

# Advancement in Injection Moulding – Modern Trends

**Ferromatik Milacron India Pvt. Ltd.**

**Vatva, Ahmedabad**



**Nikunj Patel**  
**Assistant Manager**  
**Sales Project Engineering**

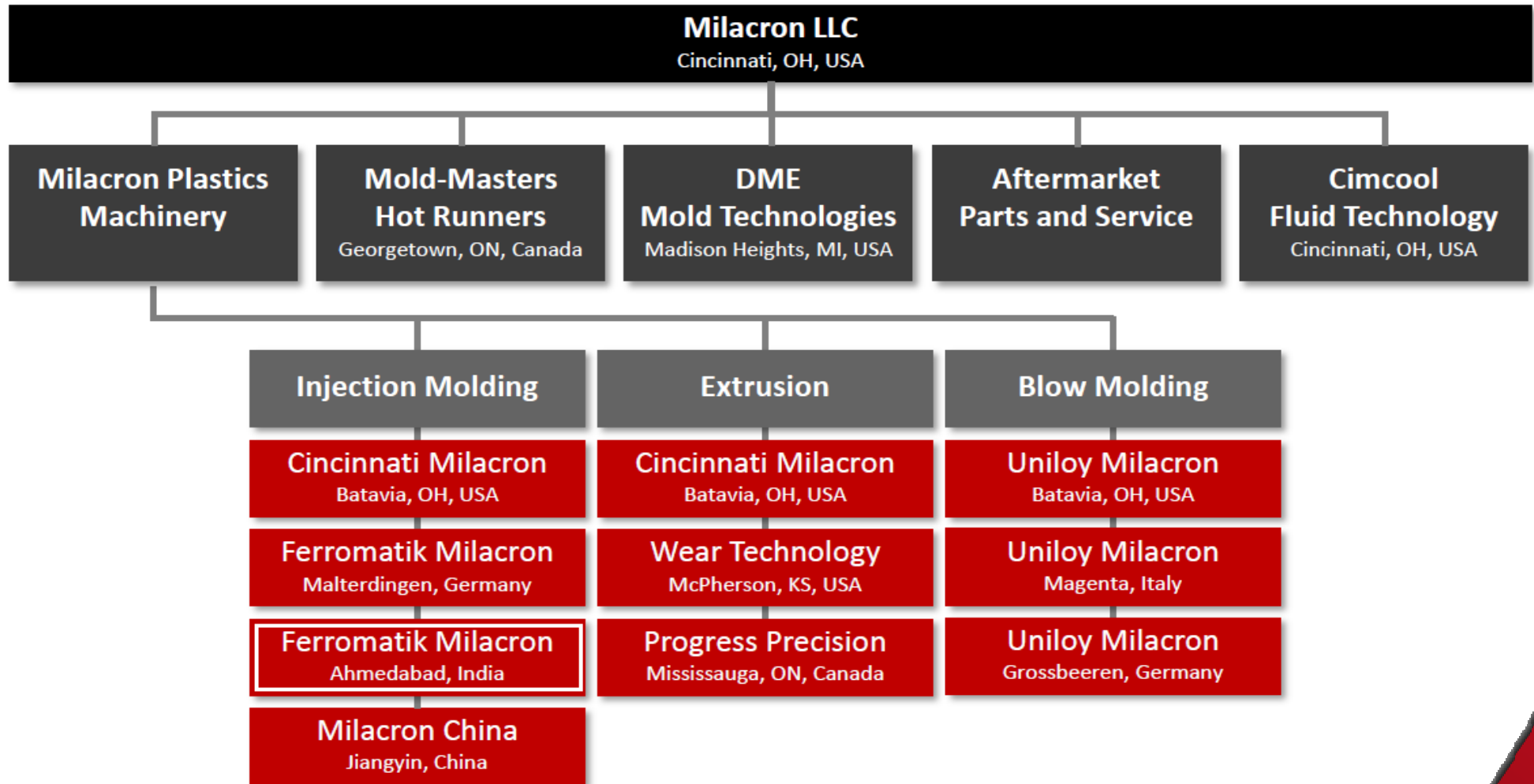


# Milacron Group

## 5 Business, 1 Focus Customer Success



# Milacron Group



Foundation – 1884

Employees – Over 4,100 Nos.

Experience - Over 125 Years

Sales – 1.1 Billion US\$

# Milacron Injection Moulding Locations

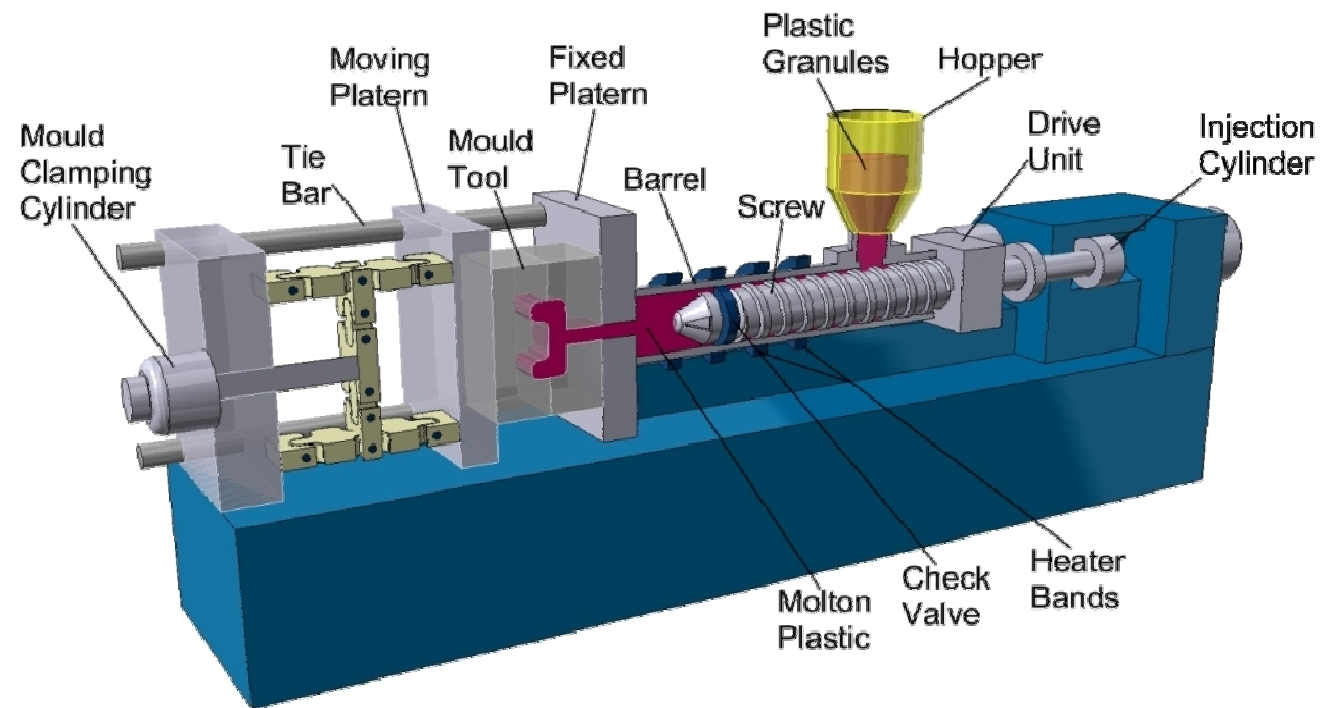
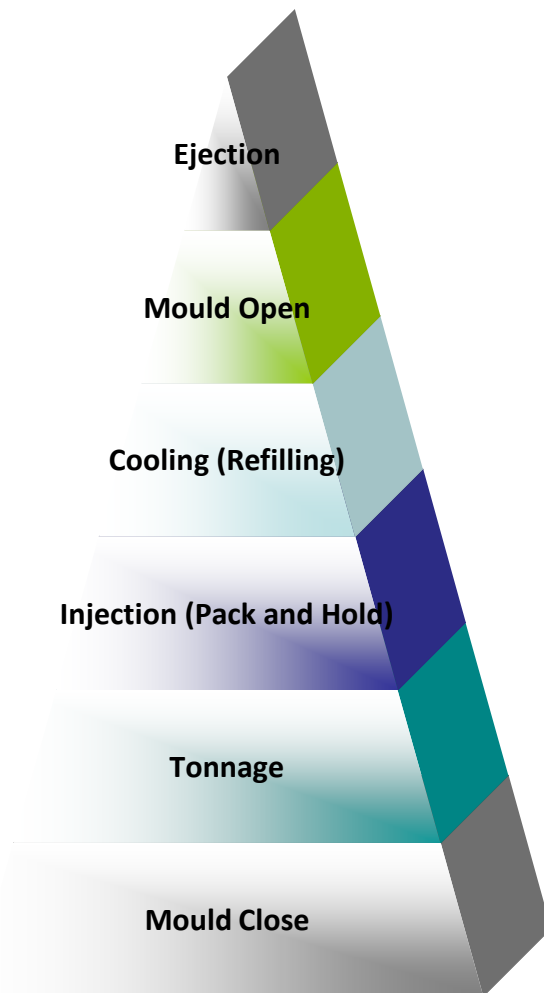




# Ferromatik Milacron India

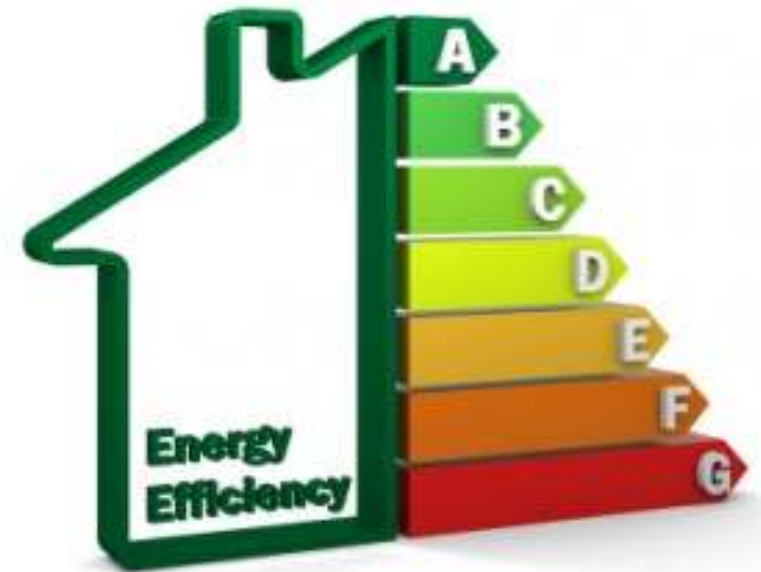
- Leading Plastics Injection Moulding Machine Manufacturer, Produce More than 1100 Machines a Year
  - Established in 1995, started Commercial Production in January'1996
  - World-class Technology & Innovation from Milacron LLC, USA
    - Global Leader in Plastics Injection Moulding Machine Manufacturing
  - Serving the Entire Gamut of Plastic Applications
  - PAN India Sales & Service Offices in Major Cities & Industrial Towns
  - Worldwide Presence - Over 40 Countries in SAARC, Middle East & Africa
    - 25% Sales from International Markets
- 
- Manufacturing Facility - 55,000 m<sup>2</sup> Area
  - Capacity – 2,000 Machines per Annum
  - Offer Machine up to 3200 Ton
  - Machines Delivered – Over 8000 Nos.

# Injection Molding



# ADVANCEMENTS IN

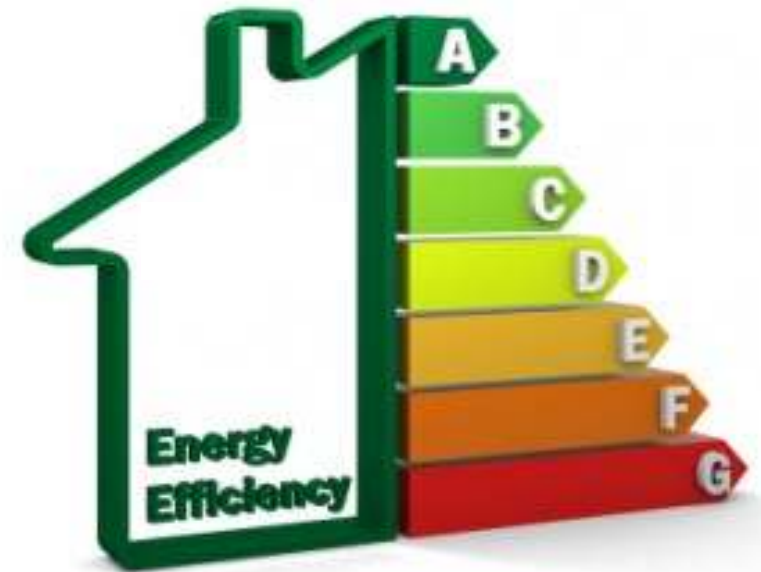
- ✓ Injection Moulding Machine
- ✓ Utilities & Auxiliaries
- ✓ Automation
- ✓ Synch with Mould
- ✓ Hawk Monitoring
- ✓ Machine Manufacturing



# ADVANCEMENTS IN

## ✓ Injection Moulding Machine

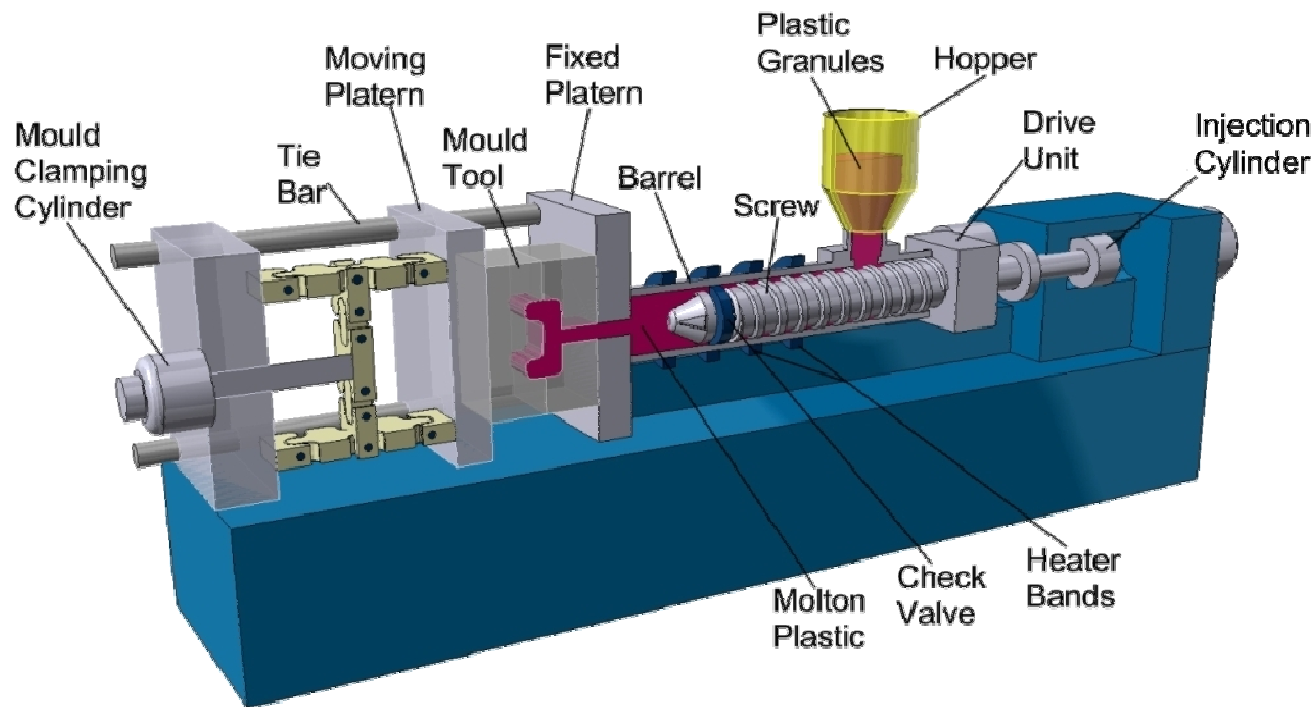
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# Injection Moulding Machine

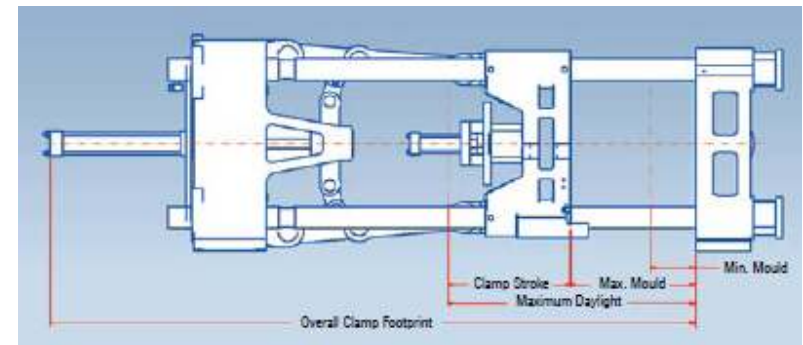
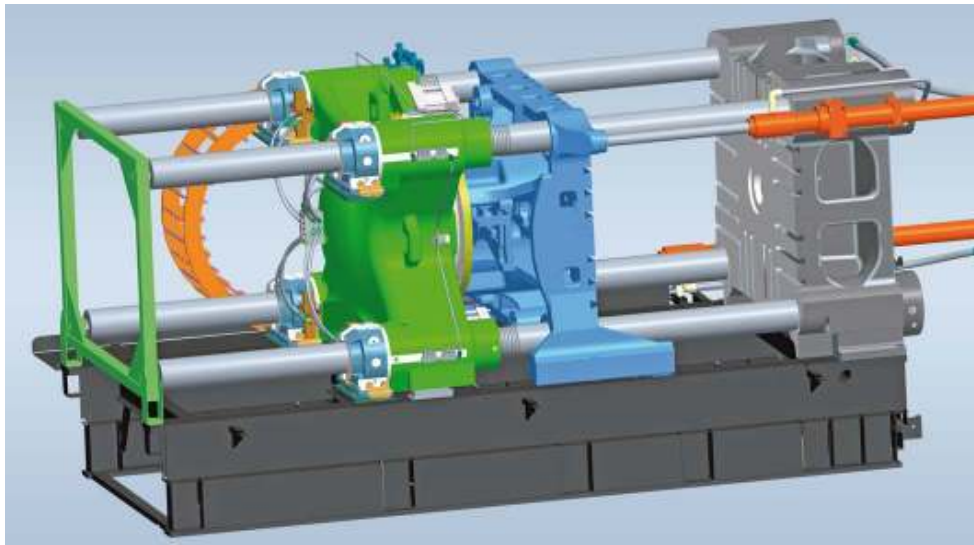
- ✓ Clamp & Injection Units
- ✓ Power, Transmission & Control
- ✓ Controllers & Electronic Communications



# Injection Moulding Machine

## ✓Clamp & Injection Units

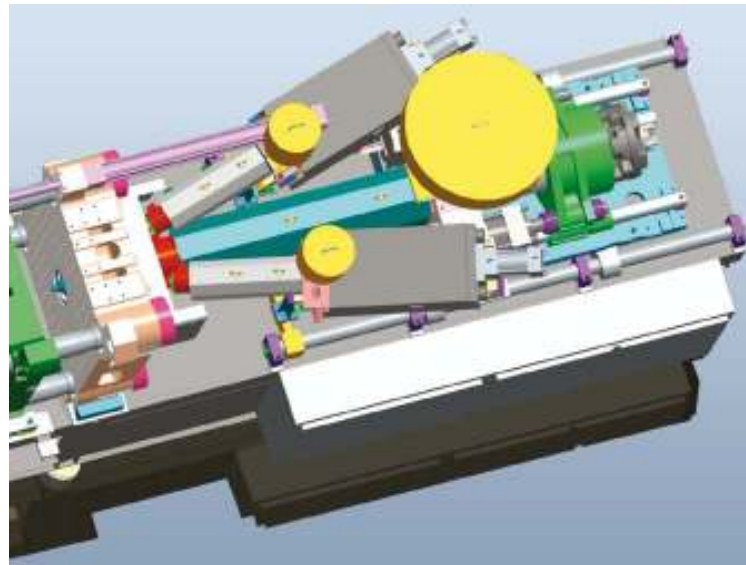
- Conventional to LM Guide ways
- High Speed 5-points advance Toggle
- 2 Platen Large Machines



# Injection Moulding Machine

## ✓ Clamp & Injection Units

- LM Guide based Injection unit for Faster Speed
- Multi-Component Injection units
  - Positioned Vertical
  - Positioned Horizontal

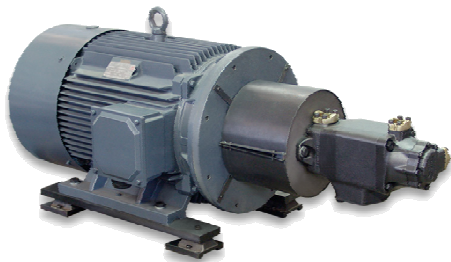


# Injection Moulding Machine

- ✓ Clamp & Injection Units
- ✓ **Power, Transmission & Control**
- ✓ Controllers & Electronic Communications

# Injection Moulding Machine

- Induction Motor + FD Pump with PQ Concept
- Variable Delivery Pump
- Electronically Controlled VV Pump with Swallow Circuit
- Servo Motors with Internal Gear Pump
- Direct Servo Motor Driven Functions (All Electric Machines)



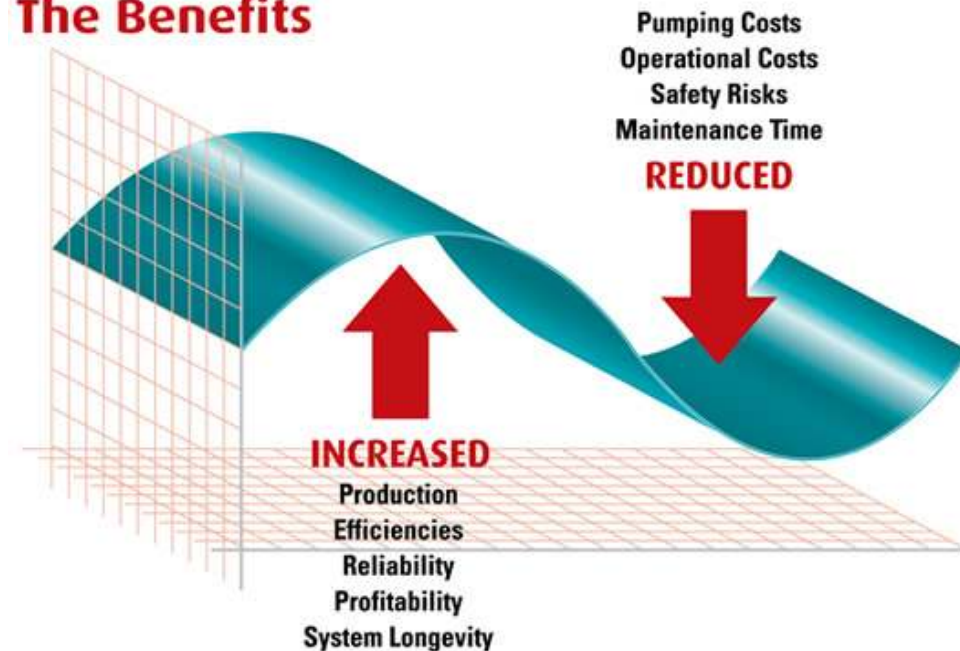


# Injection Moulding Machine

## Benefits of SPU:

- ✓ Closed loop system
- ✓ Only delivers hydraulic oil as it is needed
- ✓ Increase Accuracy & Precision
- ✓ Fast response
- ✓ Reduced Heat Generation in Hydraulic Oil
- ✓ Improve Repeatability
- ✓ Reduced Energy Consumption
- ✓ Low operating Noise
- ✓ Internal Gear Pump
  - Reduced sensitivity to contamination
  - Increase reliability & lower Maintenance costs

### The Benefits

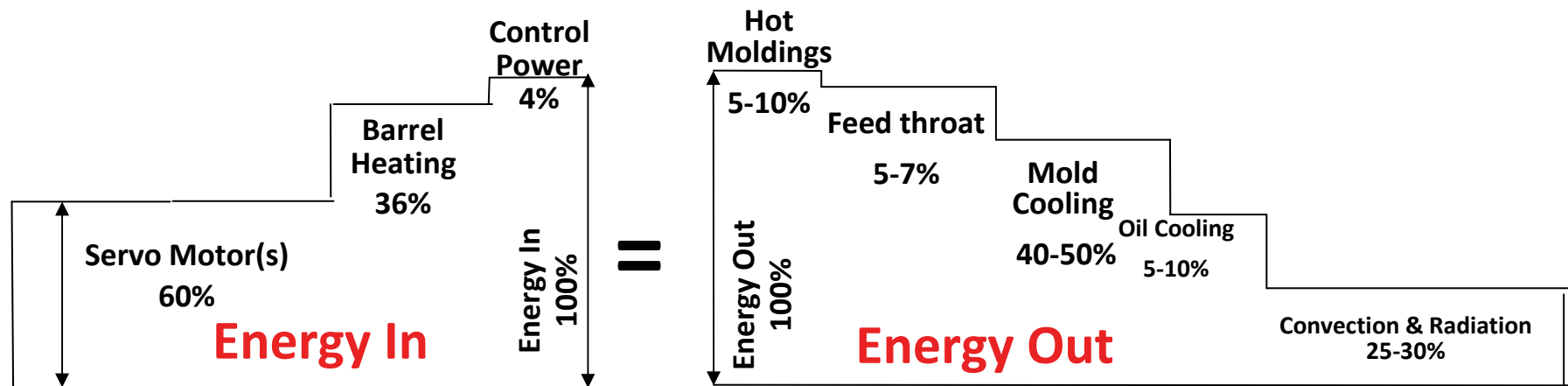




# Injection Moulding Machine

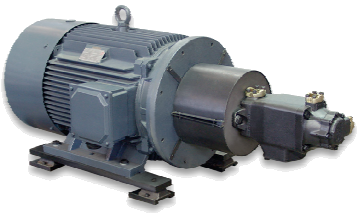
## Energy Balance\_Servo Motor

**Energy In = Energy Out**

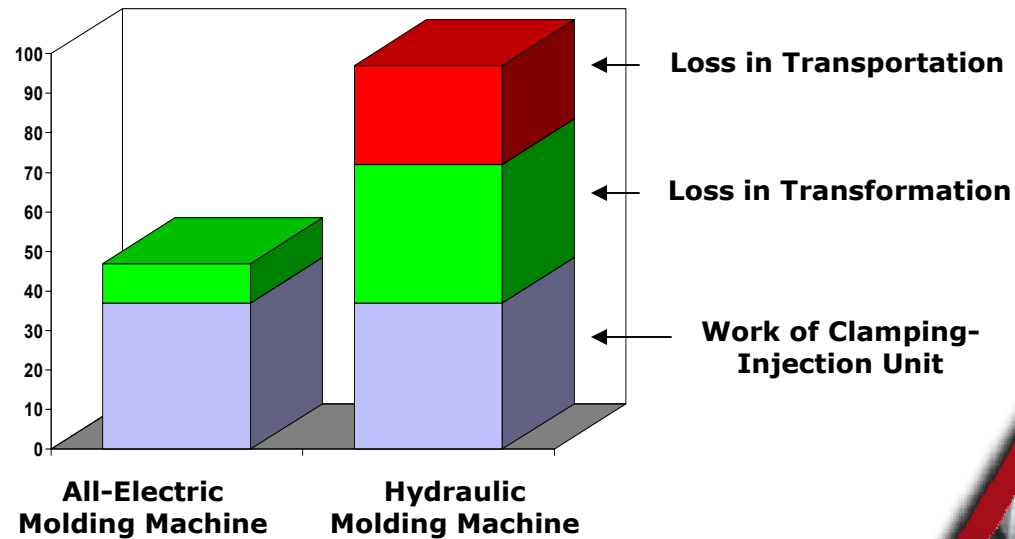
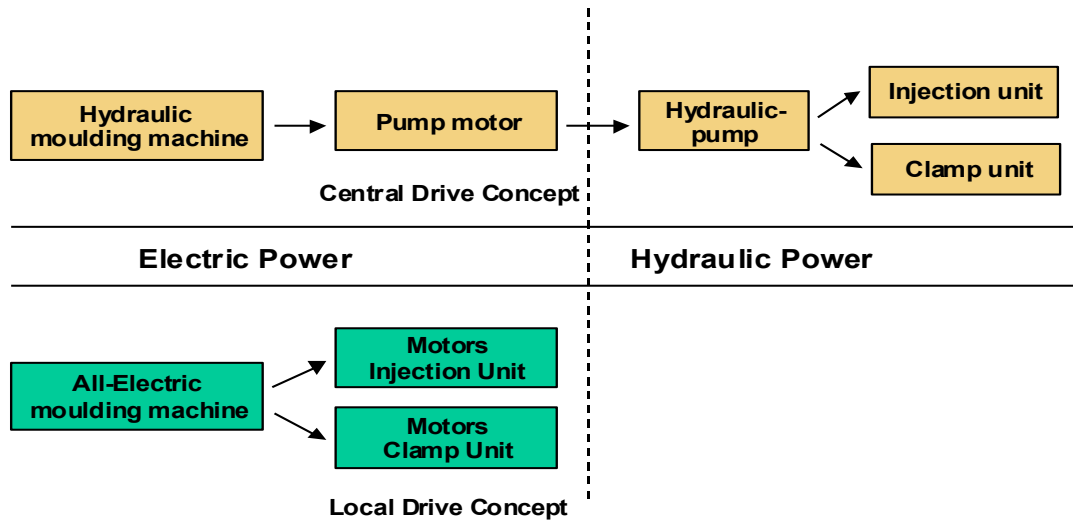


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# Injection Moulding Machine



# Injection Moulding Machine

- ✓ Clamp & Injection Units
- ✓ Power, Transmission & Control
- ✓ **Controllers & Electronic Communications**

# Injection Moulding Machine

## ✓ Controllers & Electronic Communications

- PLC Based Fully Automatic Machines
- Advance Ethernet & CAN bus systems for communications
- Remote I/Os

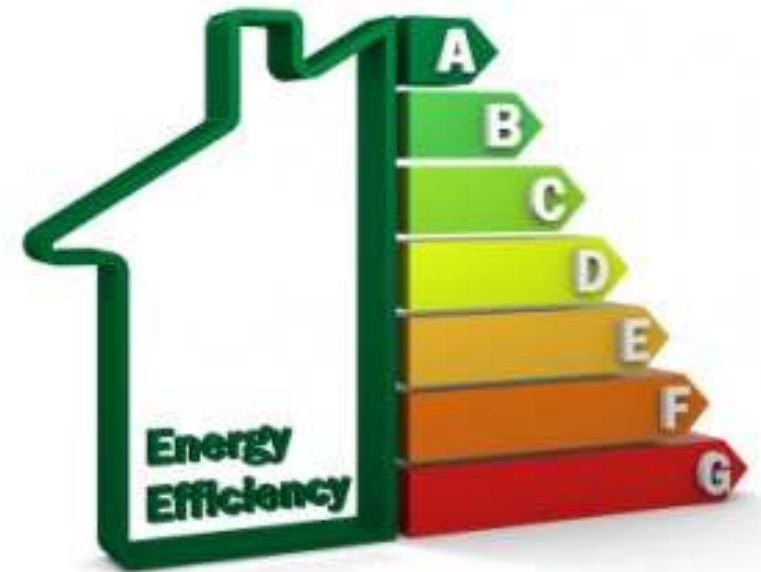


PLC Based



# ADVANCEMENTS IN

- ✓ Injection Moulding Machine
- ✓ **Utilities & Auxiliaries**
- ✓ Automation
- ✓ Synch with Mould
- ✓ Hawk Monitoring
- ✓ Machine Manufacturing

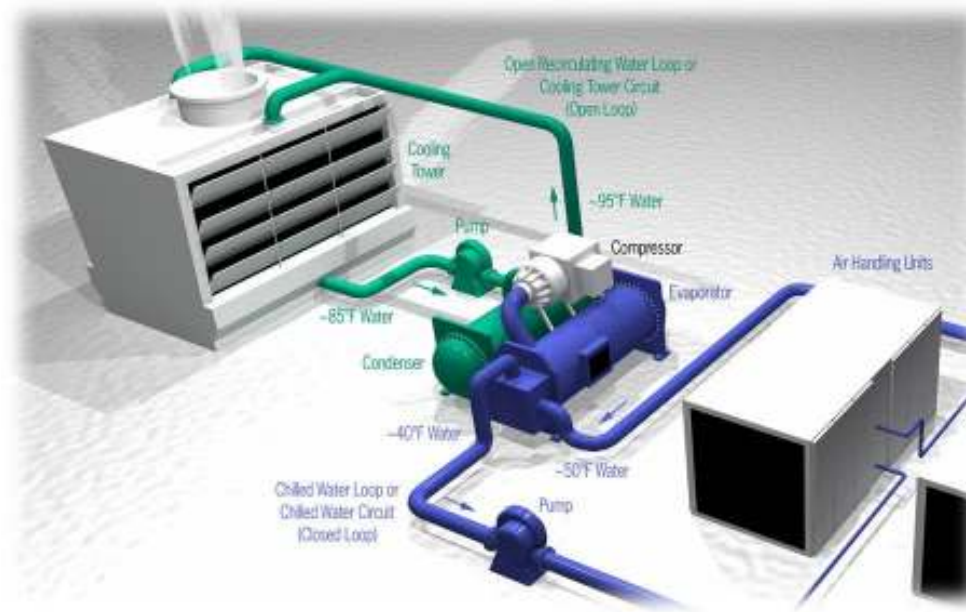




# Utilities & Auxiliaries

## Utilities

- ✓Energy Efficient Chillers
- ✓Servo Driven intelligent pumps for cooling water
- ✓Auto switching from Power to DG & vice a versa
- ✓Power Stabilizers
- ✓UPS



# Utilities & Auxiliaries

- ✓ Silo Storage
- ✓ Central Conveying System
- ✓ Online Granulation with Part/Runner separators

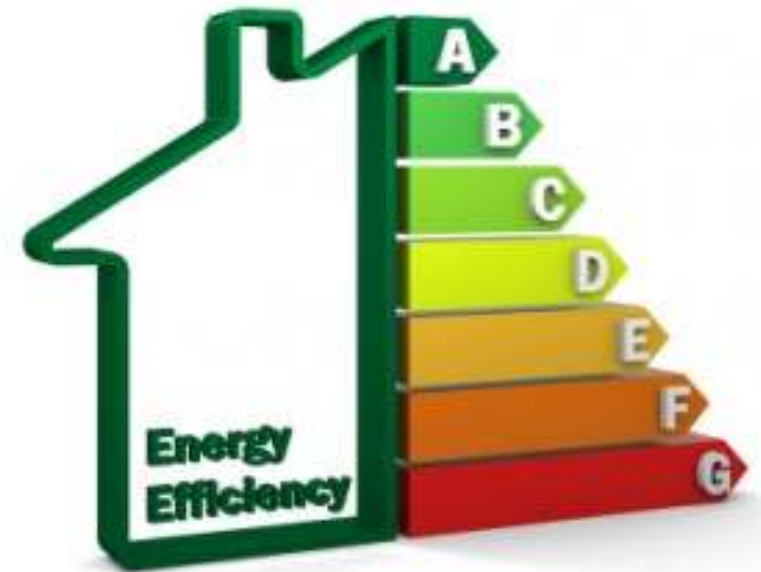


**Video-Granulation**



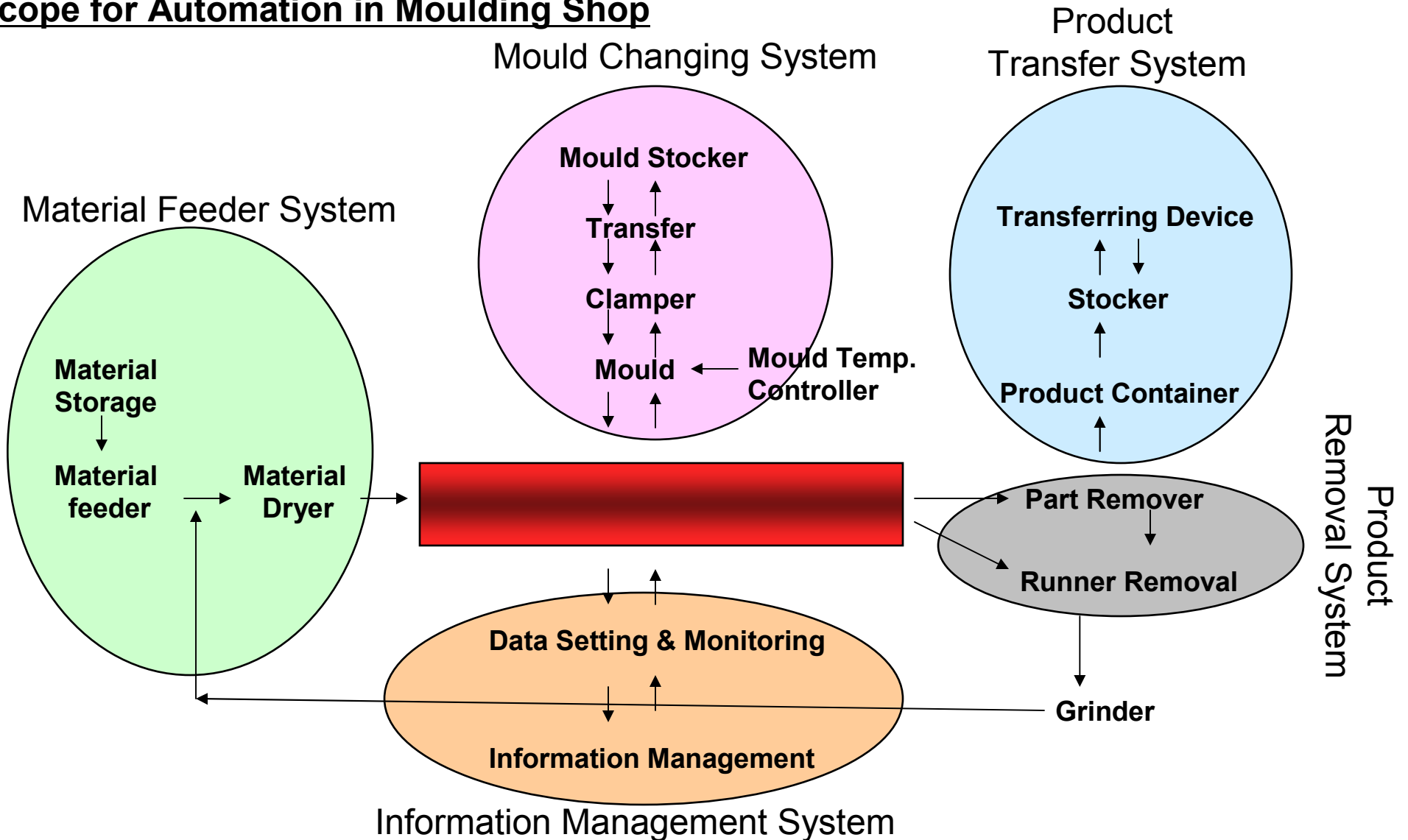
# ADVANCEMENTS IN

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# Automation

## Scope for Automation in Moulding Shop



# Automation

## Areas of Possible Automation

- ✓Material Feeding System
- ✓Mould Changing System
- ✓Product Removal & Transfer System





# Automation

## Material Feeding System

- Auto Loaders
- Dozing Systems
- Ratio Loaders
- Central Conveying System

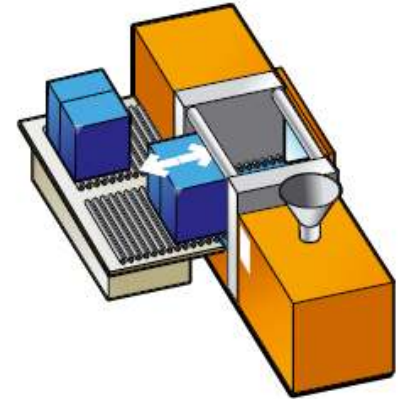




# Automation

## Mould Changing System

➤ Mould Loading / Unloading



➤ Mould Clamping / Unclamping



[Video on QMC](#)

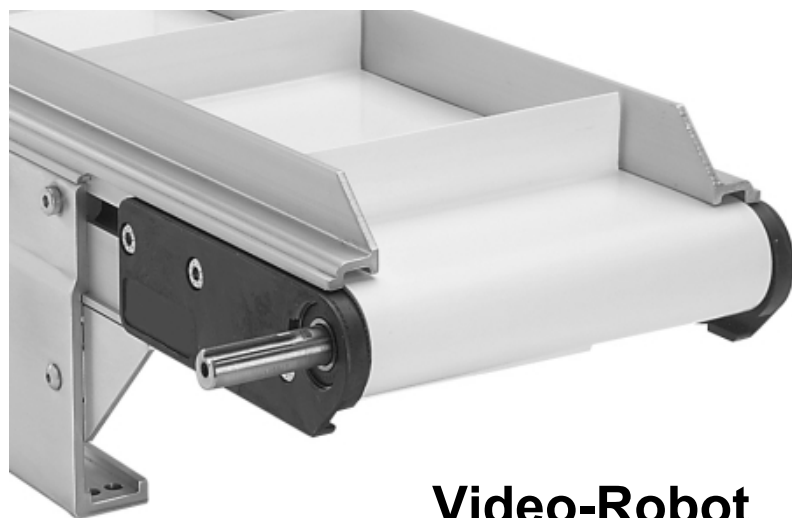
➤ Mould Connections



# Automation

## Product Removing System

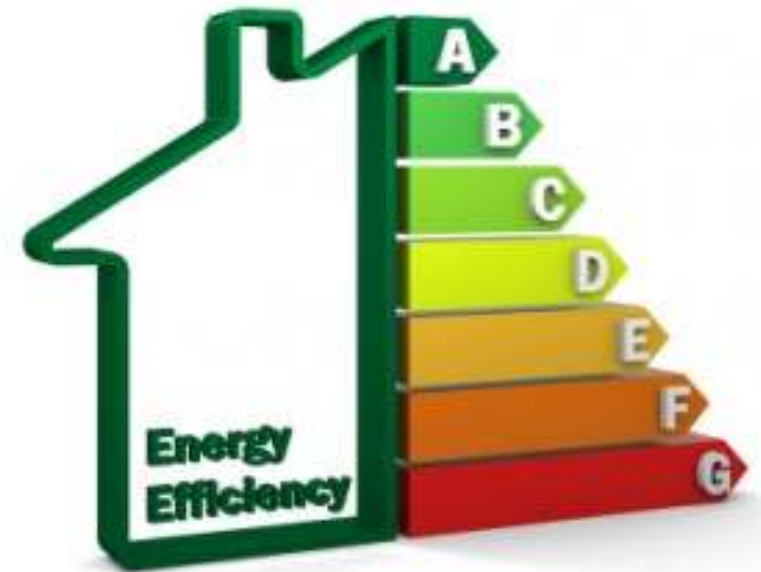
- Sprue Pickers
- Article Pick & Place Robots
- Finished Product Conveyor Belts



**Video-Robot**

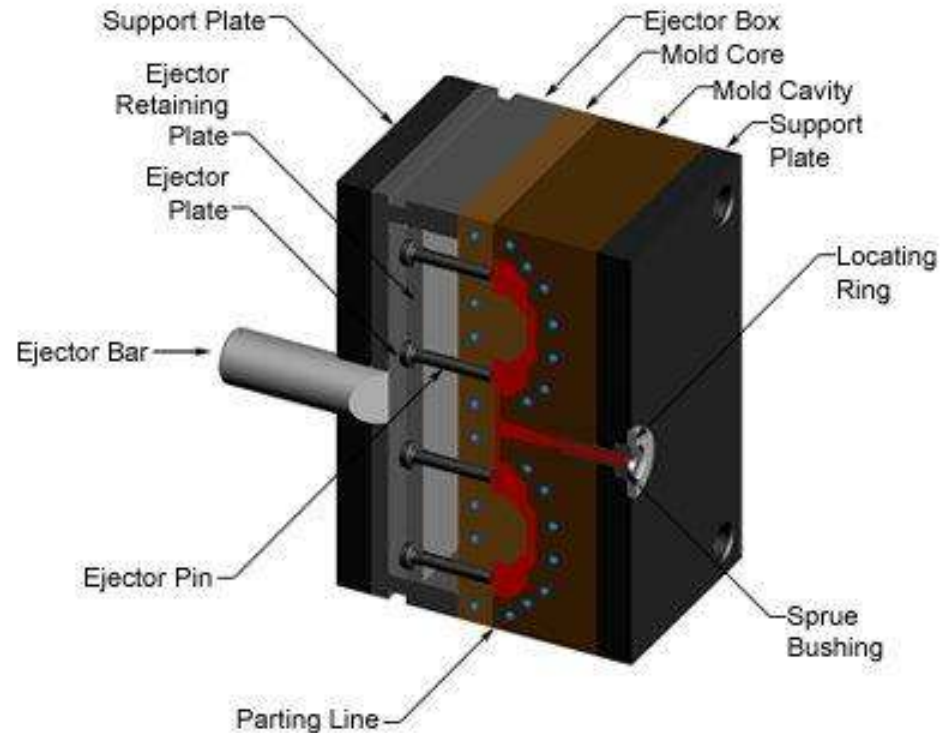
# ADVANCEMENTS IN

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- ✓ **Synch with Mould**
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# Synch with Mold

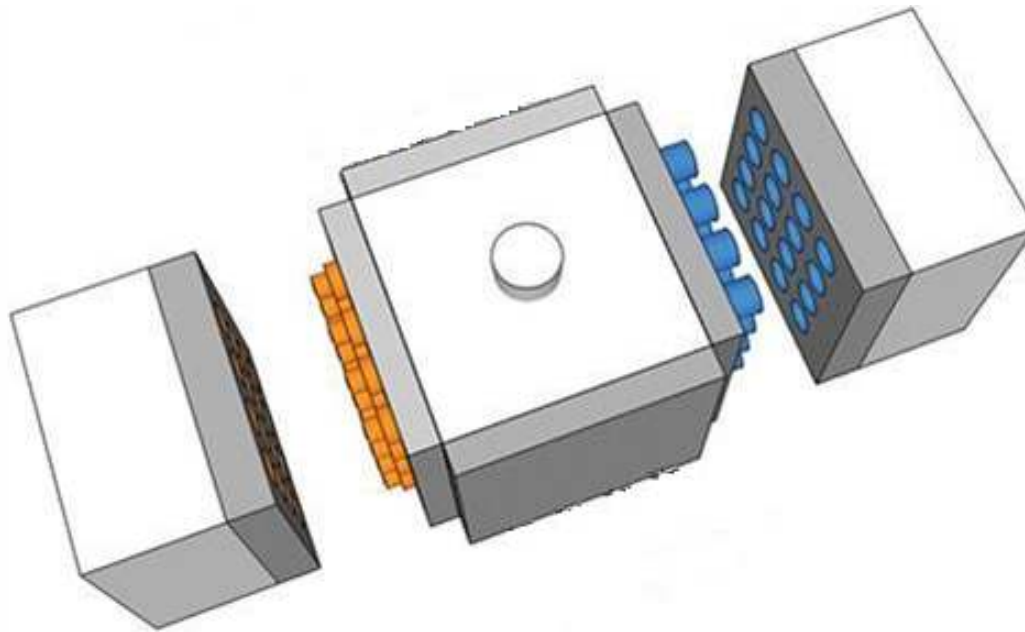
- ✓ Sequential Valve Gating Moulding
- ✓ Stack Moulding
- ✓ In Mould Labeling
- ✓ Rotary Moulding
- ✓ Stack Turning
- ✓ Sandwich Moulding
- ✓ Tandem Moulding



# Synch with Mold

## Synch with the Mould

✓Stack Moulding



[Video on Stack Moulding](#)

# Synch with Mold

## Synch with the Mould

✓In Mould Labeling



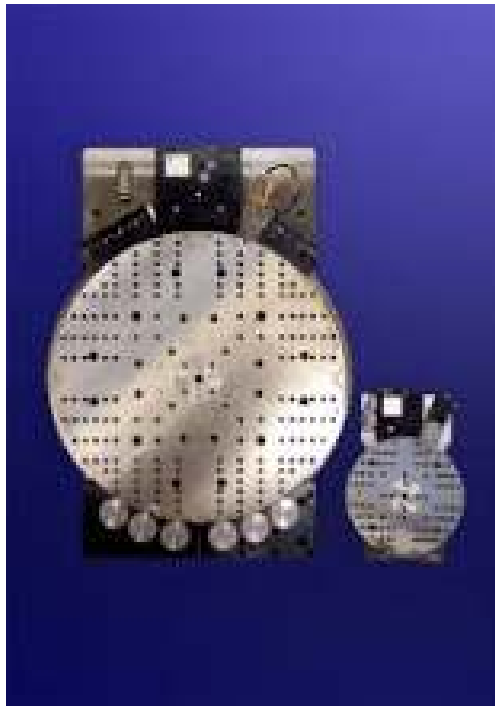
[Video on In Mould Labeling](#)



# Synch with Mold

## Synch with the Mould

✓Rotary Moulding

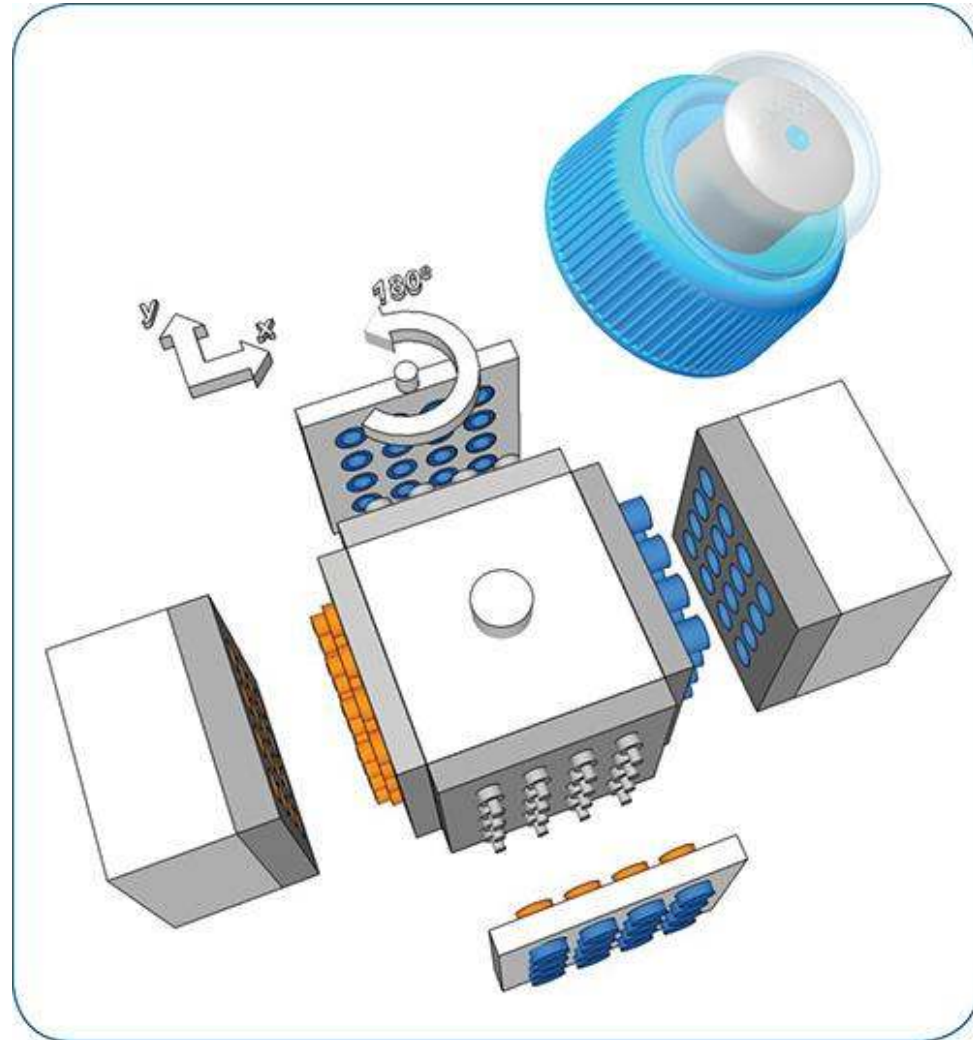


[Video on Rotary Mould/Core](#)

# Synch with Mold

## Synch with the Mould

✓Stack Turning

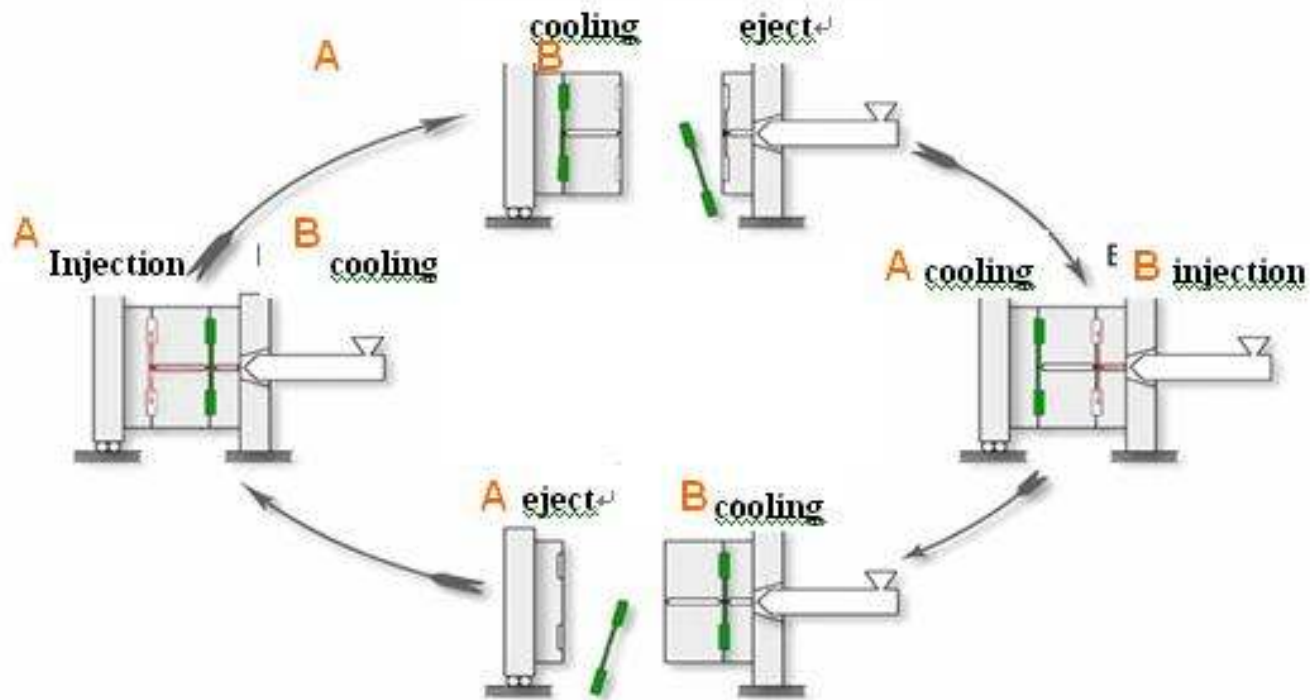


[Video on Stack Turning](#)

# Synch with Mold

## Synch with the Mould

### Tandem Moulding



[Video On Tandem Moulding](#)

# ADVANCEMENTS IN

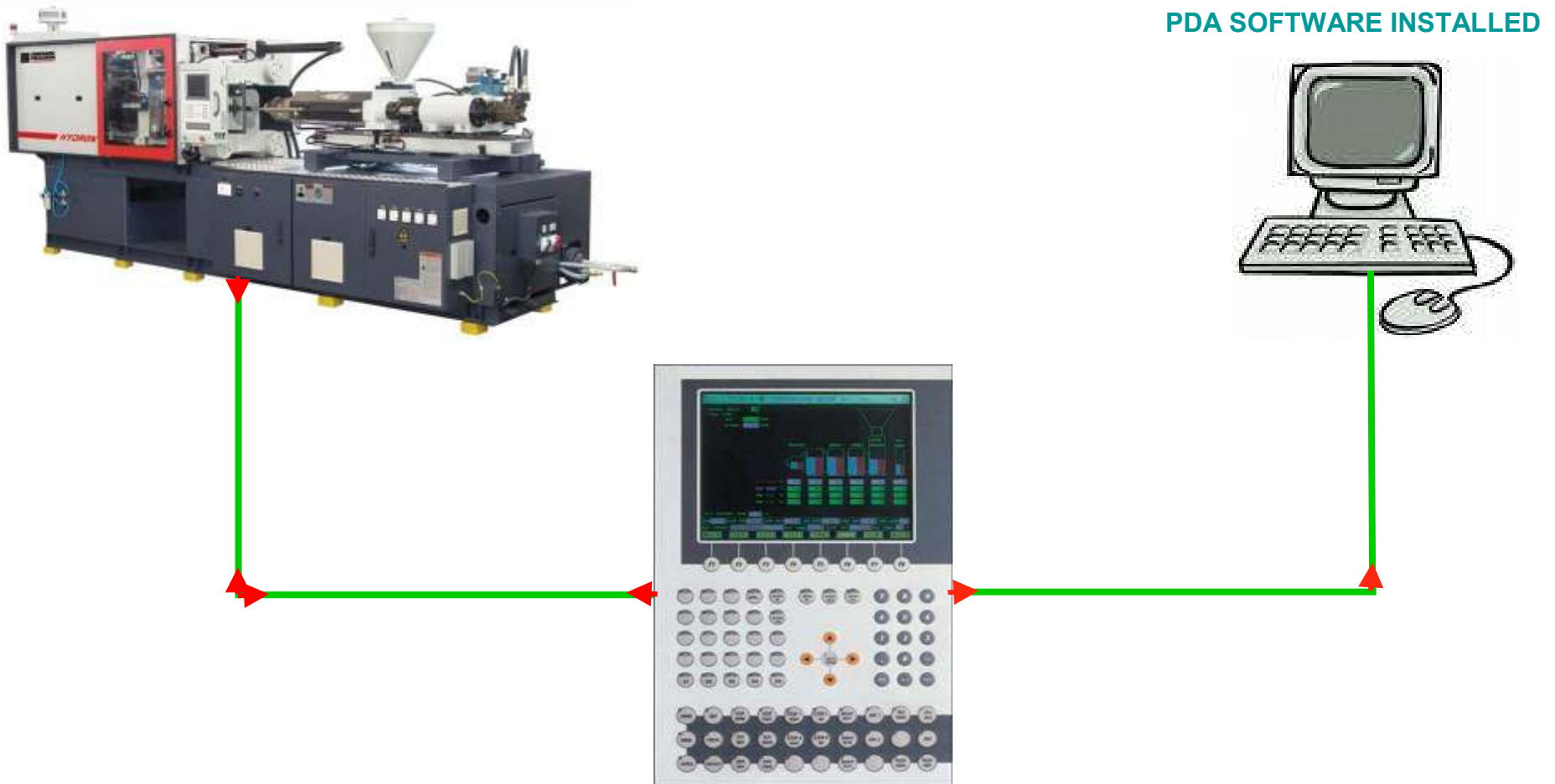
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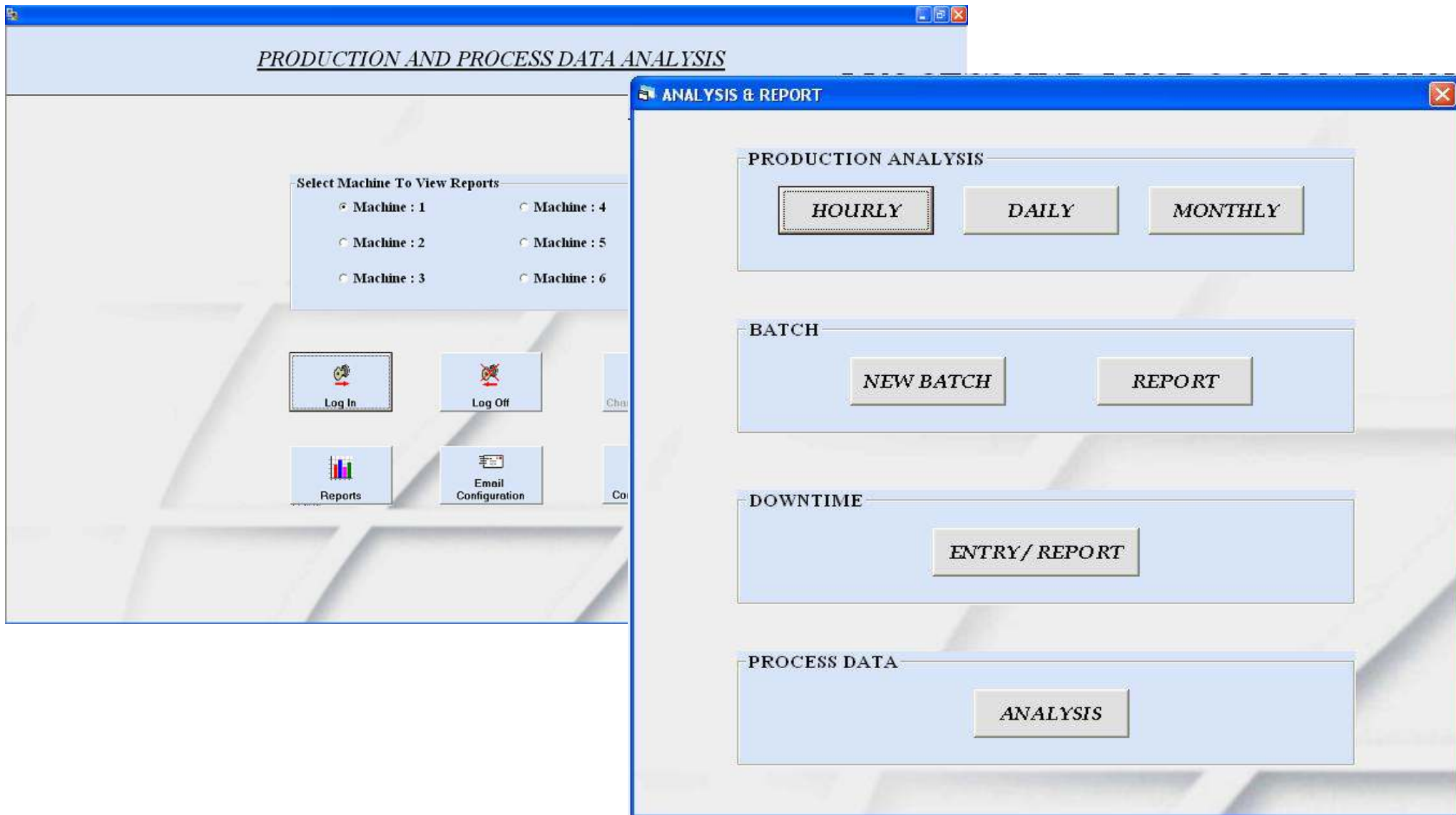
# Information Management

## Information Management System

➤ Product Data Analysis Software



# Information Management





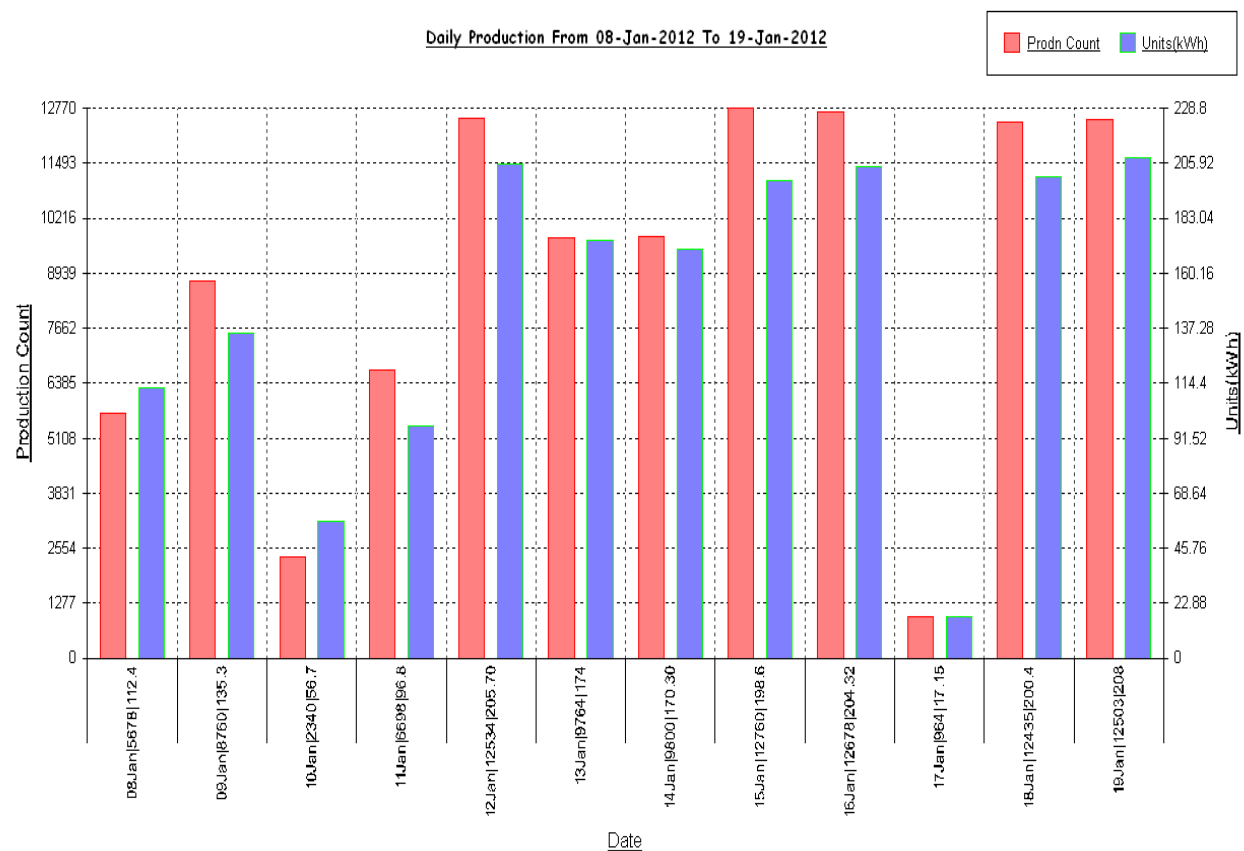
# Information Management



Hourly Production Report From 18-01-2012 To 19-Jan-2012

Hours	Day_1_Prodn_Counts	Day_1_Units(kWh)
	18-Jan-2012	18-Jan-2012
1	0	0.00
2	0	0.00
3	725	11.60
4	728	11.64
5	680	9.98
6	350	5.60
7	728	10.92
8	720	12.24
9	752	12.03
10	702	11.23
11	698	11.17
12	305	4.72
13	678	10.37
14	202	3.04
15	772	11.51
16	0	0.00
17	0	0.00
18	770	15.4
19	743	12.63
20	719	11.50
21	719	11.40
22	732	11.71
23	712	12.04
24	0	0.00

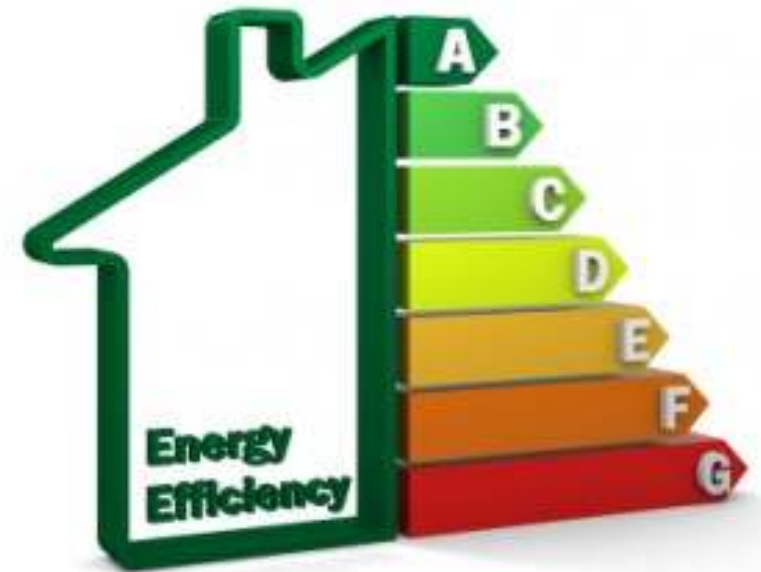
Daily Production From 08-Jan-2012 To 19-Jan-2012



- All the reports in the Graphical as well as tabular format.
- Tabular & Graphical reports can be saved as \*.xls & \*.bmp file respectively.
- Printout of reports can be taken directly.

# ADVANCEMENTS IN

- ✓ Injection Moulding Machine
- ✓ Utilities & Auxiliaries
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# Advancement in Manufacturing

- ✓ Continual Development thru Design & Validation
- ✓ Continual Improvement in Manufacturing Processes
- ✓ Offering Application based Solutions
- ✓ Technology Transfers for Glocalization

# Advancement in Manufacturing

## Continual Development thru Design

### Energy System Design

Systemic overall view, design, simulation, consulting



### Efficient Components

Products and systems with optimized efficiency



### Energy Recovery

Recovery and storage of excess energy



### Energy on Demand

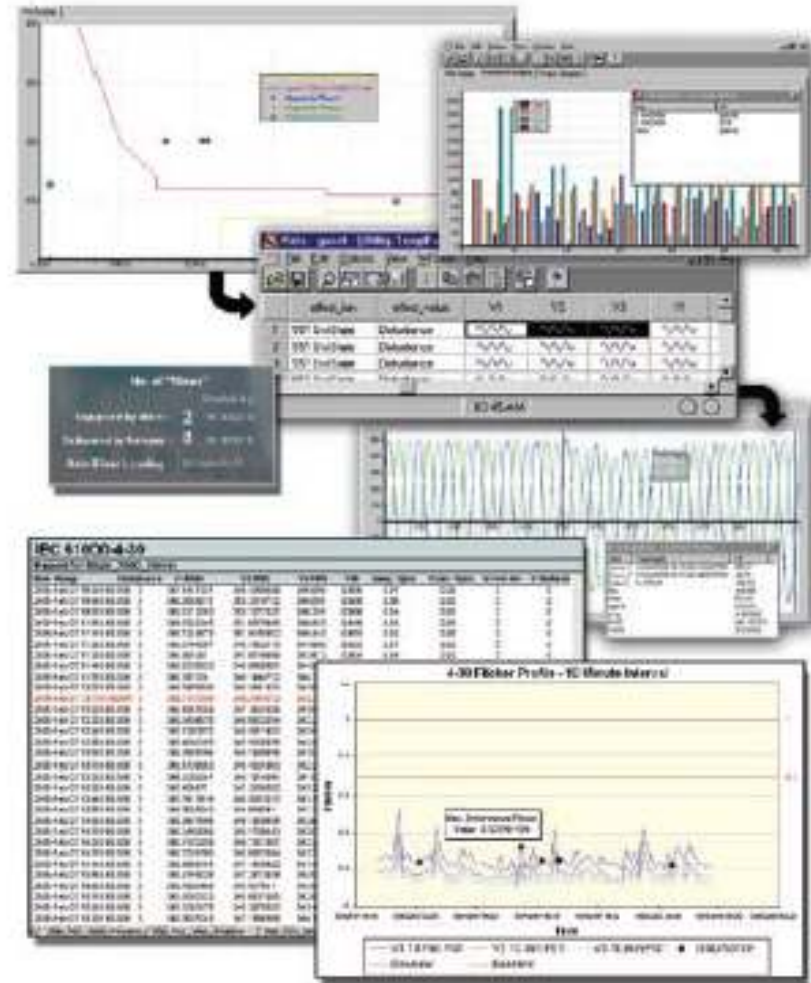
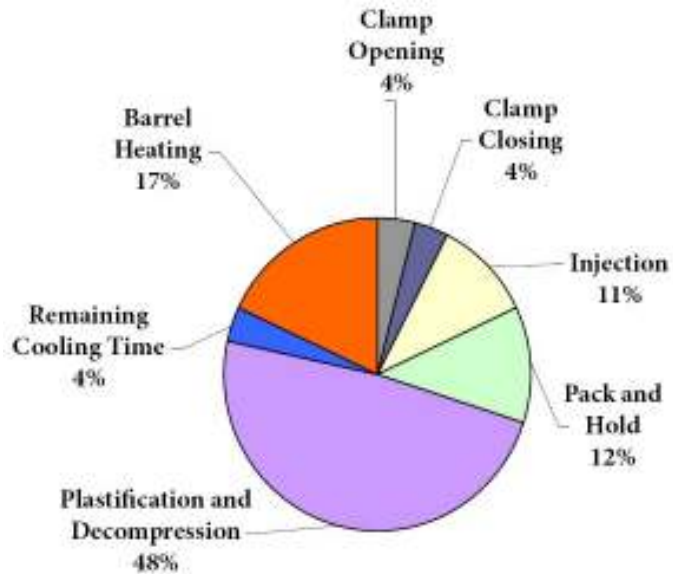
Energy usage on demand, stand-by mode



# Advancement in Manufacturing

## Validation thru advanced Software/Simulators

- ✓ High accuracy Energy Analyzer
- ✓ Advanced Electrical Circuit Design



# Advancement in Manufacturing

## Continual Development in Manufacturing Processes

### ✓ Implementing various Standards & Practices

- ✓ 5S
- ✓ Six Sigma
- ✓ ISO
- ✓ Lean
- ✓ Kaizen
- ✓ FIFO
- ✓ EHS





# Advancement in Manufacturing

## Continual Development in Manufacturing Processes

- ✓ Improved Manufacturing & Training Processes



# FMI Energy Efficient Platforms & Application Based Solutions

- All Electric Injection Moulding Machines
    - ELEKTRON Series
  - Servo Powered IMMs
    - Magna T Servo
    - Omega Servo
    - Hydron Servo
    - Maxima Servo
  - Electronically Controlled Variable Pump
    - Magna T
    - Maxima
- PET Series
  - PVC Line
  - CPVC Line
  - Omega 2C
  - Omega Split Barrel
  - MT Accupack
  - Hydron Accupack
  - Servo Pack
  - Omega Bubble Top
  - Hydron Servo 2K

# Technology Transfer for GLOCALIZATION



1<sup>st</sup>  
**Timer...**

- |             |   |             |  |
|-------------|---|-------------|--|
| <b>2013</b> | First & largest Indian built All Electric Machine <b>ELEKTRON 550T</b>  | <b>2009</b> | First to demonstrate Machine with <b>STACK MOULD</b>       |
| <b>2012</b> | First & Largest Indian Built Machine <b>MAXIMA SERVO 3200T</b>          | <b>2008</b> | Thin-walled Packaging Machine <b>MT ACCUPACK</b>           |
| <b>2012</b> | Gold Trophy Winner - <b>PLASTICON AWARD</b> for ALL ELECTRIC TECHNOLOGY | <b>2008</b> | First to demonstrate <b>IN-MOULD-LABELLING</b> System      |
| <b>2011</b> | First & Largest Indian built Machine <b>MAXIMA 2500</b>                 | <b>2007</b> | Dedicated PET Preform Moulding <b>PET SERIES</b>           |
| <b>2010</b> | First & Largest Indian built Machine <b>MAXIMA 1800</b>                 | <b>2004</b> | First to build <b>TWO PLATEN MAXIMA</b>                    |
| <b>2009</b> | First to build <b>SERVO Driven</b> Omega, Hydron & Magna Toggle Series  | <b>2004</b> | First to build All Electric Machine <b>ELEKTRON</b>        |
|             |   | <b>2003</b> | First to build Machine for <b>WOODEN PATTERN</b> Furniture |
|             |   | <b>2001</b> | First to build Machine for <b>CPVC FITTINGS</b>            |
|             |   | <b>1997</b> | First to demonstrate <b>CHAIR</b> in 52 seconds            |

***Our Landmark Achievements....***

THANK You  
For Your  
TIME

ITINERARY

8:00 AM MEET SHARON  
9:00 AM MEET JENNIFER  
10:00 AM MEET DAVID  
11:00 AM MEET TED  
12:00 PM DEPART  
LAX