

COLOR MASTERBATCH 360°

IPC 2019

September 25, Shanghai

Lukas Vogel

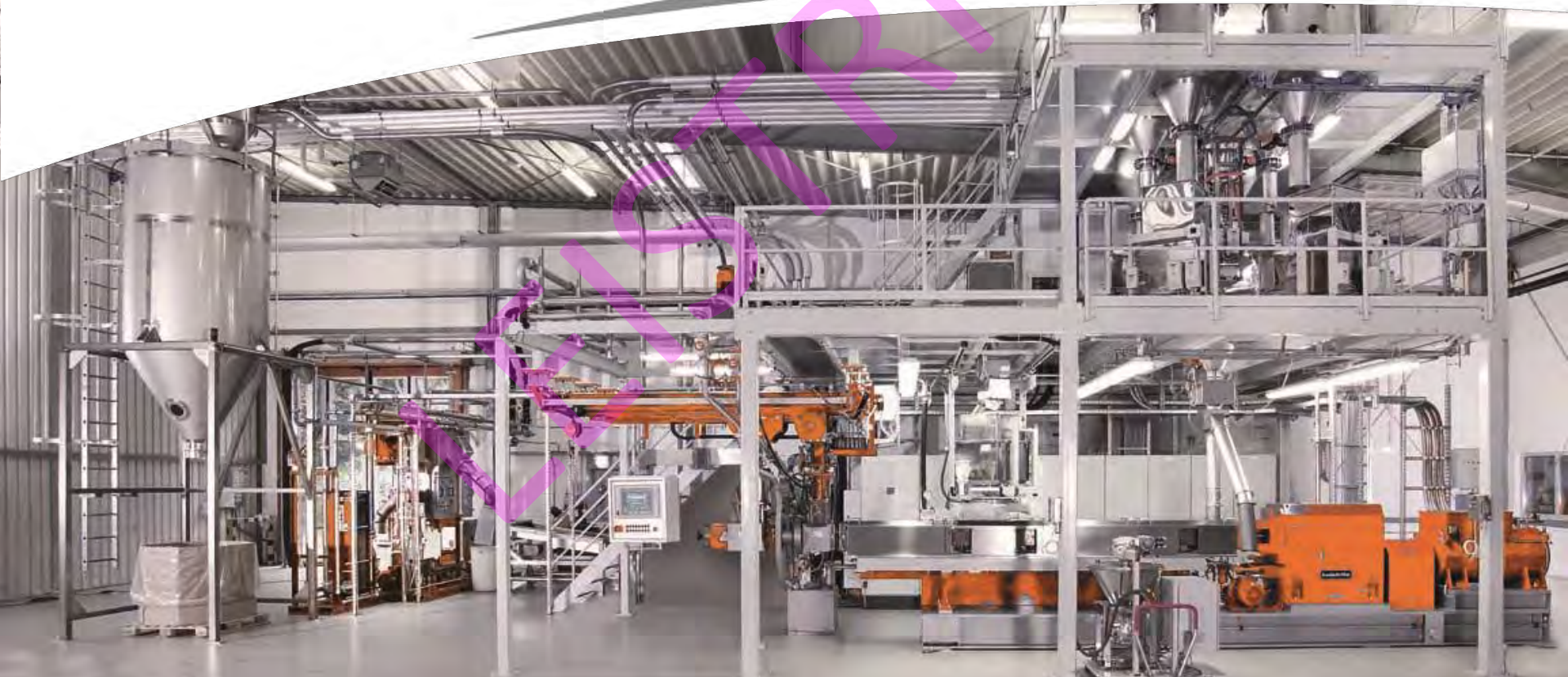
Process engineer

Leistritz Extrusionstechnik GmbH

李玉龙

Sales engineer

Leistritz Machinery (Taicang) Co., Ltd.



AGENDA 360° COLOR MB

- Some Facts about Leistritz Leistritz 公司重要信息
- Masterbatch definition 母粒的定义
- Why Masterbatch? 为什么使用母粒?
- Quality 质量
- Process 工艺
- Potential and Optimisation 潜力与优化

LEISTRITZ

IMPORTANT FACTS ON LEISTRITZ



➤ established in 1905 成立于1905年

➤ privately owned, independent company 独立的家族企业

➤ Employees 员工 ~ 2,000



FOUR BUSINESS UNITS – 四个事业部

ONE MOTION: ROTATION 共同点：旋转

Leistritz

TURBINE TECHNOLOGY

涡轮叶片技术



PUMP TECHNOLOGY

螺杆泵



EXTRUSION TECHNOLOGY

挤出技术



PRODUCTION TECHNOLOGY

生产技术



BUSINESS UNIT

EXTRUSION TECHNOLOGY 挤出技术

One of the leading
manufacturers of
co-rotating twin screw extruders
世界领先的双螺杆挤出机制造商之一

➤ for the plastics, food and
pharmaceutical industry
应用于塑料，食品和制药领域

➤ from 12 to 260 mm
screw diameter
螺杆直径从12到260mm

Example: ZSE 12 HP-PH



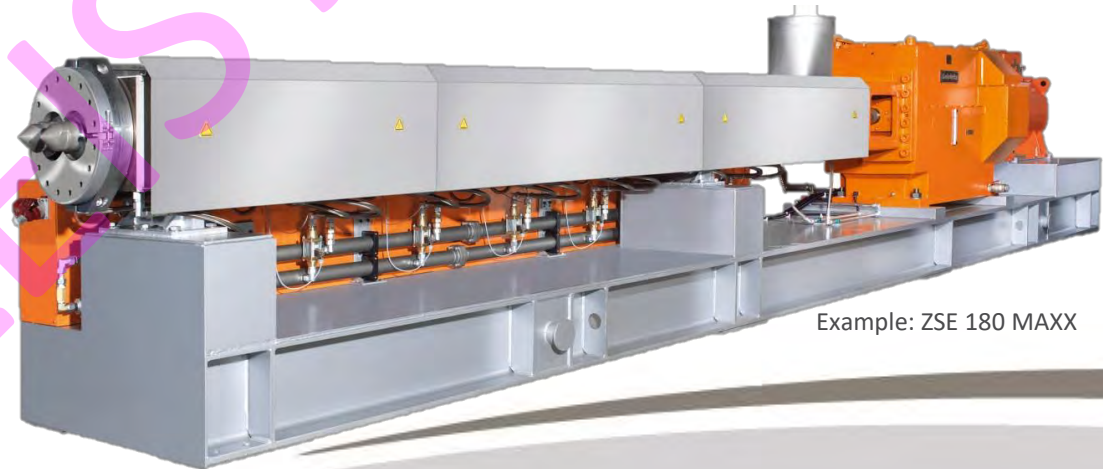
Example: ZSE 27 iMAXX



Example: ZSE 50 MAXX



Example: ZSE 180 MAXX



ZSE CC Series

ZSE CC 系列

Leistritz

Modularization Barrel, OD/ID=1.5
模块化加工段, 外径/内径=1.5

High speed: 600 and 1000 rpm
高螺杆转速: 600 和 1,000 rpm

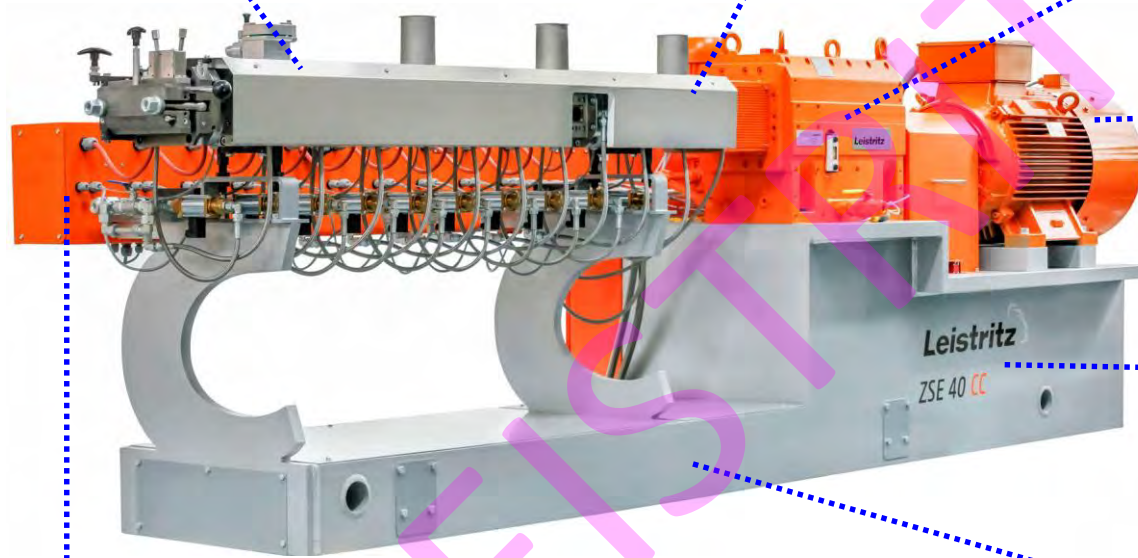
German/Austrian gearbox,
torque density= 11.5 Nm/cm³
德国制造高扭矩齿轮箱,
比扭矩值= 11.5 Nm/cm³

Air-cooled AC drive motor
风冷式交流驱动电机

Rigid Frame
坚固的支架

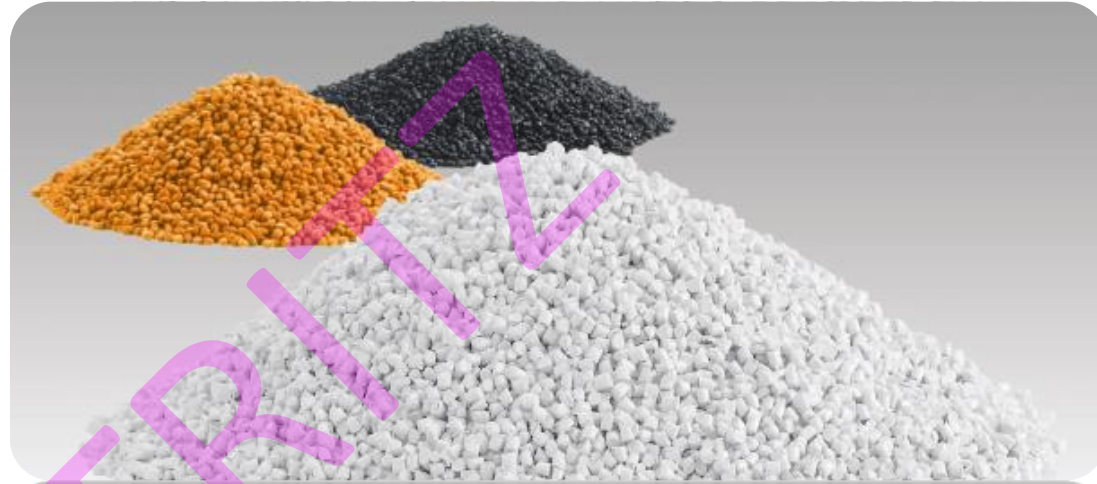
Good arrangement of heating, cooling ducts and electrical connections
合理排布的加热、冷却导管和电器连接

Surface is easy to clean
表面容易清洁



Type 型号	Screw Outer Diameter 螺杆外径(mm)	Outer Diameter / Inner Diameter 外径/内径	Spec. total torque 总比扭矩值 (Nm/cm ³)
ZSE 27 CC	27.7	1.5	11.5
ZSE 40 CC	39.7	1.5	11.5
ZSE 50 CC	49.7	1.5	11.5
ZSE 60 CC	59.6	1.5	11.5

母粒的定义

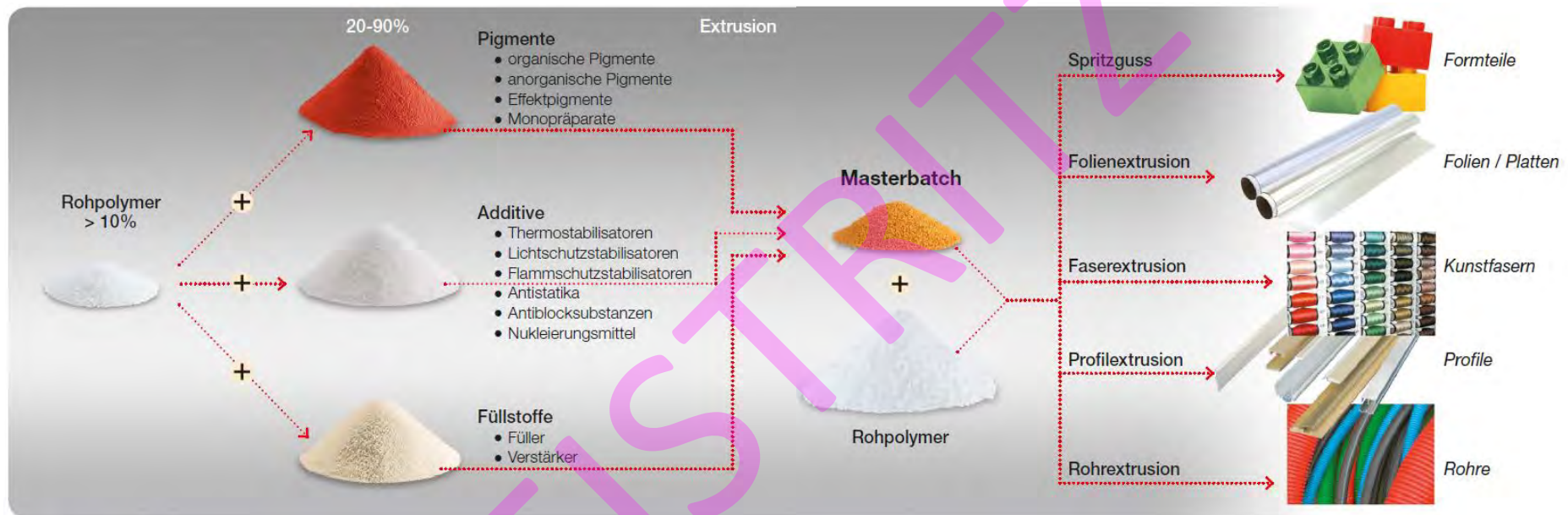


- **Masterbatch (MB)** is a solid or liquid additive for plastics used for **coloring plastics (color masterbatch)** or **imparting other properties to plastics (additive masterbatch)**. Masterbatch is a concentrated mixture of pigments and/or additives encapsulated during a heat process into a carrier resin which is then cooled and cut into a granular shape. 母粒分为给塑料着色的色母粒或改变塑料某些性质的添加剂母粒。母粒是色素或添加剂在热工艺下与树脂中共混，然后被冷却切成粒子状。

(source wikipedia.com 18.1.2016)

MASTERBATCH OVERVIEW

母粒概述



WHY MASTERBATCH?



- Less dust pollution of compounding and or injection moulding area
减少共混和注塑过程的粉尘污染
- Handling of pellets instead of powders and/or liquids 粒料处理替代粉料或液体料处理
- Dangerous substances are bound with matrix polymer 危险物质被聚合物封装
- Avoidance of expensive dosing equipment for compounding lines –
ONE masterbatch line can serve a whole compounding production
避免共混中昂贵的喂料设备花费，一条母粒产线共整个共混工艺生产
- More process stability: exactly defined pigment quantity in each pellet
工艺稳定性提高：每个粒子中的色素含量被精准控制

母粒的质量

Qformulation 配方

*

Qweighing 称量

*

Qmixing 混合

*

Qextrusion 挤出

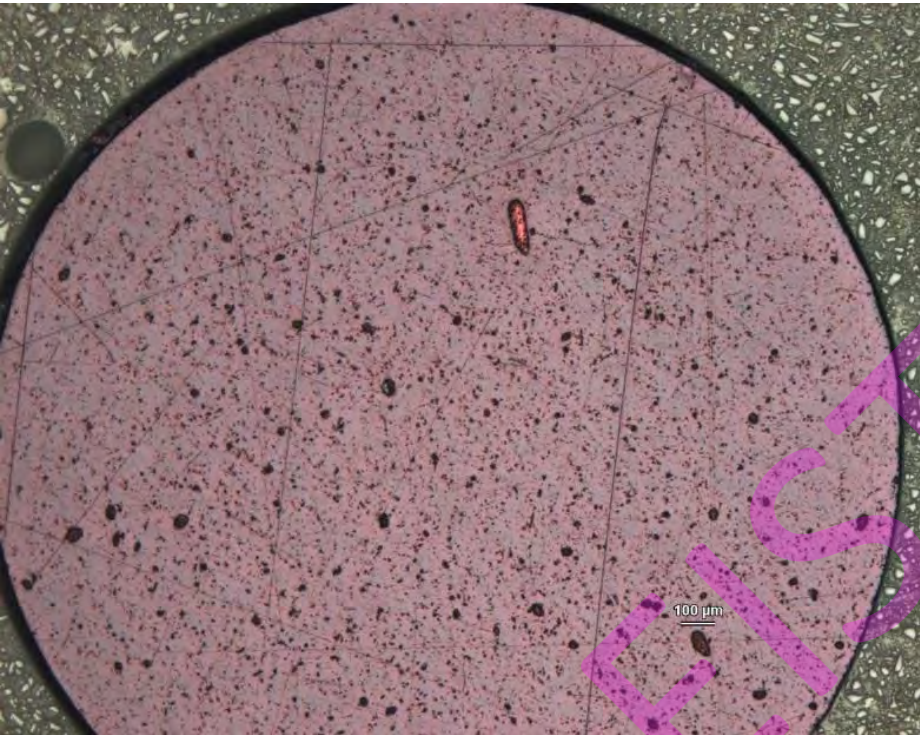
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Qmasterbatch 母粒

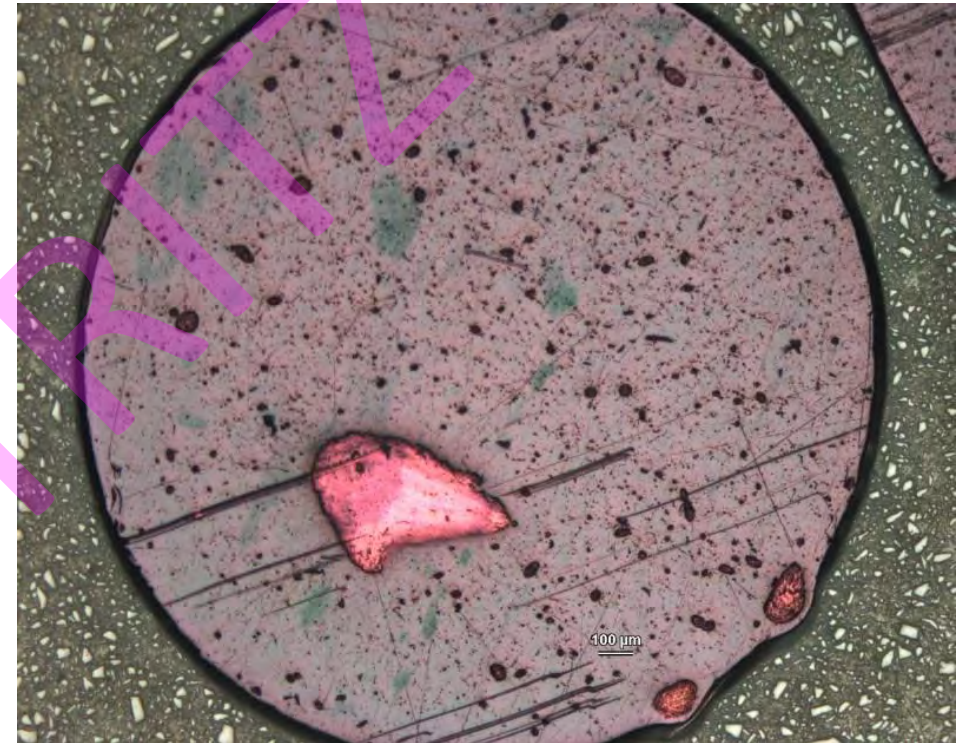


THE ENEMY OF MASTERBATCH: AGGLOMERATES

母粒的天敌：团块



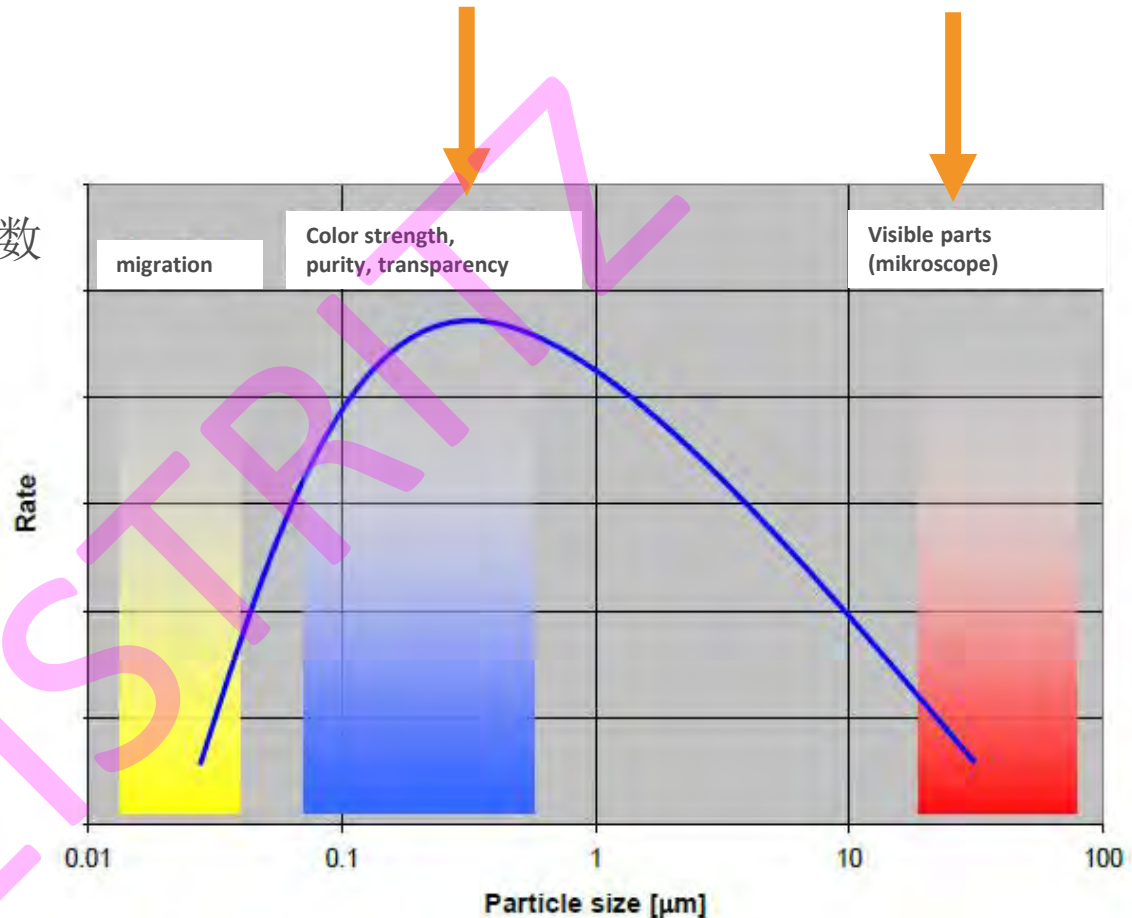
Filter value 过滤值: 1,2 bar/g
Magnification 放大倍数: 1 : 50



Filter value 过滤值: 2,6 bar/g
Magnification 放大倍数: 1 : 50

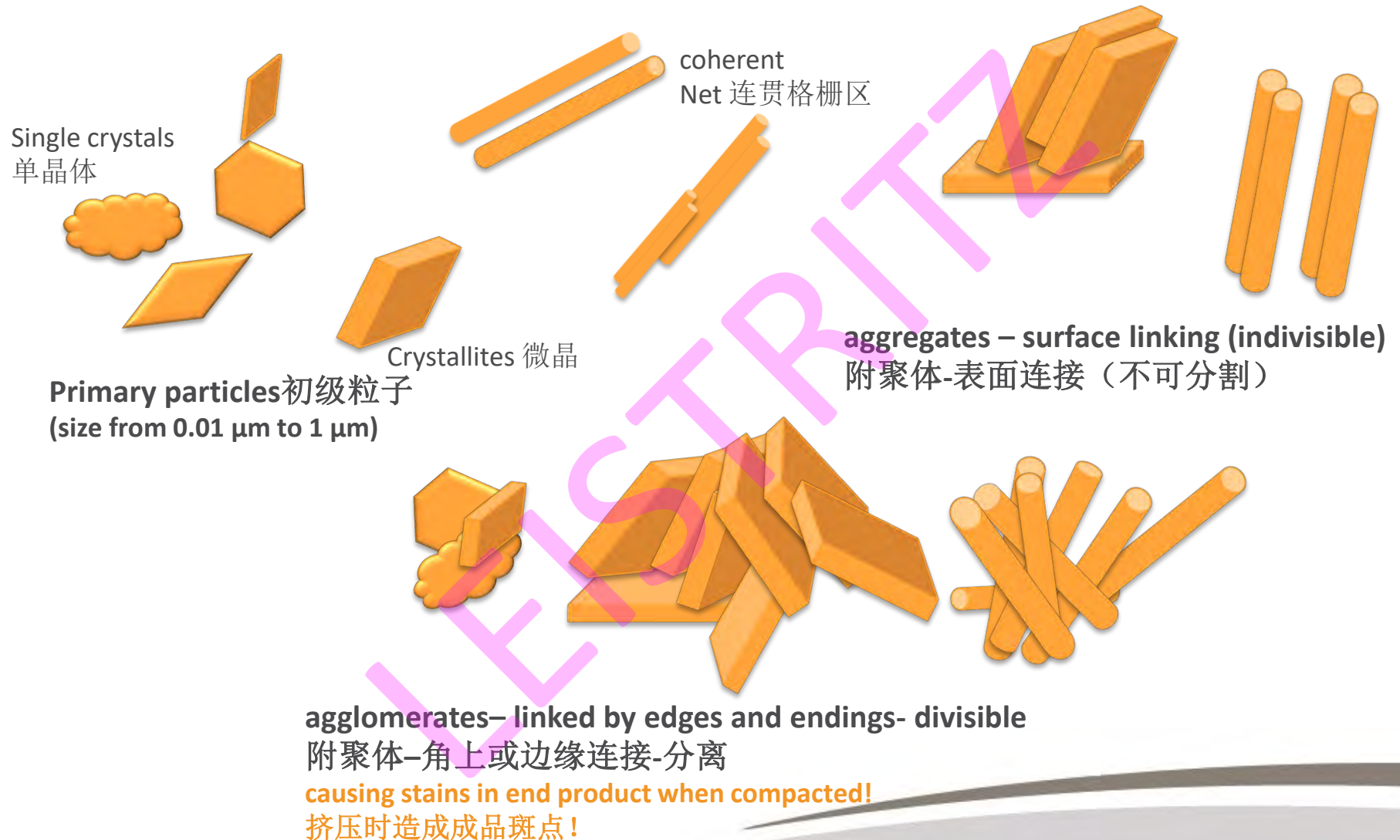
EVALUATION OF QUALITY 质量评估

- **Color measurement 量色法**
 - Color strength 着色强度
 - Colorimetical data 色彩参数
- **Visual assessment of agglomerates (mikroscope)**
显微镜下团块视觉评估
 - Quantity 数量
 - Size [μm] 尺寸
- **Filter pressure value (FPV)**
过滤压力值测定
 - According to EN 13900-5
 - film-/fiber quality 薄膜/纤维质量

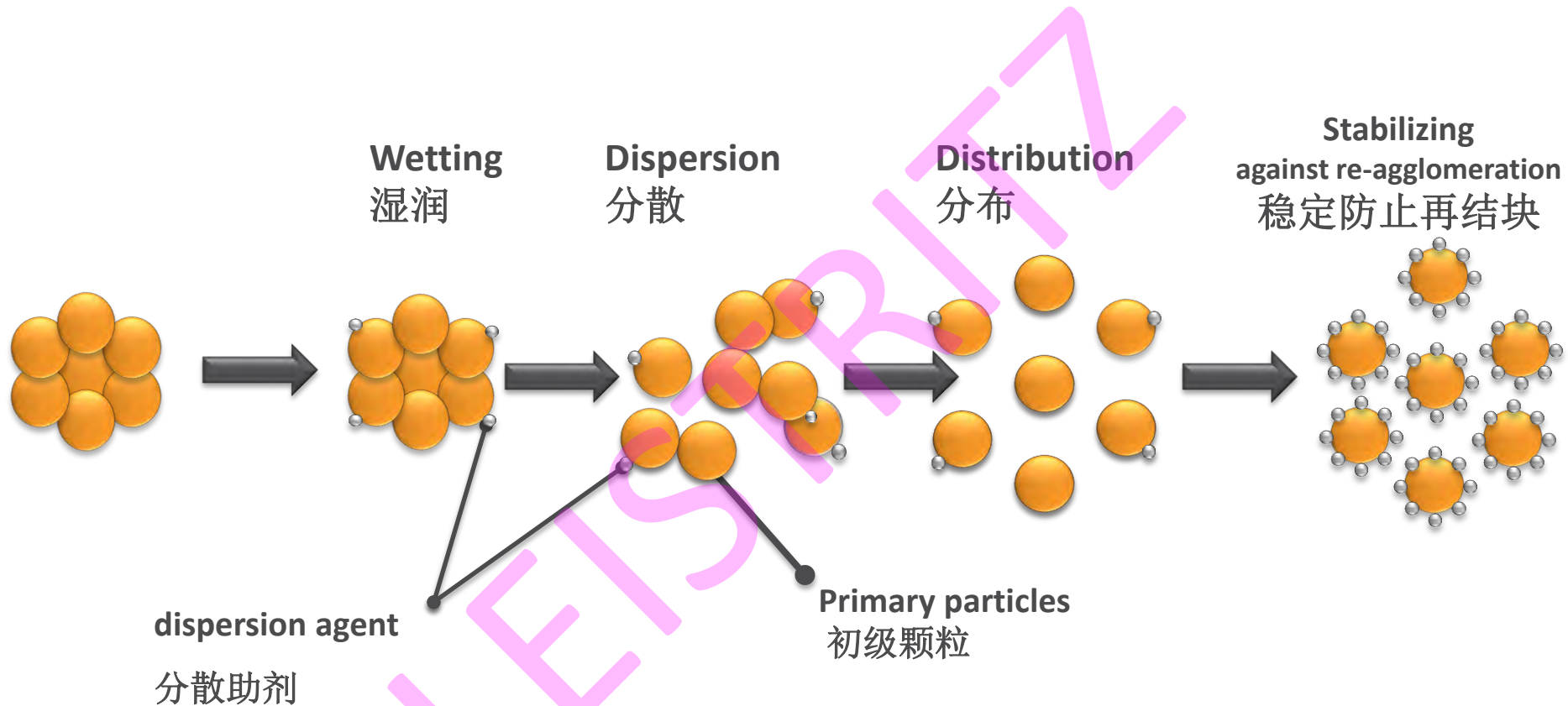


(von: C. Guckel / BASF: „Dispersion of Organic Pigments“ bei Leistritz Masterbatch Conference 2009, Nürnberg)

SHAPE OF PIGMENT PARTICLES

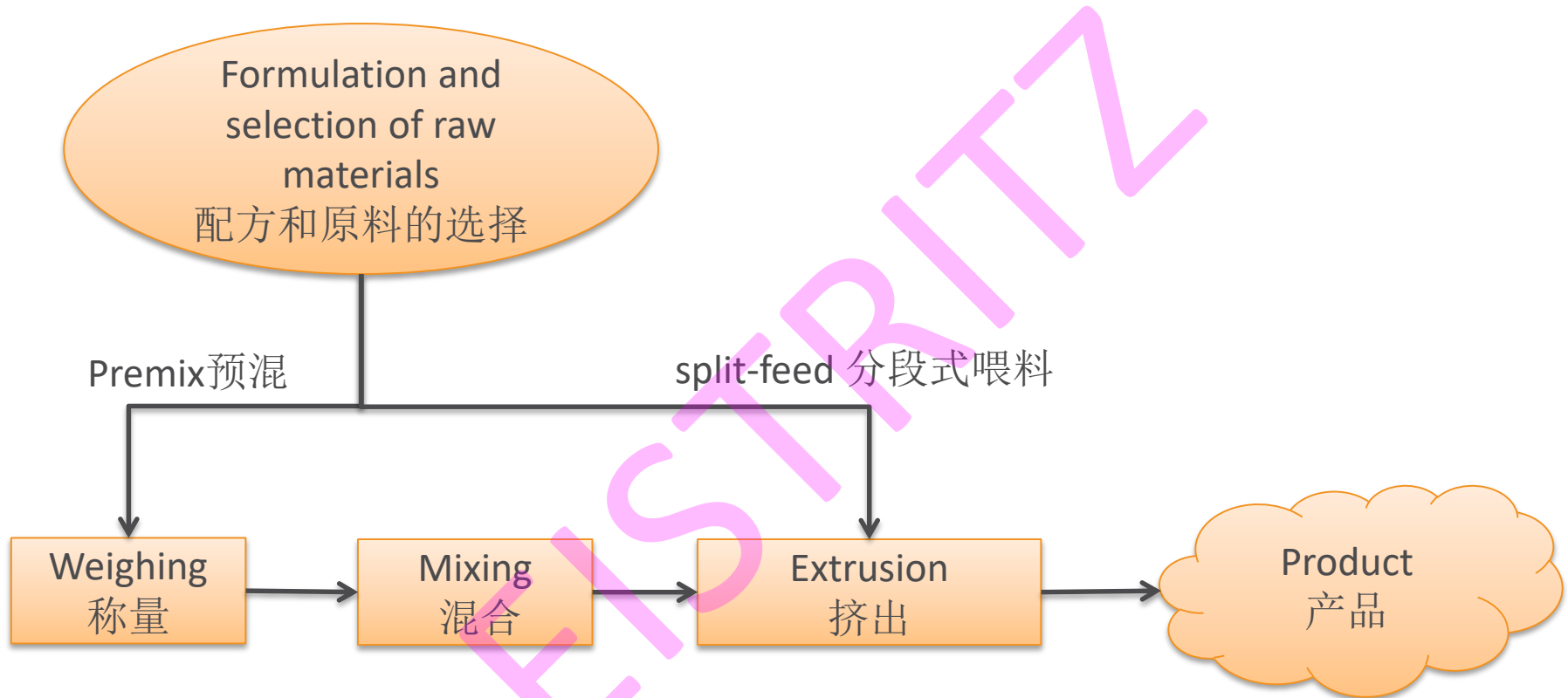


WETTING, DIVIDING AND DISPERSING ...



COLOR MASTERBATCH PROCESS

色母粒工艺



MASTERBATCH PREMIX

母粒预混工艺

Leistritz



MASTERBATCH SPLIT-FEED

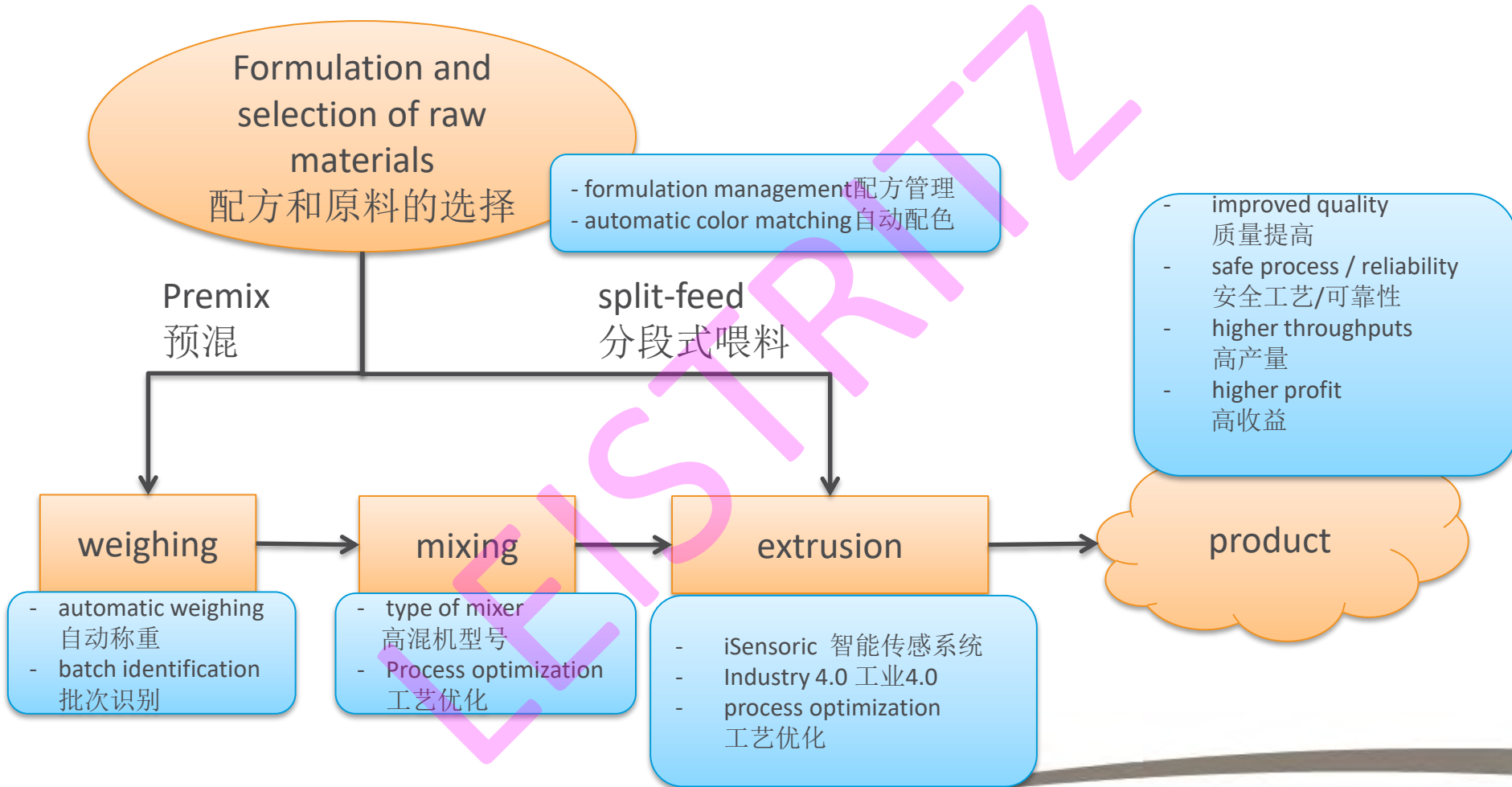
母粒分段式喂料工艺

Leistritz



COLOR MASTERBATCH POTENTIAL

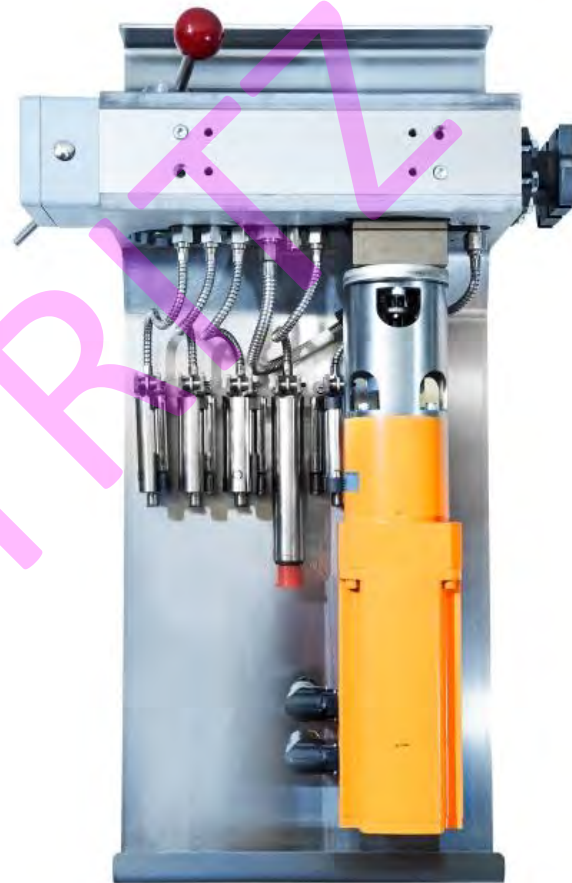
色母粒的潜在可能性



EXTRUDER INDUSTRY 4.0

挤出机工业 4.0

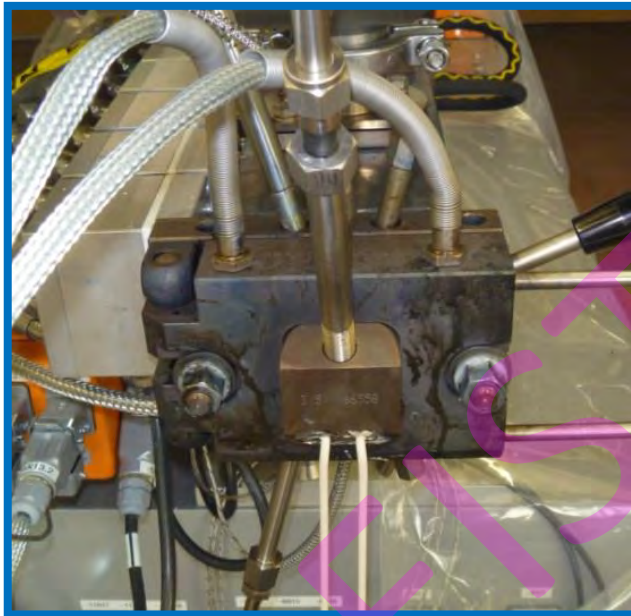
- Leistritz Elongational Rheometer
Leistritz拉伸粘度流变仪



EXTRUDER INDUSTRY 4.0

挤出机工业 4.0

➤ ColVisTec Color Measurement 光波在线测量



© ColVisTec



THANK YOU FOR LISTENSING!!!

