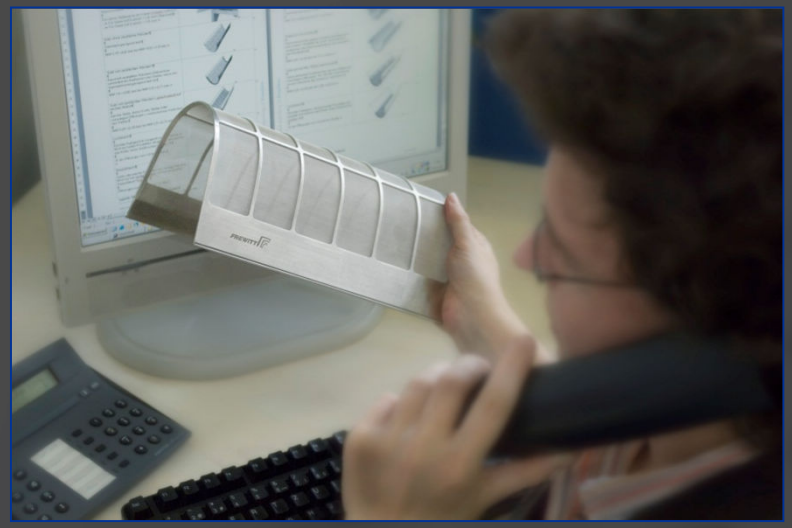
Installation for trials and process validation at Frewitt







After Sales / Service



Our main concern is satisfied customers

Our international dealer/sales agent network, as well as our prompt spare parts delivery service are key elements enabling us to respond quickly to customer concerns

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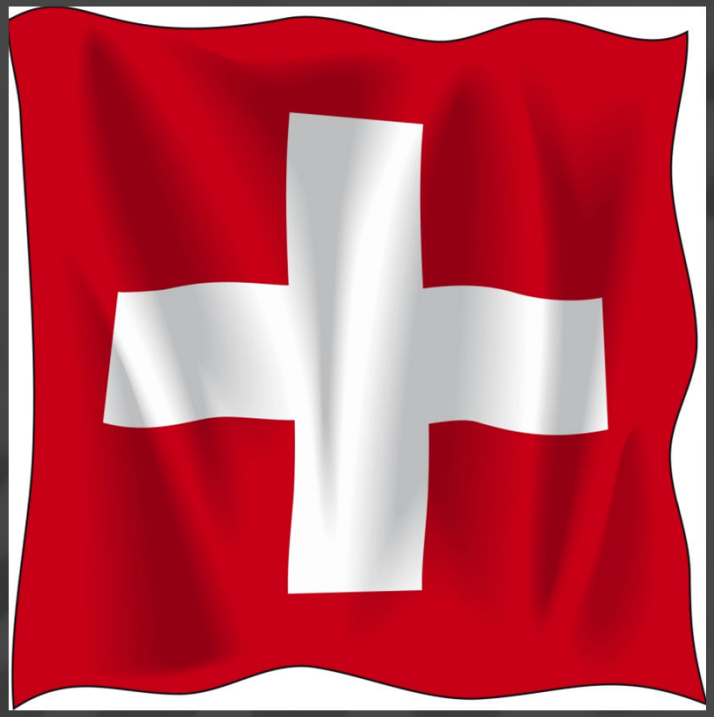
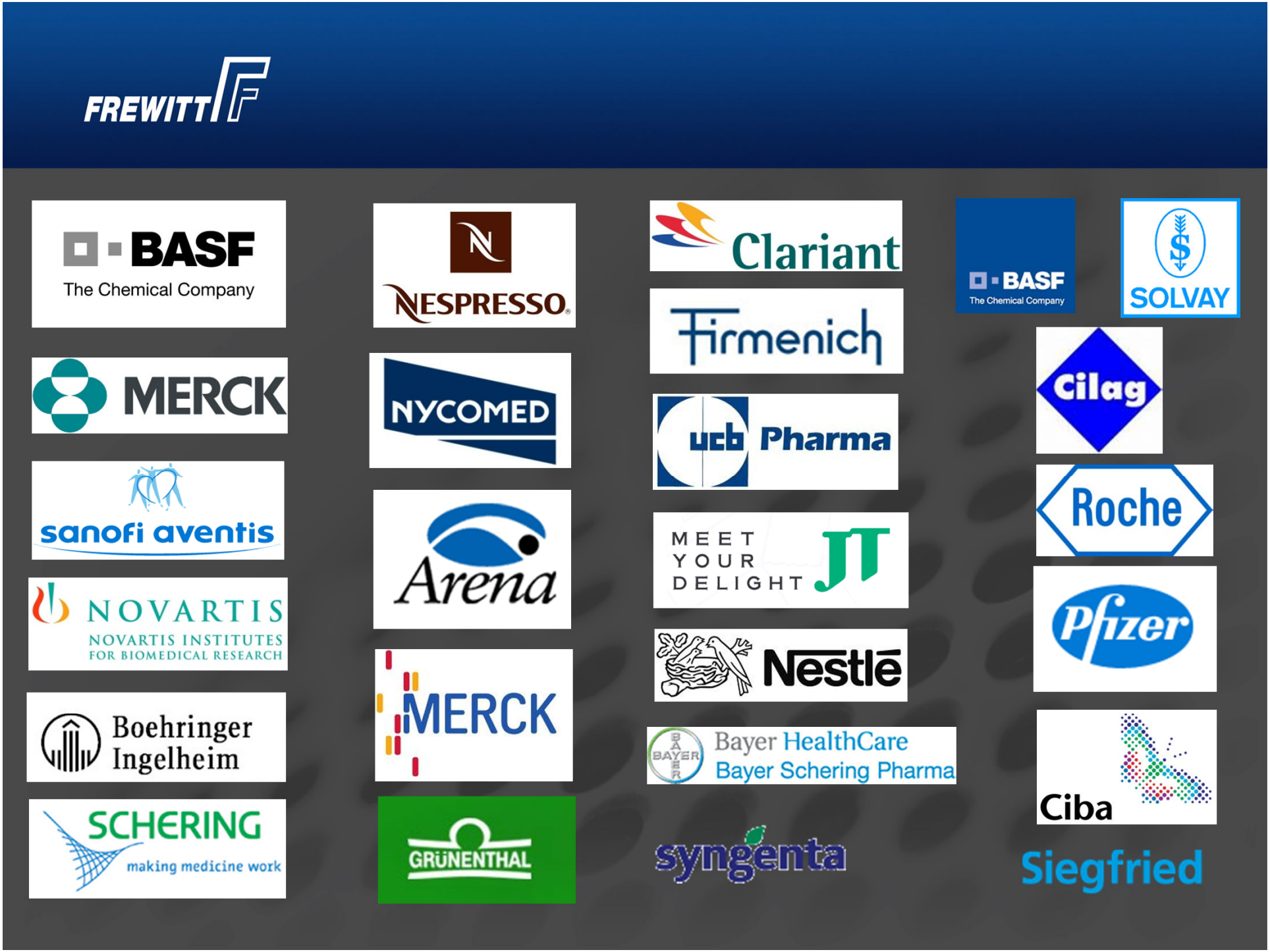
SWISSNESS




FREWITT
BASF
The Chemical Company
NESPRESSO
Clariant
BASF
The Chemical Company
SOLVAY
MERCK
NYCOMED
Firmenich
Cilag
sanofi aventis
Arena
ucb Pharma
Roche
NOVARTIS
NOVARTIS INSTITUTES
FOR BIOMEDICAL RESEARCH
MEET
YOUR
DELIGHT
JT
Pfizer
Boehringer
Ingelheim
MERCK
Nestlé
Bayer HealthCare
Bayer Schering Pharma
SCHERING
making medicine work
GRÜNENTHAL
syngenta
Ciba
Siegfried

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