NAHMAT Pan Control
Decentralized Automation for the Sugar Crystallization Process
Increasing pressure on sugar-manufacturing companies for more efficient sugar production is the main topic wherever sugar producers meet all over the world.

With up to 60% of the overall steam consumption, the sugar house is the natural selection of choice when looking into possible optimization. The automation of the crystallization with NAHMAT® Pan Control is the solution for this field, proven in more than 900 batch pans worldwide.

**Therefore a quick return of investment is assured.**

The main requirements for an automation system that enables efficient automation of the vacuum batch pans are:
- Proven performance and reliability in sugar applications worldwide
- High availability
- Robust design, high degree of protection
- Worldwide service
- Low initial investment due to modular design
- Easy extendability

The major advantages of NAHMAT Pan Control are:
- Decrease of boiling time
- Reduction of sucrose in final molasses
- Narrow range of crystal size
- Easy operation even by untrained operators
- Key parameters protected by password
- Available in different languages

NAHMAT Pan Control meets all of the requirements above and guarantees the desired results.
NAHMAT Pan Control

Hardware

The hardware is based on standard SIMATIC® PLC components available worldwide from the world market leader. All hardware elements are mounted in a cabinet which is installed close to the boiling pan.

NAHMAT Pan Control cabinets are completely assembled, pretested, and ready for operation. External wiring is limited to the connection of field equipment to a terminal strip inside the cabinet.

All commonly used field equipment may be used.

An operator panel (color LC display) allows comfortable monitoring and control of the process.

Software

The software is designed by technologists for the special tasks needed for optimized discontinuous sugar crystallization. This standardized sugar-boiling software within NAHMAT Pan Control is a ready-to-run software.

After installation of the system it is only necessary to adjust some of the major setpoints (e.g. level for calandria covered) and the strike may be started. Our experienced commissioning engineers will not only optimize all parameters like seeding point or the boiling curve, but even more: they will train the operating and engineering personnel in the factory to optimize even further during the crushing season.
**Technological Features**

NAHMAT Pan Control covers the complete automated operation of all steps of discontinuous sugar boiling (see graph).

Steps like seeding, graining, or boiling are difficult to handle manually and contain a wide range of improvement for better product quality and energy saving.

Example: If “strike hold” becomes necessary it is more efficient to decrease the vapor steam setpoint instead of opening the water valve.

Automatically controlled and reproducible seeding and graining steps enable the crystals to grow close to the physically possible maximum speed without generation of undesired fine grain.

The full-cycle program, once started, needs no further operation by the operator. Only seeding has to be carried out manually in case no automatic slurry system is available in the plant.

Disturbances during the process, like no juice available, mingler is full, or a total vacuum breakdown, will be announced and the program will run into a save position in order to keep the strike alive.

The system may be switched into manual mode at any time during the process if so required. It may even be switched back to automatic mode at any time during the running strike whenever the operator decides to do just that. The system will then finish the strike in full automatic mode.

For pans which are not fully equipped with remotely operated valves a part-cycle mode is available. It covers the most important process steps starting with “seeding” and finishing with “tightening.”

Both modes are possible.
**Taking the Mystery out of the Sugar-Boiling Process**

In eliminating the mystery from the sugar-boiling process, two advantages of our automation technology really stand out:

First, it’s the result of collaboration between industry practitioners and Siemens technicians – and not just designed to satisfy the textbook requirements of instrumentation and control – and, secondly, it behaves just the way the boiling-pan operator expects.

Equally important, the operator can run the system with very little prior training because the user interface is self-explaining while guiding the operator through the boiling process which is essential to a smooth campaign start after a long off-season.

Other benefits of our 50 years of industry experience include: integrated strike sequence control; stand-alone, island approaches; bus-capability, and much, much more. Backed by a comprehensive range of instrumentation, control, power generation, engineering, automation, drive, and production control technologies... from Siemens.

NAHMAT Pan Control is designed to work with any type of discontinuous vacuum pan all over the world, regardless if used in cane or beet sugar factories.

Moreover, the system is not restricted to be used for one product only. Its flexibility allows boiling of any product simply by changing a few parameters. Advantages of automatic sugar boiling:

- Reduction of boiling time up to 20–30 %
- Reduction of energy (heating steam, vacuum) up to 20–30 %
- Strikes without opening the water valve
- Reduction of sucrose in final molasses up to 1–2 %
- Maximum amount of desired crystal size in each strike with minimum content of fine grain.

**Factory-wide automation**

By installing a data bus system PROFIBUS integrating all NAHMAT systems a factory-wide automation concept becomes possible. Then all operations may be carried out centrally in a factory control room.

This will allow the implementation of further process optimization features like strike sequence control and a Management Information System (NAHMAT MIS). All these systems are available.

**Field instrumentation**

NAHMAT Pan Control will work with most standard electrically or pneumatically operated field equipment already existing in the plant. Despite of this, investment in more accurate instrumentation should be considered. Therefore all kinds of density transmitters, level or pressure transmitters, valves, motors, and any other equipment proven in the sugar industry are available from Siemens.

More than 50 years of experience in automating the sugar production speak for themselves. NAHMAT Pan Control has been developed based on this experience specifically for the sugar industry. This guarantees our valued clients to find all available technological sugar know-how integrated in this system.

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**51 Steps**

for manual sugar boiling

1. CHECK start conditions
2. If not, give alarm
3. CHECK water and juice supply
4. If not, give alarm
   - 
   - 
   -
48. CHECK steaming valve is closed
49. If not, go to 47
50. CLOSE discharge
51. Go to step 1

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**One Step**

for the automatic control

START
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Siemens AG
A&D SP PMD ISD Sugar & Starch
P.O. Box 32 40
91050 Erlangen, Germany
Telephone: +49 (0) 9131 7 23740
Fax: +49 (0) 9131 7 23956
E-mail: sugar@erlm.siemens.de

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