

Copeland Discus Digital with CoreSense Technology

December 2017



Copeland Discus Digital™ with CoreSense™ Technology

Customer Testimonials

“Whole Foods Market is recognized for the freshest in perishable products. The Discus Digital™ reduced the suction pressure range by 89% within minutes of activation. Case temperature fluctuations have also tightened supporting our commitment to freshness for our customers.”

**Michael Ellinger – Regional Facilities Manager
Whole Foods Market, Inc, Rocky Mountain Region**

“Reliable refrigeration equipment is important to maintaining our perishable product. The Discus Digital™ has reduced compressor cycling in our store by 56%. It extends our compressor and contactor life expectancy in addition to reducing inrush current to lower energy costs.”

**Ken Flavin – Manager Refrigeration & Maintenance
Sobeys, Inc, Stellarton, NS, Canada**

“The Rack was operating with 900 compressor cycles per day. We were days away from Grand Opening, and tried a variety of controlling methods to reduce cycle counts and still maintain product temperatures without success. We retrofitted the Digital unloader on only one compressor and the impact was amazing. Within minutes of activation, compressor cycles were reduced to 12 starts in four days for the entire Rack. ”

**Michael Ellinger – Regional Facilities Manager
Whole Foods Market, Inc, Rocky Mountain Region**

Copeland Discus Digital™ with CoreSense Technology Benefits

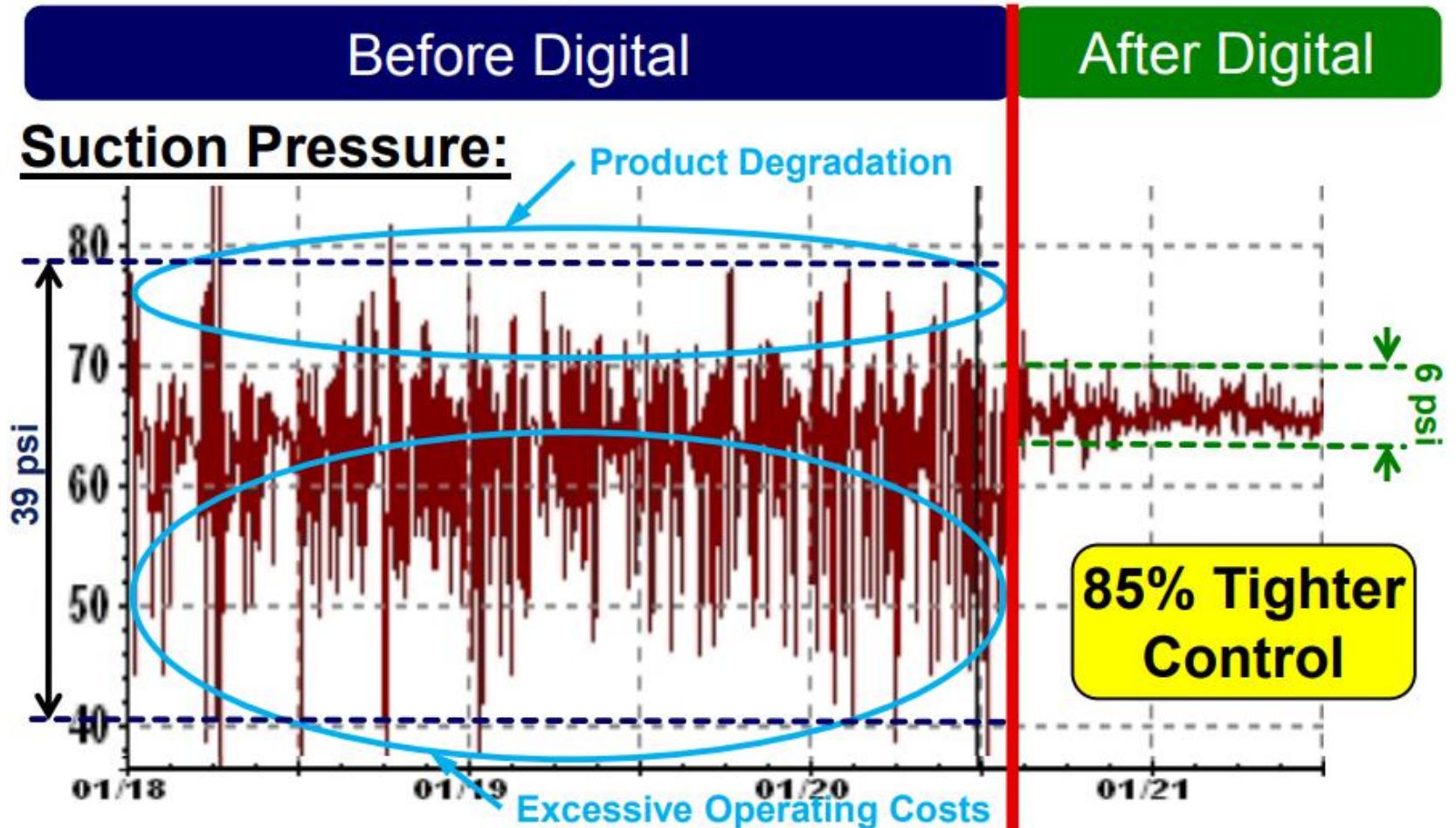
- **Precise Control of Suction Pressure and Temperature**
 - Longer shelf life and less food shrink because of minimal food temperature fluctuations
 - More consistent TXV Operation
- **Reduced Cycling of Compressors**
 - Extends contractor life
 - Extends compressor life
- **Reduced Defrost Cycle Time**
 - Tighter temperature control minimizes formation of frost on evaporator
- **System Efficiency Improvement**
 - Eliminates over/under shooting of suction pressure set point
 - Allows increasing suction pressure set point
 - Reduces inrush current / power usage
- **Paradigm Shift in Parallel System Design**
 - No need for uneven paralleling for compressor staging
 - Using common compressor selections simplifies replacement needs

Discus Digital™ with CoreSense Technology Field Experience



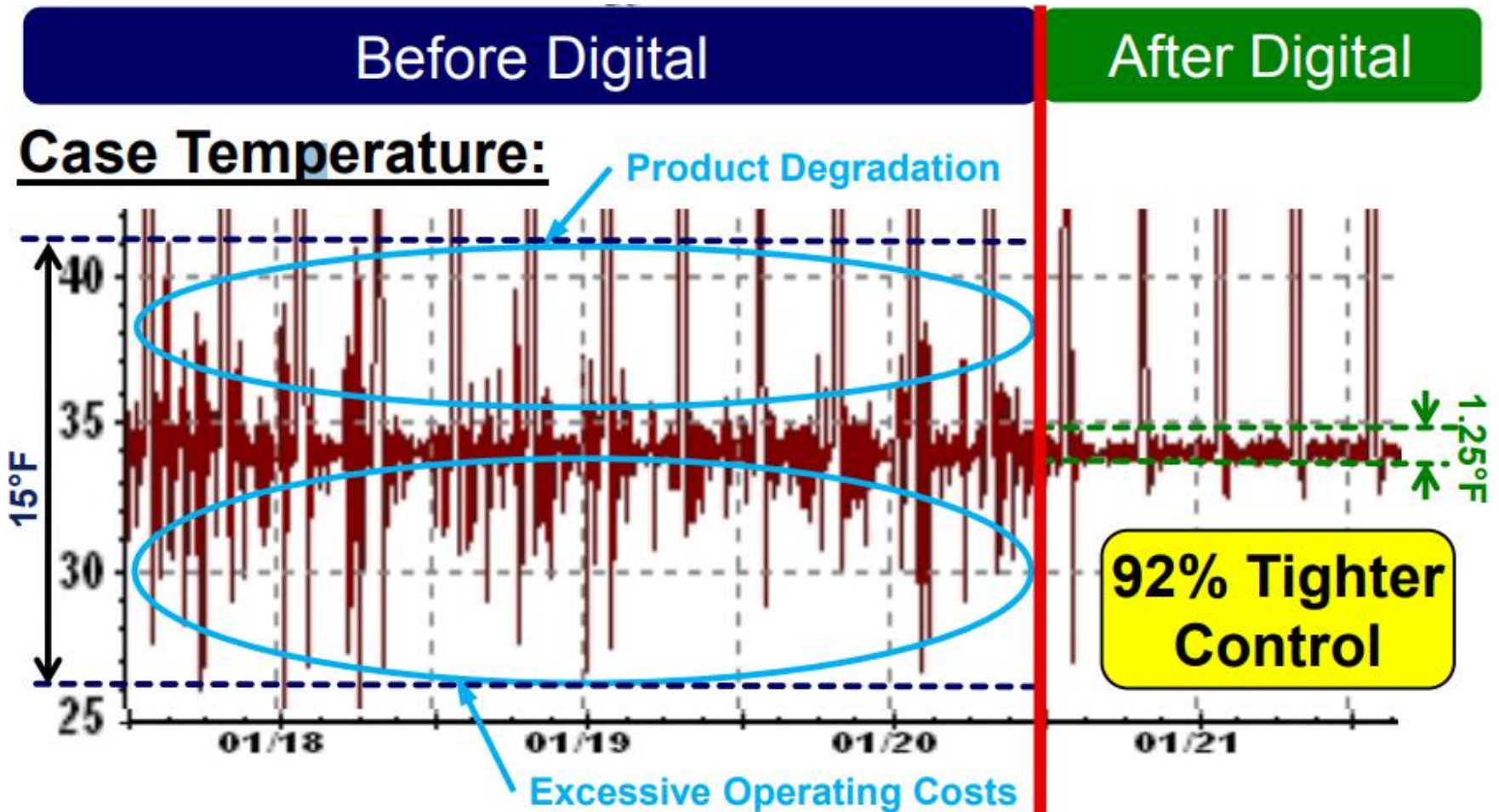
Medium Temp Rack-Suction Pressure

Rack Suction Pressure Range Narrows Significantly with Discus Digital with CoreSense Technology



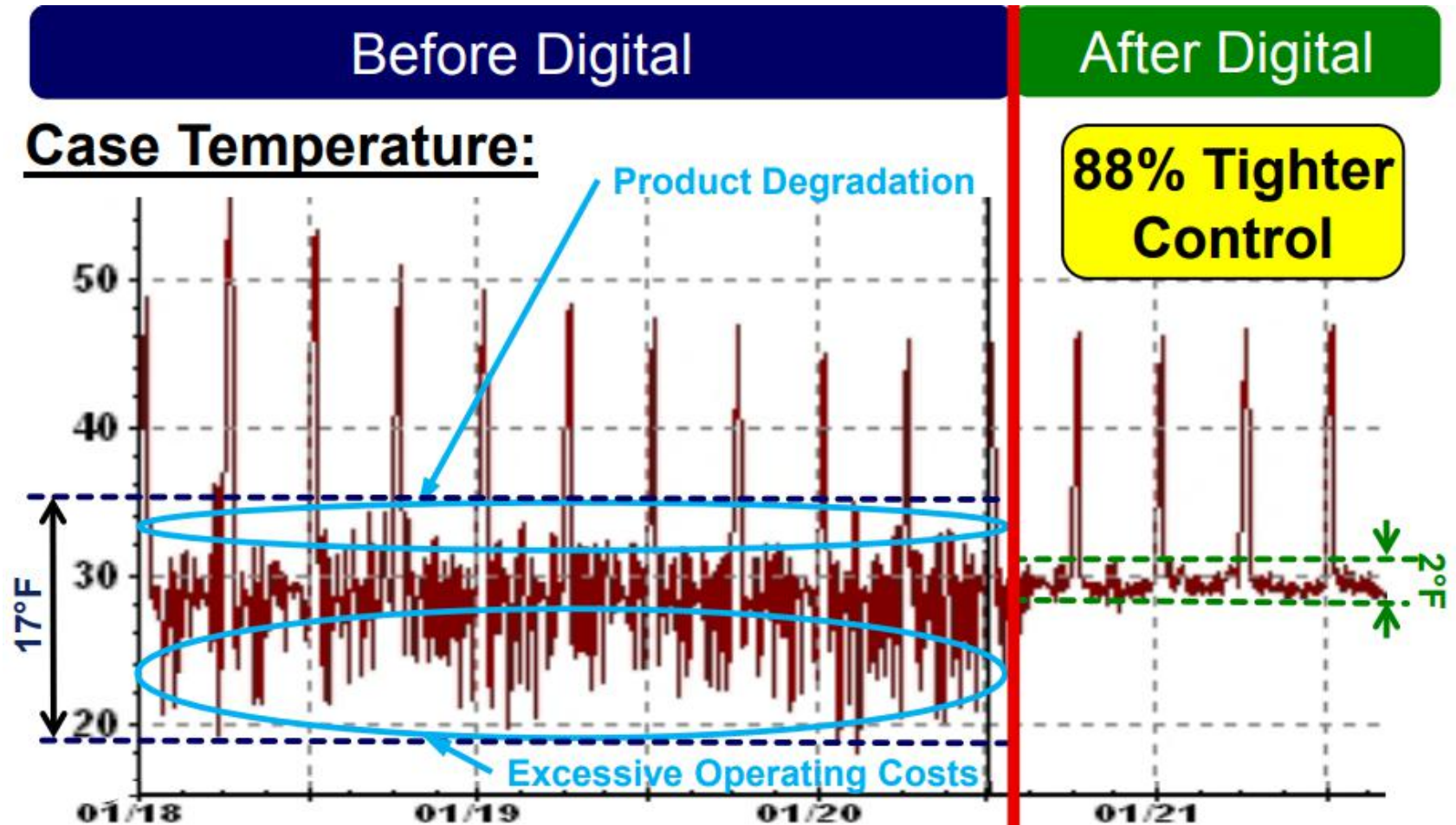
Dairy Case with Discus Digital with CoreSense Technology Activated

Case Temperature Range Narrow Significantly with Discus Digital with CoreSense Technology



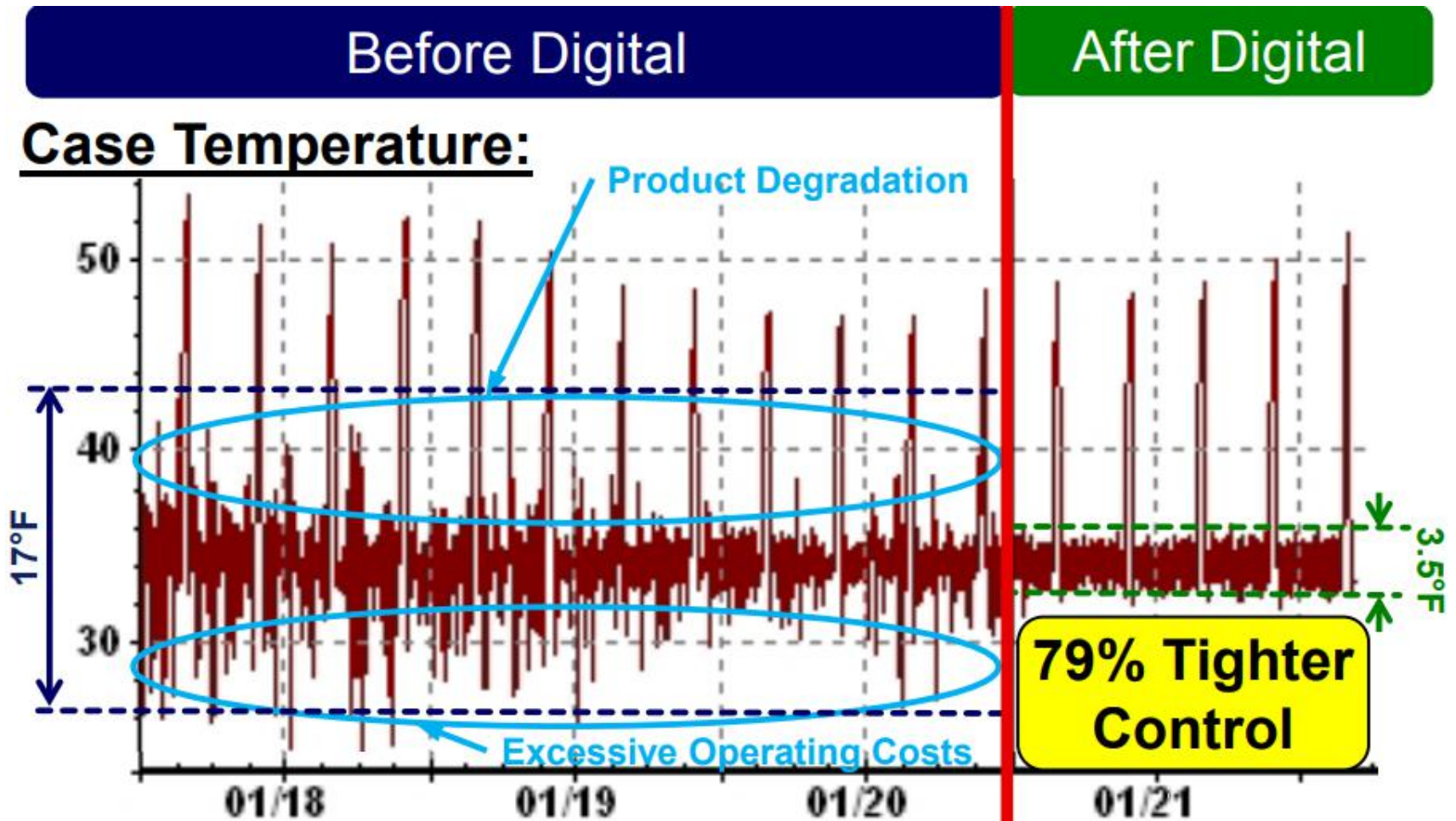
Meat Case with Discus Digital with CoreSense Technology Activated

Case Temperature Range Narrows Significantly With Discus Digital with CoreSense Technology



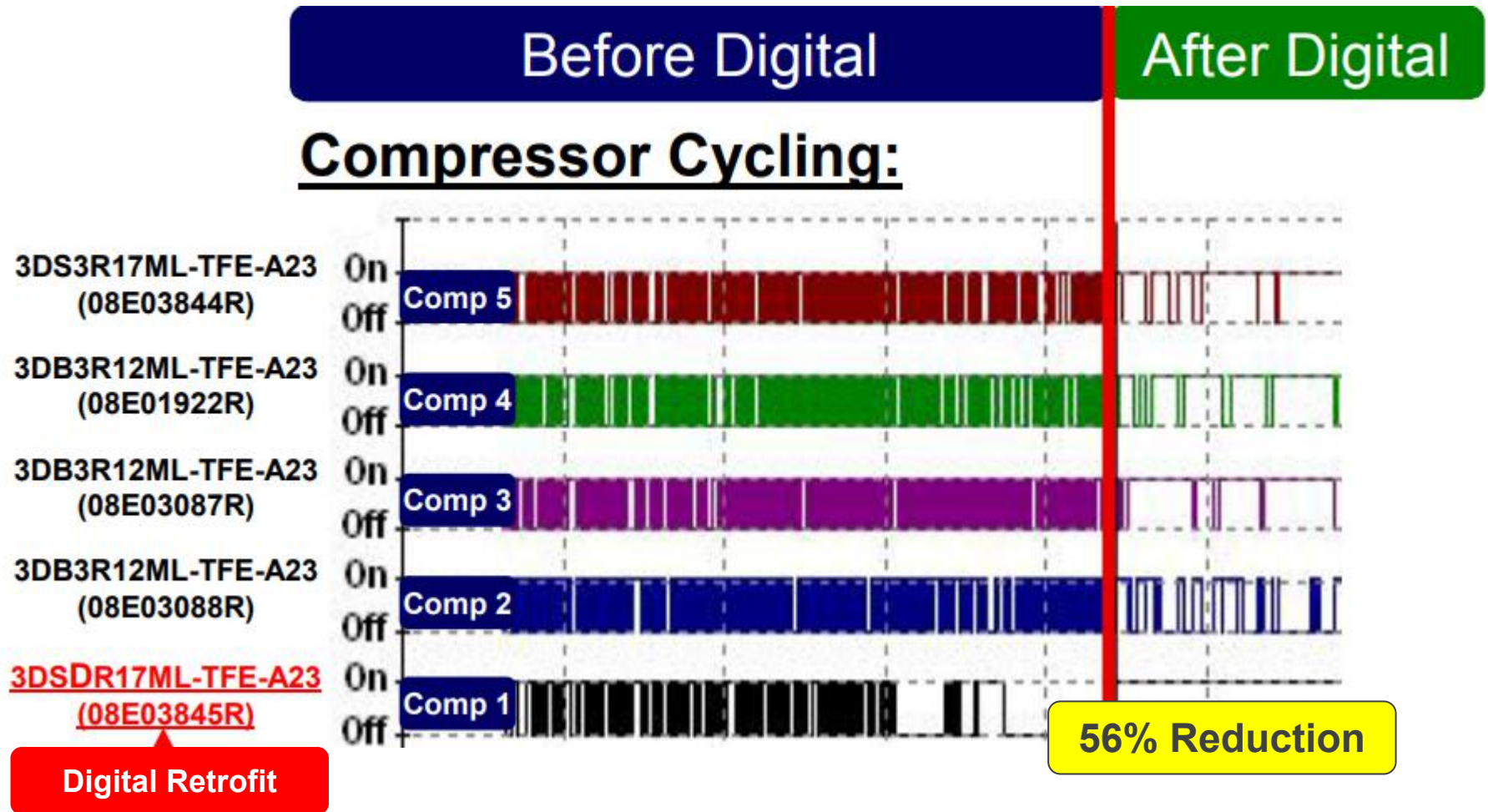
Cheese Case with Discus Digital with CoreSense Technology Activated

Case Temperature Range Narrows Significantly With Discus Digital with CoreSense Technology



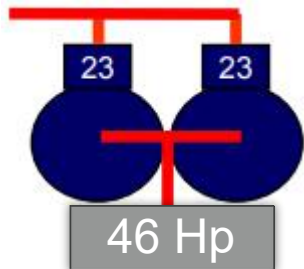
5 Compressor Rack with Discus Digital with CoreSense Technology Activated

Compressor Cycling Reduced By 56% With Discus Digital with CoreSense Technology



Leads to Paradigm Shift in Parallel Rack Design

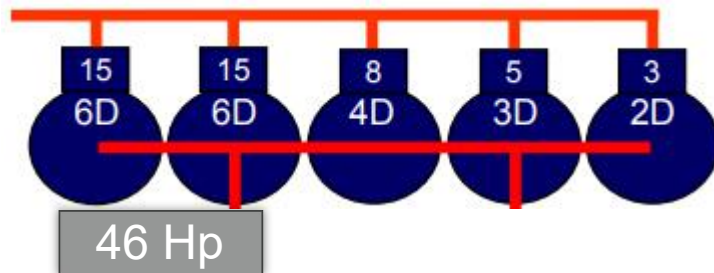
Early Rack Configurations



50% Capacity Unloading
Poor Loading Matching
Significant Compressor Cycling
High Inrush Current

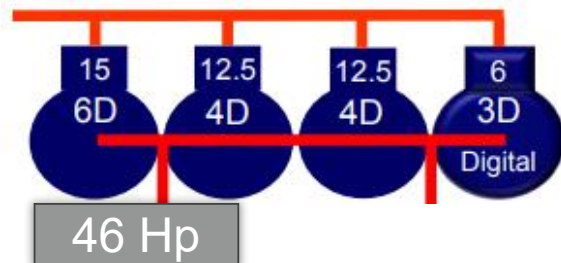
Supermarket Applications – New Store Fresno, CA

Rack-A, Traditional Configuration – Actual Store



Increased Steps of Unloading
Better Load Matching
More Compressors Needed
Increased Equipment Costs

Rack-A, Configuration with Digital – Actual Store



Variable Unloading Up To 90%
Excellent Load Matching
Reduced Number Compressors
Lower Capital Equipment Costs

Discus Digital™ with CoreSense Technology Benefits

+ Energy Reduction

- 3-10% of Refrigeration System

Value / Store

\$3,500 - \$11,000

+ Cycling Reduction

- Increase in Compressor Reliability
- Reduction in Contractor Maintenance
- Reduces Tube Stress Due to Comp Start/Stop

~0.2% Improvement
50% Reduction

+ Tighter Temperature Control

- Case Temperature +/- 1.5°F

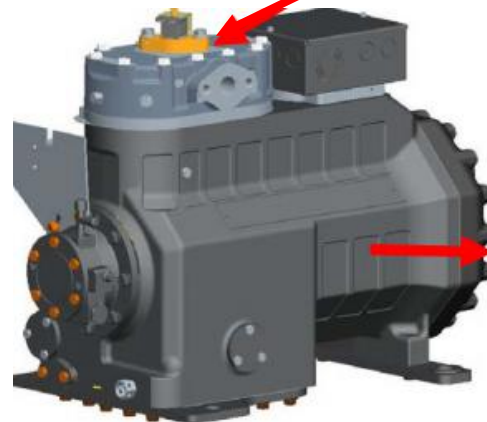
Reduced Shrink

Copeland Discus Digital™ with CoreSense Technology

- Continuous Capacity Modulation from 10 to 100%* on Copeland Discus with CoreSense Technology Compressors
 - Available with 3D, 4D and 6D
- Applicable on New & Potentially Existing Discus Compressors
- Patented Technology

Modulation Range

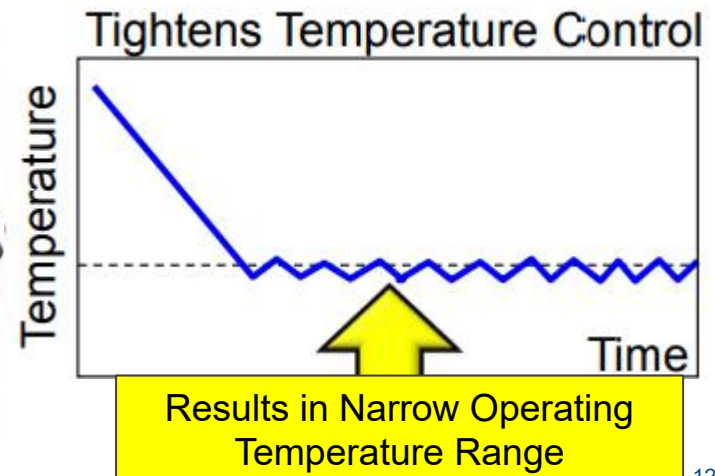
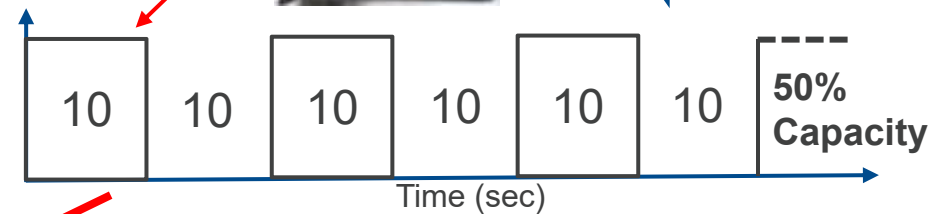
- 3D Discus Digital 10 – 100%
- 4D Discus Digital 50 – 100%
- 6D Discus Digital 33 – 100%



Digital Control Module



Not needed with Intelligent Store Architecture



Discus Digital™ with CoreSense Technology Nomenclature for 3D

Example

Standard Models

Digital Models

High/Med Temp

3DS3R17ME

3DSDR17ME

Med Temp

3DS4S12ME

3DSDS12ME

Low Temp

3DS3F46KE

3DSDF46KE

4th Character Is "D" To Indicate Digital Model

6th, 7th, 8th Characters Are Capacity At Rating

Capacity Multiplier: K = 1,000

M = 10,000

Discus Digital™ with CoreSense Technology

Nomenclature for 4D & 6D

Example	<u>Standard Models</u>	<u>Digital Models</u>
High/Med Temp	4DBNR20M	4DBXR20M
Med Temp	4DHNS16M	4DHXS16M
Low Temp	4DHNF63K	4DHXF63K

High/Med Temp	6DHNR35M	6DKXR35M
Low Temp	6DHNF93K	6DKXF93K

4th Character Is "X" To Indicate Digital Model

6th, 7th, 8th Characters Are Capacity At Rating

Capacity Multiplier: K = 1,000
M = 10,000

Discus Digital™ with CoreSense Technology Model Line-Up

3D Models

Standard Model Number	Digital Model Number
Low Temp Models	
3DA3F28K*-###	3DADF28K*-###
3DB3F33K*-###	3DBDF33K*-###
3DF3F40K*-###	3DFDF40K*-###
3DS3F46K*-###	3DSDF46K*-###
Optimized Medium Temp Models	
3DF4S11M*-###	3DFDS11M*-###
3DS4S12M*-###	3SDSD12M*-###
Dual Medium & High Temp Models	
3DA3R10M*-###	3DADR10M*-###
3DB3R12M*-###	3DBDR12M*-###
3DF3R15M*-###	3DFDR15M*-###
3DS3R17M*-###	3SDSR17M*-###

4D Models

Standard Model Number	Digital Model Number
Low Temp Models	
4DANF47K*-###	4DAXF47K*-###
4DHNF63K*-###	4DHXF63K*-###
4DJNF76K*-###	4DJXF76K*-###
Optimized Medium Temp Models	
4DHNS16M*-###	4DHXS16M*-###
Dual Medium & High Temp Models	
4DANR18M*-###	4DAXR18M*-###
4DBNR20M*-###	4DBXR20M*-###
4DHNR22M*-###	4DHXR22M*-###
4DJNR28M*-###	4DJXR28M*-###

6D Models

Standard Model Number	Digital Model Number
Low Temp Models	
6DHNF93K*-###	6DKXF93K*-###
6DJNF11M*-###	6DRXF11M*-###
Dual Medium & High Temp Models	
6DHNR35M*-###	6DKXR35M*-###
6DGNR37M*-###	6DMXR37M*-###
6DJNR40M*-###	6DRXR40M*-###

Discus Digital™ with CoreSense Technology Control Options

Copeland Discus

2D, 3D, 4D, 6D



Input / Output Point



Copeland Discus with
CoreSense Protection



Discus Digital with CoreSense Protection

3D, 4D, 6D



Analog Output Point



Digital Control Module



Copeland Discus with
CoreSense Protection



Discus Digital with CoreSense Diagnostics

3D, 4D, 6D



Copeland Discus Digital™
with CoreSense Diagnostics



Discus Digital™ with CoreSense Technology Animation

Click the movie icon below to start the
Copeland Discus Digital with
CoreSense Technology animation.

