



Our Partner for Indian Market

***DIE SURFACE TEMPERATURE AS
ON-PROCESS QUALITY CONTROL VARIABLE***

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FOREWORD

“... particularly in a diecasting company, where 40% of the sold volume value is represented by the sole value of the purchased raw material, the costs of NON QUALITY fully lie on the remaining 60% of the added value ...”

Ing. G.Mugnai

Quality Manager – Form Group

AIM Study Day

“The Cost of Non-Quality”

23/05/08 – c/o GRIMECA Spa

INTRODUCTION

Given the importance of Quality in modern Light Alloy Diecasting,
we introduce you today the available technology for:

- CONTROLLING THE PROCESS
- REDUCING SCRAP S
- OPTIMIZING PRODUCTION CYCLE

= COST SAVING

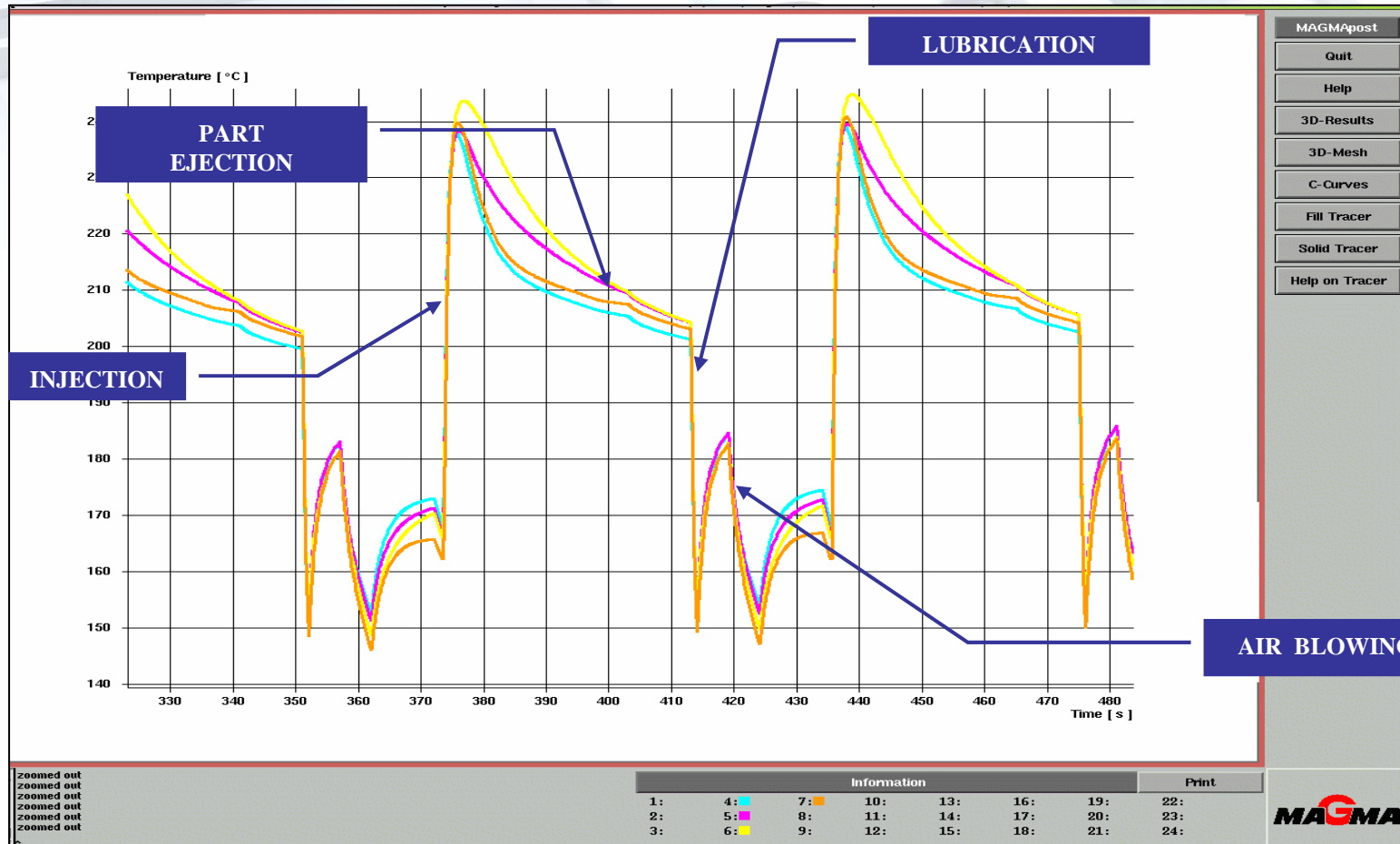
RELATION BETWEEN QUALITY AND DIE SURFACE TEMPERATURE

IN A QUALITY PRODUCTION CYCLE, YOU SHOULD HAVE THE

SAME SURFACE TEMPERATURE IN EACH DIE CAVITY AREA AND AT

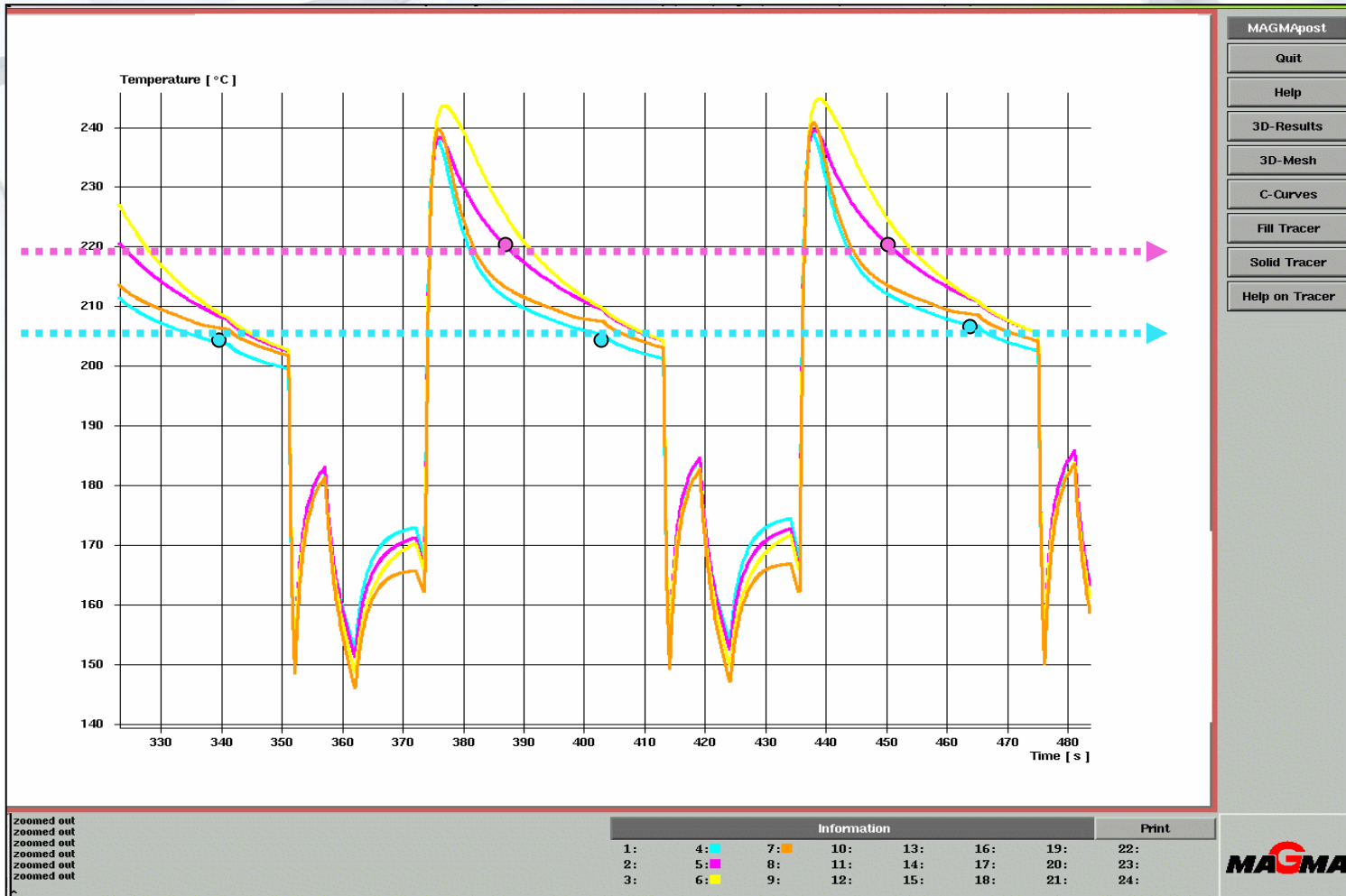
THE SAME MOMENT IN THE CYCLE

STANDARD CYCLES DURING NORMAL OPERATION FOR SURFACE AREAS



STANDARD CYCLES DURING NORMAL OPERATION FOR SURFACE AREAS

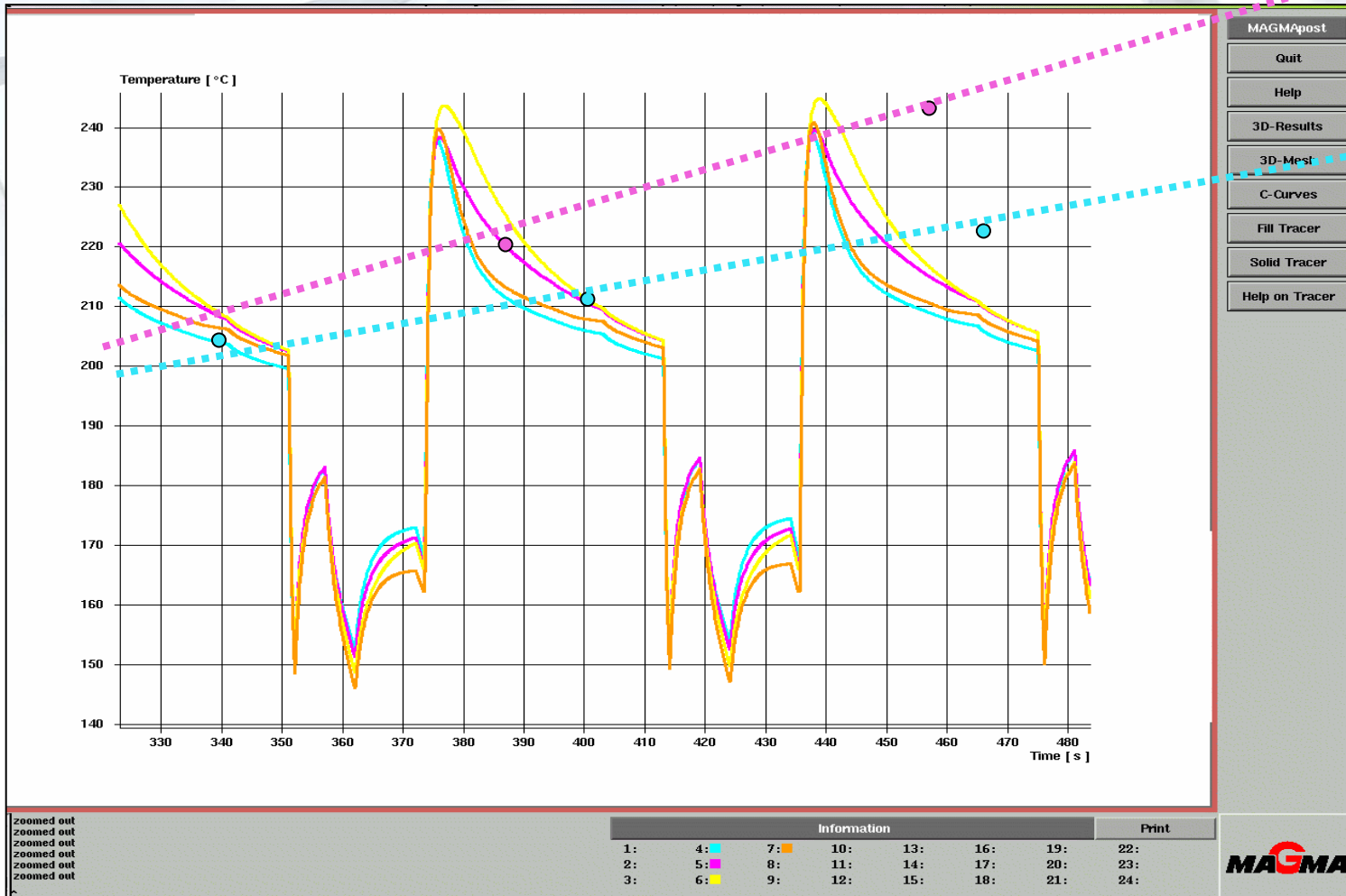
IN THERMAL BALANCE CONDITIONS = CONTROLLED QUALITY



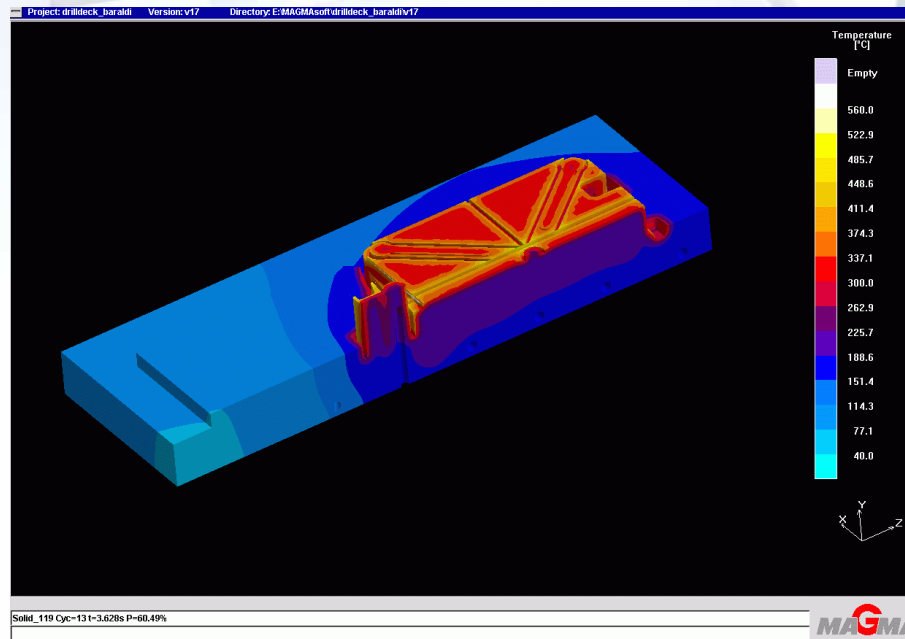
- MAGMApost
- Quit
- Help
- 3D-Results
- 3D-Mesh
- C-Curves
- Fill Tracer
- Solid Tracer
- Help on Tracer

STANDARD CYCLES DURING NORMAL OPERATION FOR SURFACE AREAS

IN NON THERMAL BALANCE CONDITIONS = QUALITY OUT OF CONTROL



PROCESS VARIABLES INFLUENCING THE DIE SURFACE TEMPERATURE

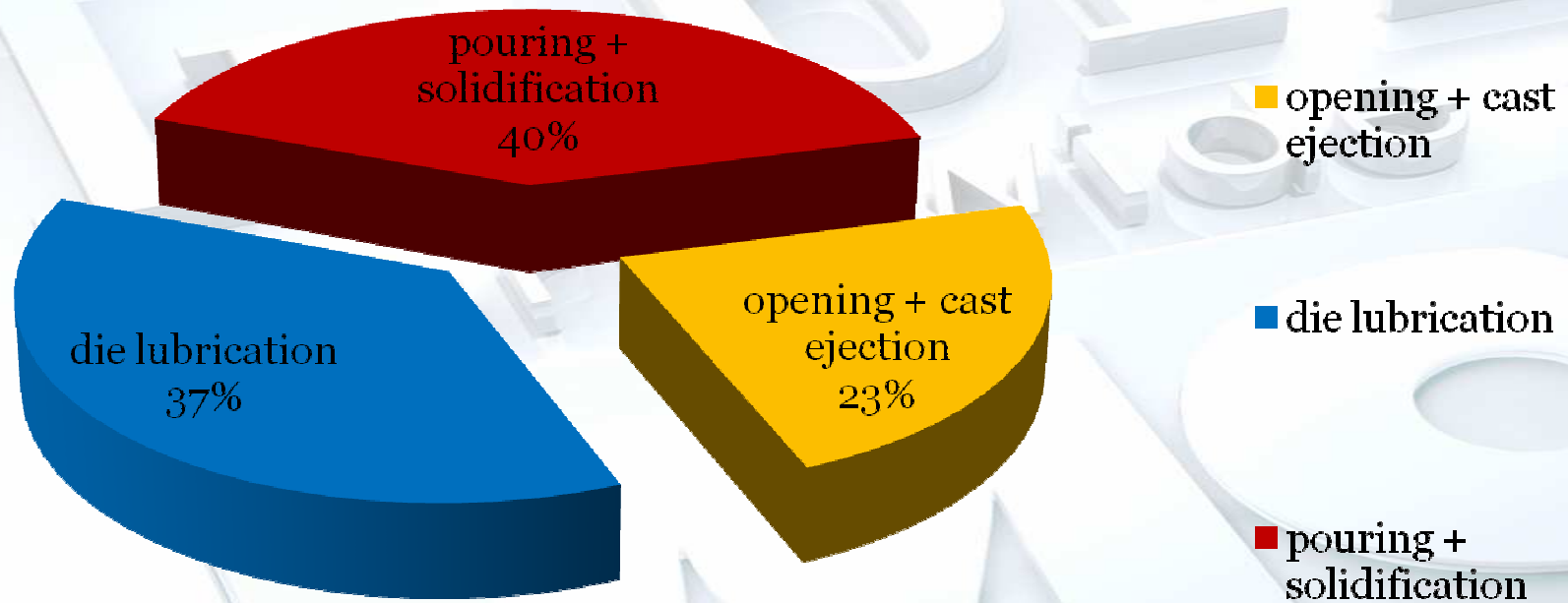


1) Alloy temperature

2) Cooling circuits and fluid flows in internal circuits (= constancy during the time)

3) **Lubrication cycle** (quantity of applied release agent and operating conditions of the lubricating equipment)

Pressure die casting **CYCLE TIMING**



It is possible to get cycle time reduction and cost saving only in the die lubrication phase.

How can we check the thermal balance of the die during the cycle ?



IS THE ANSWER

Monitoring the surface temperature of a significant die area at each cycle and always at the same time, permits us to check the thermal dynamism of the whole die cavity and to manage important feedbacks.

The technology, called Smart Lubrication System, is protected by international Patents and has been industrialized in cooperation with:



World Leader in Diecasting Technology

The patents have been licensed to IDRA that produces, installs and guarantees the S.L.S. technology integrated in the Idra casting machines

The hardware of the system is called Cycle Temperature Control (C.T.C.) and is made up of:

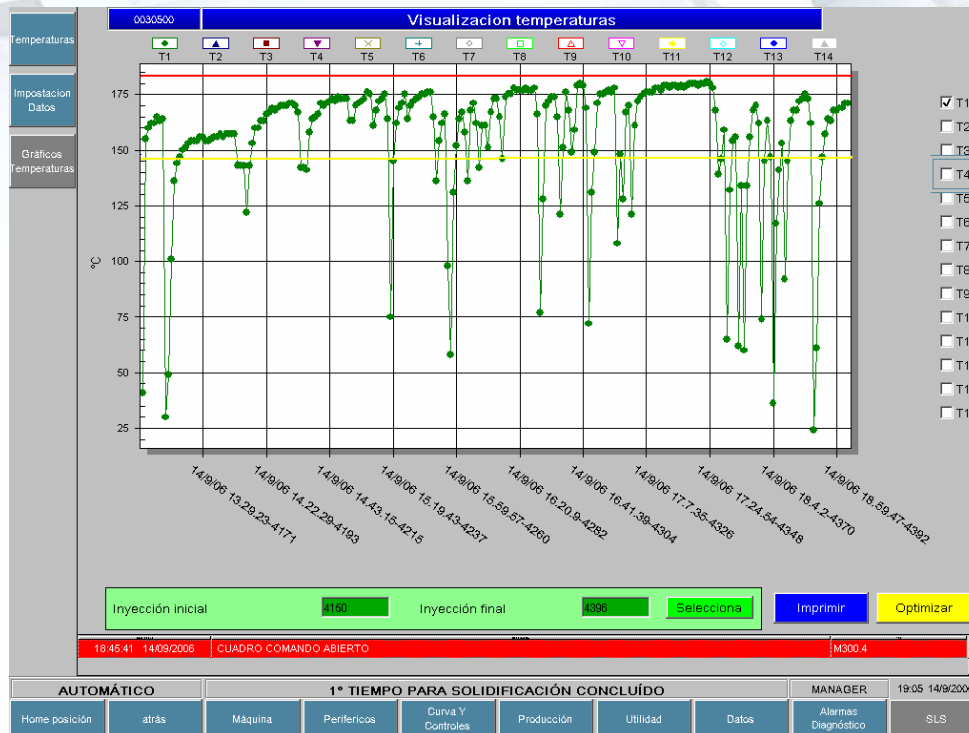
IR sensors for temperature measurement protected by a system which is able to work in aggressive industrial environments.



Luminous indicators to point out the die area to be measured.

A software managing T data and retroactions.

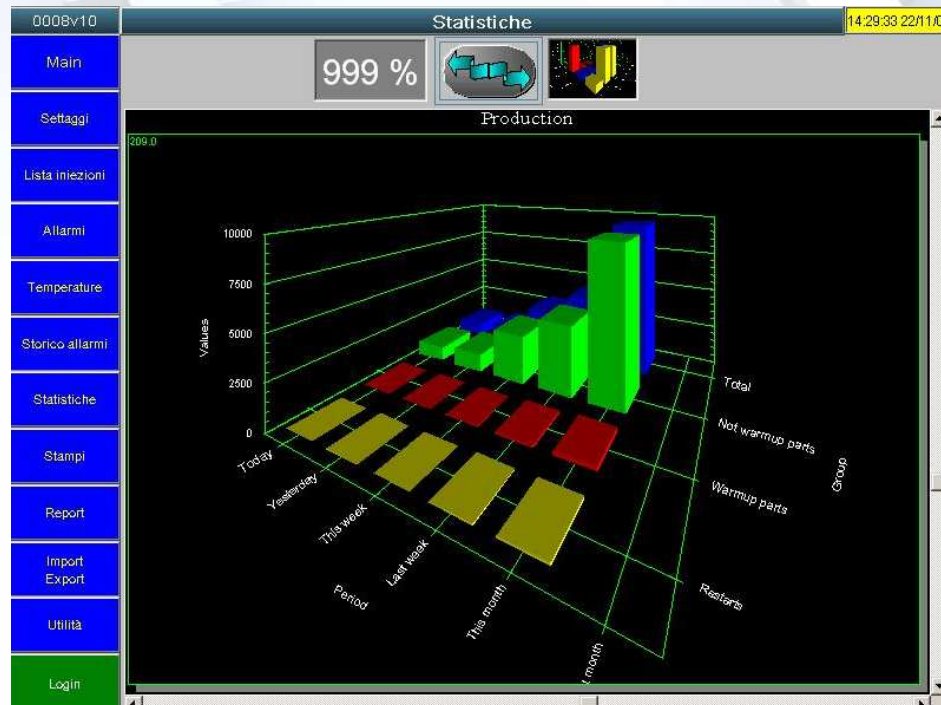
C.T.C. SOFTWARE



At each cycle the software records following data:

- Part reference
- Die reference
- Date, time (hours, minutes, seconds)
- Average temperature
- T-Max
- Optional process data
- Casting quality control

C.T.C. SOFTWARE

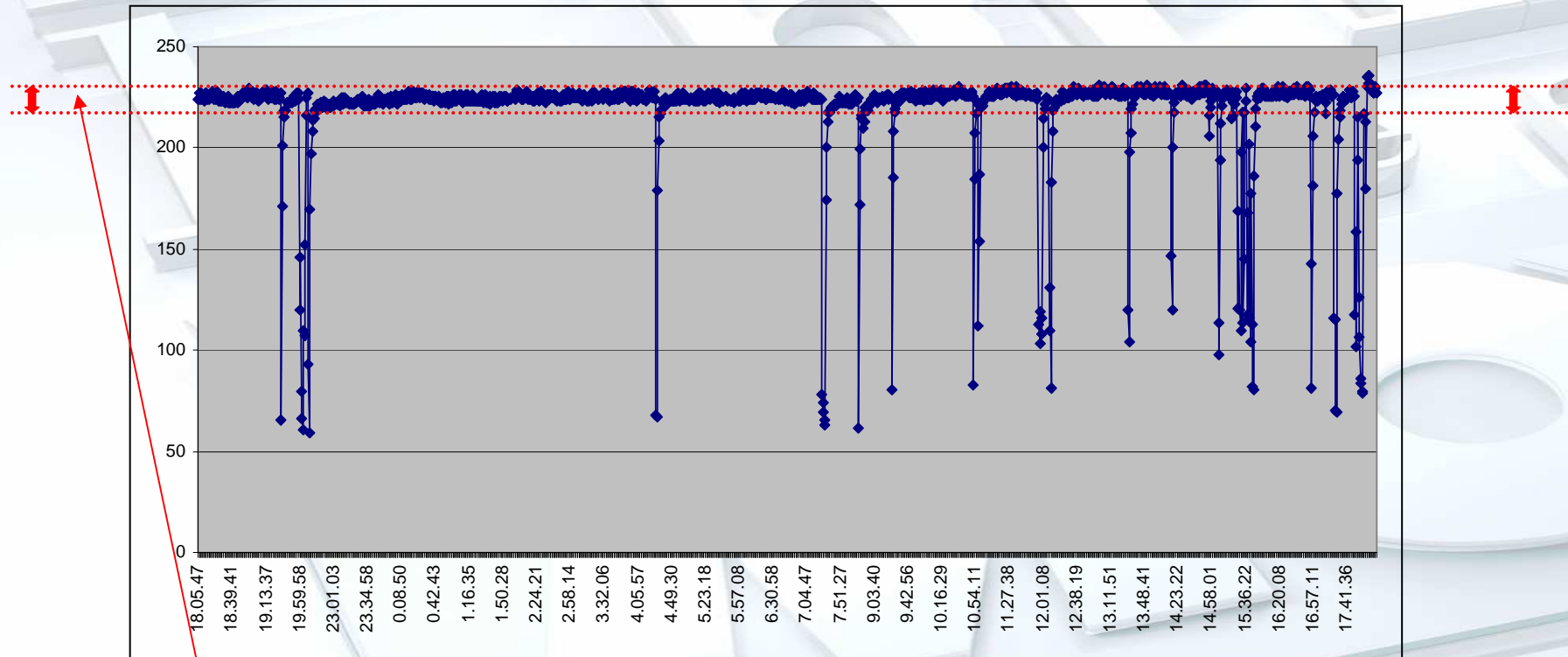


-Statistical data
connected with **Casting
Quality:**

-Castings out of
specification are
automatically rejected;

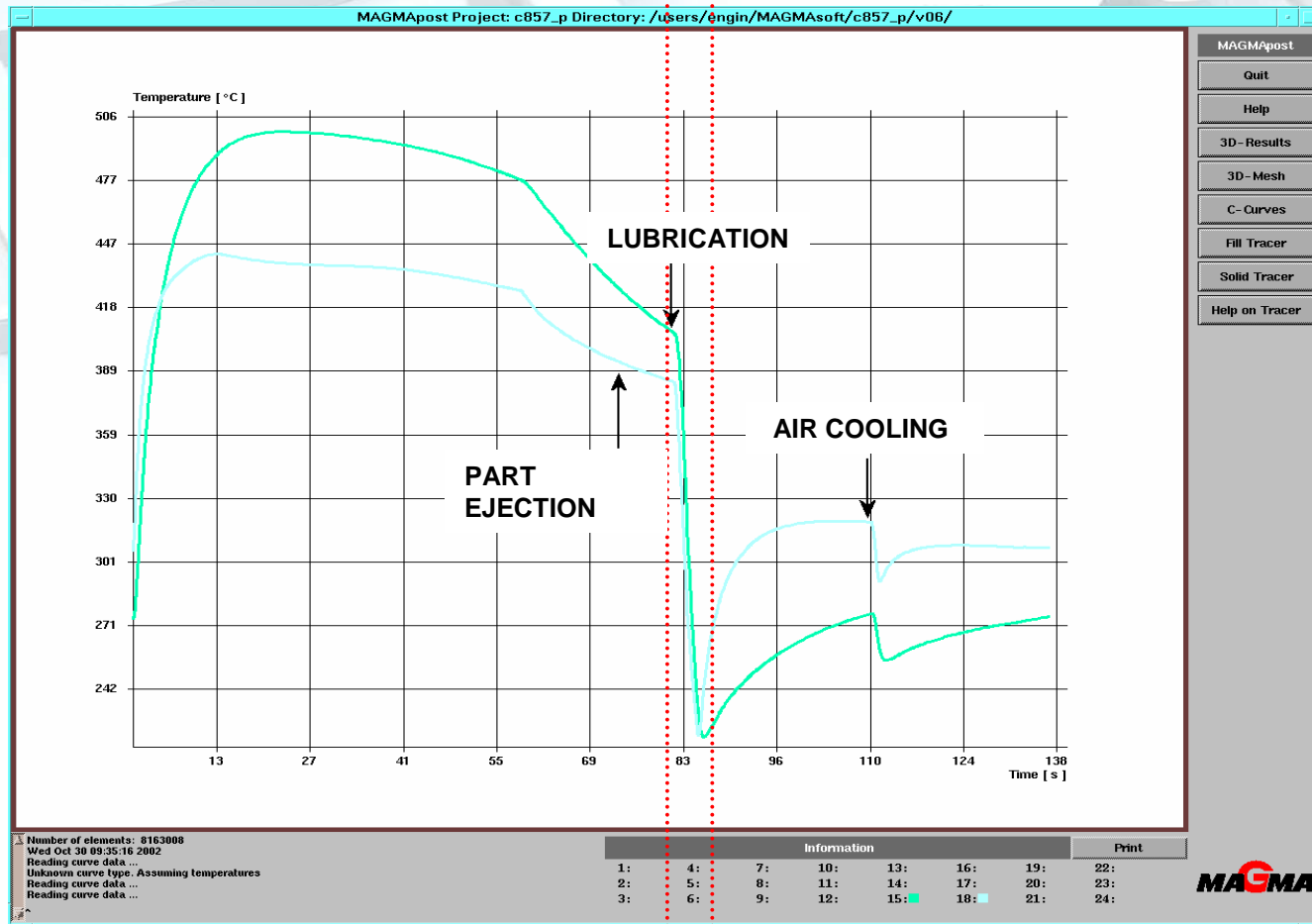
-The software is set up
for managing other eight
process variables:
(optional C.O.O.S. – Casting
Out Of Specifications)

ON PROCESS QUALITY CONTROL

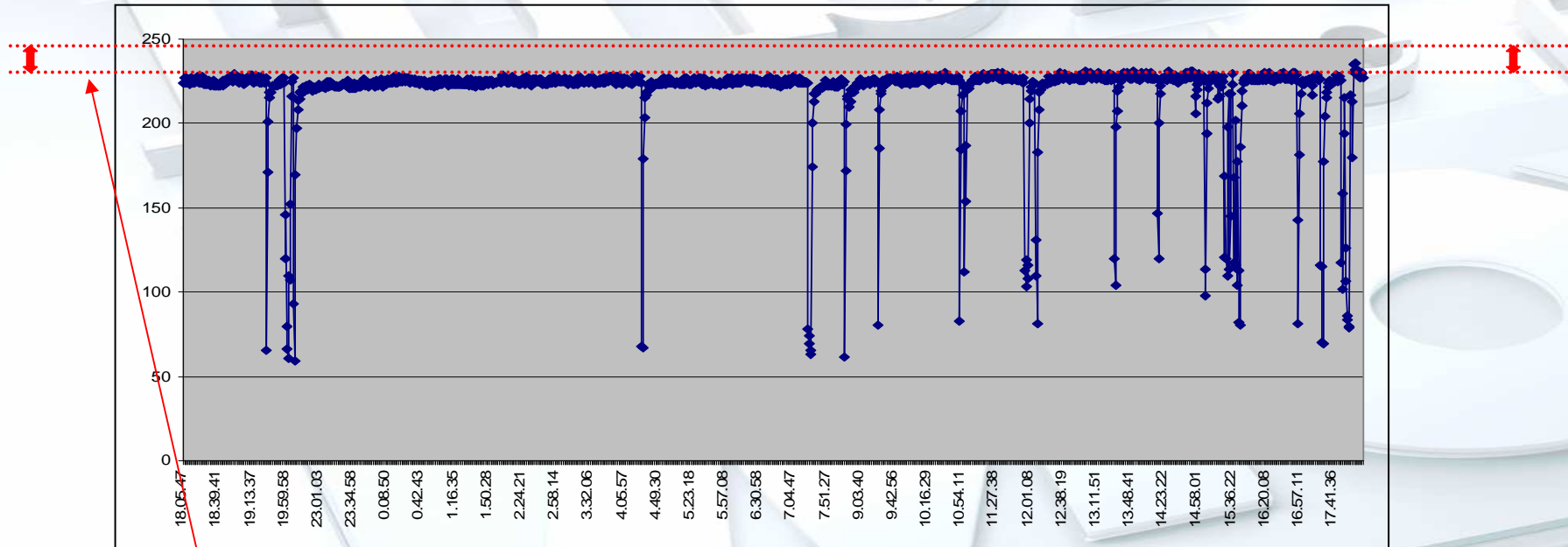


Standard Temperature Range
(= cycle stability = Constant Quality)

How much of the cycle time should I invest to lubricate/cool the die ?

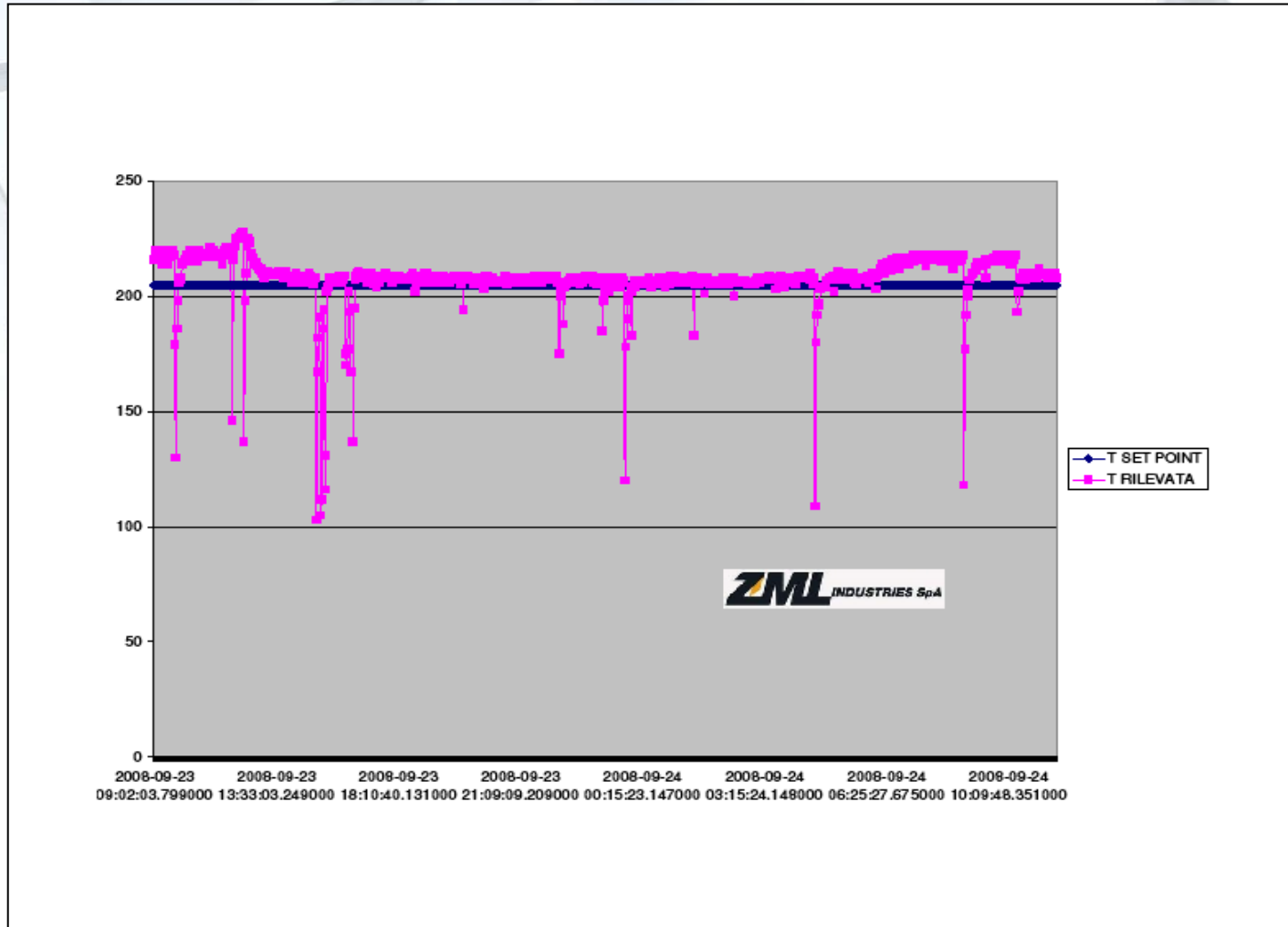


How much of the cycle time should I invest to lubricate/cool the die ?



Standard Temperature Range?
(= cycle stability = Constant Quality)

How much of the cycle time should I invest to lubricate/cool the die?



CONCLUSIONS

WITH A SYSTEMATIC CONTROL OF THE DIE SURFACE TEMPERATURE VALUES, IT IS POSSIBLE TO DETERMINE VALUES SHOWING US THE CONSTANCY OF OPERATING CONDITIONS CONCERNING:

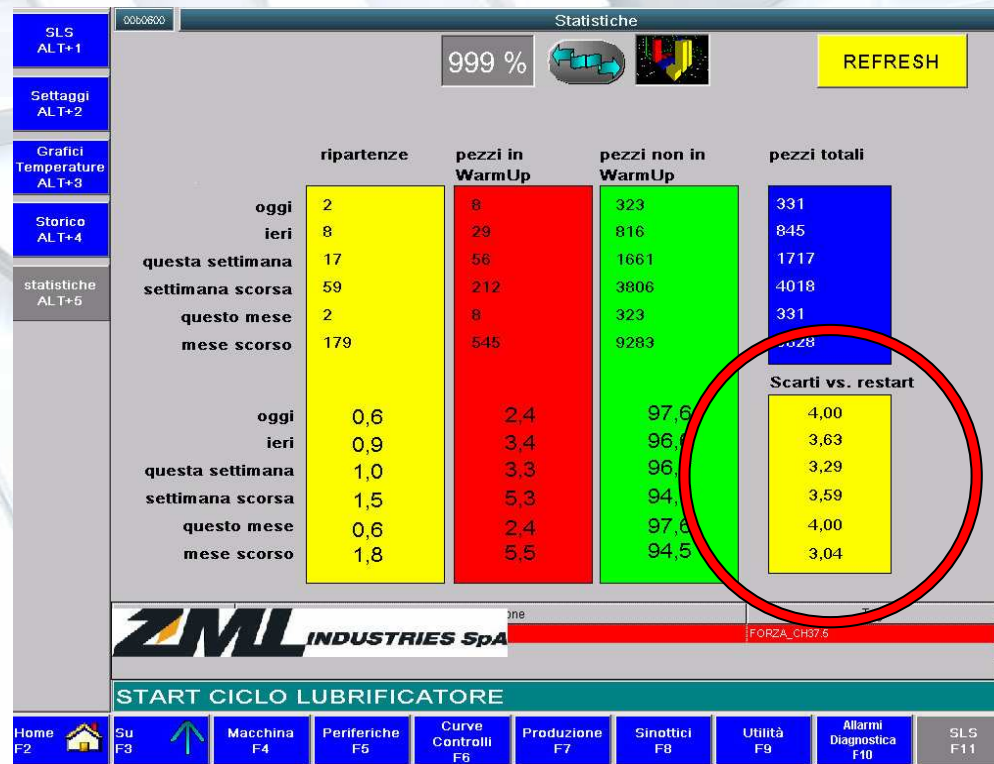
- 1) Alloy temperature
- 2) Cooling circuits and fluid flows in internal circuits (= constancy during the time)
- 3) **Lubrication cycle** (quantity of applied release agent and operating conditions of the lubricating equipment)
- 4) Management and control of every new start-up phase, optimizing the “thermal ramp” of the die and reducing scrap at low speed

WITH FOLLOWING EFFECTS ...

CONCLUSIONS

Monitoring the die surface temperature cyclically, it is possible to optimize the lubrication cycle , reducing lubrication time to the minimum necessary level in order to keep the system balance and checking the quality of the castings.

In foundries where  has already been implemented, start-up scrap has been reduced between 30 and 50 %.



THANKS FOR YOUR ATTENTION!



PARTNER IN PROGRESS
FOR ALUMINIUM AND
DIE CASTING INDUSTRY



ALUMINIUM CASTERS' ASSOCIATION OF INDIA (ALUCAST)