

Society of Dairy Technology Spring Conference 21st March 2024

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Sales & Marketing Director Penmann

- Brief overview of Penmann
- Why the need for rapid cooling
- Our history of rapid cooling
- Clauger Cooling Cell
- Summary & Questions

Penmann

- Established 1975
- Design and turnkey project delivery
- Cooling solutions for production areas & products
- Established provider of rack & pallet cooling systems
- Delivering solutions to a wide range of Dairy producers



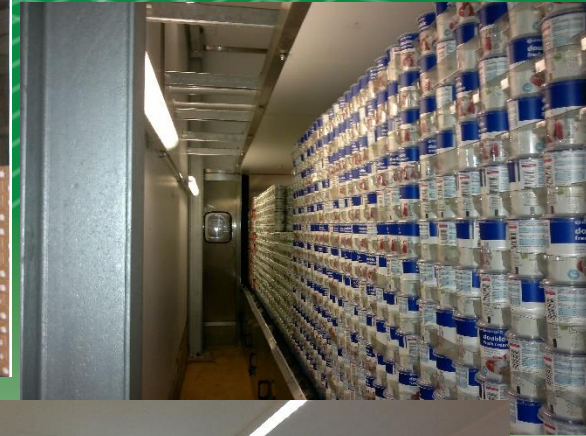
Why do you need rapid cooling

- To slow down microbial activity/process
- Get products to set and improve final appearance and texture
- Enable handling/packing
- Prevent product rejection/spoilage/complaints
- Maximise your throughput/ROI



Our experience in rapid cooling

- 1995 First inline fully automated inline pallet cooling for Muller Dairy
- Tunnels installed for Nestle Uniq plus 6 more for Mullers
- Inline cream cooler for Arla
- Static Coolers for Rachels/Bridge Farm/Dale Farm/Dairy Crest
- Partnership with Clauger and their rapid cooling cell



Penmann

INNOVATIVE CLIMATIC SOLUTIONS FOR THE FOOD INDUSTRY

IN PARTNERSHIP WITH



Rapid Cooling Cell

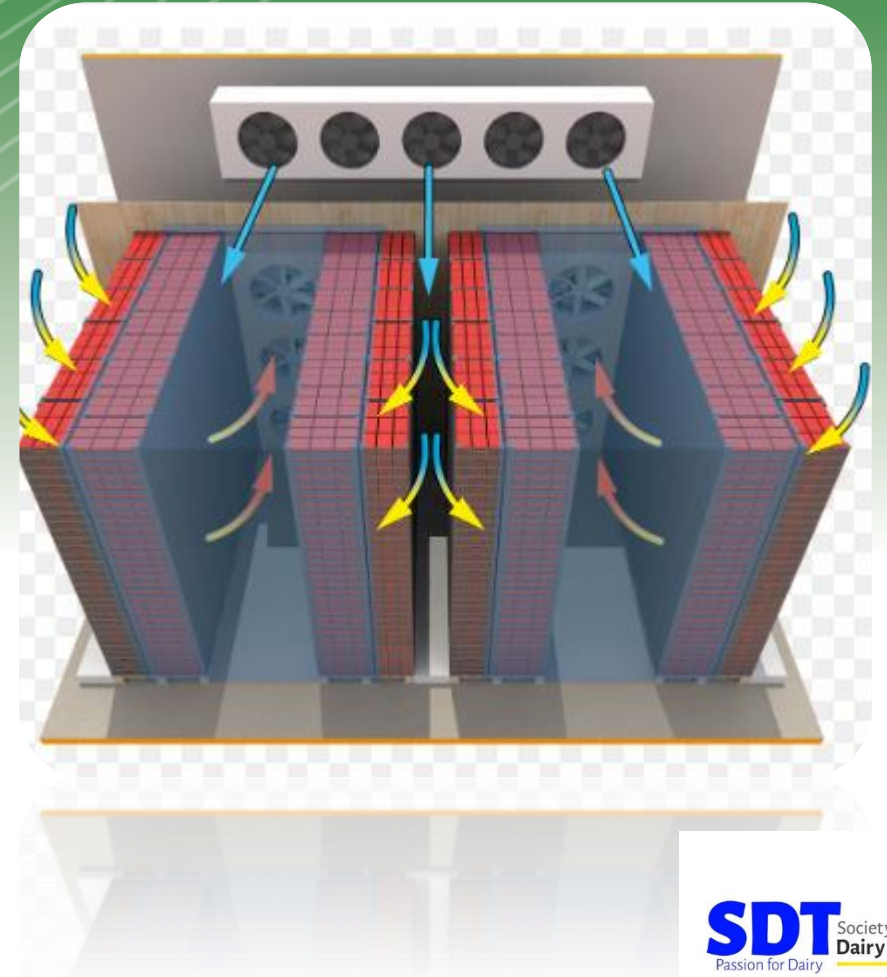
Penmann
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Standard Blast Chill issues

- Cooling System often designed on heat load
- Designed on a high velocity principle
- Air can easily bypass the product
- Product stacked too deep



Clauger Rapid Cooling Cell Features

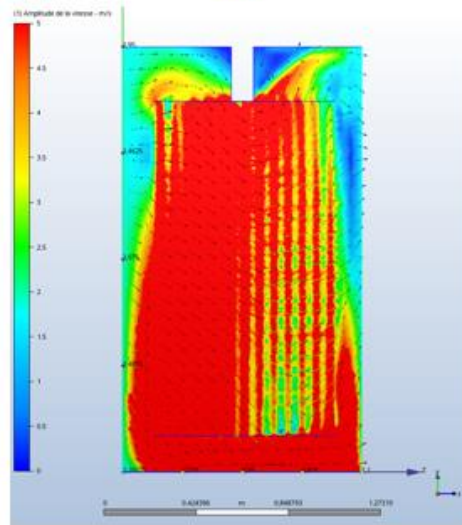
- Inflatable air bag seals
- Patented draw through airflow
- Energy efficient fans
- Cater for variable pallet/trolleys heights
- Variable residency possible
- Manual or fully automated
- Multi-Level



Airflow Simulation

Air velocity (m/s)

DO



Numerical Simulation – air velocity
Pallet side view

CLAUGER system with airtight system
around pallets

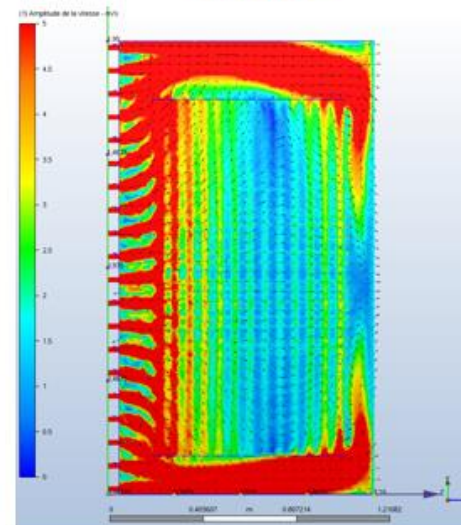
CLAUGER system with airtight system

Pallet side view

Numerical Simulation – air velocity

Air velocity (m/s)

DON'T



Numerical Simulation – air velocity
Pallet side view

Different system – Without airtight system

Different system – Without airtight system

Pallet side view

Numerical Simulation – air velocity

Rapid Cells v Standard Blast Chill

- 20% improvement in efficiency (COP)
- Operate 5°C higher
- No hot gas defrost required
- Cooling reduced from 4 to 2.5 hours 40%
- 38% increase in throughput per day

Calculation for production of 20160 cups/h of 200g 4032 Kg/H 7 pallets /h 576 Kg/pallet			
	Fast cooling room CLAUGER	Traditional Blast cooling	Differences
Cooling capacity (KW)	268	224	
Number of evaporator	4	4	
Cooling capacity / unit (KW)	67	56	19,64% extra cooling capacity
Room temperature (°C)	1	-4	5DT (°C)
Time of cooling (h)	2,5	4	1,50h less cooling time
Product entrance temperature (°C)	42		
Product exit temperature (°C)	4	5	
Homogeneity of temperature inside pallet	+/- 2°C	No guarantee	
Ammonia temperature (°C)	-5	-10	
Defrosting	air	hot gas	Hot gas defrosting is more expensive
Electrical consupcion compressor (KW)	79	79	same electricity consumption for refrigeration
COP compressor (screw)	3,4	2,84	
Production time FFS machine (hour/day)	5,5	4,0	
Incubation time (h)	5		
Cooling time (h)	2,5	4	
Total time of production	13,0		
Production (Tons/day)	22,2	16,1	Gain 6 tons / day

Production (Tons/day)	22,2	16,1	COP
Total time of production	13,0	4	
Cooling time (h)	2,5	4	
Incubation time (h)	5	4,0	
Production time FFS machine	5,5	4,0	
COP, compressor (screw)	3,4	2,84	

Benefits of rapid cooling

- Dramatically improved your cooling times and reduce bottle necks
- Controlling PH levels and improve product texture
- Improved your product shelf life and quicker dispatch
- Improve throughput and increase capacity
- Consistent product
- No product rejection
- New or retrofit installation possible



Summary

- We can provide you with a wealth of knowledge and experience in dairy production
- Rapid Cooling Cells provide great benefits to producers
- Thank you for your time and any questions or challenges we can help you with?