Rotoplas 2017
Chicago

The Matrix
Making Roto molding Plants
more Efficient

Presented by: Gary Lategan

The MATRIX
Of Roto Moulding

There are many different Lean Programs

Such as ....


5S
SORT
STRAIGHTEN
SHINE
STANDARDIZE
SUSTAIN


7S
OVERPRODUCTION
WAITING
TRANSPORT
MOVEMENTS
PROCESS
STOCKS
FLAWS

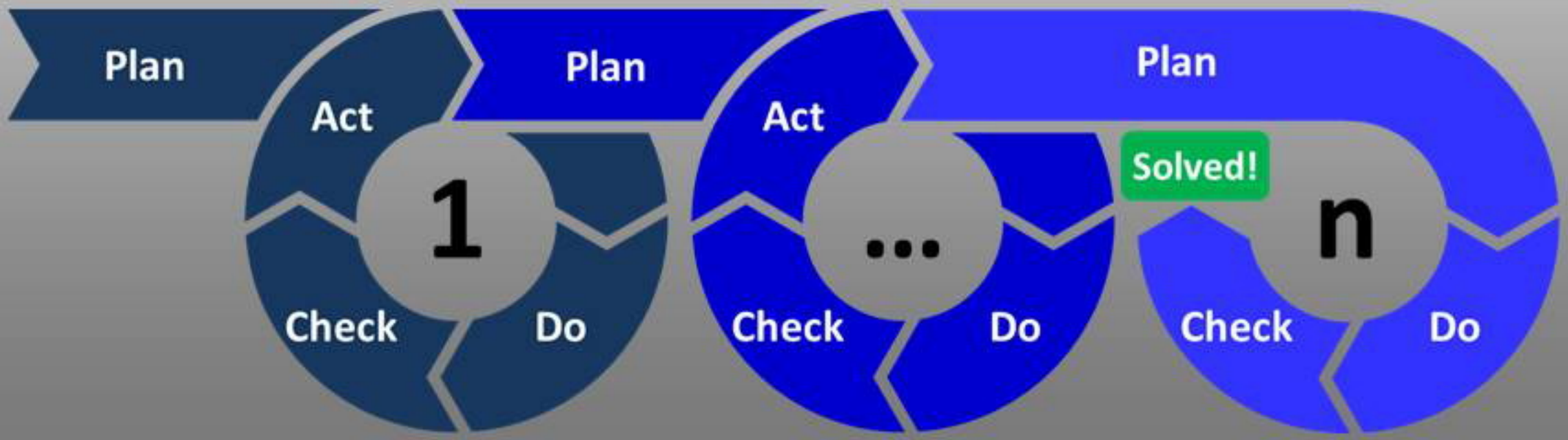

Continuous Improvement (Kaizen)
Standardized Work
Make Problems Visible
Develop Countermeasure
Determine Root Cause
Hypothesize Solution
Test Hypothesis
Implement Solution

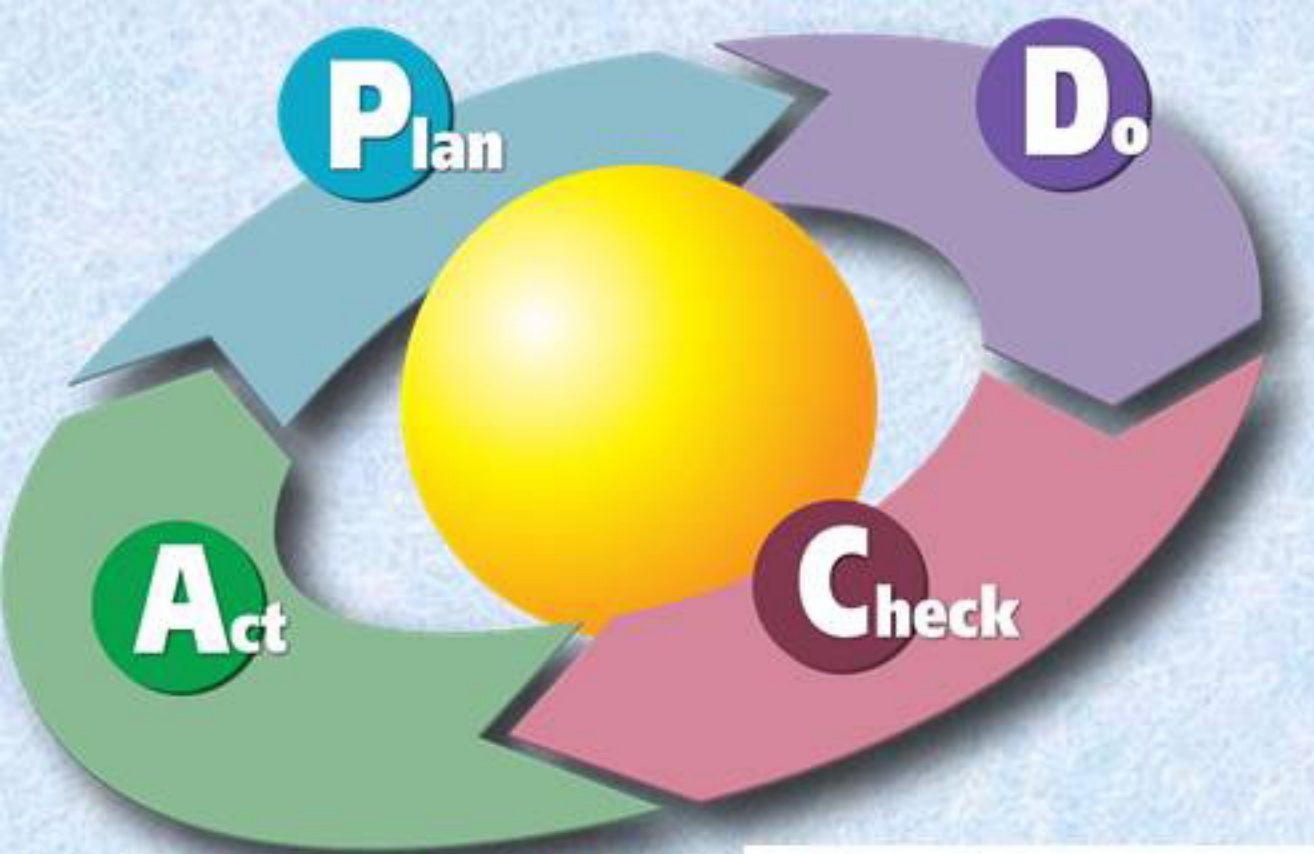

LEAN
6σ
Define
Measure
Analyze
Improve
Control

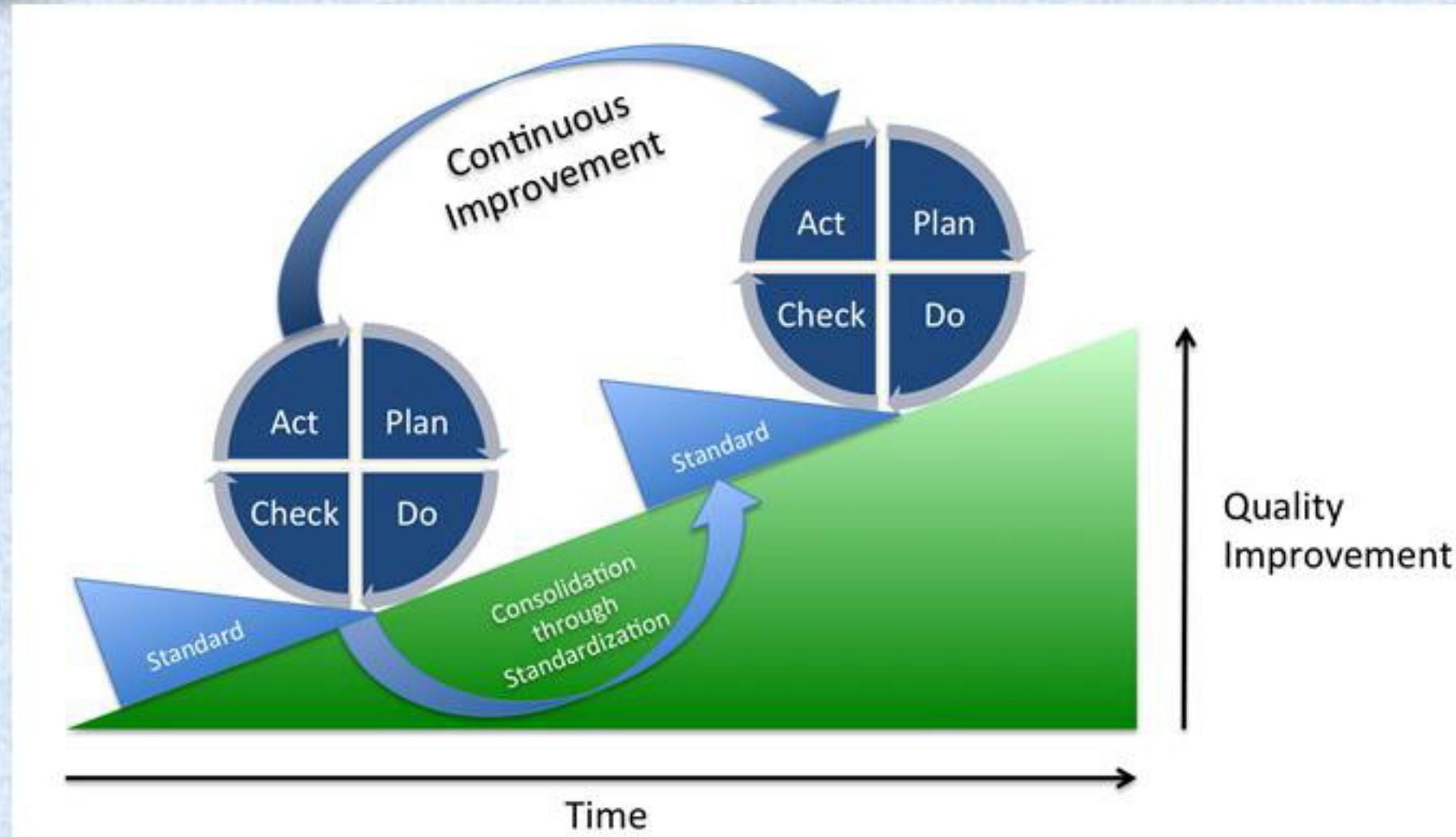
The MATRIX
Of Roto Moulding

The Common factor is ....

Continuous Improvement




Plan
Do
Check
Act


Continuous Improvement
Act
Plan
Check
Do
Act
Plan
Check
Do
Standard
Standard
Consolidation through Standardization
Quality Improvement
Time

So what did we do!

We found all interesting but
Complicated to Implement
with uneducated staff
so we simplified

“Simple but Smart”

was born!

The MATRIX
Of Roto Moulding

We focused on

Measure – Control - Improve

Every step of the process

The MATRIX
Of Roto Moulding

Production is a
QUALITY PART ON TIME

Means as fast as possible
Without reducing QUALITY

The MATRIX
Of Roto Moulding

Is based on
Lean Manufacturing
on the Factory Floor

SAVES Time, Energy & Money

The Rotomoulding Process

Design

- Parting Line
- Vent
- Operators
- Easy of Use
- Draft

Polymer

- Additives
- Modifier
- UV
- Internal release
- Thermal Stability

Moulds

- Type
- Thickness
- Position
- Rotation
- Speeds
- Shielding
- Air Movers

Heating

- Burner
- Air Flow
- Transfer
- Distribution
- Faster
- More Even

Cooling

- Fast
- Even
- Cooling
- Remove
- Inserts
- Hot

De - Moulding

- Easy to
- Remove
- Open
- Good Tools
- On Floor
- Assembly

Measure - Control - Improve

Moulded Part

The MATRIX
Of Roto Moulding

Machine configuration

Is one of the biggest costs
If not the biggest

The Right Machine

In my opinion it is a

Rock & Roll 3 Station

or

TURRET 3 arm 3 Station

The MATRIX
Of Roto Moulding

	1	2	3	4
Heating				
Cooling				
Demould				

The MATRIX
Of Roto Moulding

	1	2	3	4
Heating	20	24	23	
Cooling	25	30	32	
Demould	28	15	20	

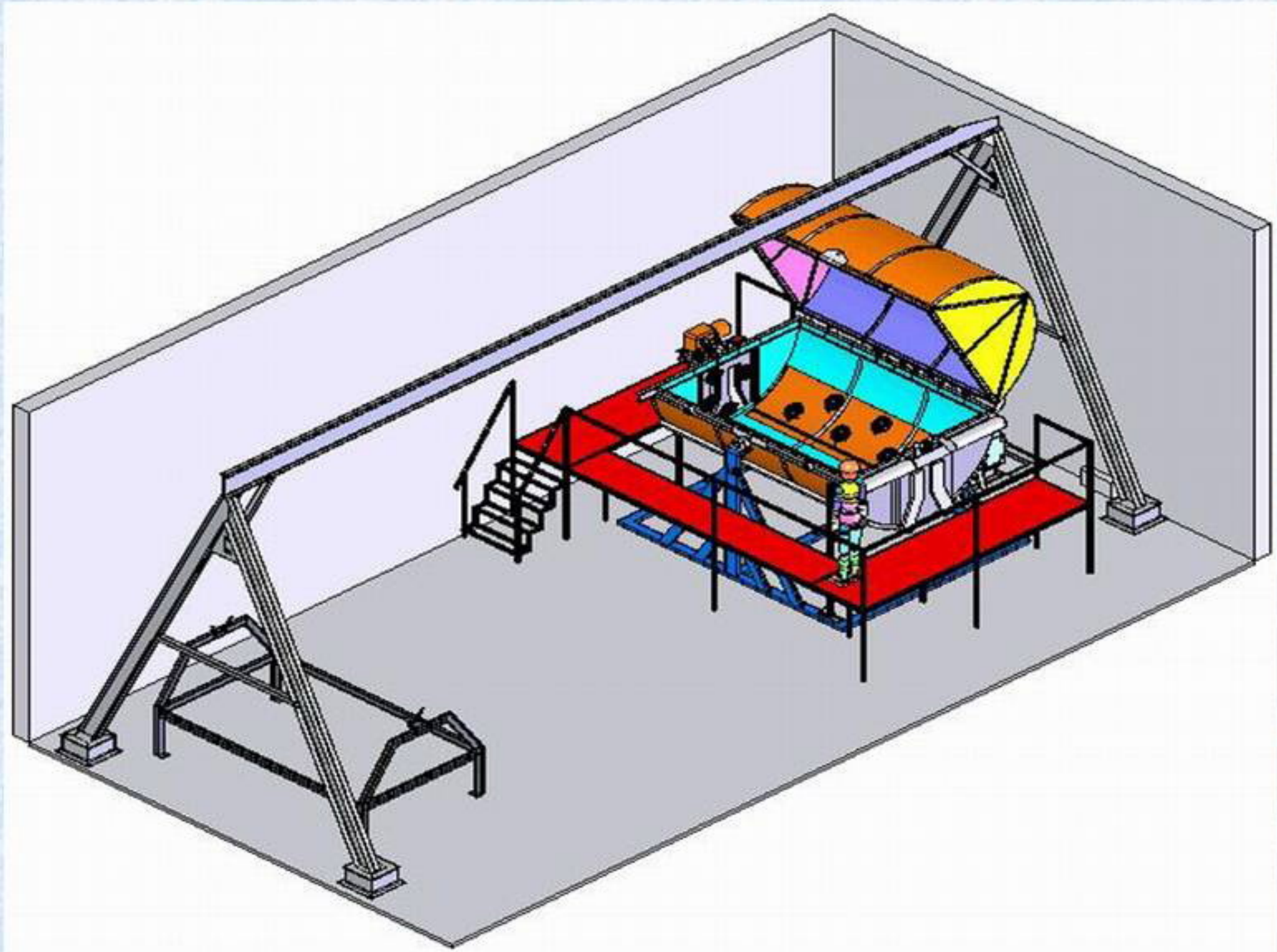
The MATRIX
Of Roto Moulding

	1	2	3	4
Heating	20	24	23	
Cooling	25	30	20	
Demould	28	15	20	

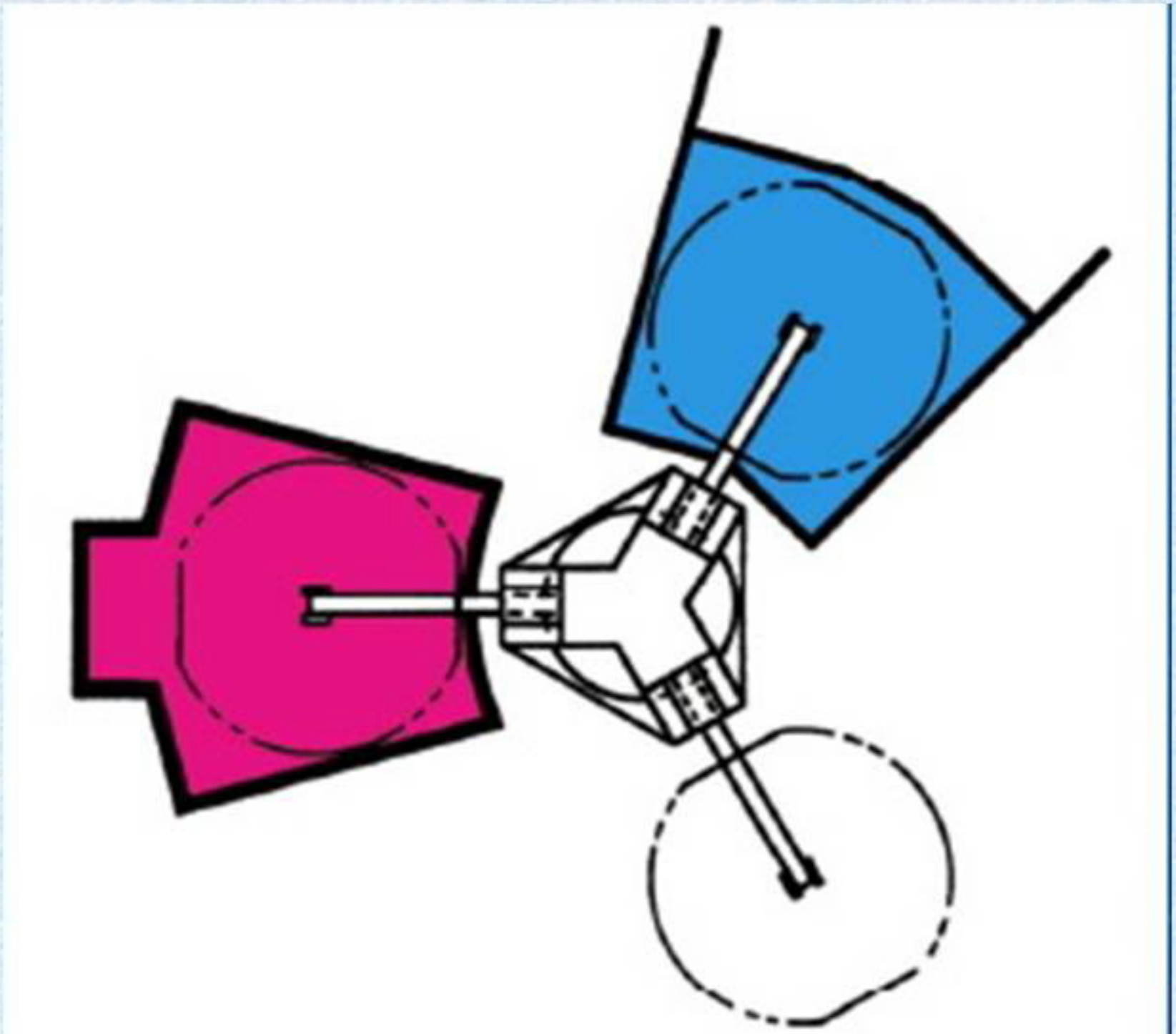

1
1:33:46
2
1:59:30
3
1:59:30


1979
1981

Over / Under Linear R&R Machine



3 ARM Turret Machine



The Wrong machine

Independent 4 ARM Carousel
With 5 or 6 Stations

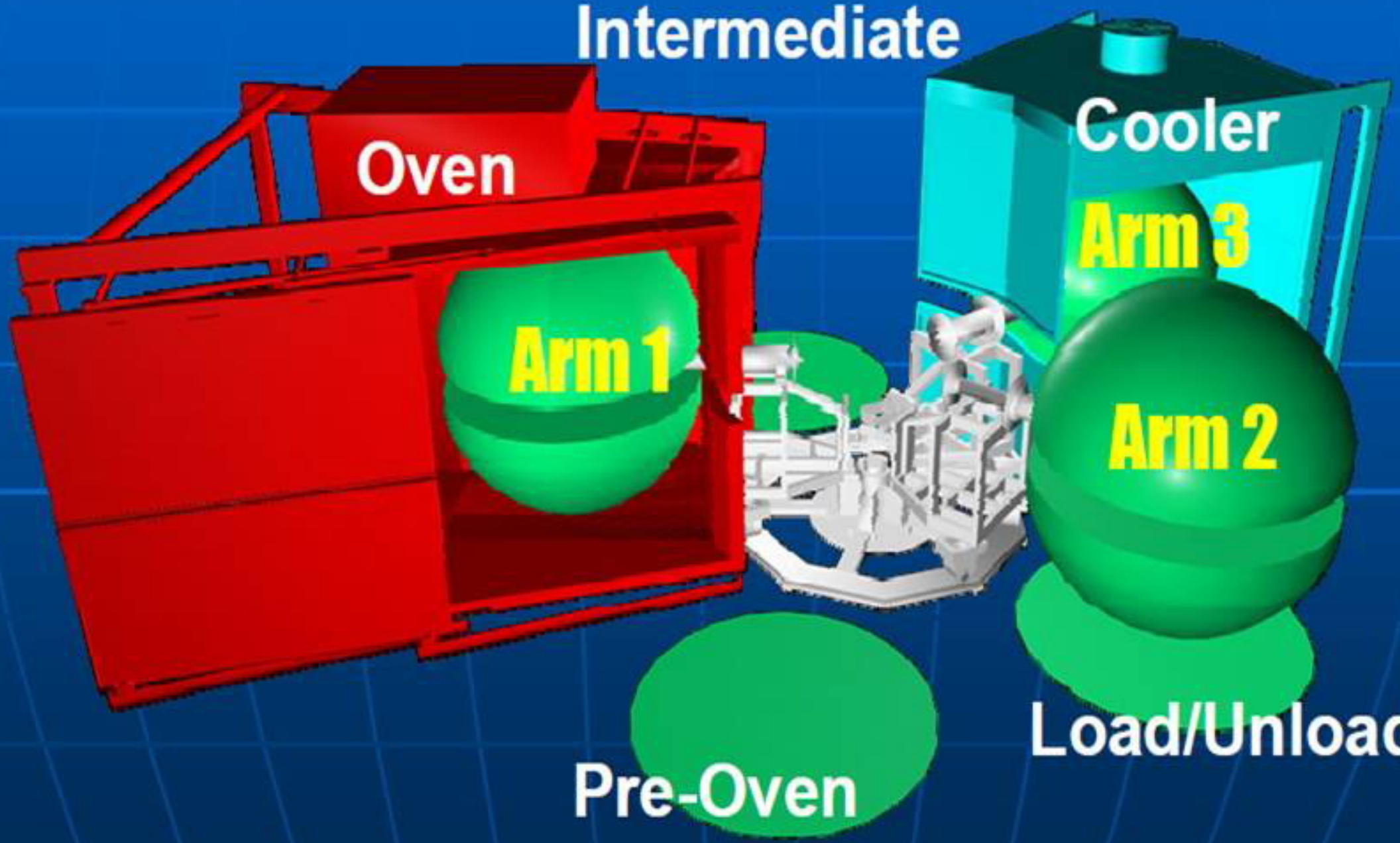
2 ARM Shuttle

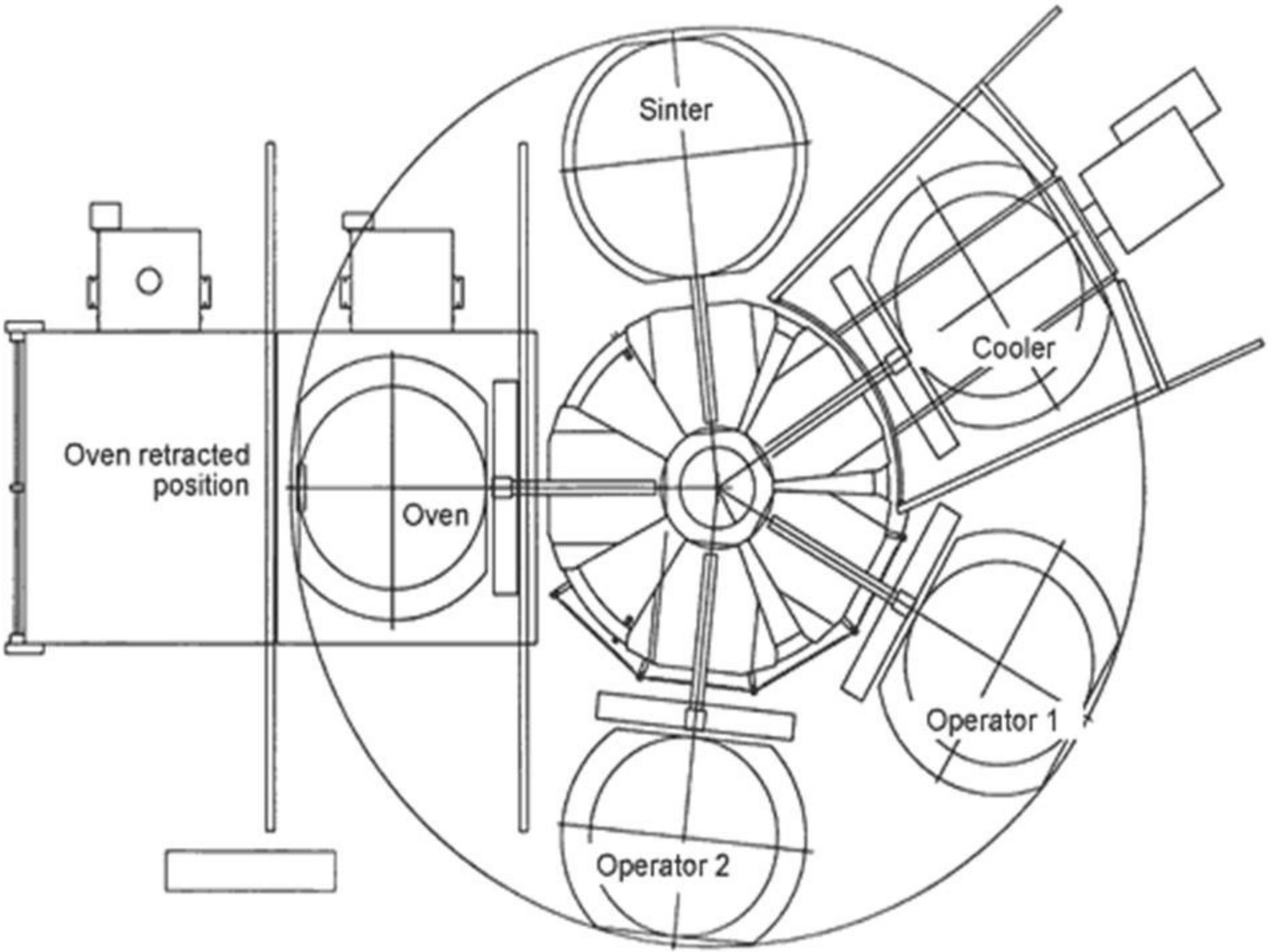
Open Flame Rock & Roll

Rocking Oven

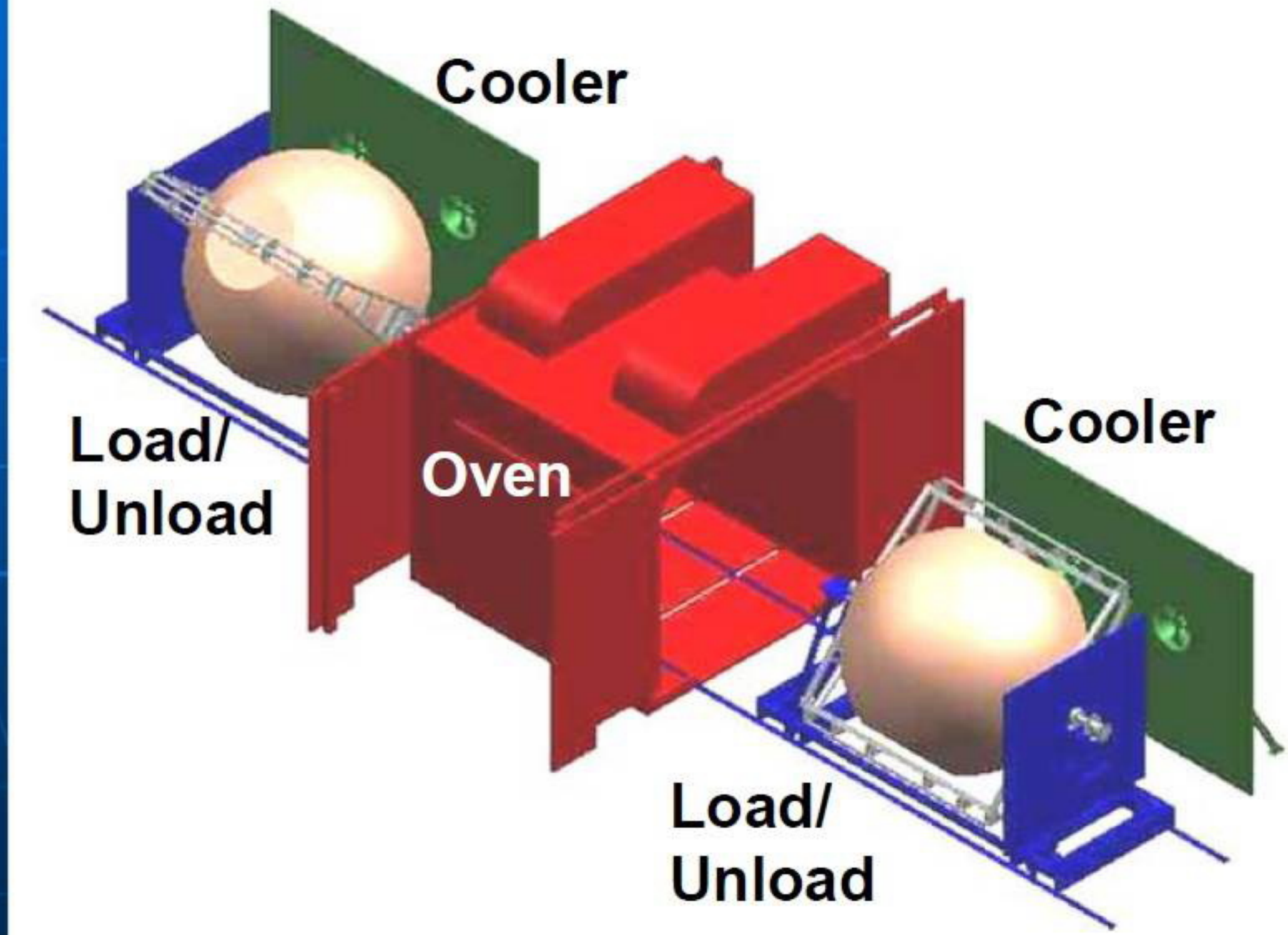
Independent-Arm Machine

3-Arms -- Five Workstations

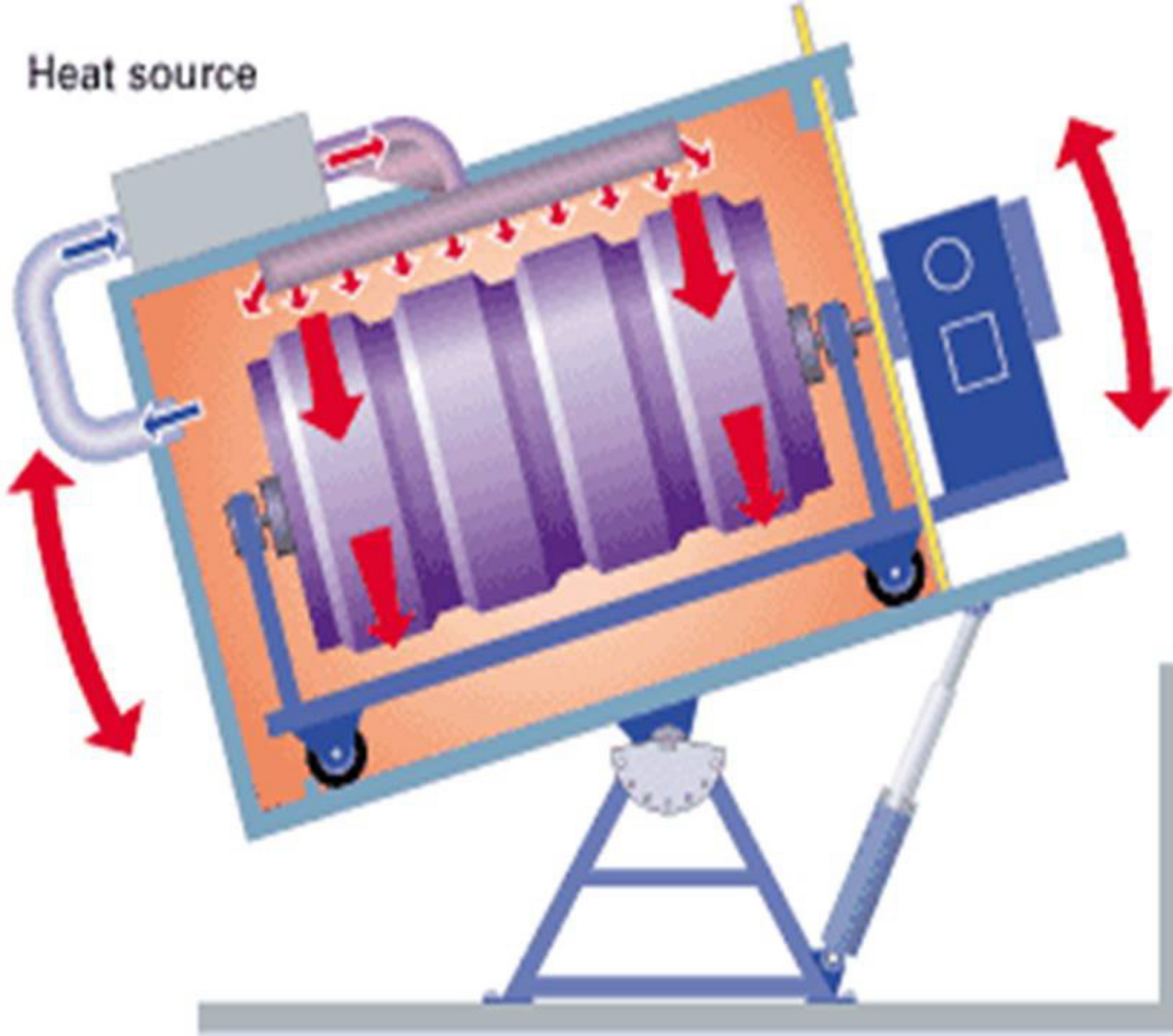



Sinter
Cooler
Oven retracted position
Oven
Operator 1
Operator 2

2 Arm Shuttle Machine



Heat source



ARM 1

2001

TempLogger - [Data Comparison]

File Language View Setup Window Help

C:\...\Scandinavia\

TempLogger

Open File
Save File
Print
Zoom
Slope
Undo slope
1 2 3 4 5 6
Smooth

Return
Close

Graph	Temp	Description	
1 < 0 >	198 °C	3 070124 16:28:44 00000	Muotti 1
2 < 0 >	31 °C	3 070124 16:28:44 00000	Uuni
3 < 0 >			

Graph	Temp	Description	
4 < 0 >	107 °C	4 070124 15:44:15 00000	Muotti 1
5 < 0 >	264 °C	4 070124 15:44:15 00000	Muotti 3
6 < 0 >			

Run Time
00:13:00
Thin line
Thick line

2007/05/24 09:42 AM

TempLogger - [Production Graphs]

File Language View Setup Window Help

C:\Program Files (x86)\TempLogger\Demo

TempLogger

Load

Refresh

Time Scale

Zoom

Menu

All Senders

Return

Close

Back

Next

All Senders

1 2 3 4

Description	Recorded
Internal mould	
Oven temp	
Internal mould	
Internal mould	

Log Time	Date
	2004-10-22

Start time	Hours
03:33	9

Sender

2013/09/03 12:41 PM

TempLogger - [Production Graphs]

File Language View Setup Window Help

C:\Program Files (x86)\TempLogger\Gary Demo

TempLogger U6

Load

Refresh

Production

Time Scale

Zoom

Menu

All Senders

Return

Close

01:00 02:00 03:00 04:00 05:00 06:00 07:00

400 °C 350 °C 300 °C 250 °C 200 °C 150 °C 100 °C 50 °C 0 °C

All Senders

00:10 00:20 02:50 03:00 03:10 03:20

Machine Production

Products Produced

(•) Individual Products
( ) Combined Products

From Date 2004-10-22 Start 03:33:40
To Date 2004-10-22 Stop 12:36:02

All Stations

Back Next

Close

Arm	Product Code	Description	Qty	Weight	Oven Time	CoolingTime	Demoulding	Cycle Time
		TOTAL	17	524.00	01:56:07	02:07:10	04:02:20	08:05:37
2	P001	Guard hut with seat	1	50.00	00:21:40	00:22:30	00:48:53	01:33:03
3	P003	1000 litre water tank	1	24.00	00:26:10	00:23:40	00:39:53	01:29:43
1	P005	Large dog kennel	1	16.00	00:22:10	00:15:40	00:50:25	01:28:15
2	P001	Guard hut with seat	1	50.00	00:21:00	00:18:40	00:44:10	01:23:50
3	P003	1000 litre water tank	1	24.00	00:24:10	00:21:30	00:48:20	01:34:00
1	P005	Large dog kennel	1	16.00	00:17:10	00:16:00	00:58:34	01:31:44
2	P001	Guard hut with seat	1	50.00	00:24:00	00:18:20	00:53:30	01:35:50
3	P003	1000 litre water tank	1	24.00	00:20:40	00:22:10	00:42:16	01:25:06
1	P005	Large dog kennel	1	16.00	00:16:20	00:23:40	00:44:43	01:24:43
2	P001	Guard hut with seat	1	50.00	00:19:00	00:21:40	00:42:12	01:22:52
3	P003	1000 litre water tank	1	24.00	00:21:10	00:26:20	00:34:03	01:21:33
1	P005	Large dog kennel	1	16.00	00:19:00	00:28:20	00:38:39	01:25:59
2	P001	Guard hut with seat	1	50.00	00:18:50	00:21:00	00:43:01	01:22:51
3	P003	1000 litre water tank	1	24.00	00:20:30	00:30:40	00:31:30	01:22:40
1	P005	Large dog kennel	1	16.00	00:15:40	00:19:00	00:41:55	01:16:35
2	P001	Guard hut with seat	1	50.00	00:19:40	00:19:10	00:44:57	01:23:47
3	P003	1000 litre water tank	1	24.00	00:21:10	00:33:10	00:19:59	01:14:19

Back Next

All Senders

1 2 3 4

Description	Recorded
Internal mould	
Oven temp	
Internal mould	
Internal mould	

Log Time	Date
	2004-10-22

Start time	Hours
03:33	8

Sender

2013/04/25 08:54 AM

TempLogger - [Production Graphs]

File Language View Setup Window Help

C:\...\ZALOHA 20.4.12 WEEK16 - Copy

TempLogger U6

Load

Refresh

Production

Time Scale

Zoom

Menu

All Senders

Return

Close

Back Next

All Senders

1 2 3 4

Description	Recorded
Vnutro	
Stred	
Dno	
Pec	

Log Time	Date
6:50:20	2012-10-09

Start time	Hours
05:33	8

Sender

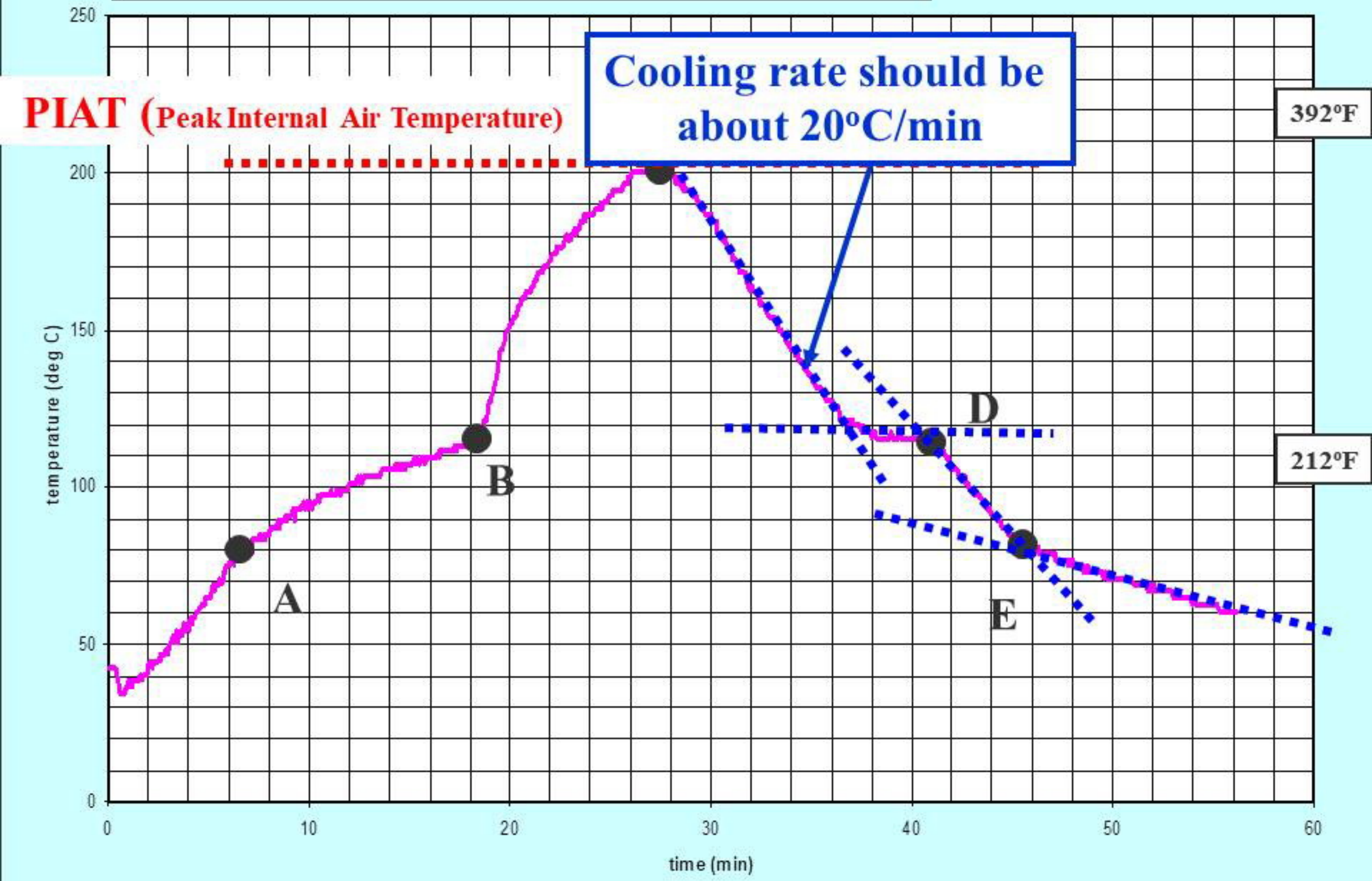
2016-06-02 06:40 PM

ENG 06:40 PM

The MATRIX
Of Roto Moulding

	1	2	3	4
Heating				
Cooling				
Demould				

The Cooling Cycle



Process Control

Find the bottle neck and solve it

Think and Design with the operator In mind as he must produce a QUALITY PART on TIME

The Operator makes our profit and is our company image

TempLogger - [Data Comparison]

File Language View Setup Window Help

C:\...\Scandinavia

TempLogger

Open File
Save File
Print
Zoom
Slope
Undo slope
1 2 3 4 5 6
Smooth

350 °C
300 °C
250 °C
200 °C
150 °C
100 °C
50 °C
0 °C

00:13:10 202 °C

070124-16H28-00000 - Muotti 1
Cure 202 Degrees C
13 Minutes
Cooling to 100 Degrees C
13 Minutes
Demolded after 27.5 Minutes

070124-15H44-00000 - Muotti 1
Cure 168 Degrees C
25 Minutes
Cooling to 100 Degrees C
32 Minutes
Demoulded after 63 Minutes

-11 °C/min
-3 °C/min

10 min 20 min 30 min 40 min 50 min 60 min 70 min 80 min

Graph	Temp	Description		
1	201 °C	3 070124 16:28:44 00000	Muotti 1	
2	34 °C	3 070124 16:28:44 00000	Uuni	
3				

Graph	Temp	Description		
4	107 °C	4 070124 15:44:15 00000	Muotti 1	
5	264 °C	4 070124 15:44:15 00000	Muotti 3	
6				

Run Time
00:13:10
Thin line
Thick line

Return
Close

2007/05/24 09:44 AM

Process Control

Faster is better when Roto-moulding

Coating the wall of the Mould Evenly with Even Heat Is the Objective

Benefits of Temperature Control?

Consistent quality!

Reduced Scrap!

Improved Output!

Increased Profit!

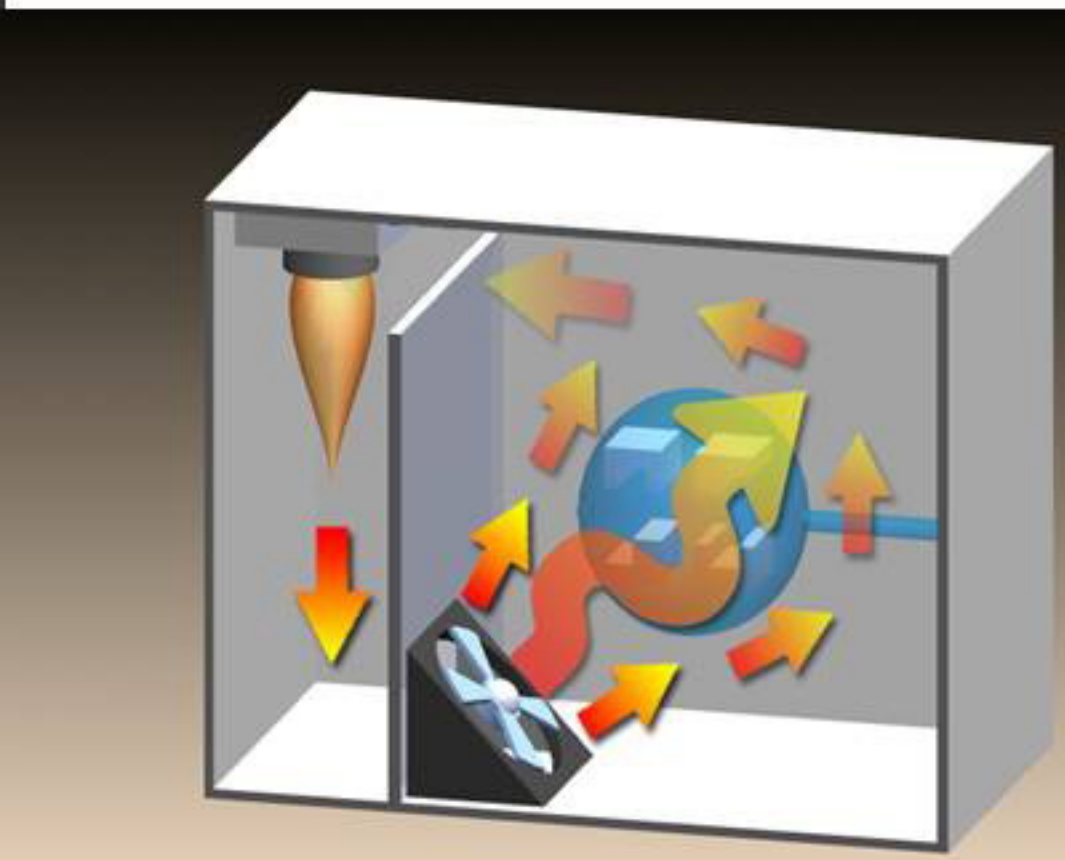
TempLogger

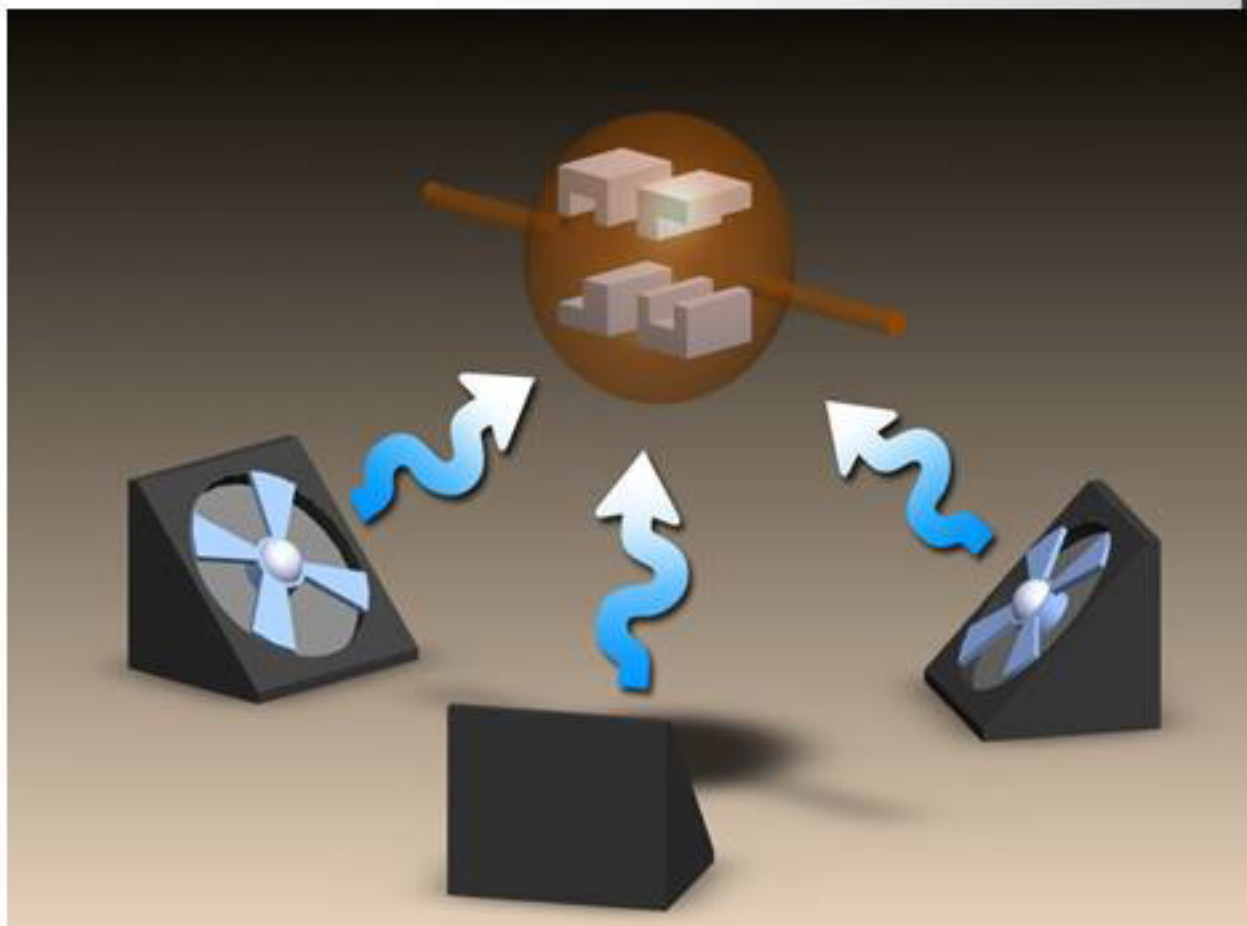
Temperature Monitoring and Control

A Roto Moulders Dream Tool

Simple but Smart

Heats and Cools the Mould Evenly





Good Design

Keep the process and operator in mind we addressing the following points

Fit for Purpose
Mould
Frame
Fixing
Production
Finishing
Delivery

So what have you done differently!

Today
Last week
Last year

Or are you happy to continue doing it the same for the rest of your life!

Need help to optimize you Roto process

Call RotoMan now for

Quality Parts on Time

Or are you happy to continue wasting Time, Energy and Money!

We offer the following Products and Services

Roto Release

The Internal Release Agent that sets you FREE!

The Internal Release Agent that sets you FREE!

Not just about a good consistent Release but includes:

1. 1000's of release without touching the tool.
2. Higher Temperature, High speed moulding.
3. Reduced Downtime
4. Reduces Surface Pinholes
5. Good consistant and even release every time
6. Faster Sintering - Reduced cycle time to reach PIAT temperatures
7. Reduces Energy Consumption
8. Assists removing parts with deep undercuts and shrink on parts
9. Good consistent quality finish on glossy or matt finish.
10. No expensive coating of tools or flanges required
12. Parting Line Flashing does not build up
13. Reduces Dust adhesion to finished product
14. Reduces Static build up in mould
15. Improved flow of material in sharp corners, and inserts
16. Easier to remove threaded parts

“ARMO” Dry Flow & Bulk Density Test Kit

How does your powder compare to the World Standard?

The Dry Flow & Bulk Density Test is meant to give you a good idea of the performance of a powder during the rotomoulding process.

Dry Flow Test

Dry flow is the time taken for 100 grams of powder suitable for rotomoulding to flow through a standard funnel and fill the measuring cup. Dry flow is the measure of how a powder will tumble and flow in the mould during the rotational moulding process.

Flowability affects the heat transfer in the powder pool and how the powder distributes itself within the mould. Flowability depends mostly on the particle shape and to a lesser extent on particle size. Particles that have been ground poorly will have “tails” which will cause powder to have poor flow properties, possibly leading to pinholes on the surface, bridging across narrow recesses, a rough internal surface, a high void content within sharp corners and threads in the moulded part.

Handy 8x Magnifier

For Quality Control with accurate 10mm scale

Ideal for checking and monitoring

Porosity, Bubble, Pinholes

Powder Particle Sizes & Shape

Dry Blend & Compounding Quality

No batteries, fixed focal length.

Roto Solutions & TempLogger

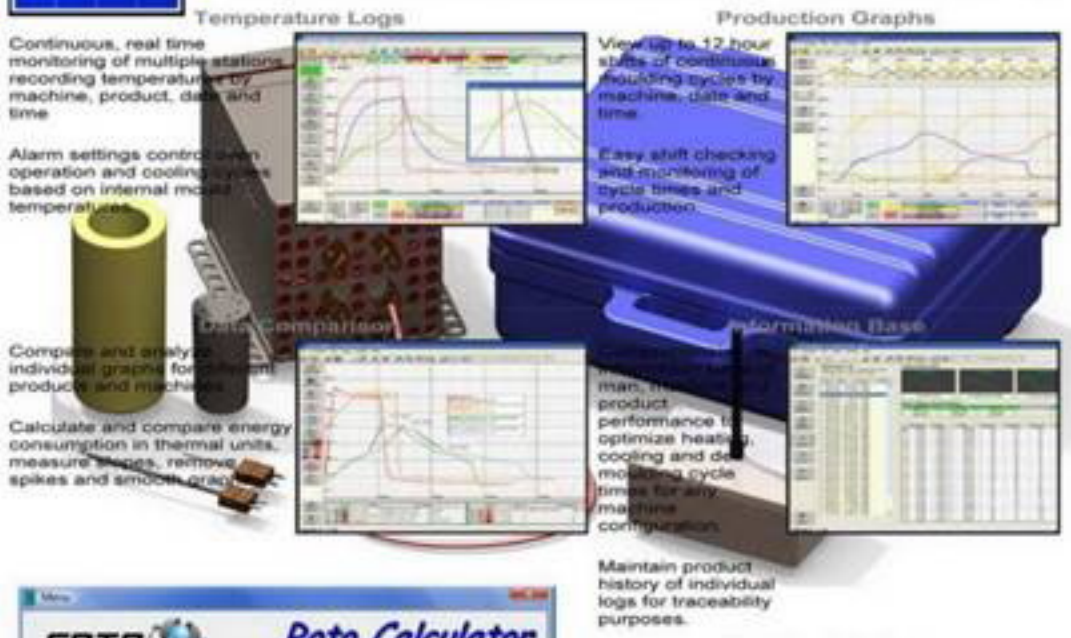
Dream Tools for the Roto Moulder

Ever wished there were tools out there to help make the process of producing Roto Moulded parts better, quicker and easier!

Look No Further!

TempLogger

Temperature Monitoring and Control



ARMO
Dry Flow Funnel & Bulk Density Tester

Gary Lategan

gary@rotosolutions .co.za

A Man on a Mission

A moulder with a vision to make the rotomoulding process a state of the art process rather than something out of the Dark Ages, Gary Lategan set out to find ways and means to achieve his goals.

Gary travelled the world looking for advice and help in the '80's and 90's after being isolated from the world for the first 10 years of his moulding career due to economic sanctions placed on South Africa.
However after his travels to the US, Europe and Australia,he returned home unsatisfied with what he had learnt and purchsed. This initial disappointment provided the inspiration that Gary needed to develop tools and systems to help him achieve his goals.

Today, with 29 years' experience as a rotational moulder and a consultant to the industry for the last 8 years, Gary is internationally recognized as an innovator and leader in the rotational moulding industry.
Gary has worked with over 200 customers in 39 countries worldwide. He never misses an opportunity to share or gain knowledge of the rotomoulding industry and its processes. He developed **TempLogger** and related tools to help moulders attain their full potential . Gary has also been invited as a guest speaker to many international conferences and has spent many hours consulting in factories around the world.

Gary was a partner in Atlas Plastics from October 1979 to November 2006 where he held the position of Technical Director. During this time he was involved with the design and development of the products, moulds and machines.
He developed production systems for just about every type of rotomoulding imaginable and recognized the necessity to monitor and effectively manage temperature throughout the production process. By the time he left Atlas Plastics in 2006, the factory was manufacturing about 2 500 rotomoulded products daily.

Roto Solutions was founded in 2004 as an R & D company focused on innovation for the rotomoulding industry, its main focus being on temperature control for which the **TempLogger** temperature monitoring and control package was developed.
Gary's vision was to develop a diagnostic tool to optimize heating and cooling cycles while allowing operators to identify faults real time and obtain a better understanding of the process, thereby producing better parts, reducing rejects and improving output.
TempLogger has evolved constantly as have the other services offered by Roto Solutions such as RotoDesign, RotoProfit and RotoCalc to mention a few.
RotoRelease is another innovative product developed by Gary as he felt the need to eliminate the use of release agents on the mould surface, which is both time consuming and leads to parts be inconsistant in quality and finish.

2010 **TempLogger** was introduced into Canada and finally 2011 sees Gary's first foray into the United States of America.

roto solutions

Need to
Streamline the Process

We offer the following onsite programs that cover the complete process:

Back to Basics with a Twist
Simple but Smart another way
RotoProfit the cutting edge

TempLogger

Temperature Monitoring and Control

For more info please contact me

Gary Lategan

+27 82 8883180

gary@rotosolutions.co.za

or visit our website

www.rotosolutions.co.za

ROTO SOLUTIONS