Surfin Technology

Technology for greater process control and powder savings

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Powder Coating over 50 years

Continued focus on improving the application efficiency

- Charging system
- Application environment, booth airflow
- Recovery efficiency

- Applied coating thickness and process control
- Color change flexibility

Fully optimized

Fully optimized

Fully optimized

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Improving powder application efficiency

Optimum charging

Save powder
The integrated 100 kV cascade delivers the highest transfer efficiency.

- Perfect transfer efficiency thanks to the 100 kV high performance cascade

*The brand new powder coating **Mach-Jet Gun** associated to its control module **CRN 457** and integrated **DPCS** exclusive system provides an optimum charge to powder. Operator selects easily the coating program adapted to different shapes of the parts, which secures a perfect quality of finish and helps achieving powder savings.*

The advantages of WAGNER gun technology:

- Significant optimization of the powder charging and powder flow
- Increased application efficiency through higher voltage production for an optimum charge

With the right settings, any leading-brand equipment can apply optimum charge to your powder.

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Let’s talk about the revolution

- *“… a radical change in the established order…”*
- A fashionable term or true technological breakthroughs?
- What’s a powder application system?
  - a pump
  - a spray gun
  - a controller
- Since early late 70’s numerous design improvements for guns, controls, but hardly any for the pumps – the core system component defining how much powder can be sprayed and how efficiently applied.
- The introduction of HDLV, dense-phase pump technology – the only true technical revolution in powder coating industry. A truly *“radical change”* in the powder coating process.

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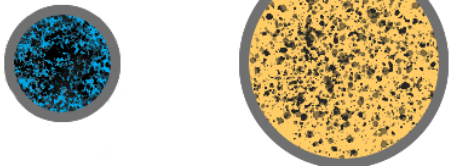
HDLV – High Density Low Velocity

Dense-phase HDLV pump technology

- Powder pushes powder
- With high density and low velocity (minimum wear)
- High output stability (reduced applied coating cost)
- Up to 3000 hours of operation without pump maintenance



6 mm ID
Fließgeschwindigkeit – **4** m/s
Erforderliche Luftmenge – **7 l/min**

10 mm ID
Fließgeschwindigkeit – 16 m/sec
Erforderliche Luftmenge – **75 l/min**

Paint and Carrier

With all painting methods, there are paint particles and “carrier”

- Solvent or water for liquid paint

- Air for powder coatings

With all painting methods, the more the “carrier” the worse the coverage.

Paint-to-Solvent and Powder-to-Air ratio are very important considerations when optimizing coverage or efficiency.

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HDLV – High Density Low Velocity

Pioneers of dense phase technology since 2004

What it does

- Soft spray pattern delivers unmatched application efficiency
- No powder bouncing back

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Performance by design

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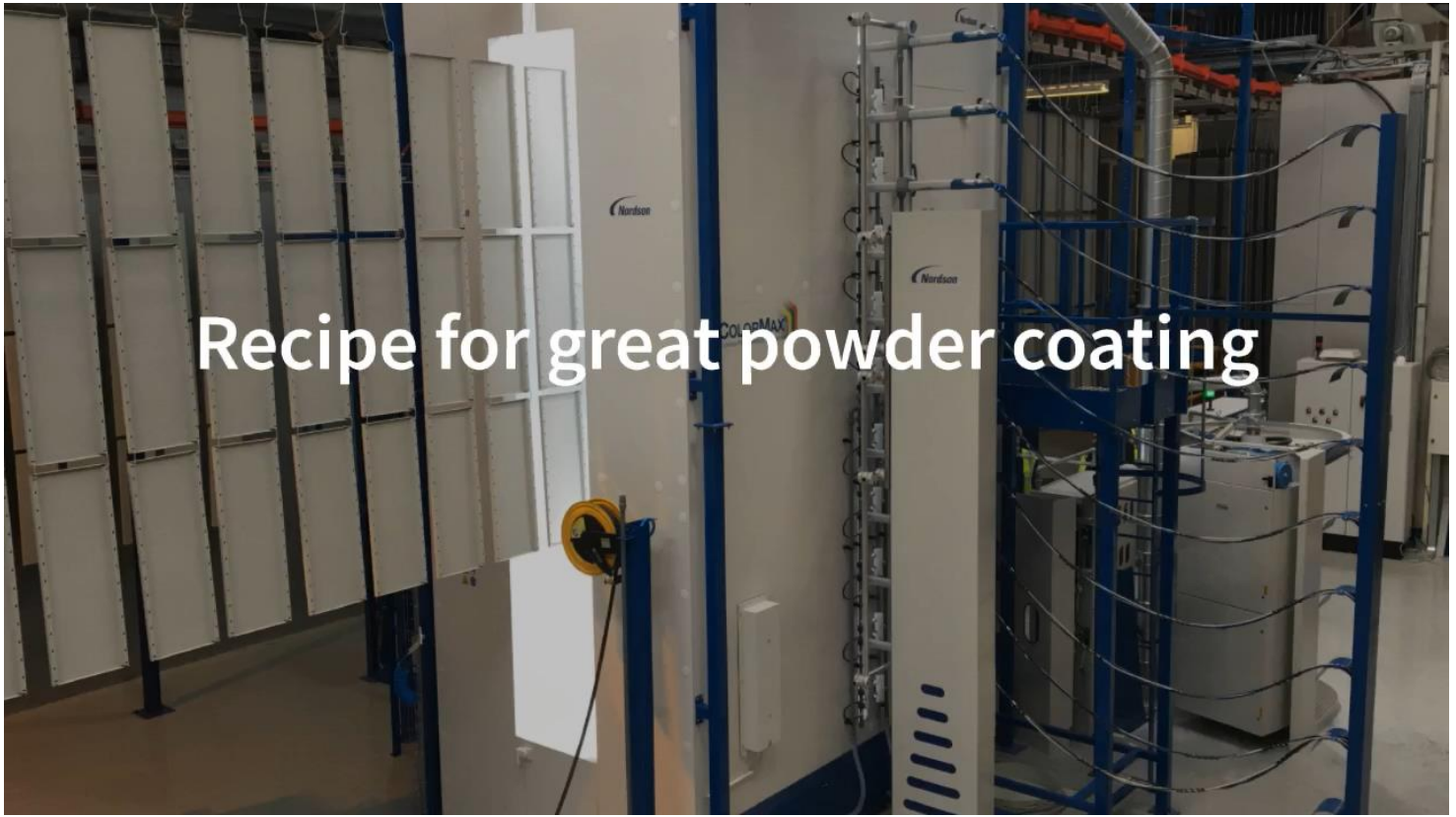

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Performance by design

HDLV – High Density Low Velocity

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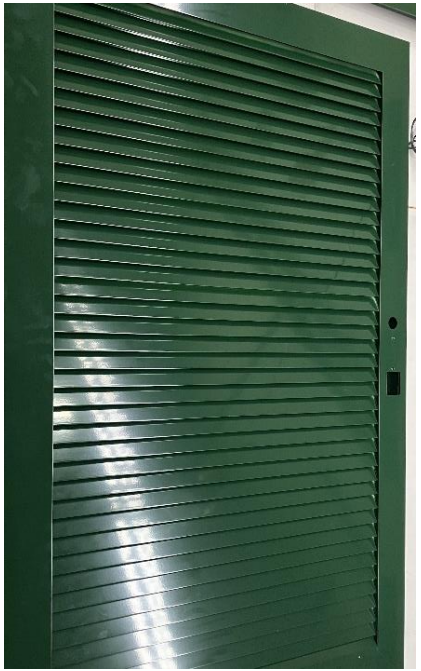
- Soft spray pattern delivers unmatched application efficiency
- No powder bouncing back
- **Superior coverage of corners and difficult part geometries**.



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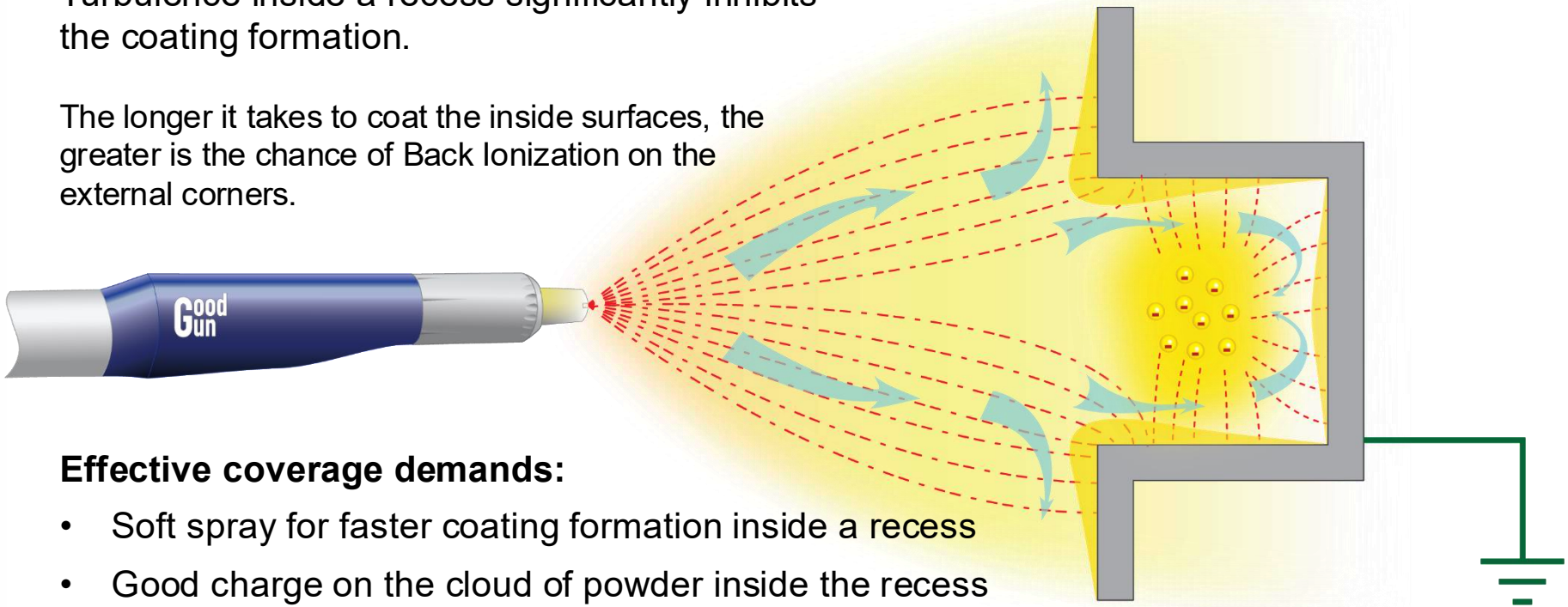
Performance by design

Breaking through the Faraday Cage

Turbulence inside a recess significantly inhibits the coating formation.

The longer it takes to coat the inside surfaces, the greater is the chance of Back Ionization on the external corners.



Effective coverage demands:

- Soft spray for faster coating formation inside a recess
- Good charge on the cloud of powder inside the recess
- Delaying back ionization on the external surfaces (limit the charge by controlling current, not voltage)

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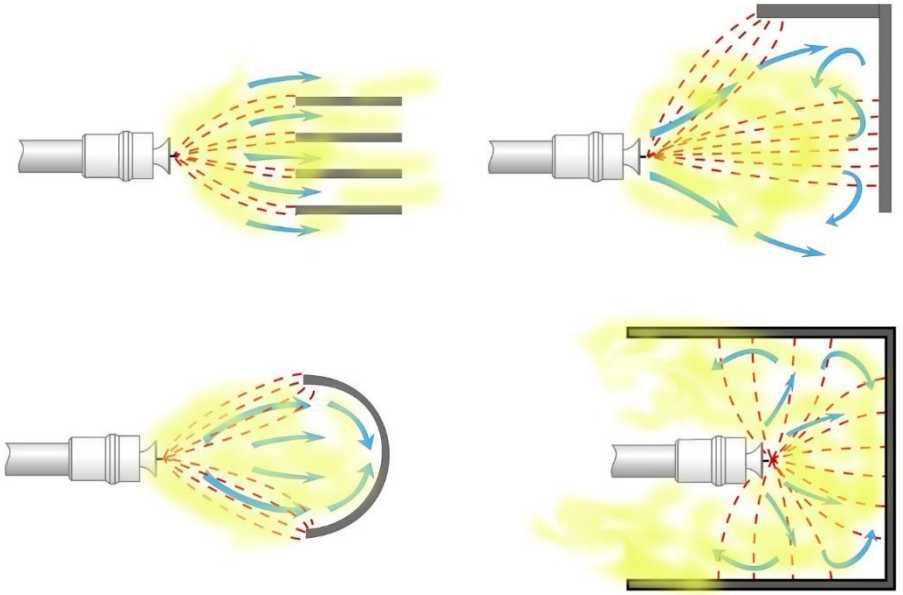
HDLV – Breaking through Faraday Cage

Pioneers of dense phase technology since 2004

It is not all about charge

- Optimization of the aerodynamics near parts' surfaces.
- Flexible control of the spray pattern velocity
- **Independent of the powder flow rate**



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Softs spray – key to breaking into the Faraday Cage

HDLV – Breaking through Faraday Cage

Pioneers of dense phase technology since 2004

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- **Superior coverage of corners and difficult part geometries**.

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Performance by design

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Performance by design

HDLV – Unmatched Productivity

Pioneers of dense phase technology since 2004

What it does

- Soft spray pattern delivers unmatched application efficiency
- No powder bouncing back
- Superior coverage of corners and difficult part geometries.
- **High production rate – up to 650 gr/min powder output**

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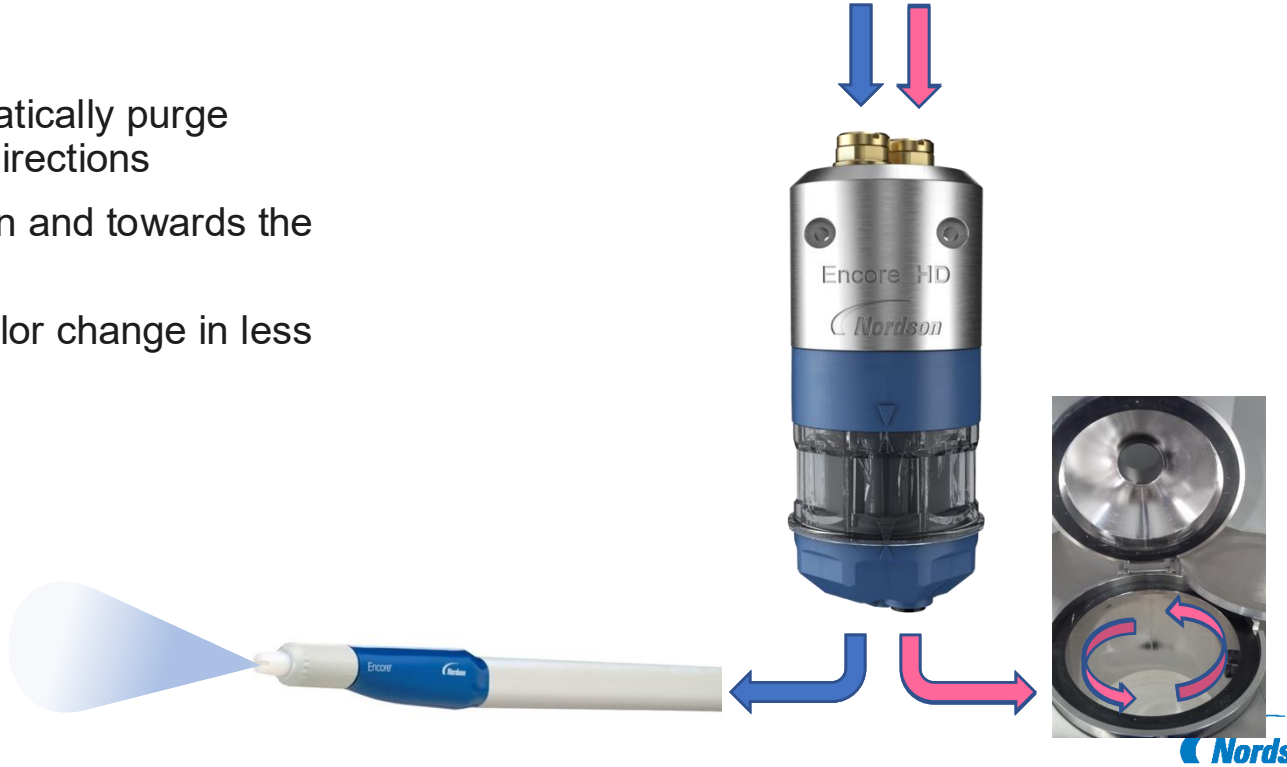
Performance by design

HDLV – Fast, high quality color change

Pioneers of dense phase technology since 2004

What it does.

- HDLV pumps automatically purge themselves in both directions
- Toward the spray gun and towards the hopper
- Highly automated color change in less than 30 seconds
- No disassembly



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HDLV – Color-On-Demand

30 sec. automatic color change

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Spectrum® ***COD*** – Reducing Carbon Footprint

Vestre, Norway - https://www.theplus.no/en/activities

The world's most energy efficient factory

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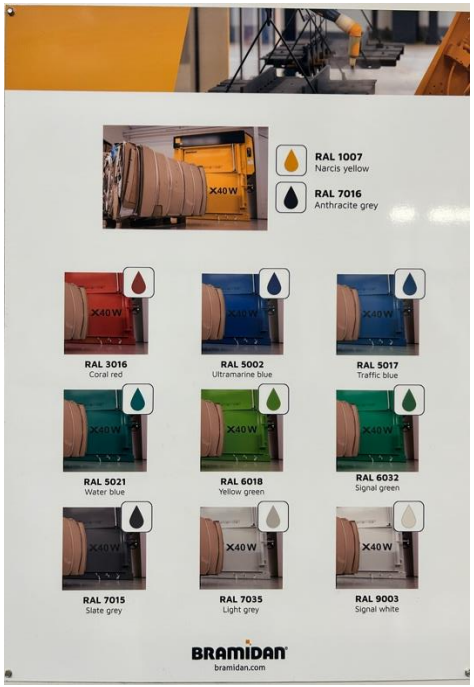
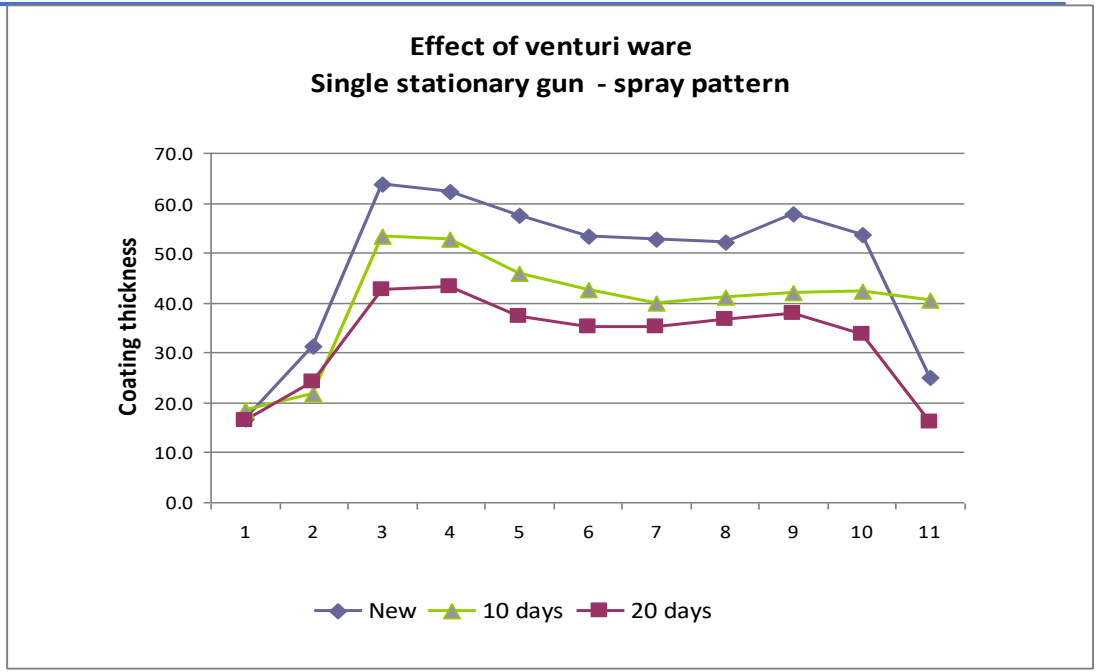
Color On Demand – Bramidan, DK



Ejector pump wear effect.

With traditional venturi pumps, the wear of the simplest part of the system creates as much as 30% variance in the powder output – from new to worn – typically, about 3 weeks of life.

With such impact on the powder output, venturi wear becomes on of the most significant variables in your process.



Measured and kindly provided by Alstrong, Belarus

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HDLV – Significant Cost Savings

Pioneers of dense phase technology since 2004

What it does

- Soft spray pattern delivers unmatched application efficiency
- No powder bouncing back
- Superior coverage of corners and difficult part geometries.
- High production rate – up to 650 gr/min powder output
- **High output stability over the longest time for consistent applied coating thickness and significant savings.**

Line speed	2,5	m/min.
Maximum product height	1,5	m.
Sides coated	2	
Productivity per hour. (2D)	450	sq.m./hr.
Line density	60,00%	
Coated per hour	270,00	sq.m./hr.
Work hours per day	14	
Days per year	250	
Annual coating capacity	945.000	sq.m.
Average film thickness	75	micron
Relative density of powder	1,5	
Coating applied per year	106.313	kg.

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Performance by design

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Coated per hour	270,00	sq.m./hr.
Work hours per day	14	
Days per year	250	
Annual coating capacity	945.000	sq.m.
Average film thickness	10	micron
Relative density of powder	1,5	
Coating applied per year	14.175	kg.

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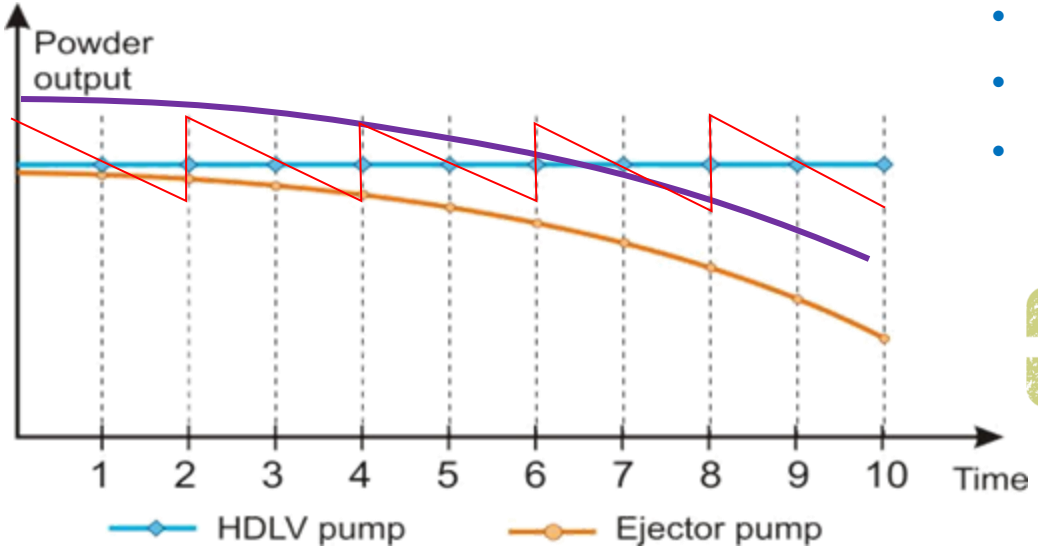
Performance by design

HDLV vs Traditional Venturi Technology



With venturi technology

- Dependance on the operator
- Increased powder consumption
- Limited control over the spray velocity

WHAT CHANGED?

The current state of the industry

WHAT CHANGED?

- Wide acknowledgement and adoption of process control as the main path to significant powder savings
- New technical solutions to improve the powder output stability for powder savings
  - Measure the results & adjust the operating parameters
  - Continuous monitoring of powder output with automatic adjustments to compensate for variations due to pump wear
- Evolution vs Revolution
  - No change to the principle of operation of core system components
  - Evolution – improving performance by remedying shortcomings of original technology.

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Process Control – Key to powder savings

“Measure & Adjust Approach”

“Process control refers to the monitoring and adjusting process parameters to get a preset or desirable output.”

www.petrotechnic.com

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Challenges with “Measure & Adjust”

“I need more coating thickness. What do I adjust?”

- Increase powder output … (more air - more wear)
- Reduce spray velocity… (how? Need air to move powder through the hose.)
- Increase charge… (what about back ionization?)
- Improve product grounding … (huh…?)

Virtually any parameter adjustment requires adjustment of some other parameter to maintain the same application conditions

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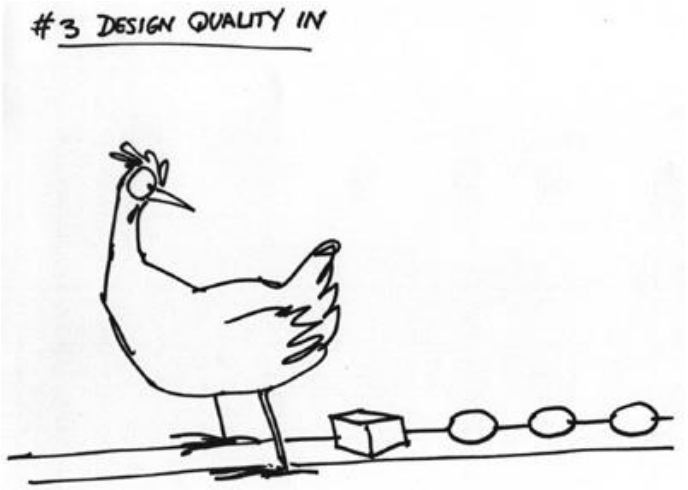
Process Control

“Design Quality In Approach”



https://leanandkanban.wordpress.com/2011/07/15/demings-14-points/

“Being in-control means the process is stable and predictable”

www.isixsigma.com

3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

https://deming.org/explore/fourteen-points/

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Process control by design

Is this achievable?

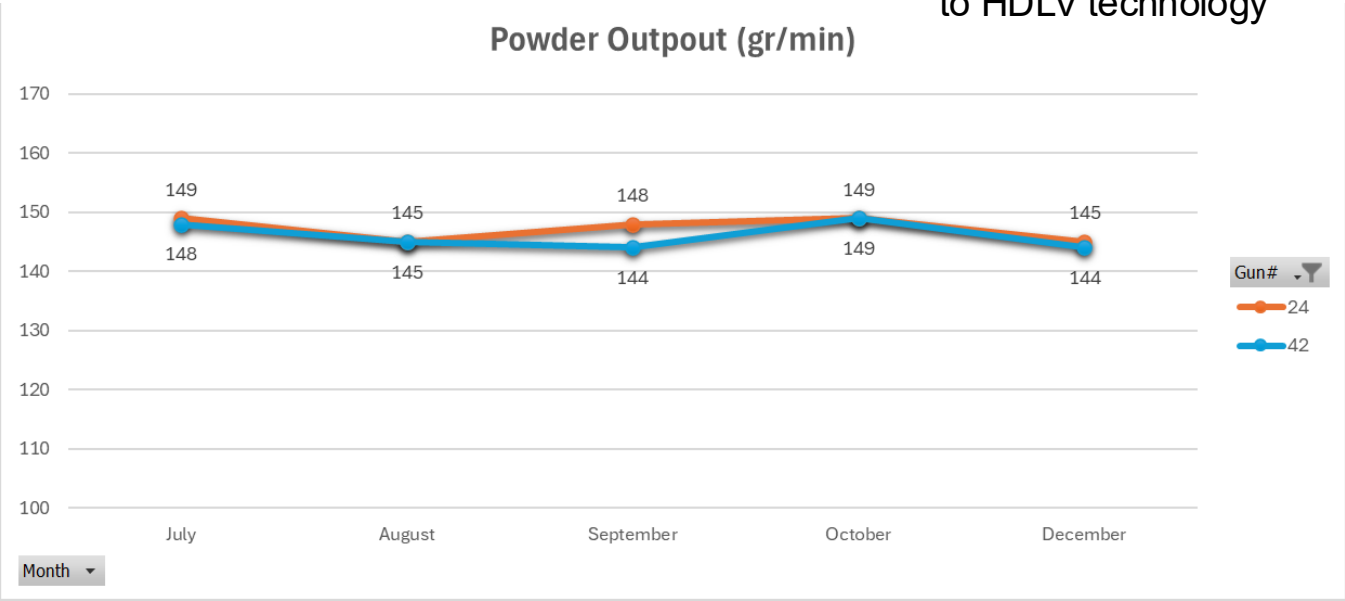
- Measurements at multiple customers
- Over several months
- Same spray systems @ same settings
- Using vacuum-cleaner bag, 1 min spray, weight scale.
- All can be confirmed by our customers

Process control by design

Is this achievable?

Real customer examples.

- German customer
- 42 spray systems
- 3-shift operation
- **30% reduction** in powder output after upgrade to HDLV technology

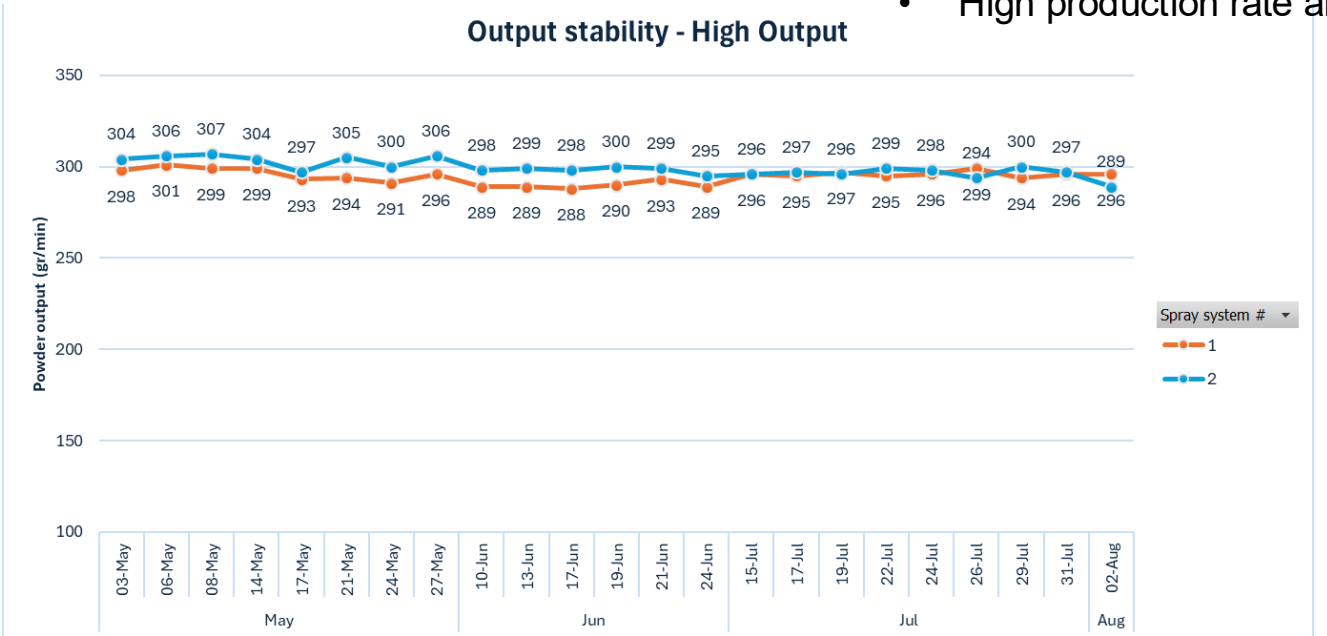


Process control by design

Is this achievable?

Real customer examples.

- German customer
- Multiple robot-mounted spray systems
- 8 years in operation
- High production rate and powder output

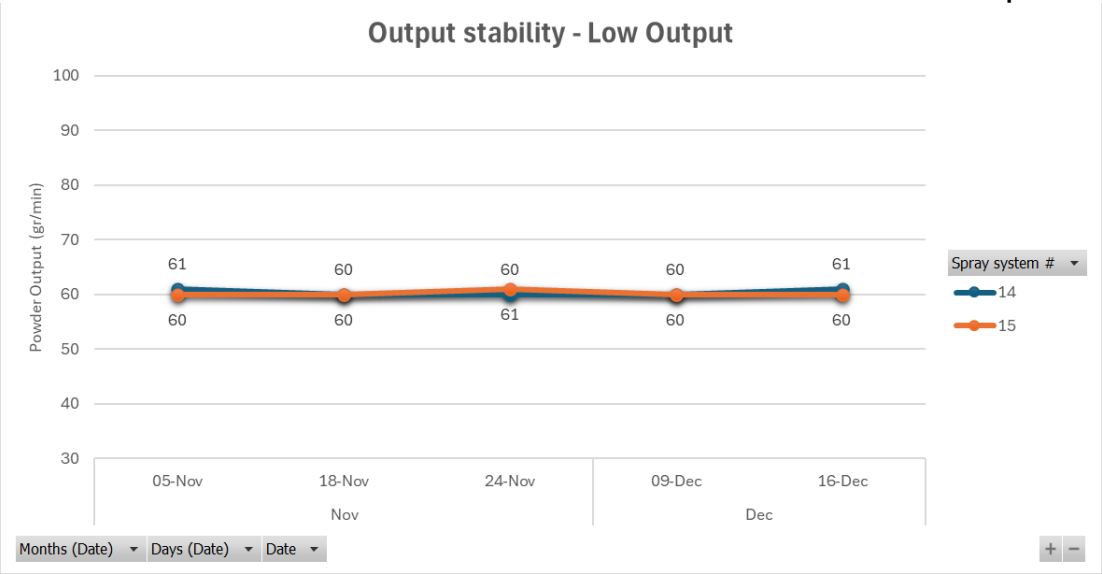


Process control by design

Is this achievable?

Real customer examples.

- German customer
- 24 spray systems with dynamic contouring movers
- 5 years in operation
- Low powder output (with some powders)



Process Control for Significant Powder Savings

Measure & Adjust Approach

- Improvement in process control
- Powder savings due to better applied coating stability

- Requires advanced control with automated valves with 3rd party measurement instruments
- Or, multiple sensors, valves, controls
- Adjustment of any parameter requires either adjustment of another or changes the process
- When used with traditional venturi pumps, does not achieve independent powder volume vs spray velocity control
- Increases maintenance

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Process Control for Significant Powder Savings

Process Control by Design

- Stable process requires no adjustments
- Significant powder savings due to stability, application efficiency, coverage of complex shapes
- No adjustments = Lower operator skill required
- Thousands of hours without pump maintenance
- 3rd party measuring devices beneficial for quality assurance and detecting faults on the line but not necessary to achieve process control.

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Low Operating Cost

3000-4000 hours of operation without pump service

- Minimum maintenance downtime
- Highly durable powder-contact system components

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Revision Date

24/04/2025

TrueBlue Preventive Maintanence Spare Parts

1-Shift	6	12	18	24	30	36	42	48	54	60	66	72	Months		
2-Shift	3	6	9	12	15	18	21	24	27	30	33	36	Months		
3-Shift	2	4	6	8	10	12	14	16	18	20	22	24	Months		
Operation (h)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	Hours		

Product Top Assembly	Assy Qty	Part Number	Spare Part	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity	Unit	Spare Qty per Assy	Est.Life Cycle* (h)
Encore HD Pump (Auto)	10	1625730	KIT, SERVICE, HD PUMP				10				10				10	PC	1	4000
Encore HD Pump (Auto)	10	1078161	KIT,SERVICE,CHECK VALVE										10			PC	1	10000
Encore HD Pump (Auto)	10	7035356	TUBING,PWDR,ANTIST 5.6X8.2MM 23M ROLL						10						10	PC	1	6000
Encore HD Pump (Auto)	10	173101	TUBING,PE,8MMX6MM,NATURAL						50						50	M	5	6000
Encore HD Pump (Auto)	10	1625735	Pump Manifold Gasket								10					PC	1	8000
Encore HD Pump (Manual Systems)	2	1625730	KIT, SERVICE, HD PUMP				2				2				2	PC	1	4000
Encore HD Pump (Manual Systems)	2	1625733	KIT,CHECK VALVE,HD/XD PUMP										2			PC	1	10000
Encore HD Pump (Manual Systems)	2	7035356	TUBING,PWDR,ANTIST 5.6X8.2MM 23M ROLL						2						2	PC	1	6000
Encore HD Pump (Manual Systems)	2	173101	TUBING,PE,8MMX6MM,NATURAL						10						10	M	5	6000
Encore HD Pump (Manual Systems)	2	1625735	Pump Manifold Gasket								2					PC	1	8000
Encore HD Gen3 Automatic Gun 5ft	10	1081657	Flat Spray Nozzle, 3-mm		10		10		10		10		10		10	PC	1	2000
Encore HD Gen3 Automatic Gun 5ft	10	1604824	Electrode Assembly,Flat Spray	10	10	10	10	10	10	10	10	10	10	10	10	PC	1	1000

Thank you

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