

# Cosmetic Production Technology from Tetra Pak 利乐化妆品生产技术





# Tetra Pak Processing 利乐加工业务



Dairy



Beverage

Cosmetics



Powder &  
Cheese

Ice cream



Prepared food





# Committed to Cosmetics 化妆品业务

- Proven performance and quality in Cosmetics since 1986  
1986年进入市场，提供整体解决方案和设备
- 21 countries in Asia, Oceania, Europe and the Americas  
业务覆盖亚太、大洋洲、欧洲和美洲等21个国家
- A superior product with clear technical benefits  
高质量产品和专有技术
  - Backed by local engineering and process expertise  
本地化技术团队
  - Round-the-clock local service  
及时的售后服务





# Product Portfolio – 产品系列

Systems 系统/方案	Products 单机/部件	Automation 自动化	Services 服务
Tetra Almix Delta Pilot	Dispersers/Mixers	Tetra Plant Master	Mechanical & Electrical Installation
Tetra Almix Delta Module	Mixing Vessels		Commissioning & start up services
Tetra Almix Dynamics	Process & Storage Tanks		Technical Service
Tetra Almix Delta Plant	CIP		e-Business
	Control Cabinets		Systems Upgrades
	Components		Training and Expertise





# Tetra Almix Delta Family





# Tetra Almix Delta

## Broad Application 广泛的应用范围

- Hair care 护发:  
colour creams, conditioner, shampoos, relaxers,  
pomades, styling products  
染色, 护发素, 洗发露, 润发油, 烫发产品, 塑发产品
- Skin care 护肤:  
creams, sun care, lotions, ointments, moisturizers,  
peelings  
润肤露, 防晒霜, 润肤液, 油(药)膏, 锁水露, 去角质膏
- Others 其它:  
bath&shower products, dental care, colour cosmetics,  
lip sticks, more...  
洗浴产品, 口腔保健产品, 彩妆, 唇膏.....





# Tetra Almix Delta

## Unique Concept & Technology – 独有的加工理念和技术

- **Modularized Design 模块化设计**
  - ✓ full compatible with existing recipes 配方管理
  - ✓ easy up-scaling from pilot to full scale 易于生产规模升级
  - ✓ shortest installation 现场安装
- **Guaranteed performance 提供性能保证**
  - ✓ proven solutions 方案验证
  - ✓ skid mounted 标准模块组装
  - ✓ full-scale factory pre-tested 出厂前预组装与预测试
- **CODE<sup>3</sup> technology CODE<sup>3</sup> 技术**
  - ✓ Patent: Cold-direct emulsification 专利技术
  - ✓ Highest flexibility with H/H + H/C + C/C 高的生产灵活性
  - ✓ flexible batch sizes 批次处理
  - ✓ adoptable to all formulations 适用于所有配方



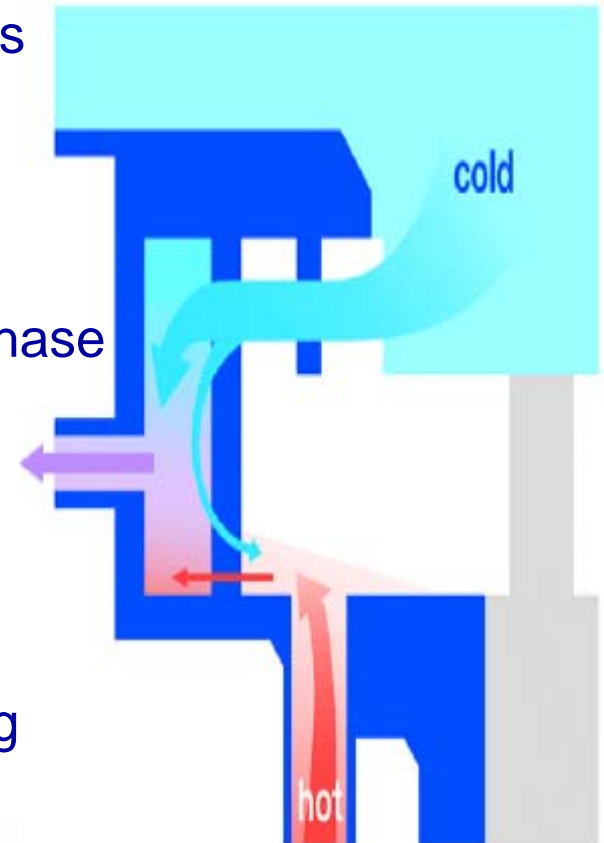




# Tetra Almix Delta

## Patented CODE<sup>3</sup> Technology 专利技术

- Patented hot/cold mixing technology shortens batch times by up to 66%  
专利热/冷混合技术，缩短批次生产时间66%
- Significant energy savings 节约能耗
- ✓ enables direct emulsification of hot oil/wax phase into cold water phase  
热油/蜡与冷水直接混合乳化
- ✓ No need to heat main phase  
无需加热主液相
- ✓ No need to cool the final product before filling  
无需在灌装前冷却成品

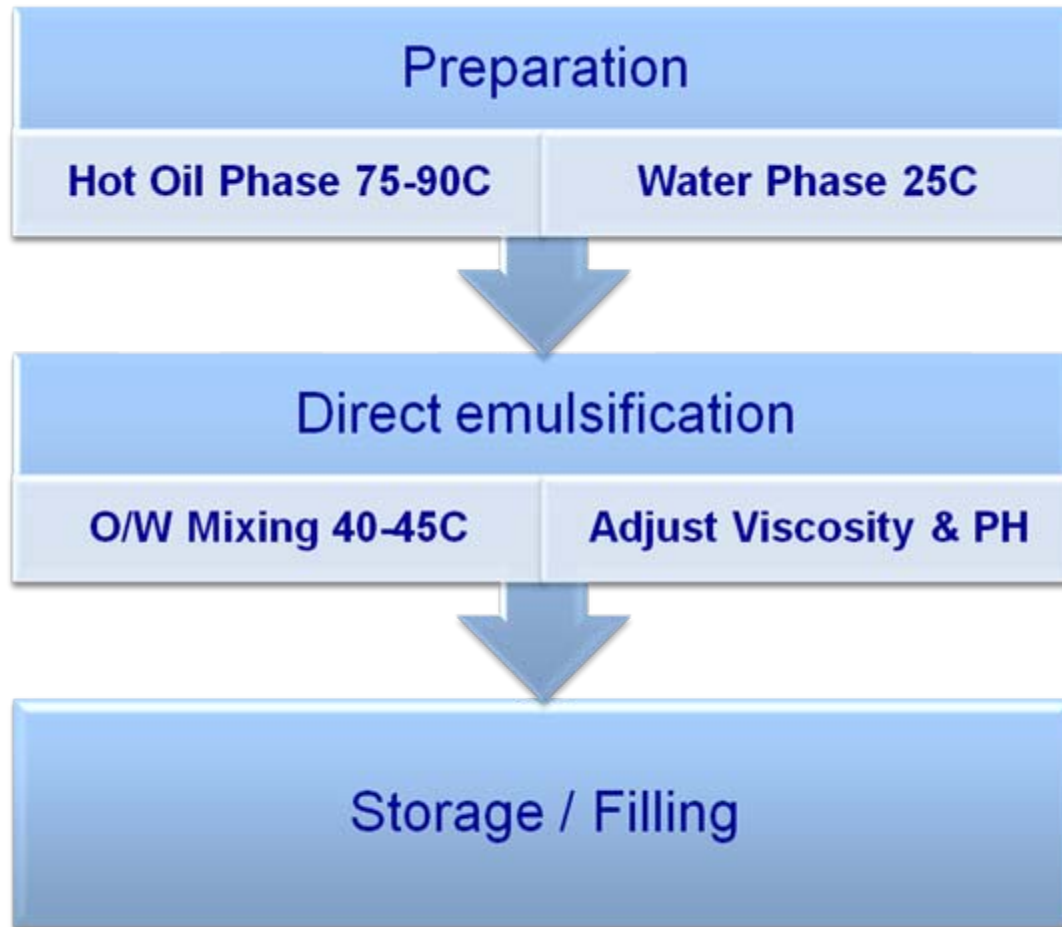






# Innovative Hot-Cold emulsification

## 创新的Hot-Cold乳化工艺



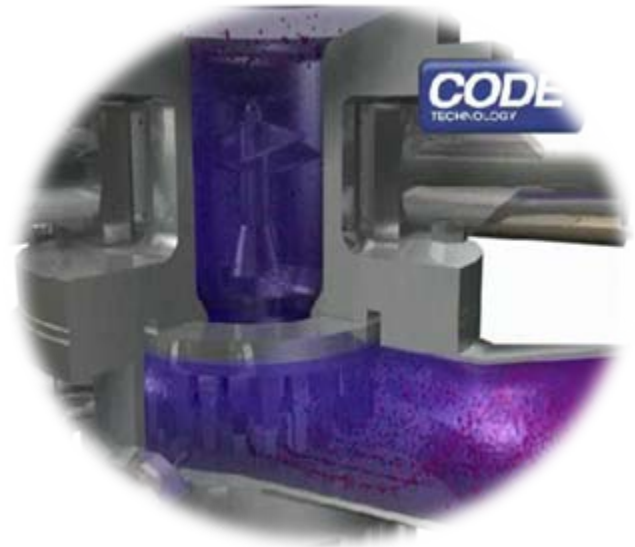
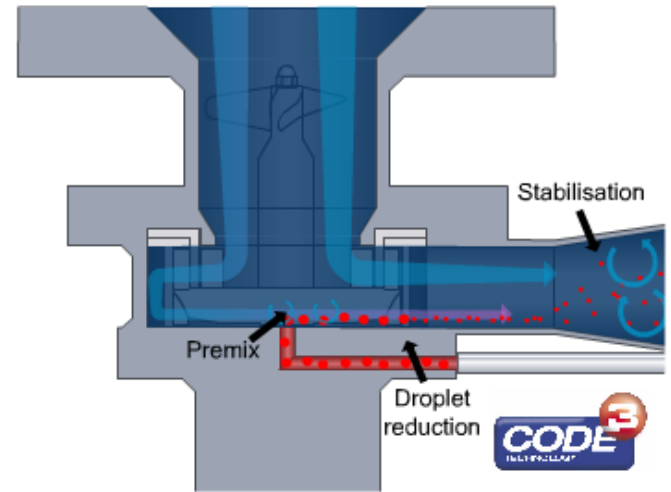
No need to heat main phase 无需加热水相



# Why is it possible to make cold-direct emulsion?

## Tetra Almix Delta是如何实现冷乳化的?

- Using specially designed inline homogenizer with premix chamber in the high shear region (patented design)  
专利设计的均质机预混腔
- Hot oil phase is injected into the chamber, instantly emulsified by part of the cold water phase  
油/水相直接在预混腔进行乳化
- The chamber only allows part of water phase to be mixed with hot oil phase, keeping the chamber warm enough for emulsification to take place  
预混腔内乳化温度的控制

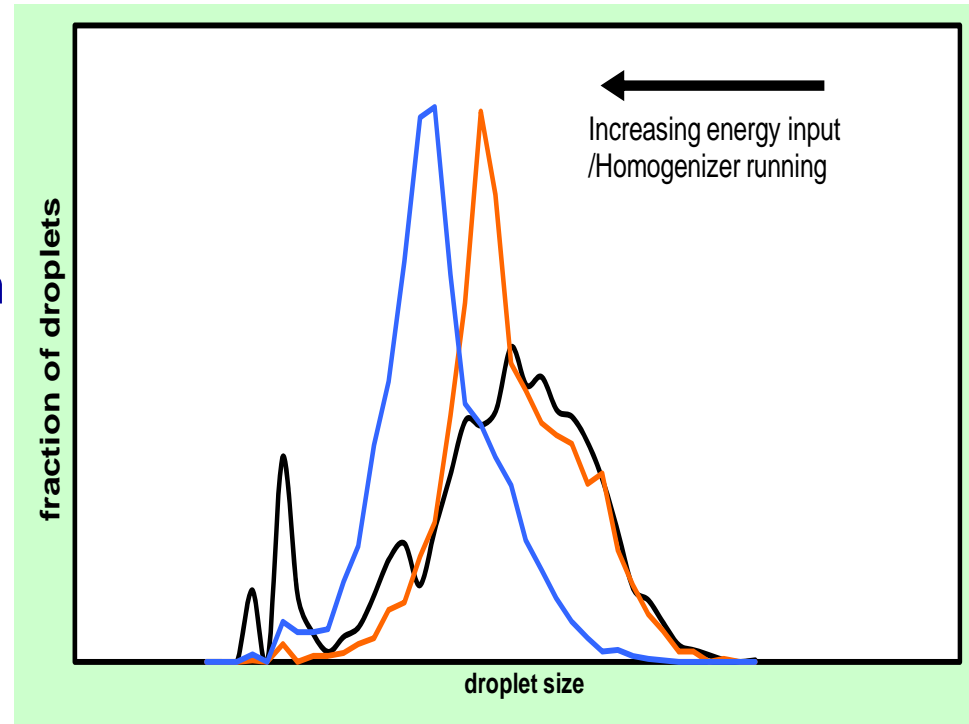




# Secrets of success of CODE<sup>3</sup> technology

## CODE<sup>3</sup> 冷乳化技术成功的关键

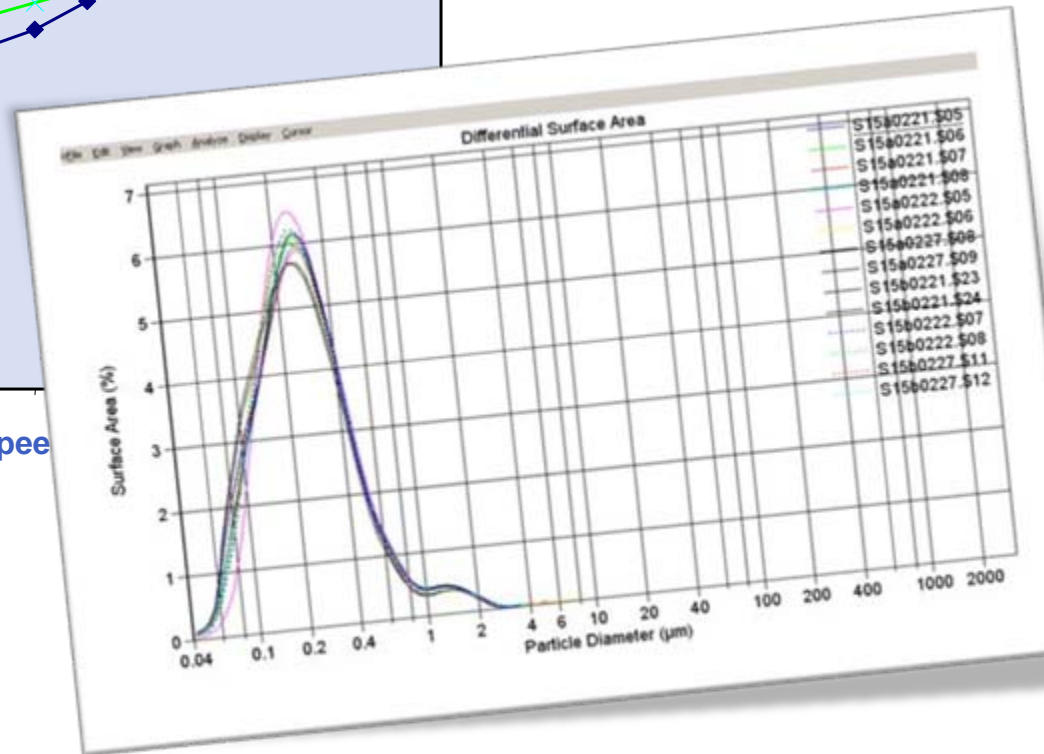
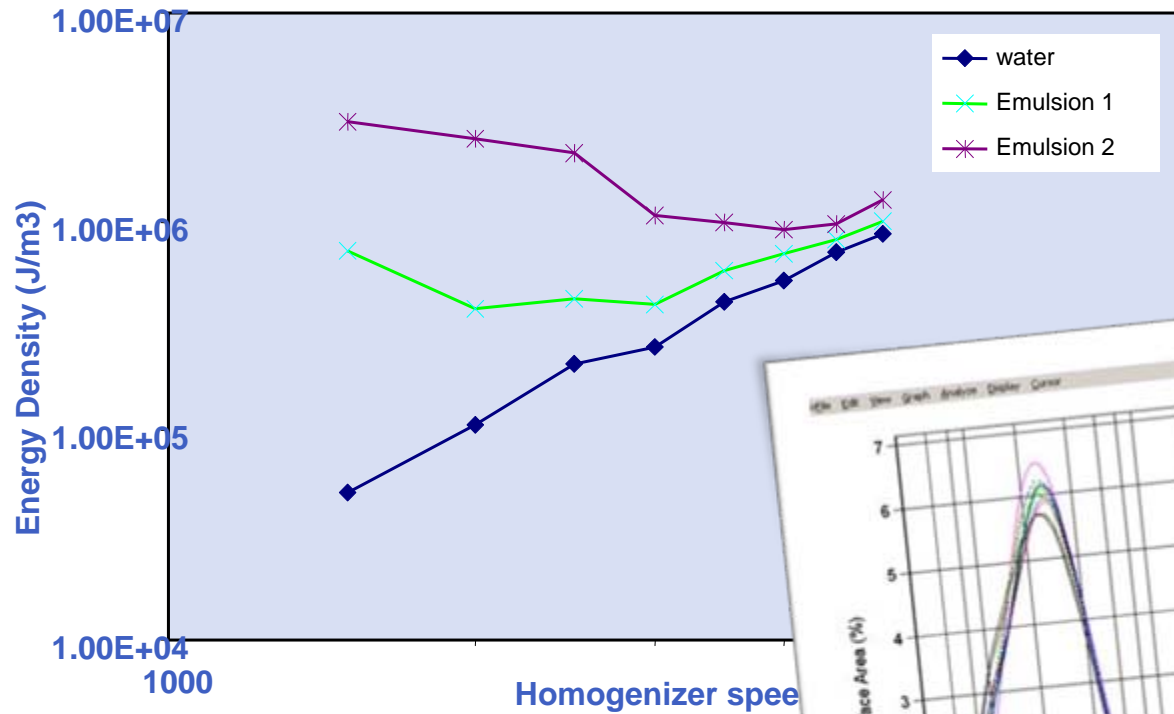
- Correct temperature profile  
(no shock cooling)  
准确的温度控制
- Correct energy density  
(right particle size and uniform distribution)  
准确的均值强度
- Correct timing  
(in pre-mix, dispersion and stabilization)  
准确的均值时间





# Energy Density and Drop Size Distribution

## 能量密度和粒径分配







# Comparison on Features

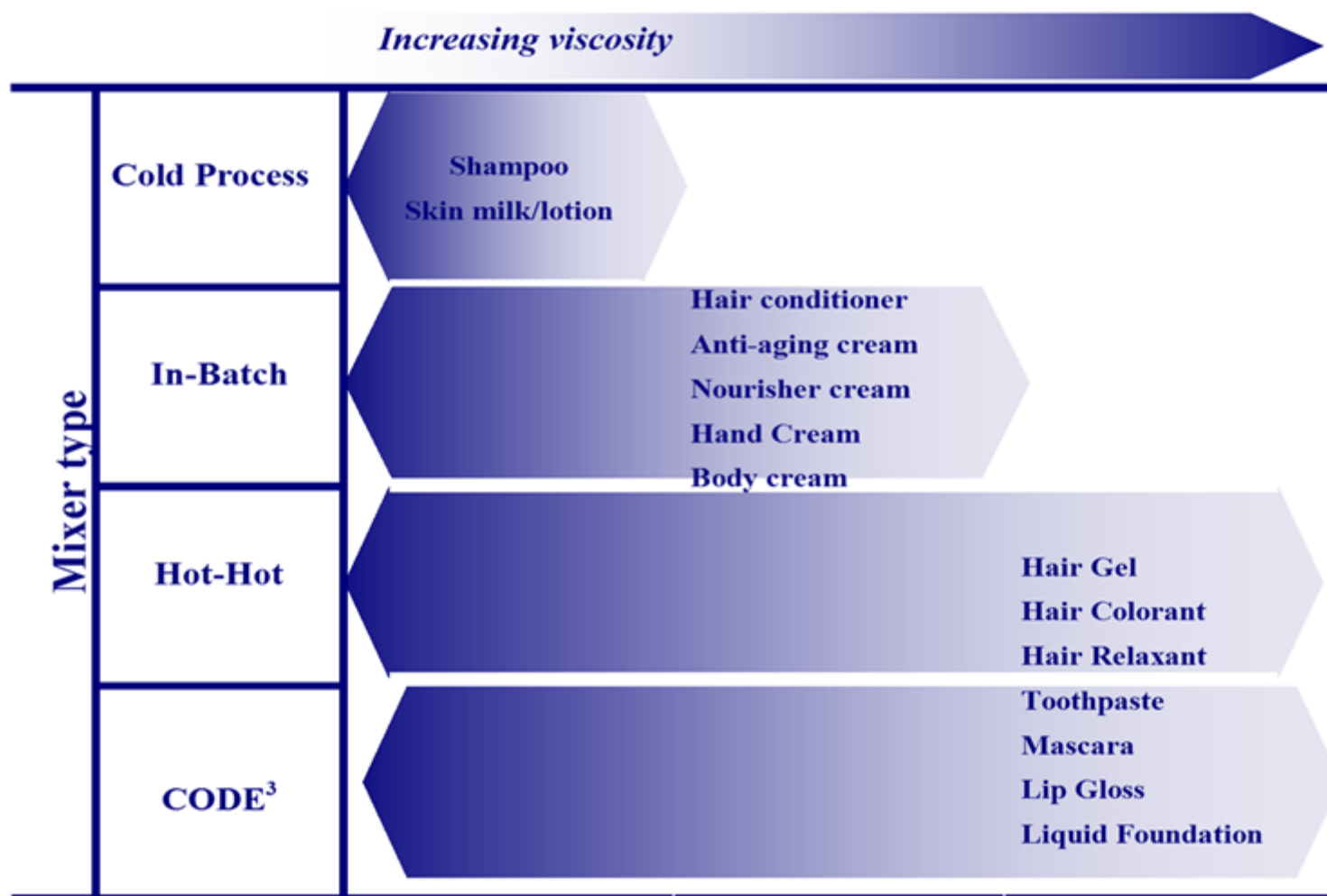
## 不同加工工艺的综合比较

Feature 特性	Cold 冷	Hot-Hot 热-热	CODE <sup>3</sup>
Investment 投资	\$	\$\$	\$\$\$
Energy consumption 耗能	similar	similar	lower
Batch time 批次时间	similar	similar	lower
Viscosity 黏度	<8000 cps	up to 70,000 cps	up to 70,000 cps
Product loss 产品损失	medium	medium	medium
Drop size 粒径尺寸	< 2 micron	2-5 micron	< 1 micron



# Comparison on Processing Scope

## 处理产品范围的比较

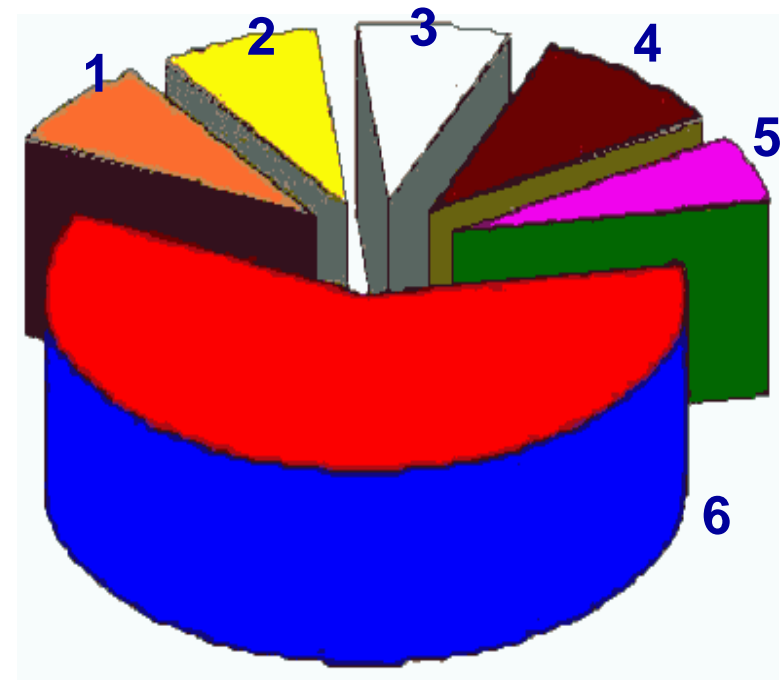




# Time consumption 时间的消耗

## Conventional technology (Hot-Hot) 传统热乳化工艺

No	Steps	Ratio
1	Emptying 排空	8%
2	Cleaning (CIP) 清洗	8%
3	Preparation 准备	8%
4	Heating 加热	10%
5	Emulsification 乳化	6%
6	Cooling 冷却	60%

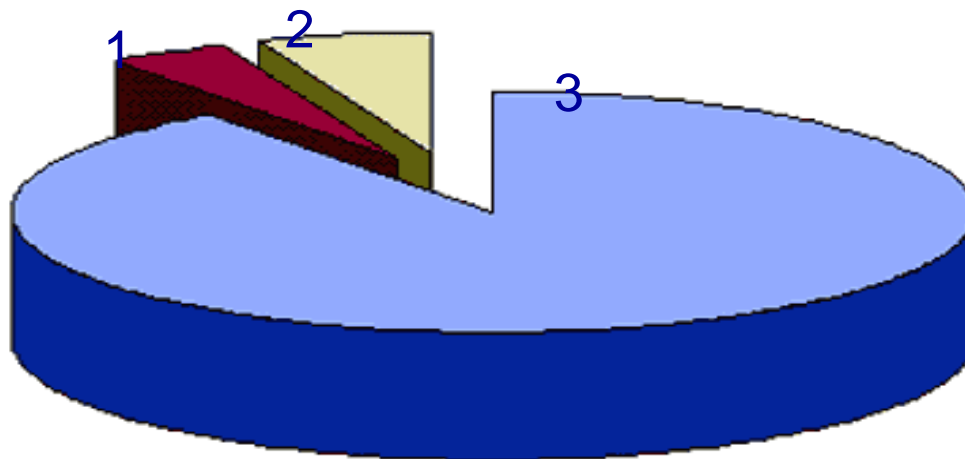




# Energy consumption 能耗

## Conventional technology (Hot-Hot) 传统热乳化工艺

No	Steps	Ratio
1	Homogenizing (electricity) 均质	4%
2	Mixing (electricity) 混合	6%
3	Thermal 加热	90%



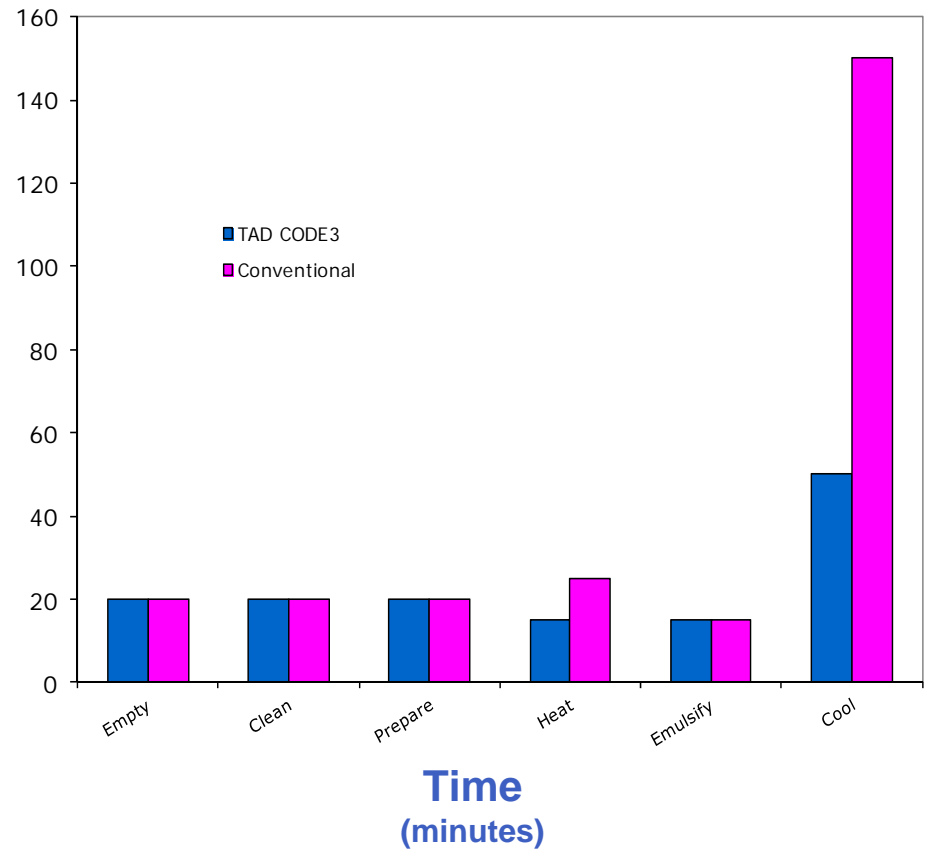
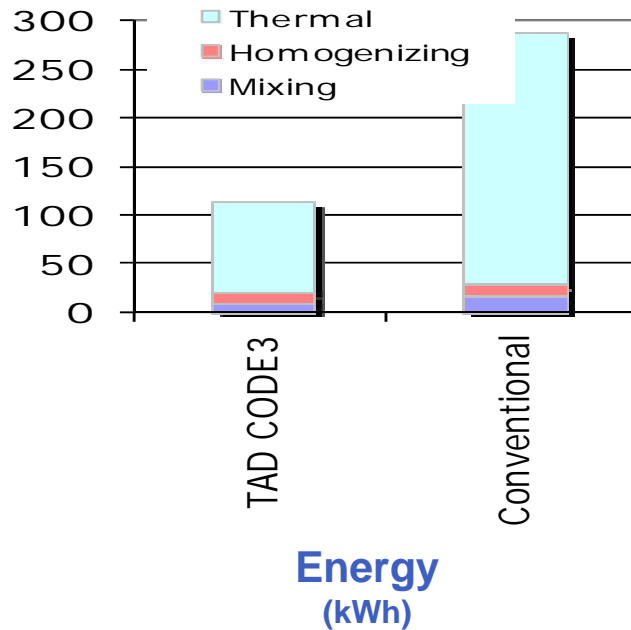




# Energy and Time comparison Conventional vs. CODE<sup>3</sup>

## 能耗和时间比较

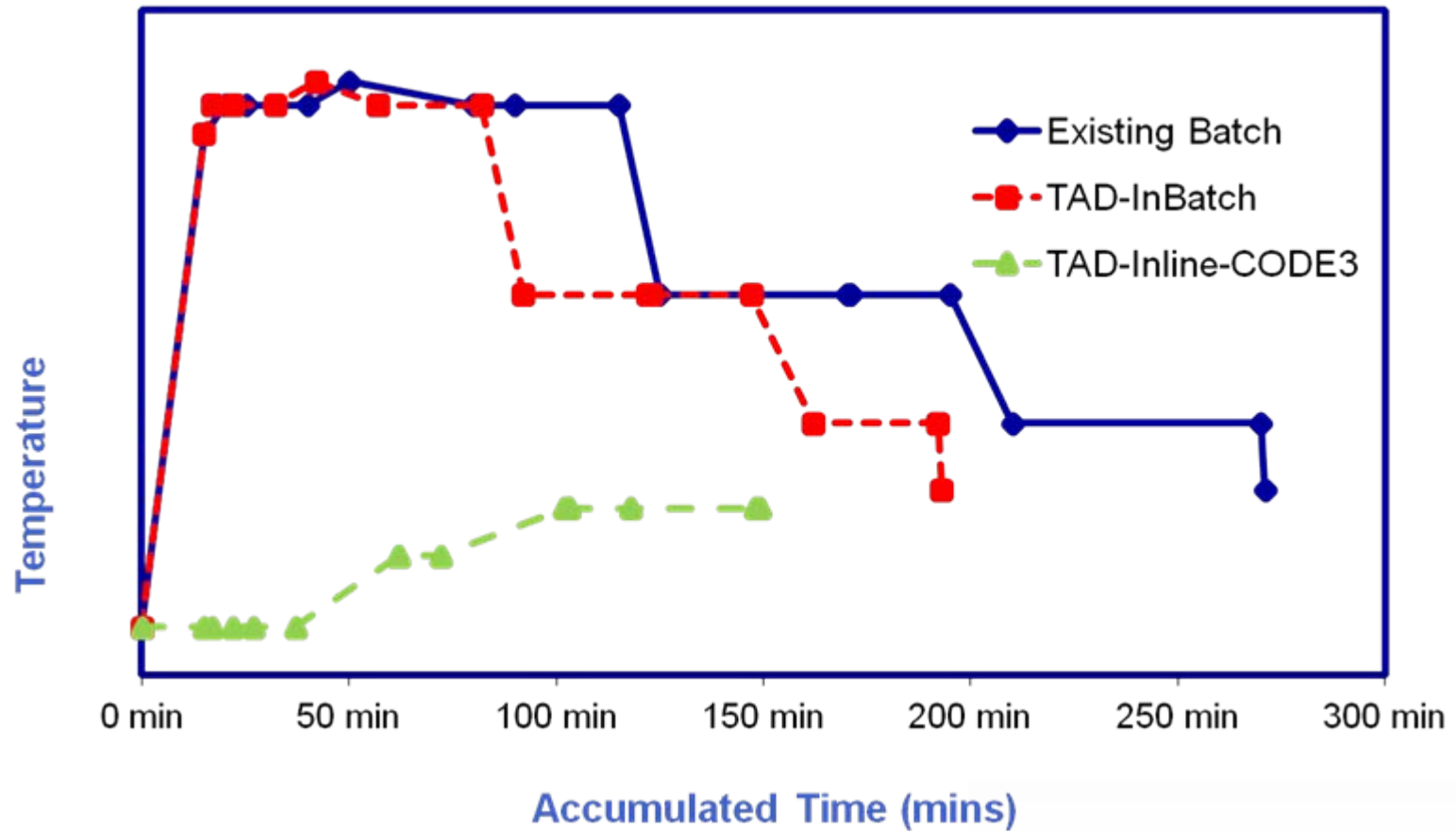
Example:  
Hair colorant (1.5 ton Batch)





# Batch Time Comparison

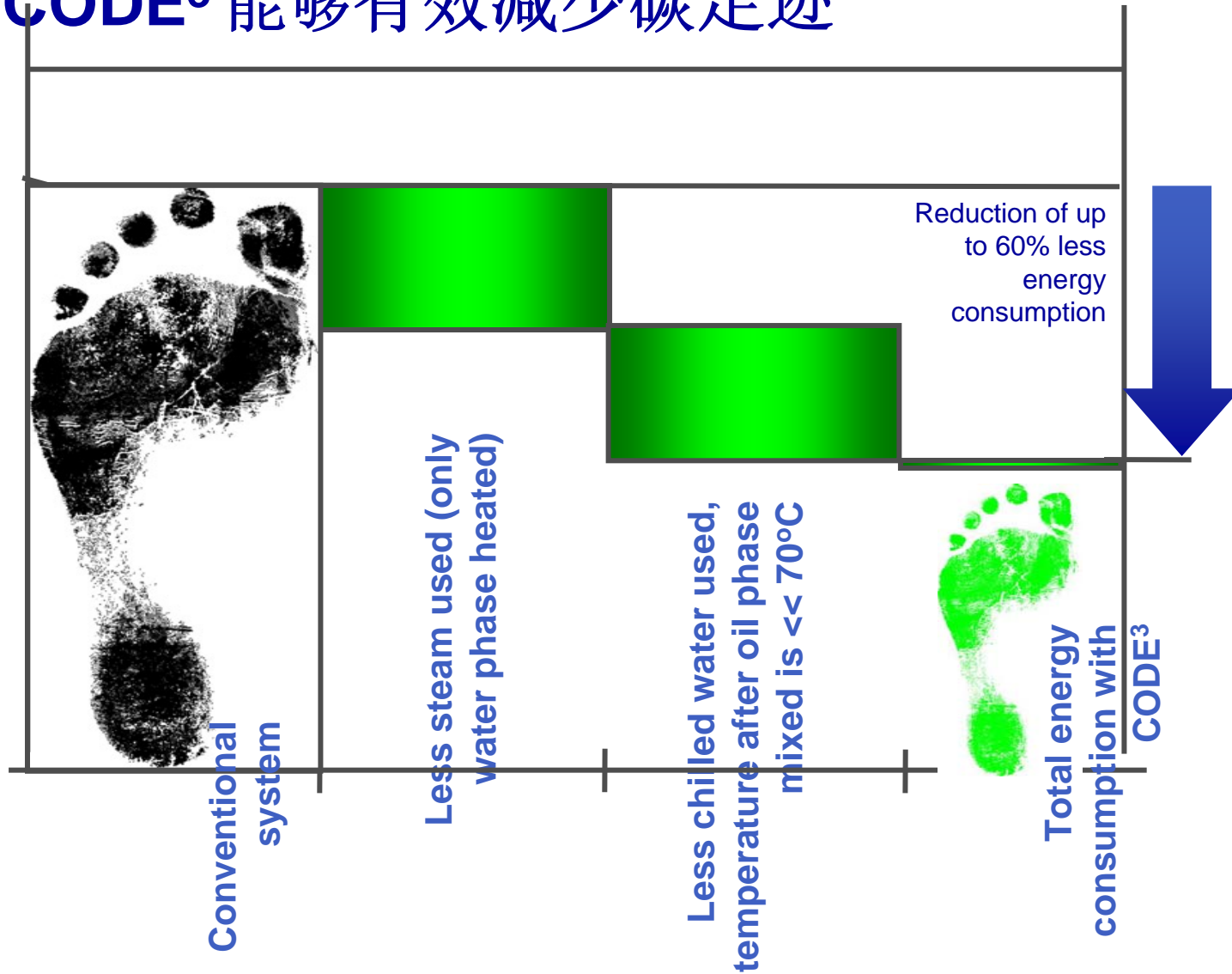
## 生产效率的比较





# Smaller Carbon Footprint

## CODE<sup>3</sup> 能够有效减少碳足迹





# Example of Potential Savings 实例

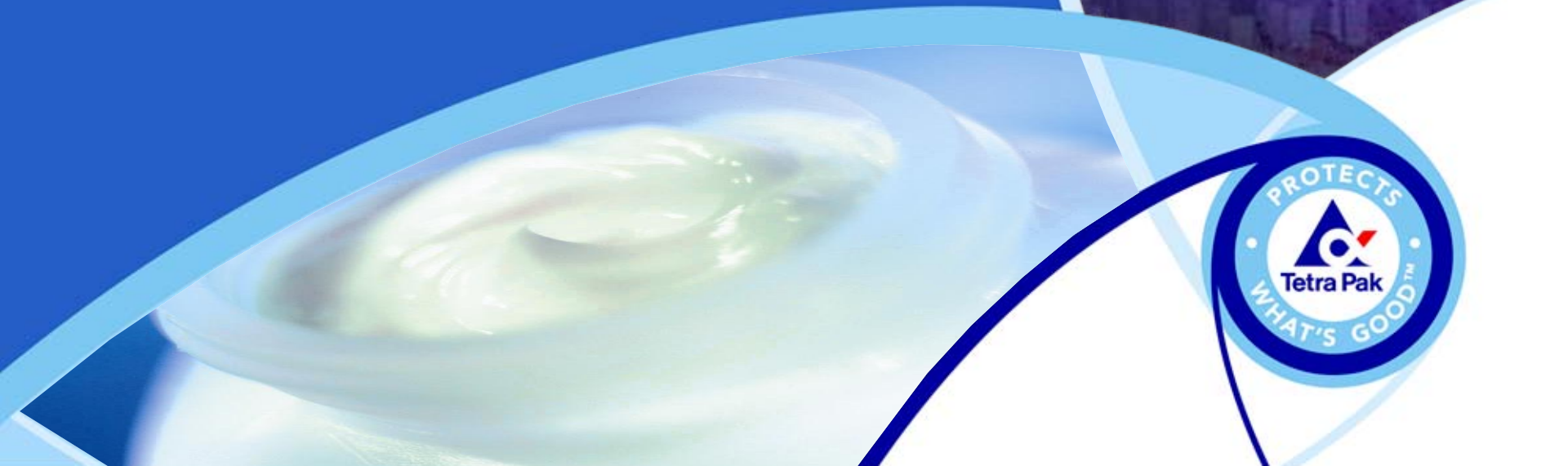
by Comparing 6 T/day of Lotion Manufacturing Using Conventional vs CODE<sup>3</sup> Processes

Conventional	Cold-direct	Potential Savings
Bigger vessel due to longer batch time	Smaller vessel with shorter batch time (2/3 smaller)	Significant investment cost
Need to use more expensive diluted version of surfactant (SLES)	Can use cheaper concentrated surfactants (SLES) without problem in mixing it.	20,000 USD/year in savings through cheaper raw materials.  No need for separate dilution unit.
May need more expensive type of viscosity adjuster for smooth dispersing.	Cheaper version viscosity adjuster can be used with no problem in dispersing.	36,000 USD/year in savings through cheaper raw materials.
More energy consumption for electricity, heating/cooling and longer batch time.	Less energy consumption for electricity, heating/cooling and shorter batch time.	25,000 USD/year in savings through lower energy/electricity bill



# Key Components of Tetra Almix Delta TAD的关键部件

Wang Yue  
Tetra Pak China





# High Shear Homogenizer 高剪切均质机

All TAD modules are fitted with high shear homogenizer of either these type:

所有TAD模块适合以下高剪切均质机

- In-batch homogenizer 批次均质机

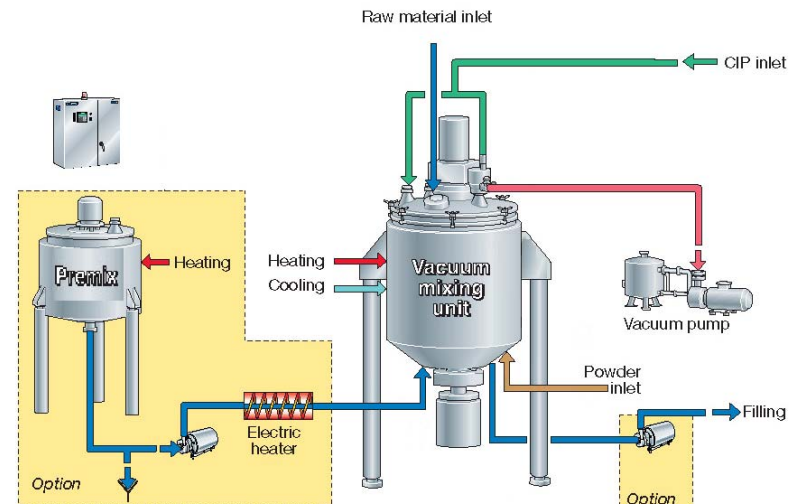
✓ TAD Inbatch

- In-line homogenizer 在线均质机

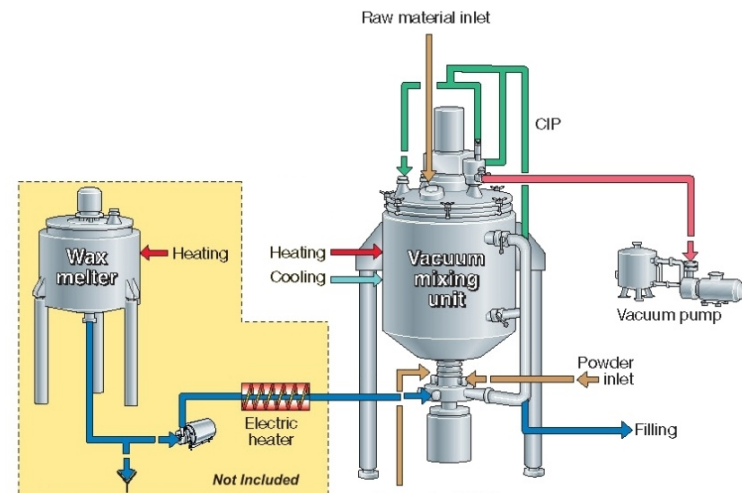
✓ TAD Cold

✓ TAD Hot-Hot

✓ TAD CODE<sup>3</sup> (Hot-Cold)



InBatch Configuration



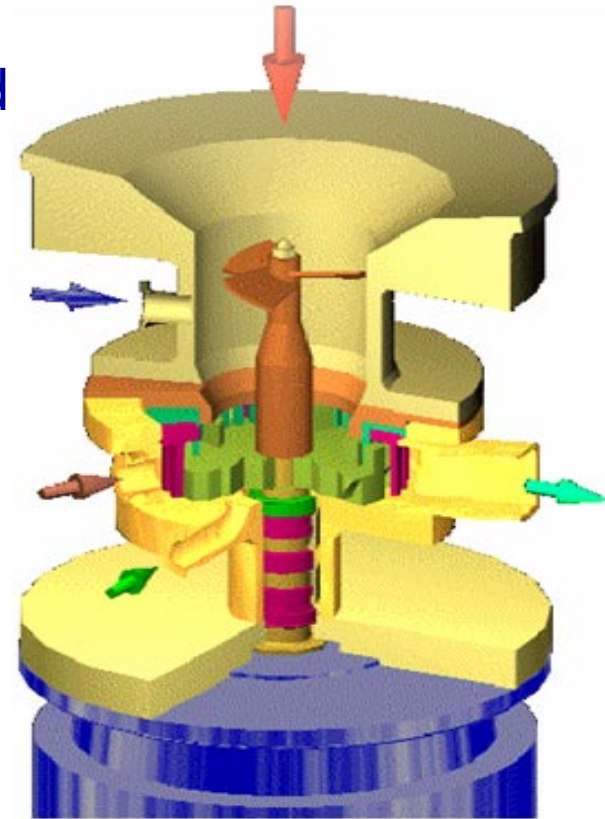
InLine Configuration



# Features of Tetra Pak homogenizer

## 利乐均质机的工作特性

- Controlled pressure difference routes cold stream into sub-rotor chamber  
在一定的压力差下产品进入转子轴腔
- High turbulence generates premix  
剧烈的产品湍流产生预混和
- Extreme shear forces in the narrow rotor/stator gap emulsify the premix  
狭小的转子轴缝隙内生高剪切力，实现对预混料的乳化





# Vessel design for Tetra Almix<sup>®</sup> Delta

## 压力容器设计

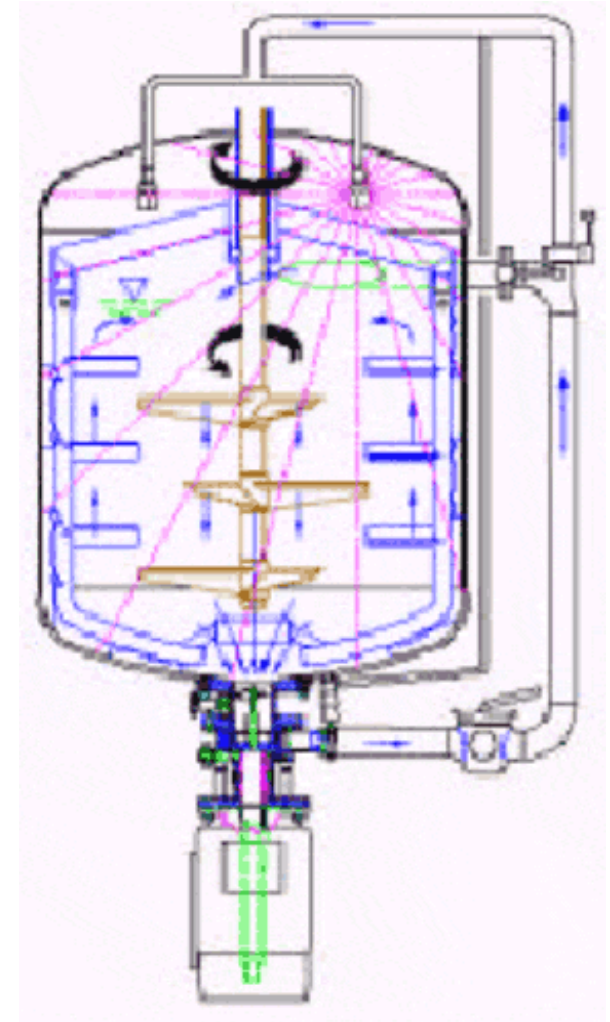
- Capacity产能: 100 to 20,000 liter
- Viscosity黏度: up to 300,000 cps
- Pressure压力: -1 to 3 bar
- Temperature温度: 0 to 125° C

### Versatility多功能性:

Design serves both complex and simple formulations, emulsions as well as suspensions.

### Products产品:

Shampoo, conditioner, relaxer, lotions, skin care, sun screens, toothpaste, etc.



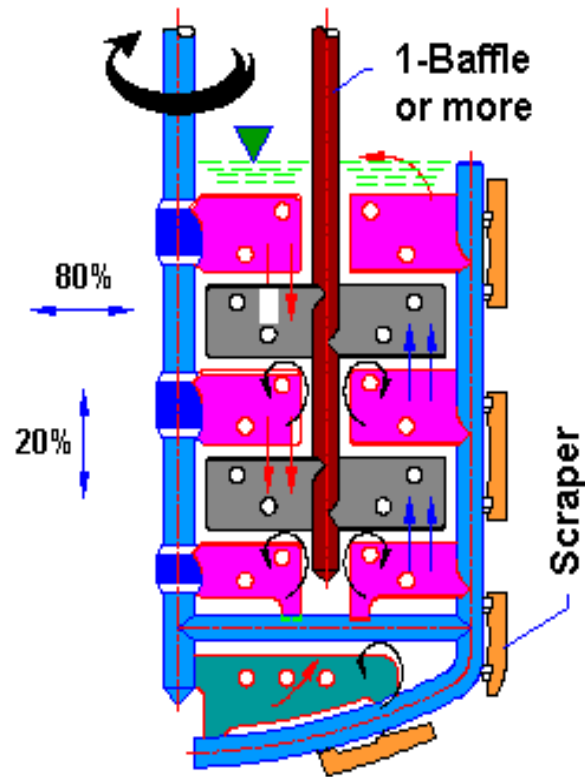




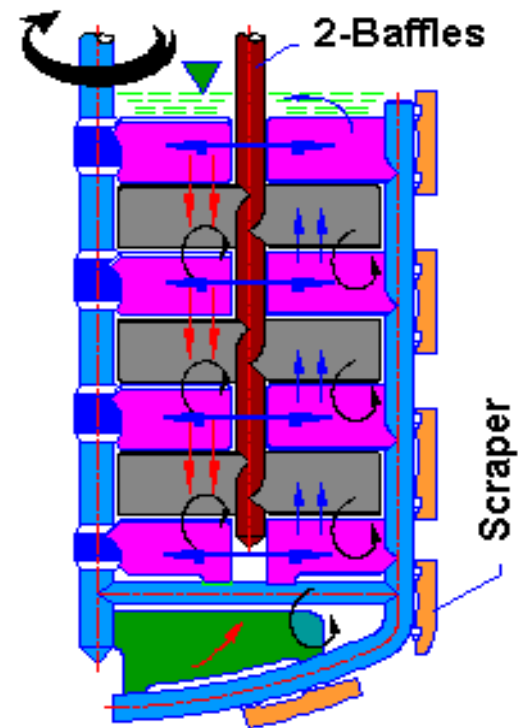
# Mixing and agitating systems

## 混合和搅拌系统

Anchor agitator with  
(perforated) baffles



Agitator with mating blades





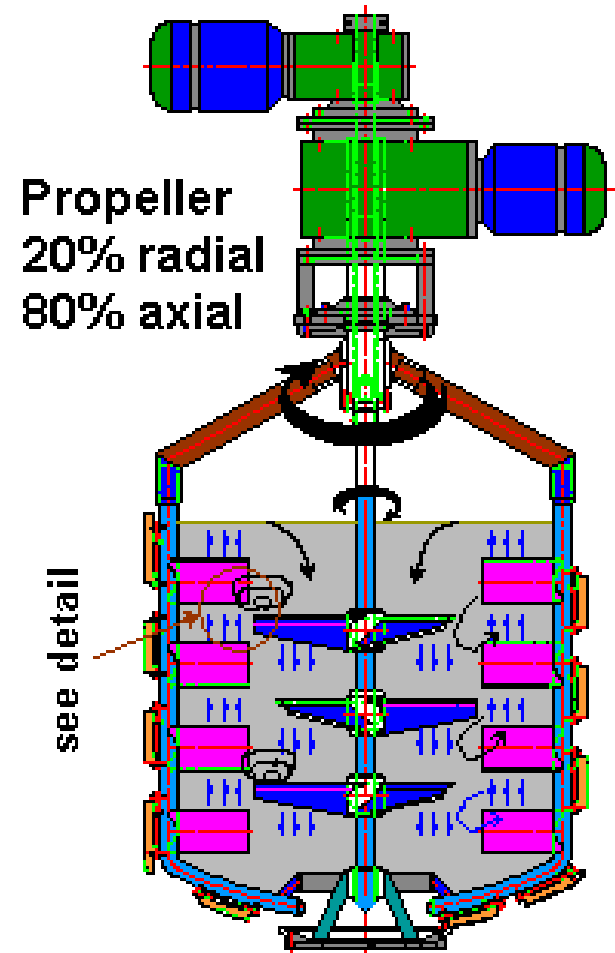
# Mixing and agitating systems

## 混合和搅拌系统

### Counter-rotating agitator

#### 同轴异向搅拌

- The most universal agitation system  
最普遍的搅拌形式
- Able to handle shear-sensitive products  
适用于处理对剪切力敏感的产品.
- Moderate power consumption  
耗能低
- Counter rotating movement gives high vertical velocity is achieved, enabling fast dispersion of any materials added.  
同轴异向搅拌加快产品垂直移动速率，使加入的原料迅速均匀扩散





# Automation platform of Tetra PlantMaster® 自动化平台

- Open ISA S88 standard S88标准的应用
  - Recipe management 配方管理功能
  - Product scheduling 生产计划
  - Batch control 批次控制
  - Full traceability (Work Tracking) 追溯功能
  - Full integration of peripheral equipment\* 与外围设备的整合/兼容
  - Upgrade for existing automation systems\* 平台升级
- \*depending on existing structure



***Thank You***

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