

Gas Nitriding Furnace



Nitriding Furnace Automation

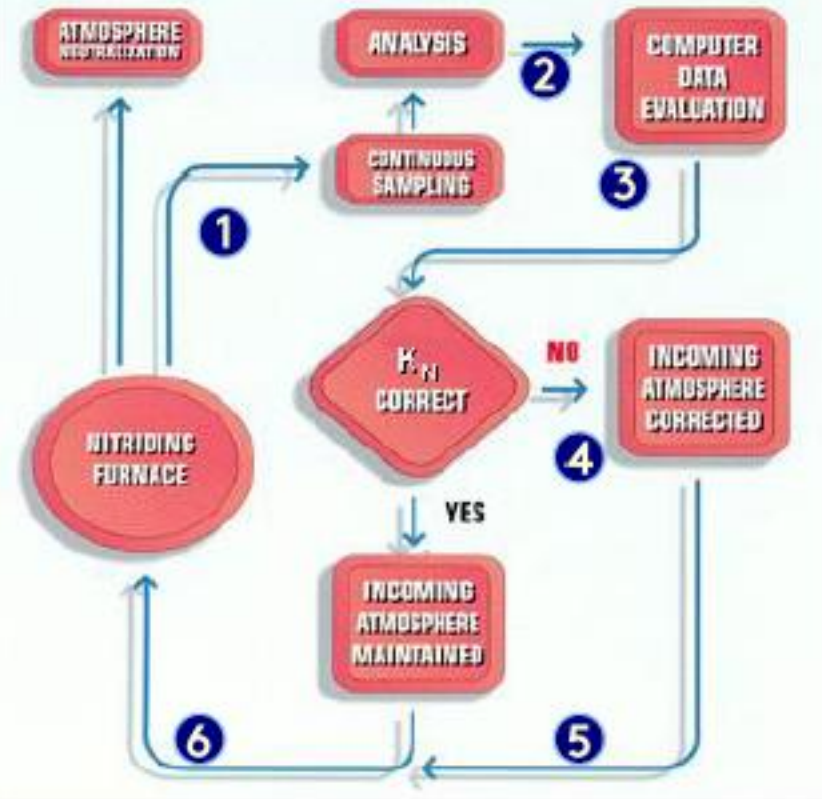
Purpose of Nitriding / Nitrocarburizing

- Increase surface hardness
- Improve wear resistance
- Eliminate / reduce adherence, pitting, microwelding
- Improve resistance to softening at T°
- Corrosion Protection & costmetic appearance

Gas Nitriding Furnace

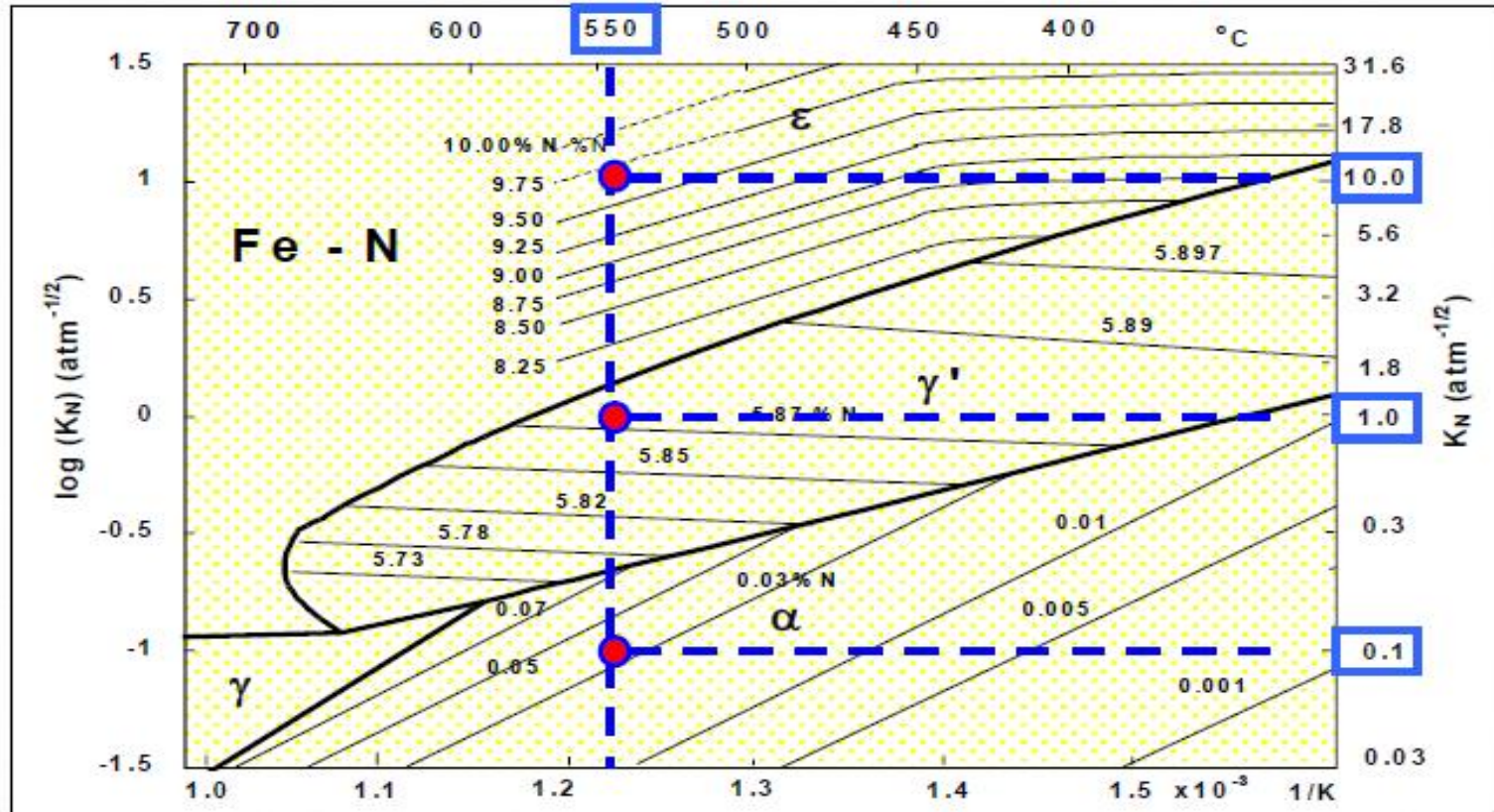
Closed-Loop Process Control

- Atmosphere is continuously analyzed
- System calculates the nitriding (KN) potential and compares to pre-set values
- If correct, the composition of the atmosphere is maintained, or corrected automatically



Nitriding Furnace Automation

Gas Nitriding/Nitrocarburizing Mechanisms



The K_N -T equilibrium phase diagram showing how the nitriding potential choice affects surface qualities (at 550°C or 1022°F)

Nitriding Furnace Automation

Project Details

We Provide the complete Automation for Nitriding Furnace. Our automation project includes Controlling System , Gas flowmeter (Nitrogen- Ammonia – Dissociated Ammonia -) , Hydrogen Gas Sensor – Protherm 470 Controller

Gas Nitriding Furnace

Brief about the advantage of the project we have done or why customer implemented these project at their process

Scope of Supply

Stand alone System

- Controller – Protherm 470
- Gas Flowmeter- AE Flowmeter
(Nitrogen – Ammonia- Dissociated Ammonia)
- Hydrogen Gas Analyzer – SGS
- SCADA – For Continuous Monitoring and Data Logging
- Panel Wiring on Existing Panel



Single Gas Sensor



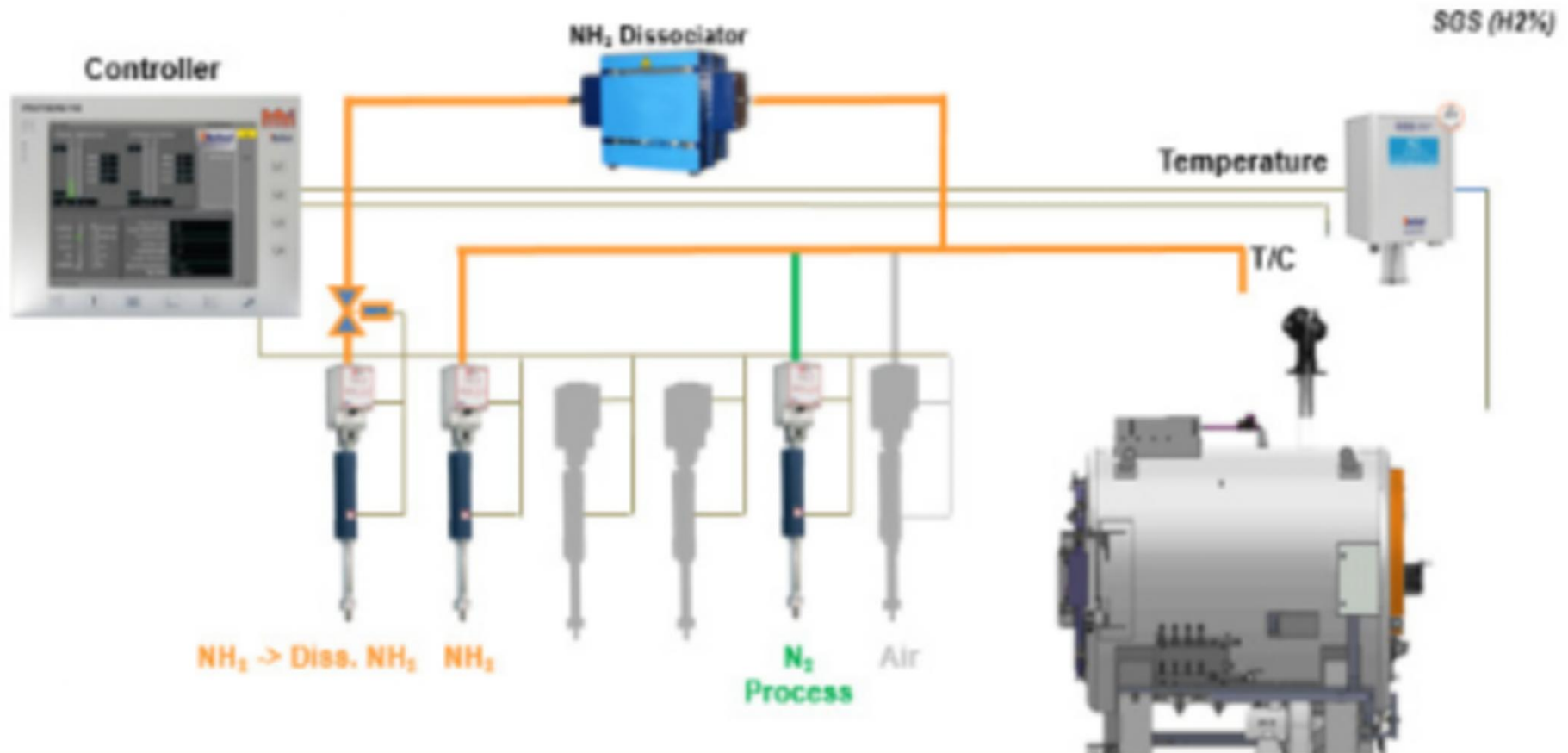
Protherm 470 Controller



FLOWMETER

Controlling System

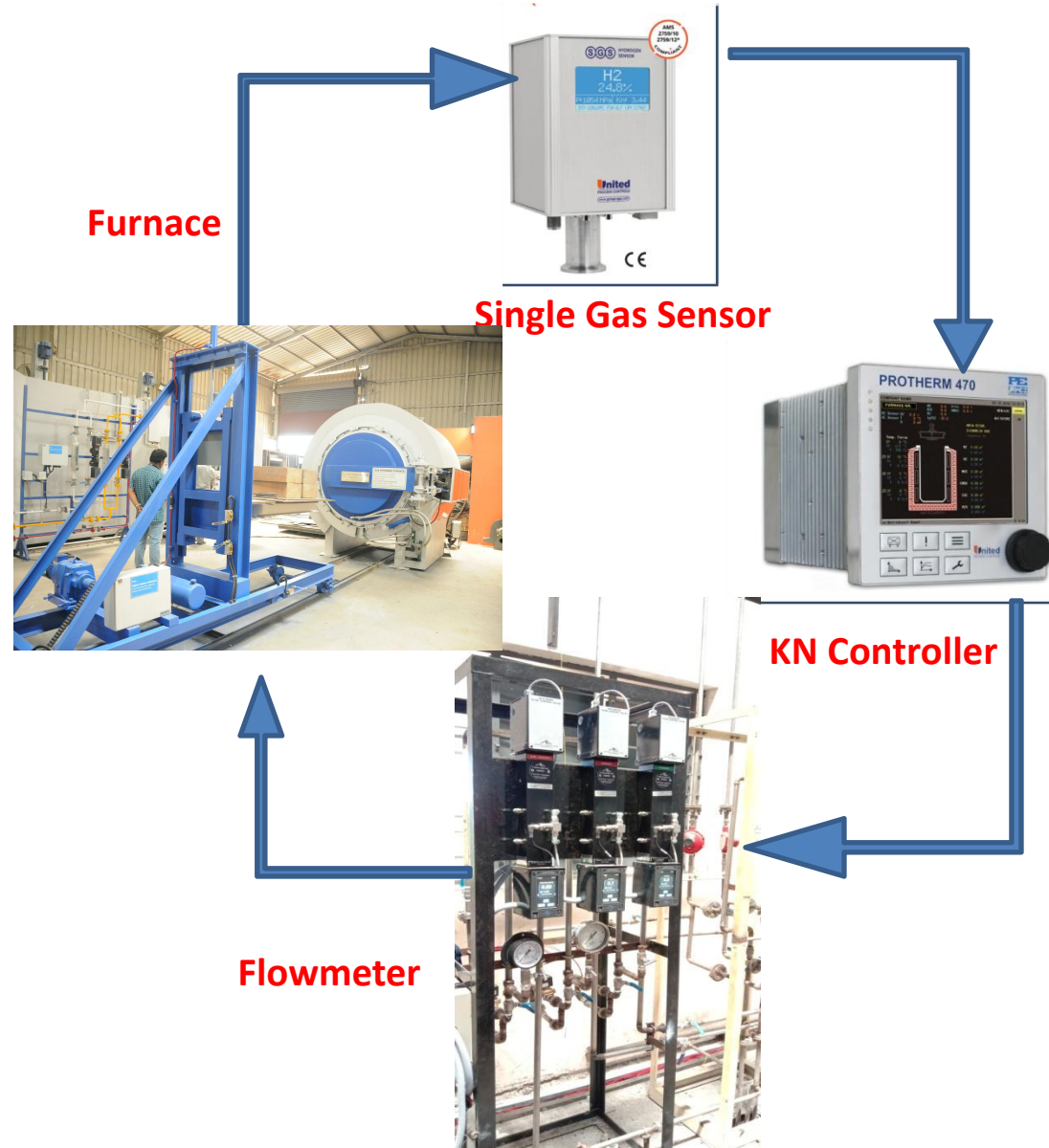
K_N – Nitriding Control



Control System

Closed-Loop Process Control

- Atmosphere is continuously analyzed
- System calculates the potentials (K_N) and compares to pre-set values
- If correct, the composition of the atmosphere is maintained, or corrected automatically



Flowmeter

New AE Flowmeter



Old Flowmeter



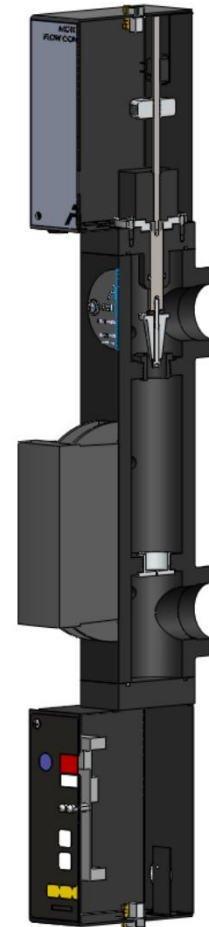
AE Flowmeter Display



Flowmeter

- Manual or electronic flow control valve
- Precision flow measurement and control
- **NIST Traceable 10 point calibration with every Meter**
- In-situ calibration certification meets **CQI-9** requirements
- Integrated flow alarm (Flow Switch)
- Integrated flow totalizing
- Touch screen display
- Ethernet Communications TCP/IP
- Analog control and feedback signals (4-20 mA)
- Serial communications and configuration software

Flow Measurement Technologies Differential Pressure Transmitter



Nitrogen – Ammonia- Dissociated Ammonia

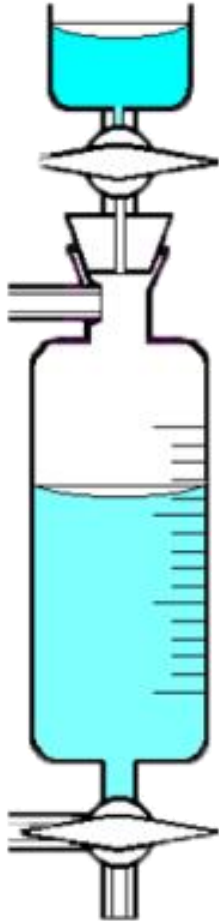
Flowmeter will measure –
Control and retransmit gas
flow rate details to the
controller

Flowmeter measure and
Control the all three gas
(Ammonia –Nitrogen –
Dissociated ammonia)
based on the remote set
point received from the
Portherm Controller



Gas Analyzer

Old Method



New Single Gas Analyzer
Hydrogen Sensor



SGS - Gas Analyzer Specification

Specification

Accuracy:	+/- 0.6% of reading plus +/- 0.4% of full scale
Linearity:	< 0.5% of full scale
Repeatability:	< 0.5% of full scale
Sampling Flow:	0.05 to 0.5 lpm / (0.1 to 1 cfh) not controlled
Atm. Flow Speed:	0.1 - 60 m/sec (0.3 to 200 ft/sec)
Response Time:	95% in 60 sec @ 0.2 lpm / (0.4 cfh)
Power Requirements	24VDC, 1.5 Amps max
Ambient Temperature (operating):	0- C to 65- C (32- F to 140- F)
Working Pressure:	ambient +/- 35 mbar (0.5PSI) Can be used in equipment with vacuum purge (no measurement in vacuum)



SGS - Gas Analyzer Features

- Integral Sampling eliminates need for a separate sampling system
- Sampling flow is generated by exhaust gases
- Sensor block with KF25 flange for direct exhaust or furnace installation
- Sensing Block and electronics embedded in the same enclosure
- Integrated webserver with access to diagnostics and maintenance
- Optional Calculation of nitriding and Carbon potential for nitriding and nitrocarburizing
- Modbus TCP Standard
- Two analog output Programmable
- Optional :- O2 sensor or O2 sensor Temperature input



Protherm 470 Features

- Visual Display of Connected Furnace
- Can hold up to 32 PID Control – loops to regulate configured Process Parameter such as temperature, Pressure, atmospheric Parameter (e.g such as carbon potential, nitriding Potential, Oxygen potential)
- Load oriented treatments :- Real time monitoring of jobs at all stages of the process and all chambers of the furnace
- Notification and Processing of alarms
- An online diffusion calculation provides the capability to control the process using the required target values
- Up to 99 treatments and templates can be created and modified



Protherm 470 – Summary Page

UPC_Screen

2020-08-21 12:58:10

Cover is Open ●
Fan On ●
Heater On ●
E-stop Engaged ●
N2 Flow switch OK ●
Cooling Blower On ●

KN PV 2.83

KN SP 2.20

H2% 44.41 %

#5; min:2705

Fixed Flows

1 NITRIDING PROCES

8-21 23:13



MAIN T/C 505 C

505 C

N2 ●

0.2

M3/HR

0.0

NH3 ●

4.9

M3/HR

5.0

dNH3 ●

0.0

M3/HR

0.0

UP T/C

553 C

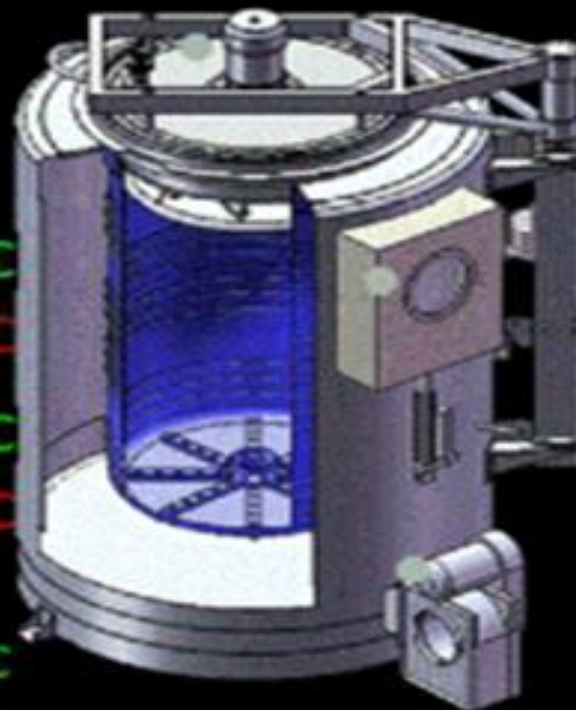
553 C

DOWN T/C

553 C

553 C

SAFETY T/C 567 C



Ver: 200804JW

Logged on: Default user , Level: 0 0.64

Protherm 470 –Receipe Details

PEP.go00 - TightVNC Viewer

2020-08-21 12:59:52

No 01 Name ITRIDING PROCESS 1 Version 20.08.2020 21:36:31
Type Nitriding Load desc.

Chamb.

Start

Edit

Stop

Jump

Back

Treat.

Method

DIFF No

No	Chamber	Name/Method	Setpoint 1	Setpoint 2	Step Time	Runtime
1	NIT_115	Heat to 350 in	350	0		142
2	NIT_115	Hold 60 Min	350	4	60	60
3	NIT_115	Safety Purge	450	4		66
4	NIT_115	Fixed Flows	505	0		49
5	NIT_115	Fixed Flows	505	0	3000	2390
6	NIT_115	Fixed Flows	170	0		
7	NIT_115	Safety Purge	170	4		
8	NIT_115	End	100	0		

Press to modify the running treatment

Logged on: Default user , Level: 0 0.39

Windows
Settings to activate Windows.

Type here to search

13:00
21-08-2020

Treatment method - Fixed flow

PCP 3000 - TightNC Viewer 2020-08-21 13:50:46

No 1 Name Fixed Flows Chamber NIT_115

Variable	Fix./Treat.	Ctrl.	Set Point	Step Ends at	Tol+	Tol-	T1	T2
NH3	Treatment							
dNH3	Treatment							
Kn	Fixed	---			0.00	0.00	0	0
NH3_Methode	Fixed		On					
dNH3_Methode	Fixed		On					
KnCtrl_Methode	Fixed		Off					

Chamb. Start Edit Stop Jump Back Treat. Method

Save Delete Cancel

Logged on: Default user , Level: 0 0.71

Type here to search

19:51 21-08-2020

Treatment method - Kn Control

PCP 3000 - TightNC Viewer 2020-08-21 13:50:46

No 1 Name Fixed Flows Chamber NIT_115

Variable	Fix./Treat.	Ctrl.	Set Point	Step Ends at	Tol+	Tol-	T1	T2
NH3	Treatment							
dNH3	Treatment							
Kn	Fixed	---			0.00	0.00	0	0
NH3_Methode	Fixed		On					
dNH3_Methode	Fixed		On					
KnCtrl_Methode	Fixed		Off					

Chamb. Start Edit Stop Jump Back Treat. Method

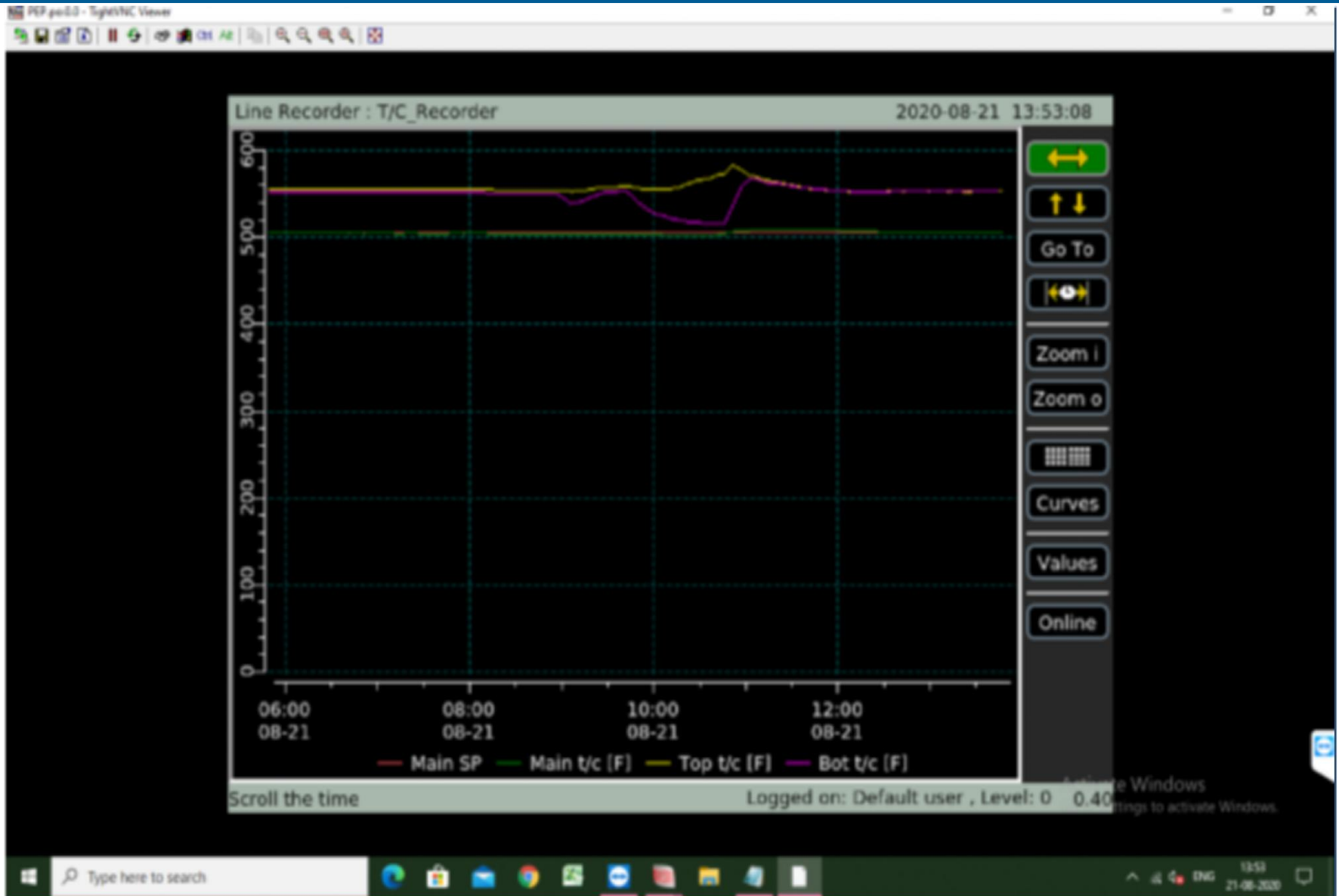
Save Delete Cancel

Logged on: Default user , Level: 0 0.71

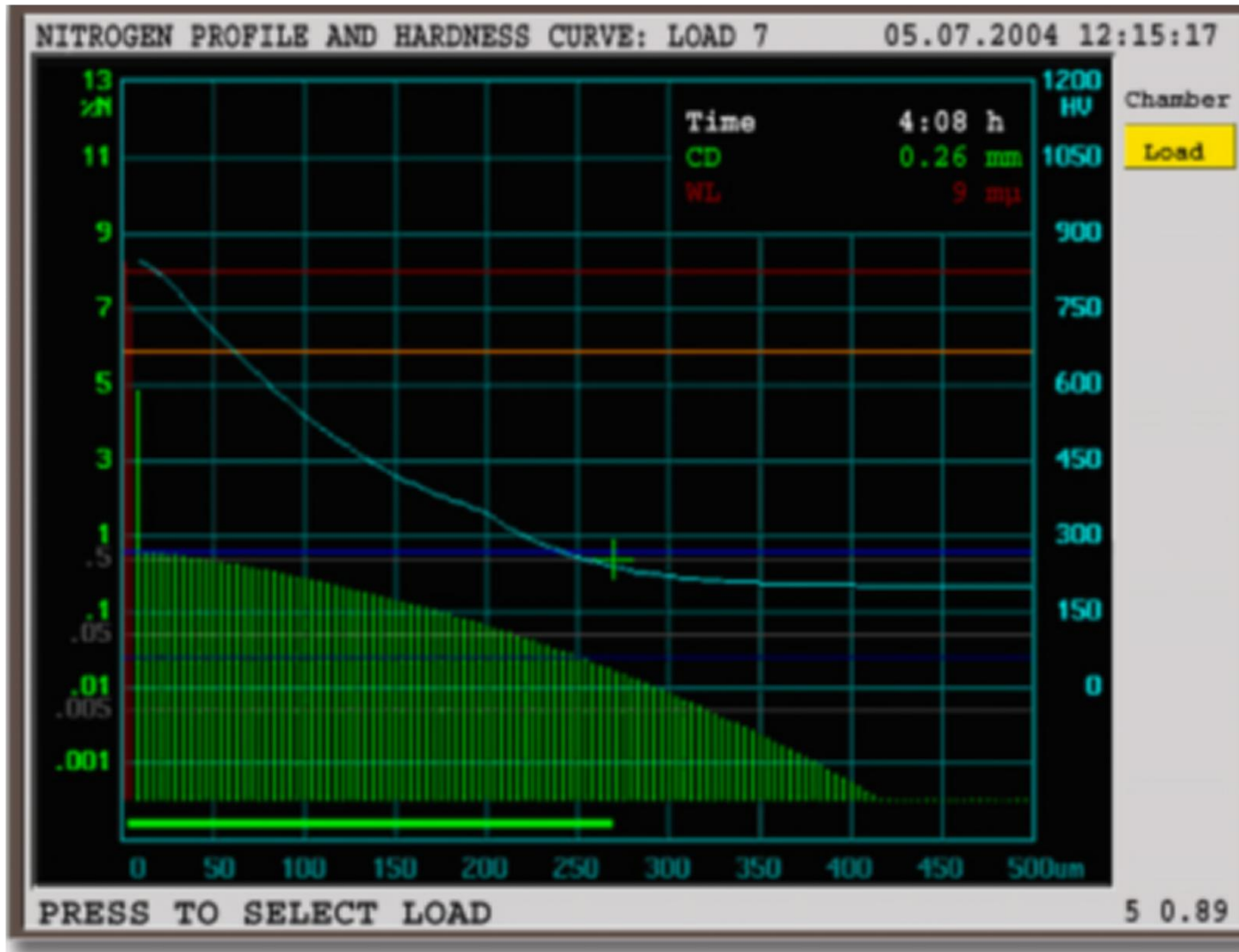
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19:51 21-08-2020

Trend Page



TREND SCREEN



SCADA SCREEN

PCVue - Main window - ARC Informatique

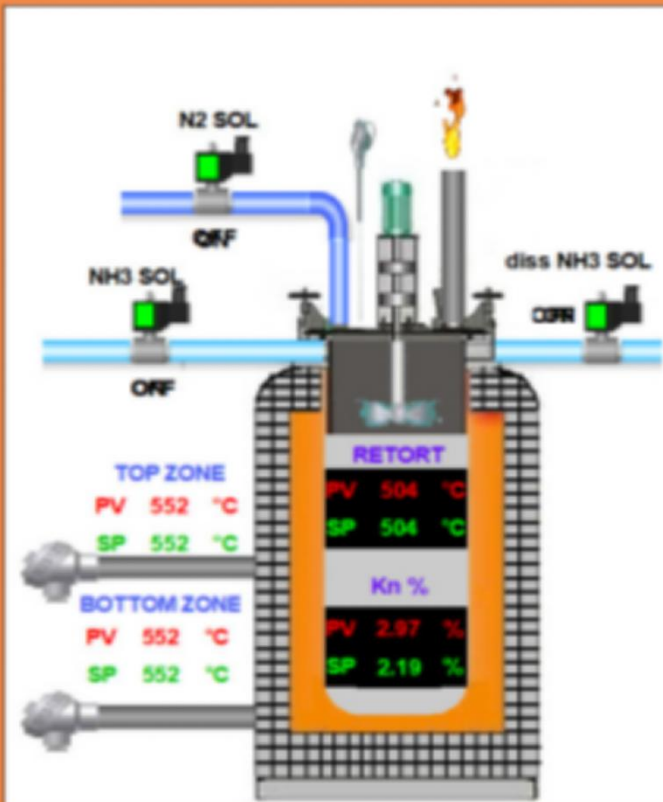
- [] [X]

NITRIDING SCADA CONTROL SYSTEM

21/08/20

14:15:37

HOME TRENDS ALARMS REPORT



CONTROL PANEL

START STOP RESUME



N2 FLOW RATE	0.2	M3/Hr
N2 FLOW SP	0.0	
NH3 FLOW RATE	4.9	M3/Hr
NH3 FLOW SP	5.0	
dNH3 FLOW RATE	0.0	M3/Hr
dNH3 FLOW SP	0.0	
H2 %	43.25	%

Activate Windows
Go to Settings to activate Windows.

Type here to search



14:15
21-08-2020

SCADA TREND SCREEN

