



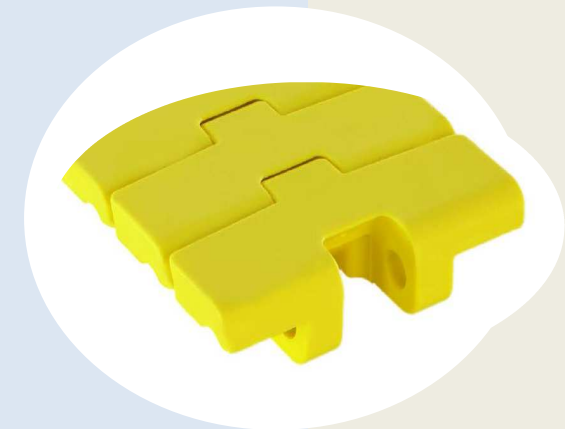
Presentation to END USERS & OEM's Part I: Product Characteristics

September 2019



eFAST: a unique opportunity for Regina

- e-F.A.S.T. is the **latest dry-running *Delrin® Acetal Homopolymer*** developed by Regina and DuPont (4-year joint R&D project)
 - ✓ Joint longest experience in dry-running materials in the Conveyor industry (since '90s)
 - ✓ Dedicated to Regina
- **Lowest Coefficient of friction in the Industry against PET**
- **Achieved stable-full dry running** in on-going high-speed PET field tests
 - ✓ Constant low friction over time
 - ✓ Low Dusting
 - ✓ Long wear life
- **Positive on-going discussions with key OEMs**





***e-F.A.S.T* material in a nutshell**

- ✓ **Highly lubricated medium viscosity Delrin®**
- ✓ **Contains proprietary lubricant developed specifically for Delrin® and e-F.A.S.T.**
- ✓ **Optimized for sustainable low friction against PET bottles**
- ✓ **Lowest CoF in the industry without external lubrication**



PERFORMANCE IN MOTION

Regulatory Status:

Food approval

- EU food approval: Available
- US food approval («FDA»): Available



Field Tests – Overview



Objective: eFAST Dry-Running capabilities in high-performing PET lines



	Coca Cola – Nogara, Italy (Coke, Fanta)	Nestlé - San Pellegrino, Italy (Mineral Water)	Nestlé - Fonte Vera, Italy (Mineral Water)
Line Section	Inliner and Single-Lane Infeed (before Labelling Machine)	Inliner and Single-Lane Infeed (before Labelling Machine)	Single Lane, Decombiner, Mass Conveyor (after the Filler)
Chain Type	Matveyor® [1" Pitch, 8.7 mm Thickness] <ul style="list-style-type: none"> □ 1600 K 83.8 Straight Running □ 783M K 83.8 Side-flexing 	Matveyor® [1" Pitch, 8.7 mm Thickness] <ul style="list-style-type: none"> □ 1600 K 83.8 Straight Running □ 783M K 83.8 Side-flexing 	FliteTop® [1.5" Pitch, 4 mm Thickness] <ul style="list-style-type: none"> □ 820 K 83.8 Straight Running □ 880M RG K 83.8 Side-flexing

Field Tests – Approach



- Test Measures:
 - Dynamic **Coefficient of Friction** (CoF) between chains and bottles
 - Chains **Elongation**
 - Chains **Thickness** reduction

- Bottles used for CoF analysis:

	Coca Cola – Nogara	Nestlé - San Pellegrino	Nestlé - Fonte Vera
UNIVERSAL MASTER (1)	<ul style="list-style-type: none"> ■ 1.5L Coke 		
PRODUCTION MASTER (2)	<ul style="list-style-type: none"> ■ 1.5L Fanta ■ 1.75L Coke ■ 2L Coke 	<ul style="list-style-type: none"> ■ 0.5L Sparkling 	<ul style="list-style-type: none"> ■ 0.5L Sparkling ■ 0.5L Still ■ 1.5L Sparkling ■ 2L Still
NEW IN PRODUCTION (1)	<ul style="list-style-type: none"> ■ 1.5L Coke 	<ul style="list-style-type: none"> ■ 0.5L Sparkling 	<ul style="list-style-type: none"> ■ 0.5L Still



Notes:

- 1) Petaloid Bottom
- 2) All bottles with Petaloid Bottom, except 2L Still (Flat bottom)



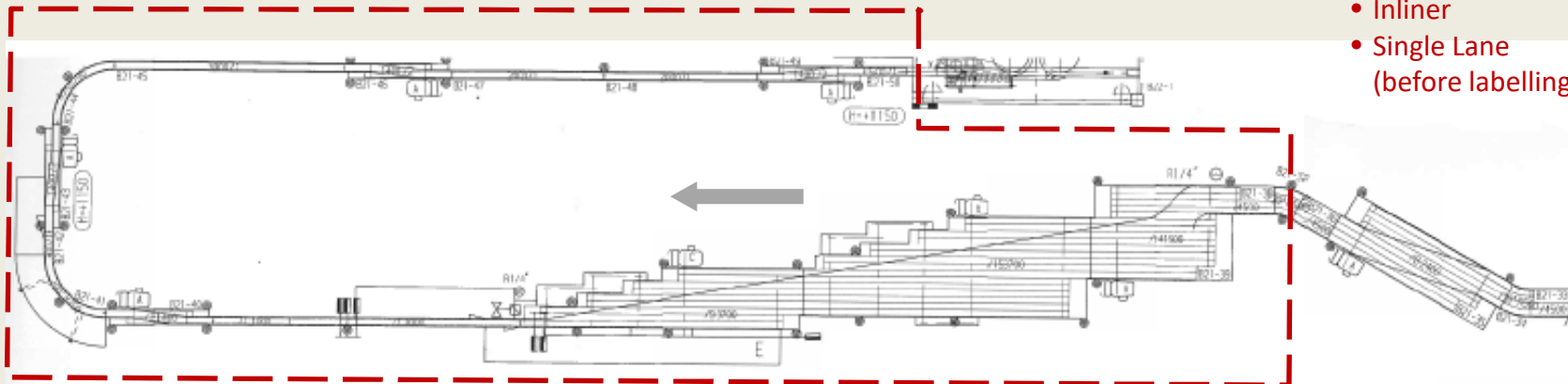
- **Test 1 – Coca Cola Nogara (Coke, Fanta)**
- Test 2 – Nestlé San Pellegrino (Mineral Water)
- Test 3 – Nestlé Fonte Vera (Mineral Water)

Test 1 – Coca Cola Nogara



APPLICATION OVERVIEW

OEM	TEST STARTUP	WORKING HOURS/DAY	CONVEYED PRODUCTS	CONTAINER TYPE	NOMINAL LINE OUTPUT [Bph]	REGINA eFAST PRODUCTS	TOTAL TEST HOURS
KRONES	February, 2017	H24, 6x7	<ul style="list-style-type: none"> ▪ Coke ▪ Fanta 	NEW PET Bottles <ul style="list-style-type: none"> ▪ 1,5L, Petaloid ▪ 1,75L, Petaloid ▪ 2,0L, Petaloid 	36.000 (1.5L)	<ul style="list-style-type: none"> ▪ 1600 K83.8 Straight Running ▪ 783M K 83.8 Side-Flexing 	5.000



Test Area (Line 6)

- Inliner
- Single Lane (before labelling machine)

Components:

- Upper Wear Strips: Standard UHMWPE
- Return Part: Rubberized Rollers
- Curves: Standard UHMWPE

Chain Speeds:

- 15 ÷ 90 m/min (at Inliner)
- 85 m/min at Single-Lane



OPERATING CONDITIONS

BEFORE

- **Lubrication:**
 - Application: Automatic, with Nozzles
 - Product: Dry lube (Ecolab DRYEXX)
 - Temporization: 6s ON, 70 min OFF
 - Consumption: 1,7Liters/day

- **Cleaning:**
 - Type: Automatic with nozzles (CIP system)
 - Product : Ecolab Topactive 200
 - Frequency: Weekly
 - Duration: 15 min (final rinsing included)

WITH eFAST

- **Lubrication:**
 - OFF (Dry Running)

- **Cleaning:**
 - Type: Automatic with nozzles (CIP system)
 - Product : Ecolab Topactive 200
 - Frequency: Weekly
 - Duration: 15 min (final rinsing included)



RESULTS

- **Elimination of Lubrication**
 - Permanent dry-running condition during the test
 - 400 liters of lubricant saved (in 5.000hrs)
- **Low Coefficient of Friction**
 - Average CoF < 0,11 for all bottle formats; stable during overall test duration
 - Limited bottles falling, in line with standard POM (with lubrication)
- **Enhanced Chain Life**
 - Negligible elongation and thickness reduction (< 0,5%)
 - No dust formation on chains
 - Expected chain life increase > 30% vs standard POM (with lubrication)
- **Low wear on standard wearstrips material (UHMWPE)**

Field Tests



- Test 1 – Coca Cola Nogara (Coke, Fanta)
- **Test 2 – Nestlé Fonte Vera (Mineral Water)**
- Test 3 – Nestlé San Pellegrino (Mineral Water)

Test 2 – Nestlé Fonte Vera (Mineral Water)

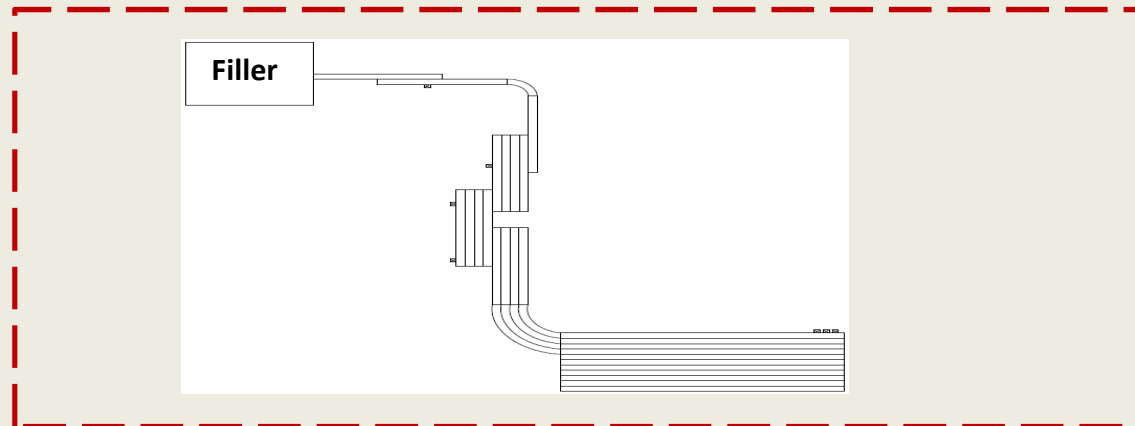


APPLICATION OVERVIEW

OEM	TEST STARTUP	WORKING HOURS/DAY	CONVEYED PRODUCTS	CONTAINER TYPE	NOMINAL OUTPUT [Bph]	REGINA eFAST PRODUCTS	TOTAL TEST HOURS
SIDEL	July 2017	H24, 6x7	<ul style="list-style-type: none"> Still Water Sparkling Water 	NEW PET Bottles <ul style="list-style-type: none"> 0,5L Still (*) 0,5L Sparkling (*) Petaloid 2L Still 	44.000	<ul style="list-style-type: none"> 820 K83.8 Straight Running 880m RG K 83.8 Side-Flexing 	2.500

Test Area (Line 19)

- Single Lane (after the Filler)
- Decombiner
- Mass Conveyor



Components:

- Upper Wear Strips: Standard UHMWPE
- Return Part: Rubberized Rollers
- Curves: Standard UHMWPE

(*) Petaloid

Chain Speeds:

- 85 m/min at Single-Lane
- 55 ÷ 32 m/min (at Decombiner)
- 20 m/min at Mass Conveyor



OPERATING CONDITIONS

BEFORE

- **Lubrication:**
 - Application: Automatic, with Brushes
 - Product: Dry lube (DICOLUBE DRK)
 - Temporization: Continuous
 - Consumption: n.a. (centralized system)

- **Cleaning:**
 - Type: Automatic with nozzles (CIP system)
 - Product: Sealed Air Unifoam VF34
 - Frequency: Weekly
 - Duration: 15 min (final rinsing included)

WITH eFAST

- **Lubrication:**
 - OFF (Dry Running)

- **Cleaning:**
 - Automatic with nozzles (CIP system)
 - Product: Sealed Air Unifoam VF34
 - Frequency: Weekly
 - Duration: 15 min (final rinsing included)



RESULTS

- **Elimination of Lubrication**
 - Permanent dry-running condition during the test
 - ~200 liters of lubricant saved (in 2.500hrs)¹

- **Low Coefficient of Friction**
 - Average CoF < 0,12 for all bottle formats; stable during overall test duration
 - Limited bottles falling, in line with standard POM (with lubrication)

- **Enhanced Chain Life**
 - Negligible elongation and thickness reduction (< 0,3%)
 - No dust formation
 - Increased chain life > 30% vs standard POM (with lubrication)

- **Low wear on standard wearstrips material (UHMWPE)**

1. Estimated

Field Tests



- Test 1 – Coca Cola Nogara (Coke, Fanta)
- Test 2 – Nestlé Fonte Vera (Mineral Water)
- **Test 3 – Nestlé San Pellegrino (Mineral Water)**

Test 3 – Nestlè San Pellegrino

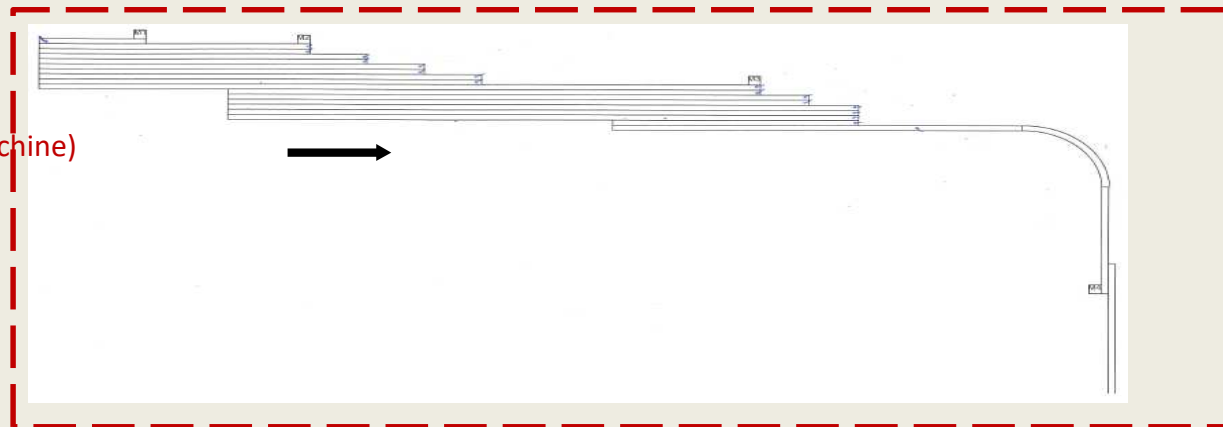


APPLICATION OVERVIEW

OEM	TEST STARTUP	WORKING HOURS/DAY	CONVEYED PRODUCTS	CONTAINER TYPE	NOMINAL OUTPUT [Bph]	REGINA eFAST PRODUCTS	TOTAL TEST HOURS
KRONES	October, 2017	H24, 6x7	▪ Sparkling Water	NEW PET Bottles ▪ 0,5L Sparkling, Petaloid	60.000 (0.5L)	▪ 1600 K83.8 Straight Running ▪ 783M K 83.8 Side-Flexing	1.000

Test Area (Line 12)

- Inliner
- Single Lane (before labelling machine)



Components:

- Upper Wear Strips: Standard UHMWPE
- Return Part: Rubberized Rollers
- Curves: UHMWPE

Chain Speeds:

- 15 ÷ 110 m/min (at Inliner)
- 85 m/min at Single-Lane



OPERATING CONDITIONS

BEFORE

- **Lubrication:**
 - Application: Automatic, with Brushes
 - Product: Dry lube
 - Temporization: Continuous
 - Consumption: *n.a.* (centralized system)

- **Cleaning:**
 - Type: Manual
 - Product: Water
 - Frequency: Weekly

WITH eFAST

- **Lubrication:**
 - OFF (Dry Running)

- **Cleaning:**
 - Type: Manual
 - Product: Water
 - Frequency: Weekly



RESULTS

- **Elimination of Lubrication**
 - Permanent dry-running condition during the test
 - ~80 liters of lubricant saved (in 1.000hrs)¹

- **Low Coefficient of Friction**
 - Average CoF < 0,12; stable during overall test duration
 - Limited bottles falling, in line with standard POM (with lubrication)

- **Enhanced Chain Life**
 - Negligible elongation and thickness reduction (< 0,2%)
 - No dust formation
 - Increased chain life > 30% vs standard POM

- **Low wear on standard wearstrips material (UHMWPE)**

1. Estimated



FREQUENTLY ASKED QUESTIONS

- **Why yellow?**
 - In order to promptly identify the need for conveyor cleaning, which is highly recommended in order to maintain the low friction properties of *e-F.A.S.T.*

- **How is the wear resistance compared to UP / DK2?**
 - Higher chain life in same application conditions
 - Dust: less powder generation
 - PV limit: tests on-going (current positive results)

- **Is it possible to use eFAST with cans or glass bottles?**
 - eFAST has not been tested yet with cans or glass bottles
(possible prospective test extension of eFAST application perimeter)

- **How is the chemical resistance compared to UP / DK2?**
 - Same chemical resistance of DK2 or UP
 - Similar performance in aseptic filling lines towards hydrogen peroxide

eFAST - Regina Product Range



e-FAST Series: Full coverage of Bottling requirements for *Loose Product Handling* sections

■ FliteTop Straight Running Chains

- 820 Series
- 828 Series

■ FliteTop Sideflexing Chains

- 880T Series
- 880MRG Series

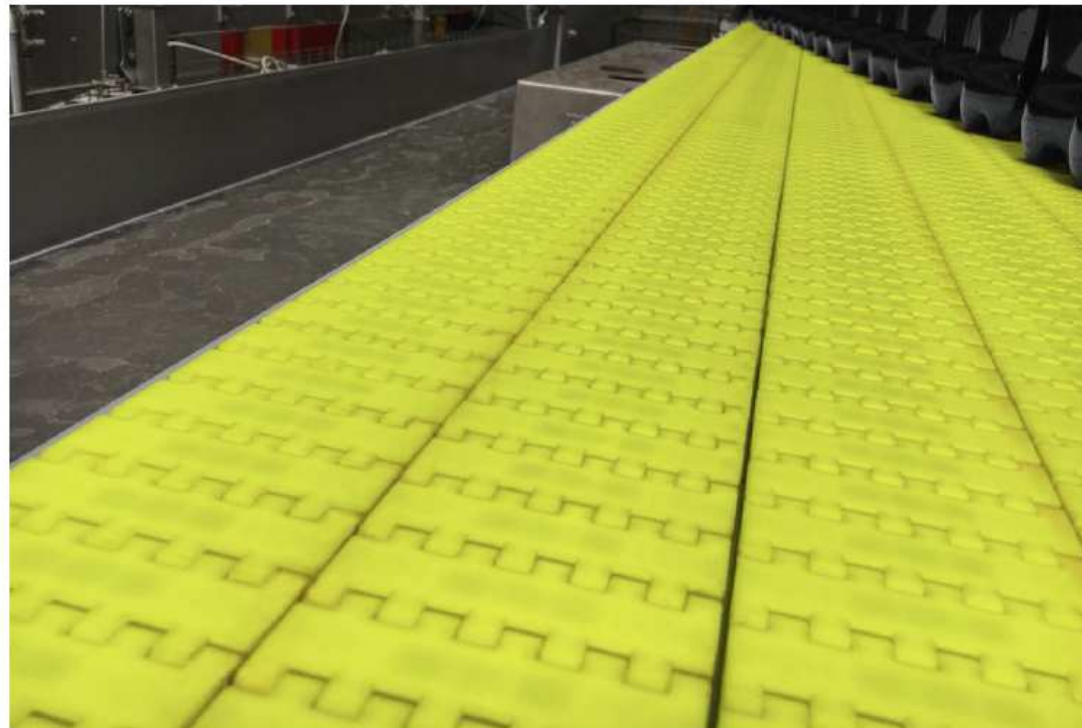
■ Matveyor Belts

- 600/610 Series
- 7300/7200 Series
- 1600/1500 Series

■ Matveyor Chains

- 783M/782M Series
- 783T Series

e-F.A.S.T.
FRICTION ABATING SLIDING THERMOPLASTIC



eFAST – Positioning in Regina POM Product Range



Most advanced material for high-speed PET bottling Dry-Running applications



APPLICATIONS

- **Core Market:**
 - Bottling
 - PET
 - High-Capacity lines
- **Dry-Running**
- **Focus Line Areas:**
Loose Product Handling
- **Regular Cleaning**

- **Core Market:**
 - Bottling
 - PET, CAN, NRG
 - Mid-Capacity lines
- **Dry-Running (PET)**
- **Focus Line Areas:**
Loose Product Handling
- **Regular Cleaning**

- **Multiple Markets:**
 - Bottling, Glass Mfg, Packaging
 - PET, CAN, NRG
 - Any-Capacity lines
- **Required Lubrication (Bottling)**
- **All Line Areas:**
 - Loose Product Handling
 - Packaging

FEATURES

- High Wear Resistance
- Developed and Tested for PET Applications
- **Application Limits to be Identified**

- High Wear Resistance
- Multiple Industry Applications
- **Proofed and Consolidated Performance**

- Good Wear Resistance
- Multiple Industry Applications
- **Proofed and Consolidated Performance**

NRG: Not Returnable Glass