



coperion

coperion
K-TRON

The Importance of Accurate Feeding for an Efficient Production Process.

Engineering Plastic Seminar 2024
India

Shalom MJ – Regional Sales Manager

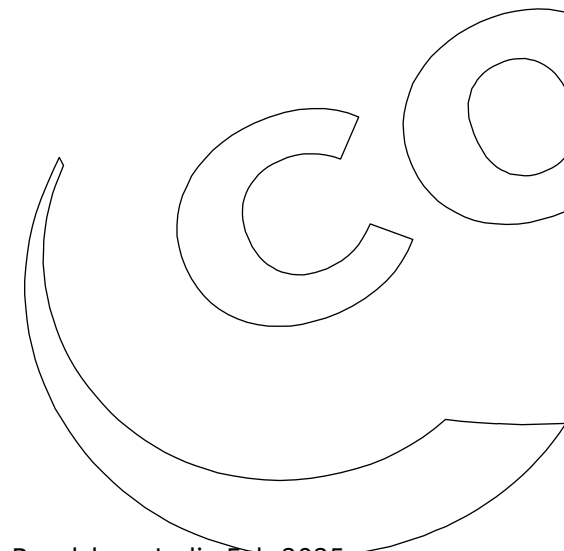
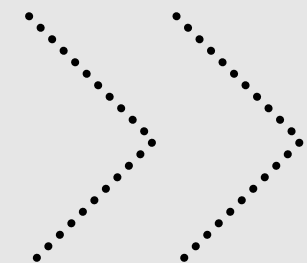
CONTENT

- 1 Introduction
- 2 Products Overview
- 3 Coperion K-Tron Technology
- 4 Smart Features
- 5 Recipe Management and Cost Saving
- 6 Takeaway

Introduction

1

coperion
confidence through partnership



Introduction

Corporate Milestones

- 1900 O. Soder AG is founded in Niederlenz, Switzerland, to manufacture flour mills
- 1949 K-Tron (then still Monsell) is founded in USA, to manufacture pneumatic scales
- 1975 K-Tron acquires Soder AG
- 1997 K-Tron opens representative office in Shanghai, China
- 2001 K-Tron acquires Pneumatic Conveying Systems Ltd.
- 2003 K-Tron acquires Pennsylvania Crusher Corp. and Jeffrey Specialty Equip. Corp.
- 2006 K-Tron acquires Gundlach Equip. Corp. and Premier Pneumatics Inc.
- 2007 K-Tron acquires Wuxi K-Tron Colormax Machinery Ltd. in China
- K-Tron acquires Rader Companies, Inc.
- 2010 K-Tron is acquired by Hillenbrand, Inc.
- 2012 Hillenbrand acquires Coperion
- 2013 Coperion and K-Tron join forces / K-Tron becomes Coperion K-Tron
- 2023 Hillenbrand Acquires Schenck Food and Performance Materials Business

Introduction

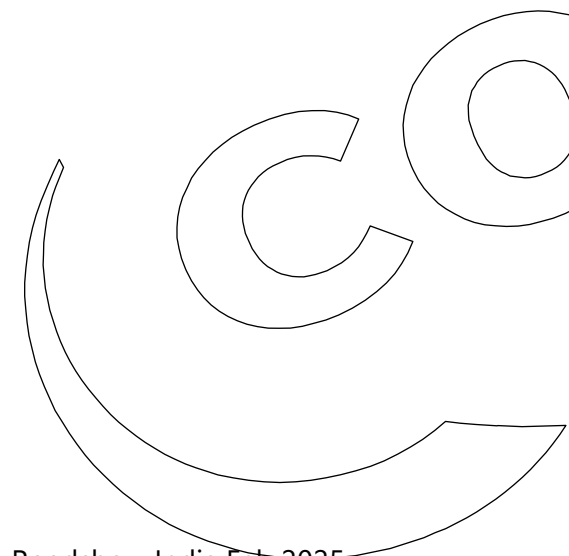
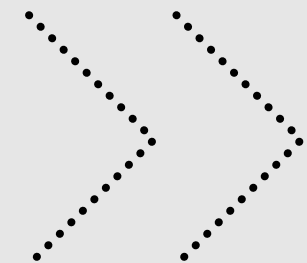
Technology Milestones

- 1972 K-Tron introduces the first digitally controlled belt scale worldwide
- 1976 K-Tron introduces loss-in-weight feeders with digital load cells
- 1989 K-Tron introduces modular feeders with Smart Force Transducers
- 1999 K-Tron introduces SmartConnex Control System and SFT III
- 2003 K-Tron introduces revolutionary Bulk Solids Pump feeding technology
- 2007 K-Tron introduces K-Vision line controller - supporting multiple languages, including Chinese and Japanese
- 2007 K-Tron introduces unique ActiFlow bulk solids activator for loss-in-weight feeders
- 2018 Coperion K-Tron introduces new K-Vision to control 2 lines simultaneously.
- 2018 Coperion K-Tron introduces Vector Duty AC motors along with Drive.
- 2019 Coperion K-Tron introduces new K3 series vibratory feeder and K3 series Pharma feeders
- 2021 Coperion K-Tron launches new version KCM-III. SFT resolution increased to to 1:8000,000 in 20 ms.
- 2023 Coperion K-Tron standardizes AC Servomotors on all motor driven feeders.
- 2023 Coperion K-Tron launches new ProRate Plus Feeder Brand

Products Overview

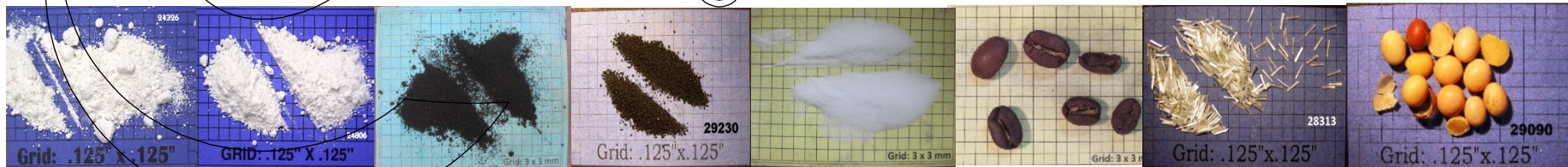
2011

confidence through partnership



Products Overview

Gravimetric Feeders



Products Overview

Pneumatic Conveying Systems and Components

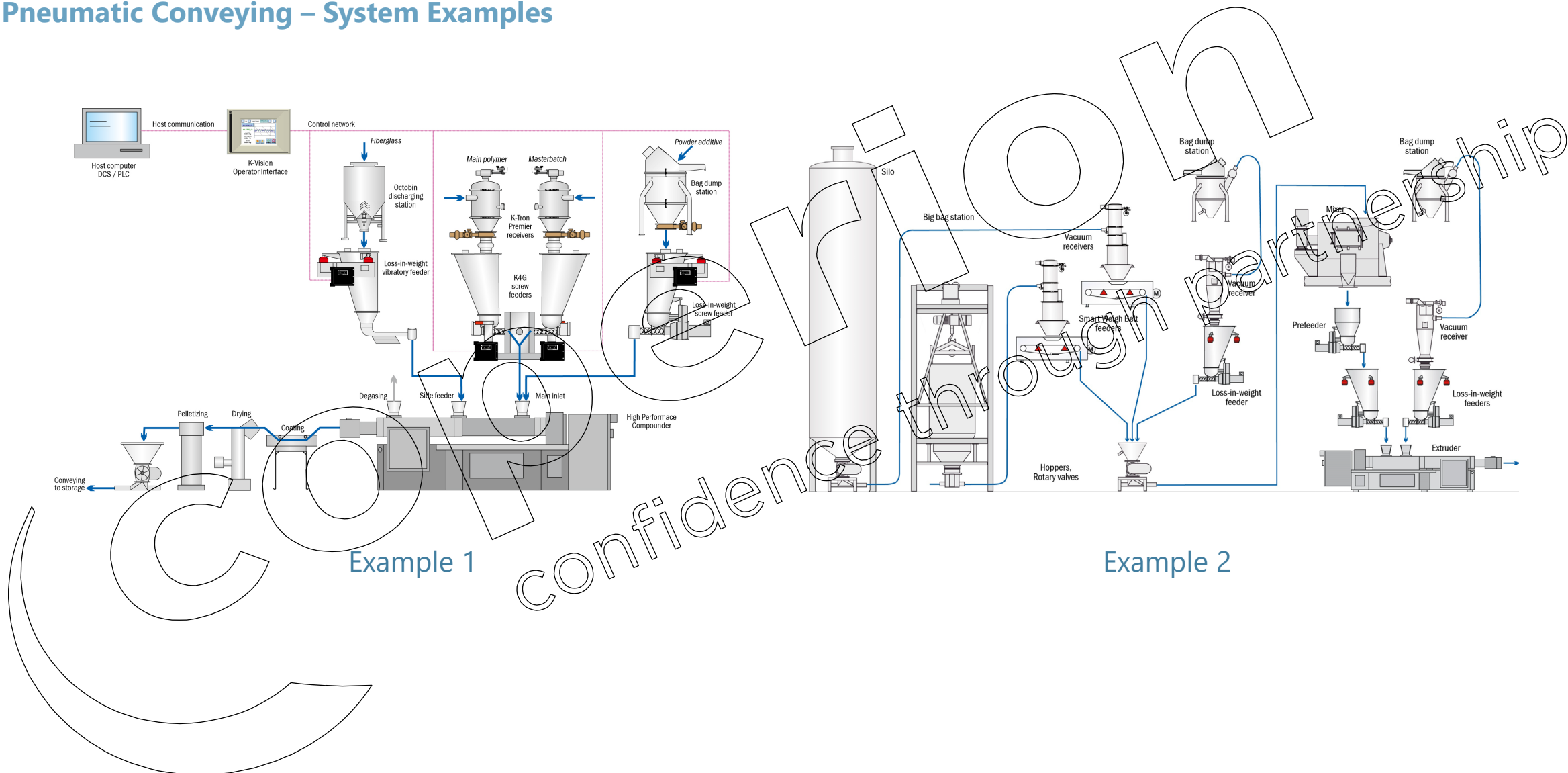
Coperion K-Tron offers a complete range of pneumatic conveying and bulk material handling systems and components for bulk materials like powders, pellets, and granules.

- Pneumatic Refill System for Loss-in-Weight Feeders
- Lean phase vacuum conveying with Series 2400 Equipment or P-Series Equipment
- Lean phase pressure conveying.
- Conveying rates up to 10,000 kg/h



Products Overview

Pneumatic Conveying – System Examples



Products Overview

ProRate Plus – Economic Feeding Solution

The ProRate PLUS Portfolio

Loss in Weight Feeder



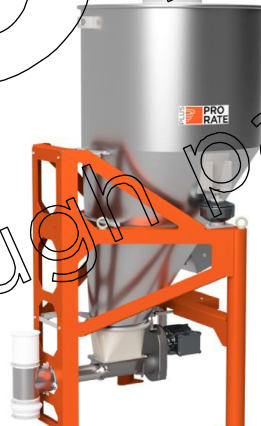
ProRate PLUS-S	
Screws	SAF15 + SAC22
Troughput	2 – 200 dm3/h
Bulk Materials	Granule – free flowing powders
Hopper	15dm3



ProRate PLUS-M	
Screws	SAF46 + SAC46
Troughput	80 – 2100 dm3/h
Bulk Materials	Granule – free flowing powders
Hopper	200dm3



ProRate PLUS-MT	
Screws	TCF33 or TAC33
Troughput	10 – 1800 dm3/h
Bulk Materials	Powders Free – poor flowing
Hopper	95dm3



ProRate PLUS-L	
Screws	SAC56
Troughput	390 – 4800 dm3/h
Bulk Materials	Granule Flakes Fibres
Hopper	400dm3

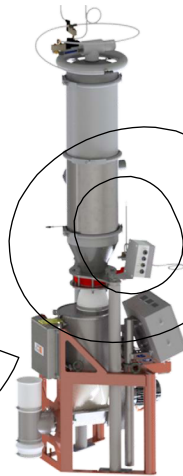
Products Overview

ProRate Plus – Economic Feeding Solution

The ProRate PLUS Portfolio

Vacuum Sequencing Conveying Equipment design to proper refill your feeders

- Automated bulk material transfer
- For powders and pellets
- Fill valves included
- Level indicators included
- All prewired → plug and play



ProRate PLUS-S + Refill



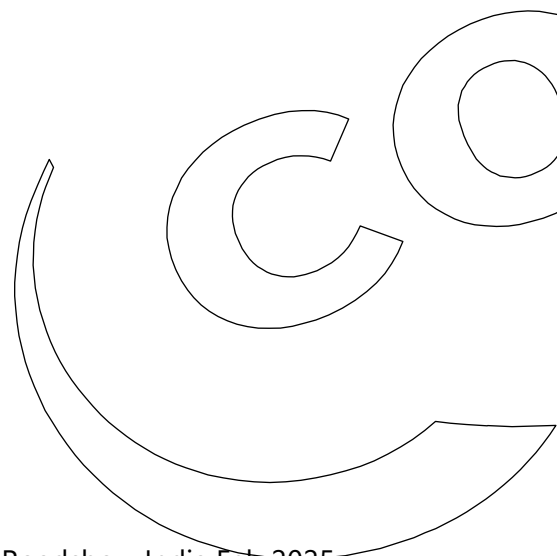
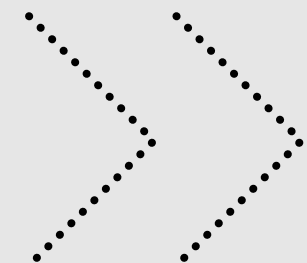
ProRate PLUS-M + Refill



ProRate PLUS-L + Refill

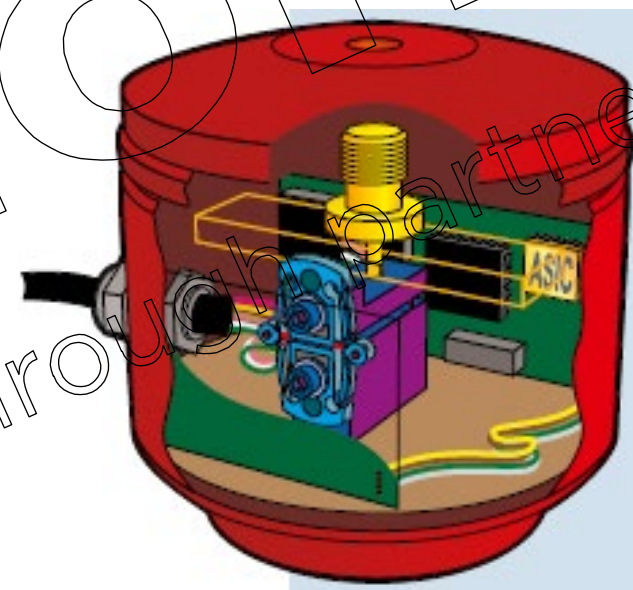
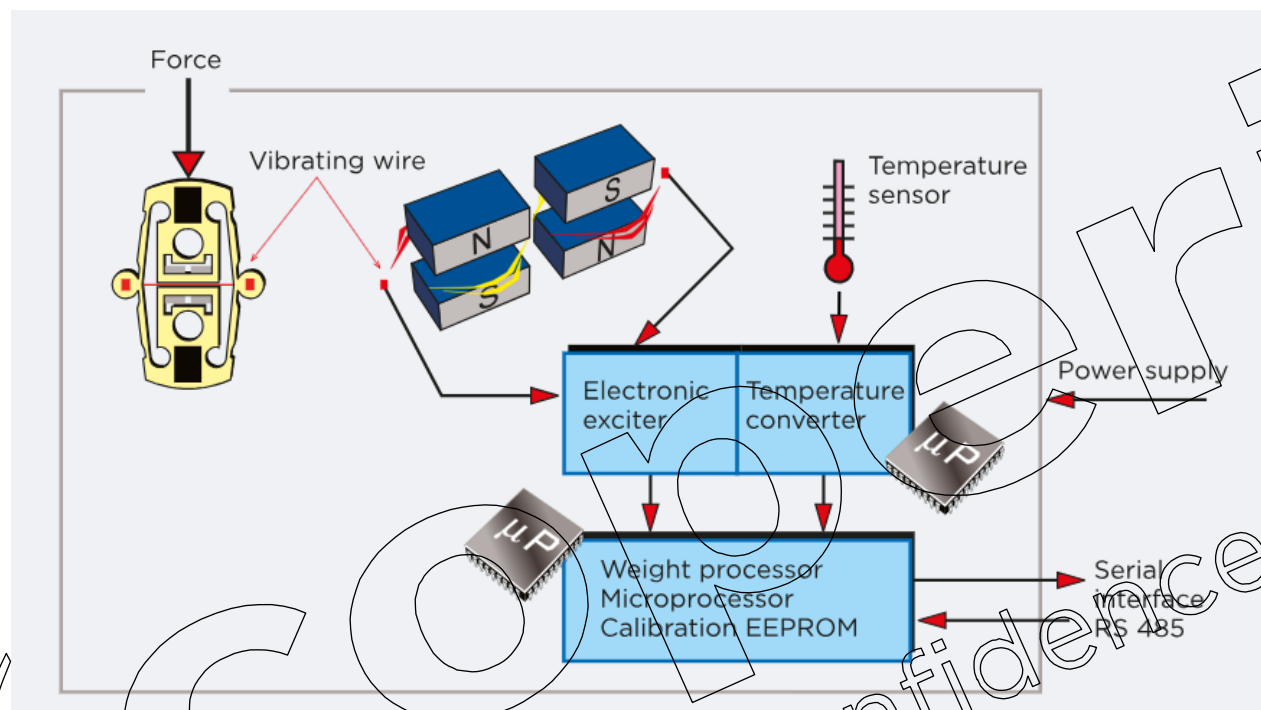


Coperion K-Tron Technology



Smart Force Transducer (SFT)

Coperion K-Tron Fully Digital Load Cell Technology

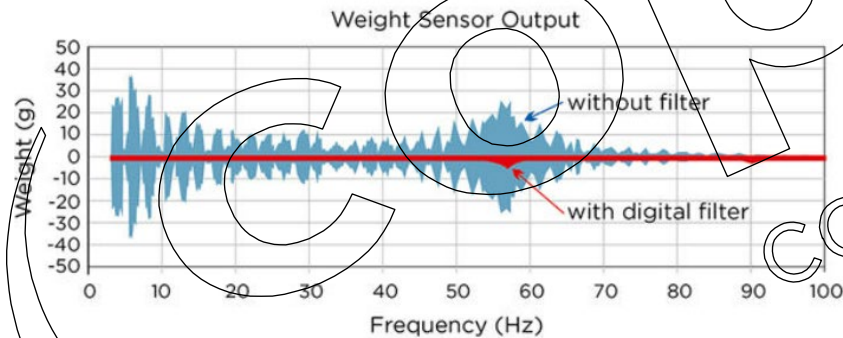


The SFT supplies a fully compensated true weigh signal

Smart Force Transducer (SFT)

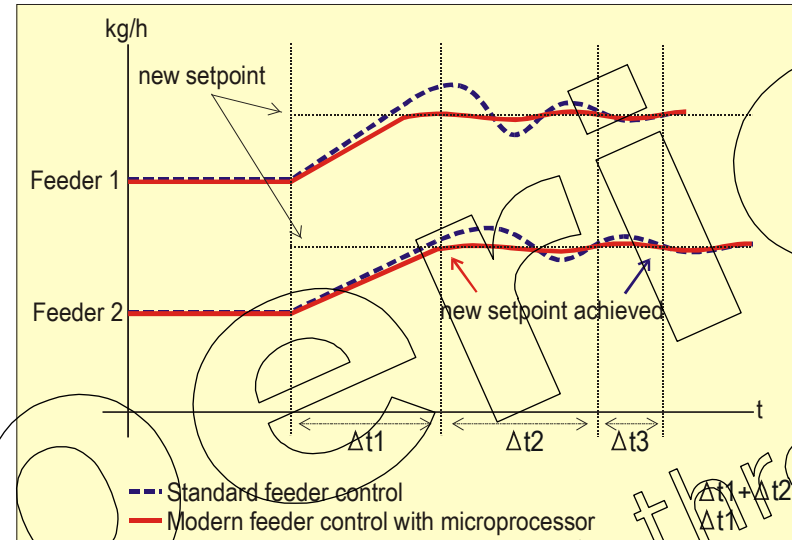
Coperion K-Tron Load Cell Technology

- Vibrating wire measurement technology
- Resolution – 1:8'000'000 in 20ms
- Built-in microprocessor
- One-time calibration at factory
- Noise-free signal transmission
- Fast sampling time (450 samples/sec.)
- High short-term accuracy in any conditions
- Not affected by vibrations



Smart Controllers

KCM III



The feeder controls adjust quickly to setpoint changes

- Advanced CPU to work with SFT Technology
- Integrated AC Servo Drive Board
- Various features:
 - Connectivity options: Ethernet, Profinet, Modbus TCP, etc.
 - Web Interface
 - Optional long term data logging
 - Optional Wi-Fi capability

Load-Cell Technology on ProRate Plus Feeders

Load Cell P-SFT Digital Smart Force Transducer

Experience the benefits of our Smart Force Transducer Loadcell Technology



P-SFT-II-L (2000N)

500,000:1 resolution
50 samples per second



P-SFT-II-M (600N)

Unmatched Accuracy

• Say goodbye to guesswork and uncertainties. Our technology ensures precise force measurements, delivering consistent and reliable results for your critical applications.

Real-Time Insights

• Gain immediate access to real-time force data, enabling you to make informed decisions swiftly and optimize your processes for maximum efficiency.

Enhanced Efficiency

• Streamline your operations with seamless integration and advanced automation capabilities. Our technology simplifies data collection, analysis, and reporting, saving you valuable time and resources.

Future-Ready

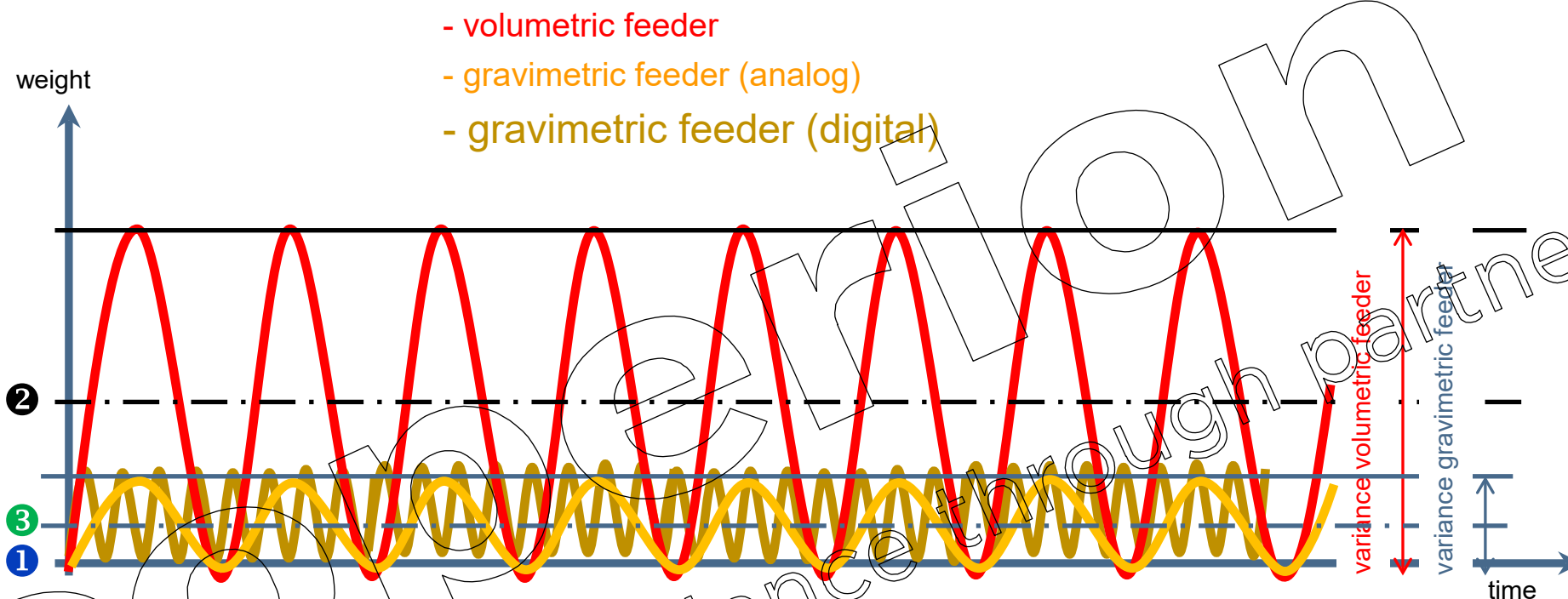
• Stay ahead of the curve with our future-ready technology. We continuously innovate to meet evolving industry demands, ensuring your investment delivers long-term value.

ProRate PLUS

Don't settle for outdated measurement methods. Embrace the future of force transducer loadcell technology with our Smart Force Transducer Loadcell Technology.



Feed Control Representation



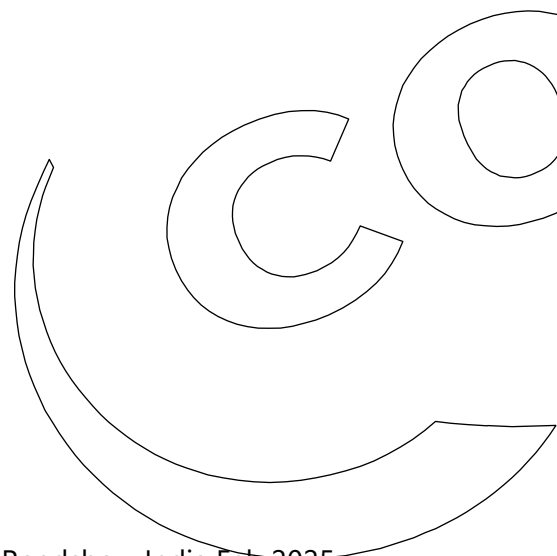
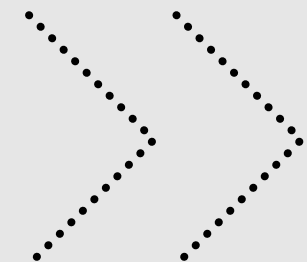
① theoretical setpoint – (minimal value)

② setpoint volumetric feeder

③ setpoint gravimetric feeder

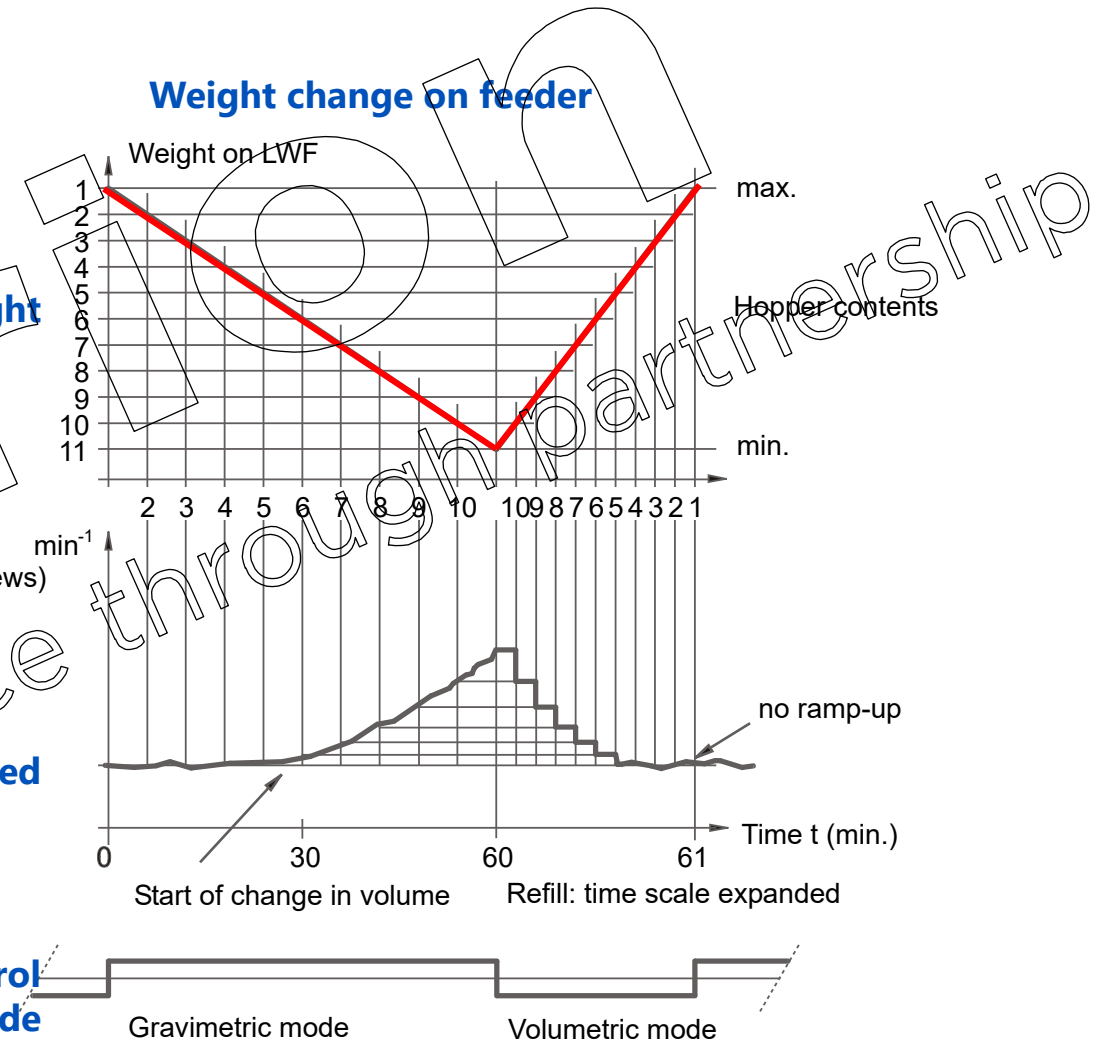
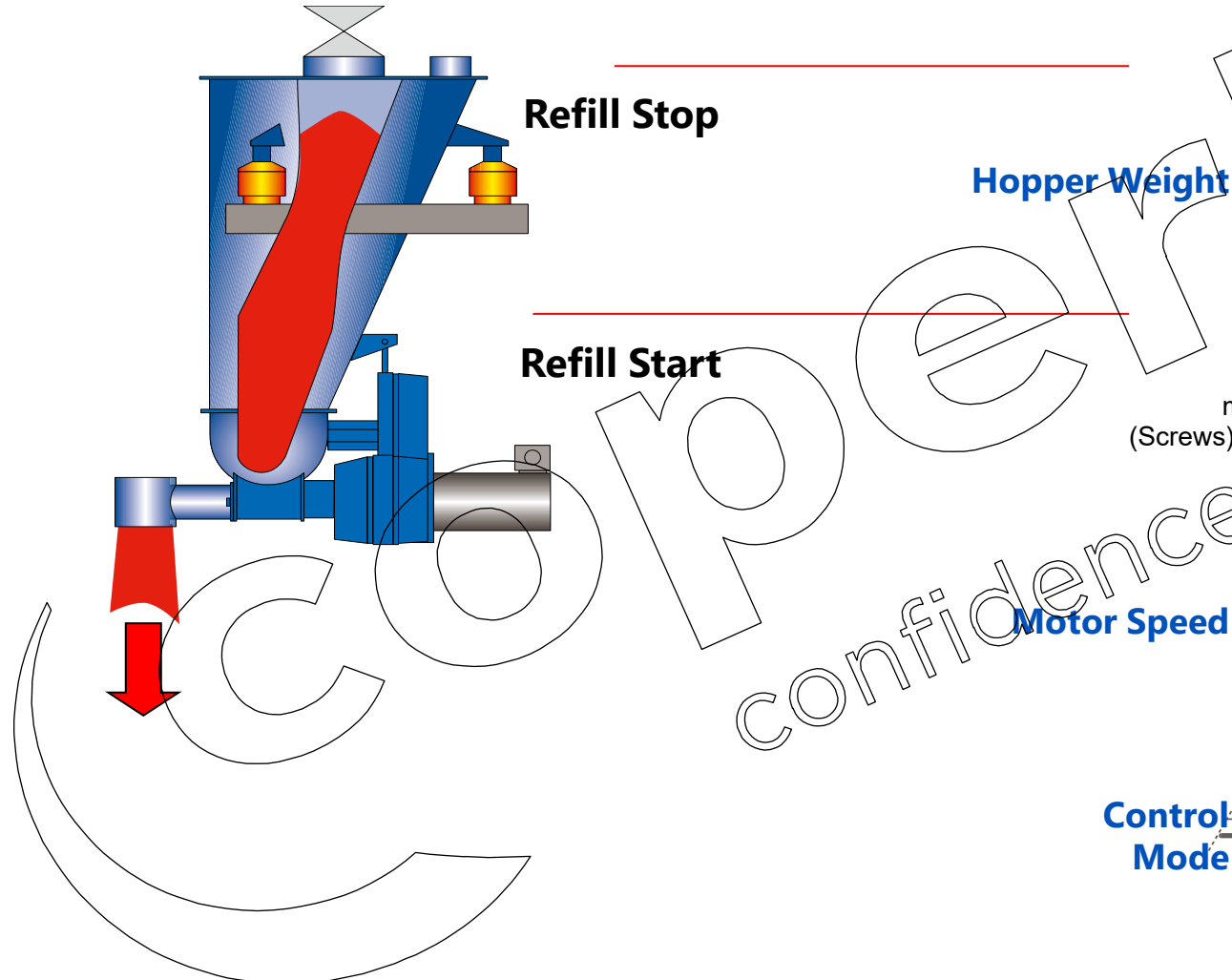
Smart Features

4



Smart Features

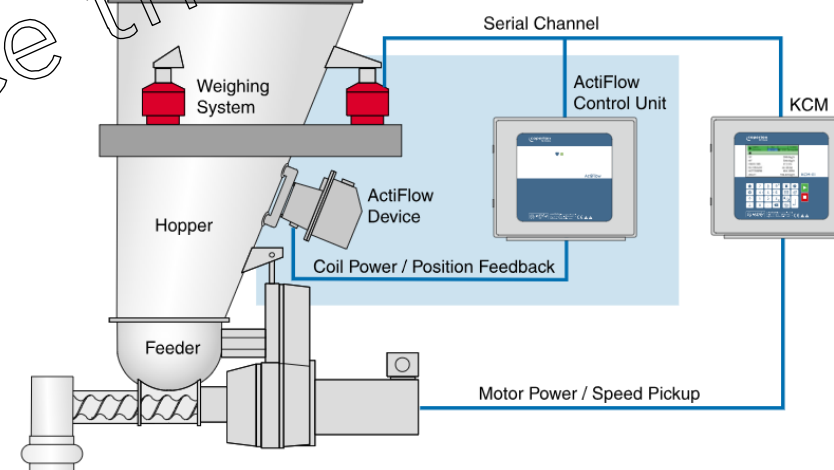
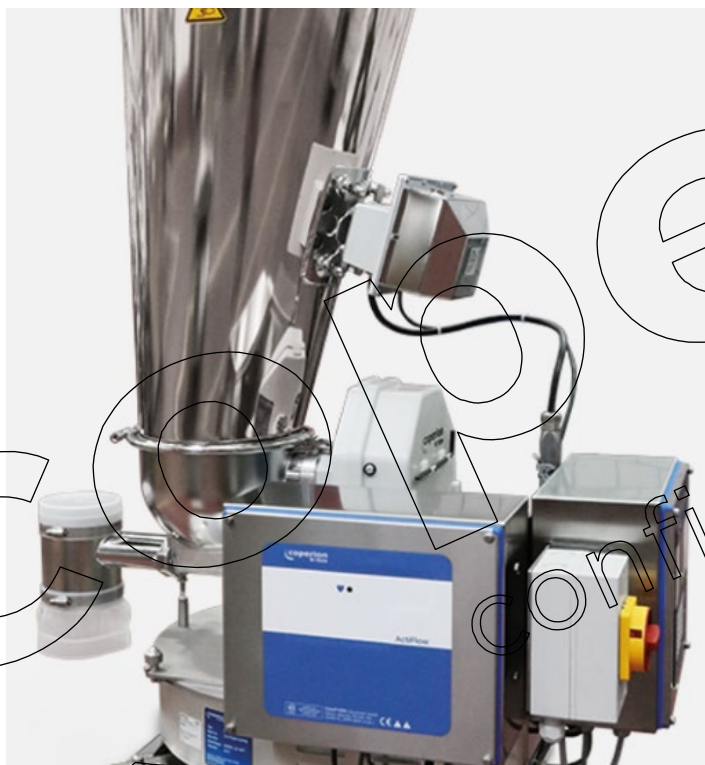
(1) Saving Material - Smart Refill Algorithm



Smart Features

(2) Reducing Changeover - The Package Of Versatility

Actiflow



Smart Features

(3) Reducing Changeover - The Package Of Versatility

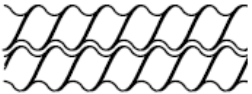

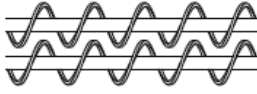
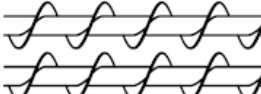
Unprecedentedly High Turndown Ratio

Example:

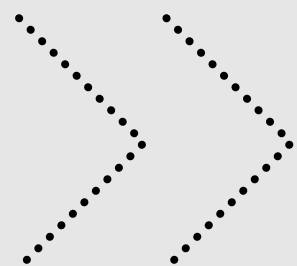
$$2267/5.2 = 436!$$

(Maximum is 436 times of minimum)

The possibility of **using the same feeder** to feed different material when Line recipe changed

Pitch		 Twin concave screws	 Twin auger screws	 Twin spiral screws	 Double auger screws
coarse pitch	dm³/h	2.9 - 1417	5.2 - 2267	3.4 - 1398	4.3 - 1712
	ft³/h	0.1 - 50.02	0.18 - 80.03	0.12 - 49.35	0.15 - 60.43
fine pitch	dm³/h	2.1 - 920	2.4 - 1370	1.82 - 1023	2.4 - 1254
	ft³/h	0.07 - 32.48	0.08 - 48.36	0.06 - 36.11	0.08 - 44.27

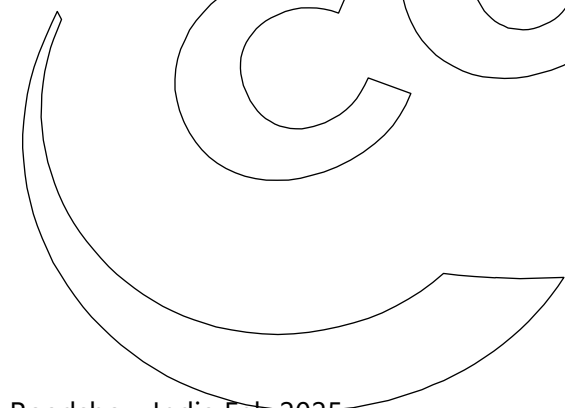




Recipe Management and Cost Saving

5

coperion
confidence through partnership



Recipe Management

Hourly Cost Elements Summary

1

A) Hourly Material Cost ~ 80-90%

Priority:

1) Saving Materials to the core with high performance feeders that can improve both momentary and long-term accuracy

3

B) Hourly Waste or Reject Cost

3) Cutting Reject Rate with consistent and controllable feeding

2

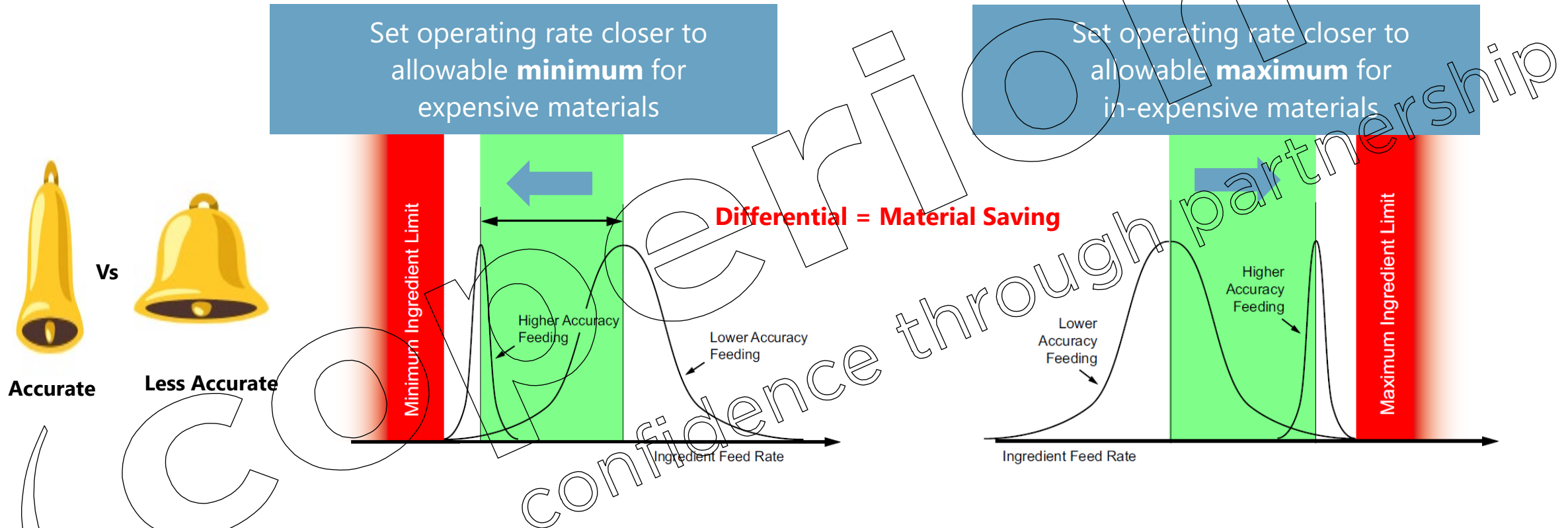
C) Hourly Production Loss by Changeover ~ 10%

D) Hourly Equipment Burden (over 10 years life)
~0.5-1%

2) Reducing Changeover
Production Loss with flexible, cleanable, reliable feeding equipment

Recipe Management

Minimizing **EXPENSIVE** Or Critical Materials and Maximizing **IN- EXPENSIVE** Materials



Recipe Management

Minimizing **EXPENSIVE** Or Critical Materials and Maximizing **IN- EXPENSIVE** Materials

EXAMPLE

ORIGINAL RECIPE			COST MINIMIZED RECIPE		
Ing	Recipe Target (%)	Hourly Ing Cost	Gravimetric Accuracy	Recipe Target (%)	Hourly Ing Cost
A	50.00	\$110.00	+0.25%	53.22	\$117.09
B	30.00	\$150.00	+0.3%	27.08	\$135.41
C	10.00	\$33.00	±0.5%	11.94	\$39.40
D	5.00	\$60.00	+0.7%	4.03	\$48.36
E	4.00	\$24.40	+0.6%	3.02	\$18.41
F	1.00	\$35.30	+1.2%	0.71	\$25.01
Total	100.00	\$412.70		100.00	\$383.68

- A: Polymer Grade 1
- B: Polymer Grade 2
- C: FR Powder
- D: Additive 1
- E: Additive 2
- F: Colour

 Savings of ~\$30/hour

Table 2 - Application Example Original and Cost Minimized Recipes

Recipe Management

Feedsmart Recipe Optimizer sheet

>> Feedsmart Recipe Optimizer sheet is downloadable at the following link

<https://www.coperion.com/en/know-how/technology/feeding-technology/feedsmart/>



FeedSmart Recipe Optimizer

Capture savings hidden in your process recipes

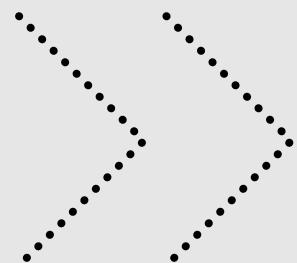


The FeedSmart Recipe Optimizer is based on an easy-to-use Microsoft® Excel® Workbook

THE TOTAL SAVINGS SOLUTION

The **FeedSmart™ Recipe Optimizer** is a powerful tool developed by Coperion K-Tron that adds a new level of functionality for processors wishing to minimize ingredient costs and evaluate options.

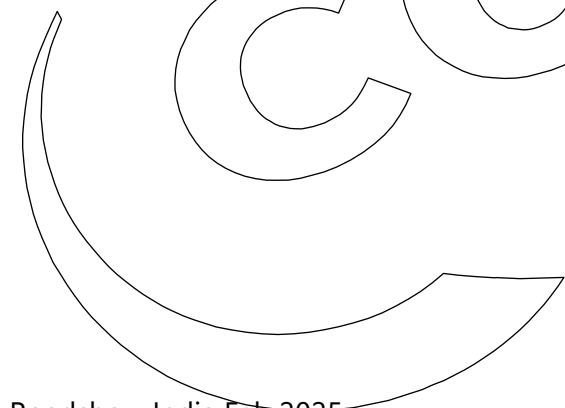
It is complemented by the **TruCost™ Savings Comparator**, a tool to support you in making the best possible decision when it comes time to purchase a new feeding system. These two essential tools are combined in an easy-to-use Microsoft® Excel® Workbook which Coperion K-Tron is offering free of charge as a download from this website.



Takeaway

6

coperion
confidence through partnership



Takeaway

- Use high accuracy feeders to save costs related to material consumption and changeover downtime
 - Supported by top-notch **Weighing Technology** and **Smart Controllers**
 - **Save ₹₹₹ / \$\$\$** on material costs with precise recipe management:





Contact

Shalom MJ

Regional Sales Manager – Coperion K-Tron
Coperion Ideal Pvt. Ltd
505, Mathura Arcade,
Near Garware House, Subhash Rd, Vile Parle East,
Mumbai - 400057

E-Mail Shalom.MJ@coperion.com

www.coperion.com

Satyendra Bhagat

Sales Director
ICE (Asia) Pvt. Ltd.
202, India Printing House,
42 G.D. Ambekar Marg
Wadala, Mumbai 400031

E-mail sbhagat@iceasia.in

www.iceasia.in



Thank you
very much for
your attention.

You're very welcome to follow us.

