

## 1.1 TECHNICAL DATA SHEET

<b>1 GENERAL</b>					
1.1	Serial Number	4715			
1.2	Kind of Machine	HOMOGENIZER			
1.3	Model	ARIETE			
1.4	Type	NS3037H			
1.5	Execution	SANITARY			
1.6	Special Features	/			
1.7	MAX Operating Pressure	240	bar		
1.8	Flow Rate Type	F			
1.9	MIN Flow Rate	/	l/h @	/	Hz
1.10	MAX Flow Rate	5000	l/h @	/	Hz
1.11	MIN Feed Pressure	4-5	bar		
1.12	MAX Backpressure	5	bar		
<b>2 OPERATING CONDITIONS</b>					
2.1	Product	BABY FOOD (VEGETABLE AND MEAT PUREE)			
2.2	MAX Viscosity	<200	cP		
2.3	MAX Relative Humidity	40	%		
2.4	Ambient Temperature	40	°C		
2.5	MAX Altitude	1000	m		
2.6	MAX operating temperature	90	°C		
2.7	MAX temperature CIP / SIP	140	°C		
<b>3 TECHNICAL FEATURES</b>					
<b>3.1 COMPRESSION BLOCK</b>					
3.1.1	Type	MONOBLOCK			
3.1.2	Number of plungers	3			
3.1.3	Material of plungers	CERAMIC			
3.1.4	Plunger diameter	65	mm		
3.1.5	Stroke	70	mm		
3.1.6	Pumping valve type	PVP40 RAD NEW			
3.1.7	Overpressure valve	SPRING LOADED	setpoint	290	bar
3.1.8	Connection, Inlet	DN65 DIN11851			
3.1.9	Connection, Outlet	DN65 DIN11851			



<b>3.2</b>	<b>HOMOGENIZING VALVE</b>			
3.2.1	Number of Stages	1		
3.2.2	Type of actuator	PNEUMATIC		
3.2.3	Type of control	/PNEUMATIC		
3.2.4	Homogenizing Valve Type	/D28-45		

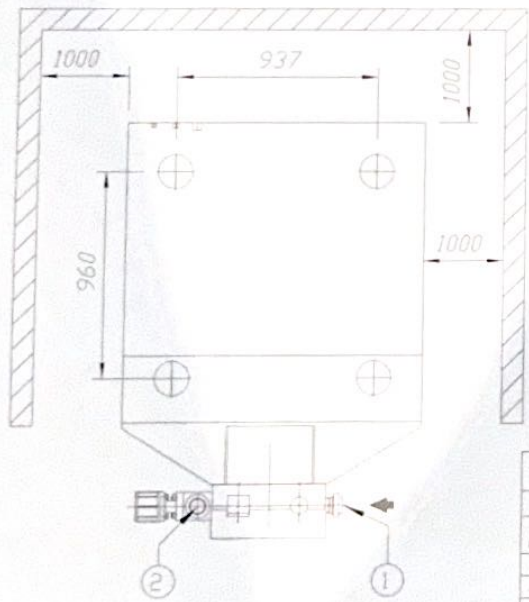
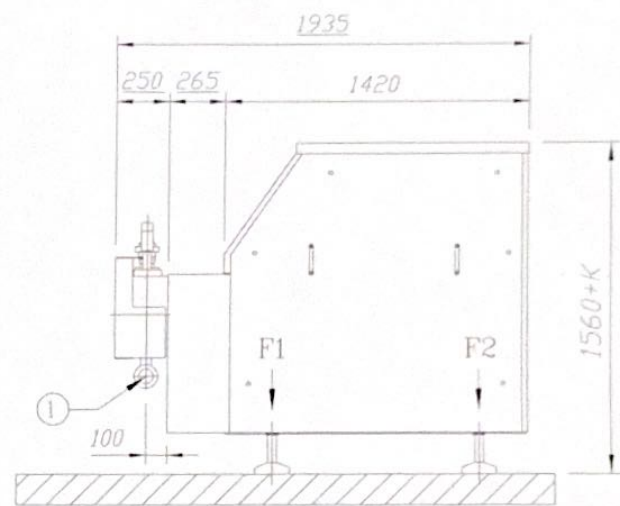
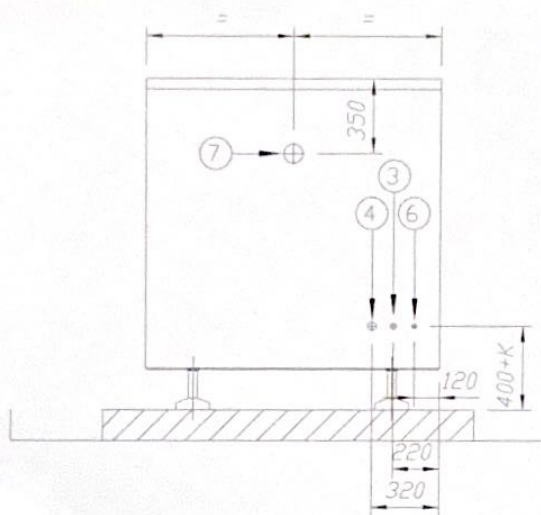
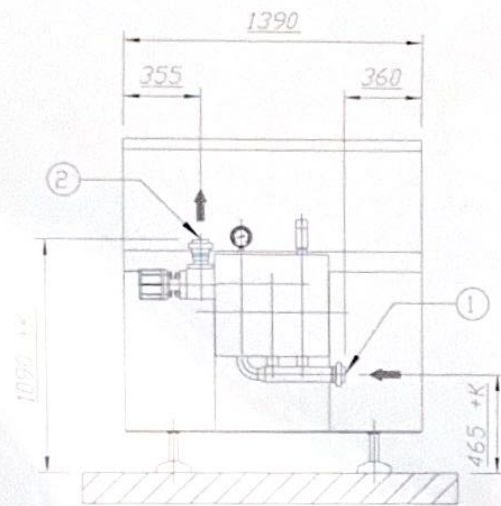
<b>3.3</b>	<b>DRIVE END</b>			
3.3.1	Main Motor (frame size; type)	AC225MA/4P		
3.3.2	Main Motor Power	37	kW	
3.3.3	RPM Crankshaft	//	MIN	
3.3.4	RPM Crankshaft	124	MAX	
3.3.5	Drive Type	GEAR REDUCER BENZLERS		
3.3.6	Gearbox speed reduction ratio	/4,37		

<b>3.4</b>	<b>LUBRICATION</b>			
3.4.1	Type	/FORCED		
3.4.2	Lubricating system	TP3A GR.1/6,1		
3.4.3	Oil Cooling system	YES		

<b>3.5</b>	<b>MAIN ELECTRICAL CIRCUIT</b>			
3.5.1	Number of phases	3		
3.5.2	Voltage	380	V	
3.5.3	Frequency	50	Hz	

<b>3.6</b>	<b>AUX ELECTRICAL CIRCUIT</b>			
3.6.1	Number of phases	1		
3.6.2	Voltage	24	V	
3.6.3	Frequency	50	Hz	

<b>4</b>	<b>OPTIONS</b>			
4.1	Suction side pulsation damper	/		
4.2	Delivery side pulsation damper	/		
4.3	Feeding pump	//		
4.4	Inlet pressure gauge	/		
4.5	Electric Power Board	//		
4.6	Overpressure Valve in Line	//	setpoint	// Bar /



OVERALL DIMENSIONS (mm)       $K = \pm 20 \text{ mm}$

ITEM	DESCRIPTION	CONNECTION
1	PRODUCT INLET	DN65 DIN11851
2	PRODUCT OUTLET	DN65 DIN11851
3	WATER INLET	1/2" BSP (MALE)
4	WATER DISCHARGE	1" BSP (MALE, TO DRAIN)
6	AIR INLET	3/8" BSP (MALE)
7	ELECTRICAL CABLES INLET	HOLE $\varnothing 90$
WEIGHT : Kg 2100 (F1=1400KG F2=700KG)		

DESCRIPTION				INSTALLATION DRAWING FOR NS3037 ENERGY		USER	
DESIGNER	APPROV	CHECKED	DATE	<b>Niro-Soavi S.p.A</b> Specialty Products Division via M. da Erba Edoardi, 29/A 43100 PARMA (ITALY) PHONE ++39 (0)521 965411 - FAX ++39 (0)521 242819			
LS			17/07/02				
REV	DESCRIPTION	SIGN	DATE				

SCALE 1 : 30  
 SH 1 OF 1  
 DRAWING  
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<b>GEA</b> Niro-Soavi S.p.A. <small>Specialty Products Division</small> <small>Via S. de Ermo 18/20, 38141          47100 Ferrara (Italy, It.)</small> <small>PHONE: +39.0521.462111 FAX: +39.0521.242119</small>	<b>ASYNCHRONOUS MOTORS          SPECIFICATION SHEET</b>		SPEC-E1C		
			21.08.02	0	
	1/220182		NS 3037H	DATE	REV
	NIRO SOAVI JOB		MACHINE MODEL	MACHINE SERIAL NO.	SIG.

<b>MAIN MOTOR</b>  CODE: MB4120B1	MANUFACTURER	ABB		PHASE NO.	3
	RATED OUTPUT	37	kW	FRAME SIZE	225S
	VOLTAGE	380	V	MOUNTING DESIGN.	B3
	FREQUENCY	50	Hz	THERMAL PROTECTION	NO
	EFFICIENCY	93,6	%	ROLLER BEARING	NO
	RATED CURRENT	72	A	STANDARDS	IEC-CENELEC
	STARTING CURRENT	475,2	A		
	POLES	4			
	POWER FACTOR	0,84			
	CONNECTION	DELTA			
<b>CABINET COOLING FAN MOTOR</b>  CODE: VB0035.V	RATED OUTPUT	0,18	kW	POLES	4
	VOLTAGE	380	V	PHASE NO.	3
	FREQUENCY	50	Hz	MOUNTING DESIGN.	AXIAL
	RATED CURRENT	0,39	A	STANDARDS	IEC
	CONNECTION	STAR			
<b>OIL PUMP MOTOR</b>  CODE: MB4405A1	RATED OUTPUT	0,55	kW	POLES	4
	VOLTAGE	380	V	PHASE NO.	3
	FREQUENCY	50	Hz	MOUNTING DESIGN.	B14
	RATED CURRENT	1,7	A	STANDARDS	IEC-CENELEC
	CONNECTION	STAR			
<b>FAN MOTOR ON THE MAIN MOTOR</b>  CODE:	RATED OUTPUT		kW	POLES	
	VOLTAGE		V	PHASE NO.	
	FREQUENCY		Hz	MOUNTING DESIGN.	
	RATED CURRENT		A	STANDARDS	
	CONNECTION				
<b>MOTOR M1</b>  CODE:	RATED OUTPUT		kW	POLES	
	VOLTAGE		V	PHASE NO.	
	FREQUENCY		Hz	MOUNTING DESIGN.	
	RATED CURRENT		A	STANDARDS	
	CONNECTION				
<b>MOTOR M2</b>  CODE:	RATED OUTPUT		kW	POLES	
	VOLTAGE		V	PHASE NO.	
	FREQUENCY		Hz	MOUNTING DESIGN.	
	RATED CURRENT		A	STANDARDS	
	CONNECTION				
<b>MOTOR M3</b>  CODE:	RATED OUTPUT		kW	POLES	
	VOLTAGE		V	PHASE NO.	
	FREQUENCY		Hz	MOUNTING DESIGN.	
	RATED CURRENT		A	STANDARDS	
	CONNECTION				



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			21.08.02	0
	1/220182	NS 3037H	4715	DD
JOB NIRO SOAVI	MACHINE MODEL	MACHINE SERIAL NO.	SIG.	

LUBRICATING & COOLING FLUID					
		Required		Min	Max
PISTONS	WATER	YES	Pressure (Bar)	2	3
			Temperature (°C)	10	25
			Consumption (l/h)	300	
GEAR BOX		NO	Pressure (Bar)		
			Temperature (°C)		
			Consumption (l/h)		
OIL EXCHANGER	WATER	NO	Pressure (Bar)		
			Temperature (°C)		
			Consumption (l/h)		
STERILE CONDENSATE EXCHANGER		NO	Pressure (Bar)		
			Temperature (°C)		
			Consumption (l/h)		

Note : max. hardness < 15°fH ; max. particle size = 60 microns .

COMPRESSED AIR					
		Required		Min	Max
COMPRESSED AIR		YES	Pressure (Bar)	6	10
			Consumption(Nm <sup>3</sup> /h)		
			Pressure (Bar)		
			Temperature (°C)		
			Consumption(Nm <sup>3</sup> /h)		

STEAM					
		Required		Min	Max
STERILE CONDENSATE PRODUCTION		NO	Pressure (Bar) <sup>(1)</sup>		
			Temperature (°C)		
			Consumption (kg/h)		
(1) THE CLIENT MUST INSTALL A PRESSURE REDUCER AT THE STEAM INLET CONNECTION TO ADAPT THE PRESSURE TO THE MACHINE'S REQUIREMENTS					
PULSATION DAMPER		NO	Pressure (Bar) <sup>(2)</sup>		
			Temperature (°C)		
			Consumption (kg/h)		

ELECTRICITY					
Electrical supply (V/Hz)	V = 3x	380	Hz =	50	
Power absorbed (kW)	kW =	40,4			
Current absorbed (A)	A =	73,7			
Note :					





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LEGEND  
TO CONCEPT FLOW SHEET

SPEC - 102 C





DATE	REV.
	0
SIG.	

Page 1 of 2






1. INSTRUMENT SYMBOLS

-  LOCAL
-  IN MAIN PANEL
-  LIMIT VALUE  
H: HIGH OR OPEN  
L: LOW OR CLOSED
-  POINT OF MEASUREMENT  
WITHOUT INSTRUMENTATION

2. PROCESS LINES

-  PRIMARY FLOW LINE, GENERAL
-  SECONDARY FLOW LINE, GENERAL
-  MECHANICAL CONNECTION
-  SUPPLY LIMIT MARKER























3. INSTRUMENT SIGNAL LINES

-  GENERAL
-  ELECTRICAL
-  PNEUMATIC
-  HYDRAULIC
-  CAPILLARY

4. FLOW LINE ABBREVIATIONS

- AS AIR SUPPLY
- CIP CLEANING IN PLACE
- CS CONDENSATE SUPPLY
- CWS CHILLED WATER SUPPLY
- ES ELECTRIC SUPPLY
- GS GAS SUPPLY
- NS NITROGEN SUPPLY
- OS OIL SUPPLY
- SS STEAM SUPPLY
- WS WATER SUPPLY
- R RETURN

5. MACHINERY AND EQUIPMENT

-  AUTOMATIC ACTUATOR FOR REMOTE CONTROL, GENERAL
-  MANUAL ACTUATOR NOT FOR REMOTE CONTROL
-  AUTOMATIC ACTUATOR WITH INTEGRATED MANUAL CONTROL FACILITY
-  DIAPHRAGM ACTUATOR
-  SOLENOID ACTUATOR
-  PISTON ACTUATOR
-  ELECTRIC AC MOTOR
-  ADJUSTABLE SPEED CONTROL
-  COMPRESSOR OR VACUUM PUMP, GENERAL
-  FAN
-  PUMP FOR LIQUIDS GENERAL
-  CENTRIFUGAL PUMP
-  HIGH PRESSURE PUMP
-  1-STEP HOMOGENIZER
-  2-STEP HOMOGENIZER
-  FILTER, GENERAL
-  HEAT EXCHANGER WITHOUT CROSS FLOW e.g. ELECTRIC HEATER
-  LIGHT SOURCE
-  VALVE CLOSES (FC)
-  VALVE OPENS (FO)
-  VALVE RETAINS POSITION
-  FAIL-OPEN INDICATION FOR A 3-WAY VALVE





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LEGEND  
TO CONCEPT FLOW SHEETS

SPEC - 102 C

DATE

REV.

Page 2 of 2

SIG.

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6. LETTER CODE FOR IDENTIFICATION OF INSTRUMENT FUNCTIONS

	FIRST LETTER MEASURED OR INITIATING VARIABLE	MODIFIER	SUCCEEDING LETTER (1) DISPLAY OR OUTPUT FUNCTION
A			ALARM
B			DISPLAY OF STATE (2)
C			CONTROLLING (4)
D	DENSITY	DIFFERENCE	
E	ALL ELECTRICAL VARIABLES (5)		SENSING ELEMENT
F	FLOW RATE	RATIO	
G	GAUGING, POSITION OR LENGTH		
H	HAND (MANUALLY INITIATED) OPERATED		
I			INDICATING (3)
J		SCAN	
K	TIME OR PROGRAMMED TIME		
L	LEVEL		
M	MOISTURE OR HUMIDITY		
N	USER'S CHOICE		USER'S CHOICE
O	USER'S CHOICE		
P	PRESSURE OR VACUUM		TEST-POINT CONNECTION
Q	QUALITY (5)	INTEGRATE OR TOTALIZE	INTEGRATING OR SUMMATING
R	NUCLEAR RADIATION		RECORDING
S	SPEED OR FREQUENCY		SWITCHING (2)
T	TEMPERATURE		TRANSMITTING
U	MULTIVARIABLE		MULTIFUNCTION UNIT
V	VISCOSITY		VALVE, DAMPER, ACTU, ELEMENT
W	WEIGHT OR FORCE		
X	UNSPECIFIED (5)		UNCLASSIFIED FUNCTIONS
Y	VIBRATION		COMPUTING RELAY, RELAY
Z			EMERG. / SAFETY ACTING (2)

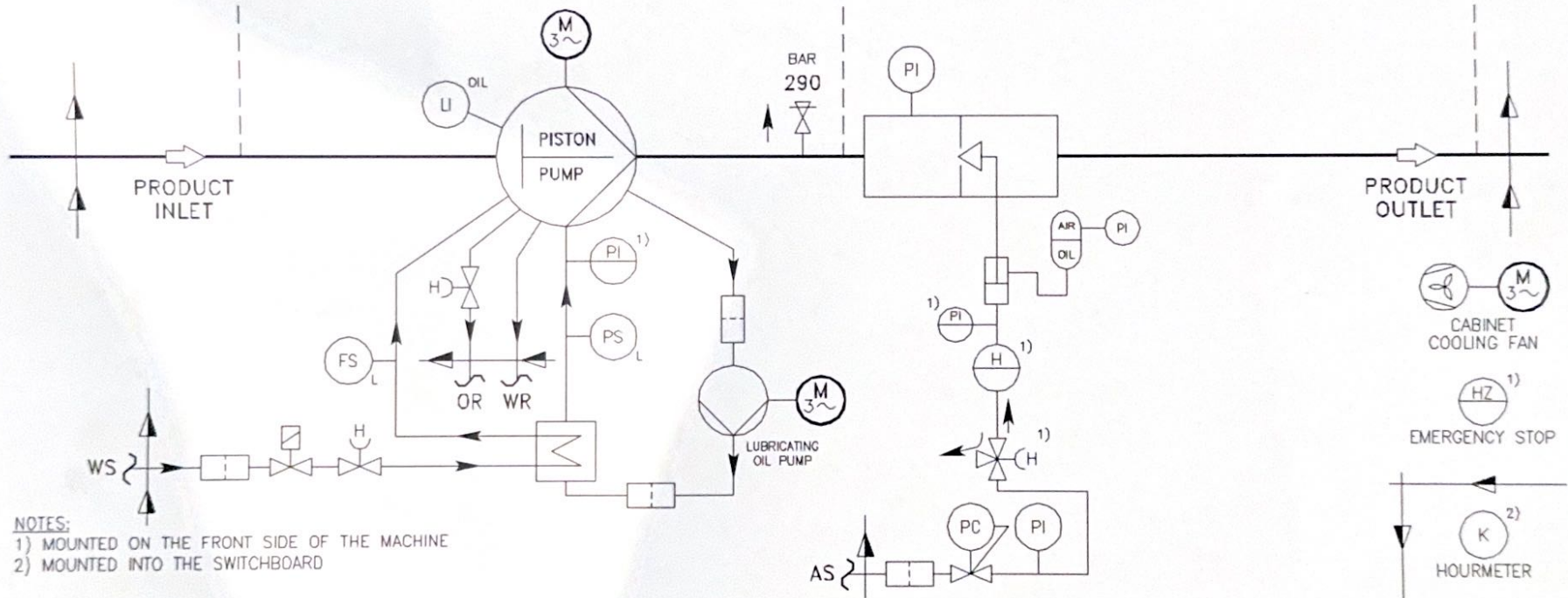
EXAMPLE : PDIRC

DIFFERENTIAL PRESSURE INDICATION, RECORDING AND CONTROL  
FIRST LETTER P, MODIFIER D, SUCCEEDING LETTERS I,R,C

- 1) NORMAL SEQUENCE OF SUCCEEDING LETTERS : B.I.R.C.T.Q.S.Z.A.
- 2) SIGNAL TYPE : ON/OFF
- 3) SIGNAL TYPE : CONTINUOUS
- 4) SIGNAL TYPE : NORMALLY CONTINUOUS. IF ON-OFF, S IS ADDED
- 5) A NOTE SPECIFIES THE MEASURED PROPERTY. E.g. FOR LETTER E, I, U, P OR F



DIMENSION	PRESSURE	FLOW (CAPACITY)	TEMPERATURE	VISCOSITY	PRESSURE	PRESSURE	PRESSURE
MEASURE UNIT	BAR	l/h	°C	cP	BAR	BAR	BAR
PRODUCTION	MIN. 4 ÷ 5	MIN. 5000 MAX. 5000	MAX. 90	MAX. 200	MAX. 240	MAX.	MAX. 5
CLEANING/STERILIZATION	MIN. 3 ÷ 4	MAX. 5000	MAX. 90/140	MAX.	MAX.	MAX. -	MAX.



NOTES:  
 1) MOUNTED ON THE FRONT SIDE OF THE MACHINE  
 2) MOUNTED INTO THE SWITCHBOARD

Rev. Letter	Revision	Rev.	Appr.	Date	This drawing is property of N.S. It must not be used, copied, or handed to any third party otherwise dispense or without our express permission in writing					
GEA	Niro-Soavi S.p.A.	SCALE	Drawn DD	21.08.02	SHEET	MACHINE TYPE	MACHINE SERIAL NUMBER	NIRO-SOAVI JOB	FLWSHEET No.	Rev.
Specialty Products Division	Via M. da Erba Edoardi, 29/A 43100 PARMA ( ITALY ) PHONE: +39.0521.995411 - FAX: +39.0521.242818		Check.		1/1	NS3037H	4715	1/220182	F220182	0
			Appr.							



<b>GEA</b> Specialty Products Division Niro-Soavi S.p.A. via M. da Erba Edoari, 29/A 43100 PARMA (ITALY) PHONE : +39.0521.965411 - FAX : +39.0521.242819	<b>RUNNING SEQUENCE</b>		SPEC-E4C	
			21.08.02	0
	1/220182	NS 3037H	4715	DD
JOB NIRO SOAVI	MACHINE MODEL	SERIAL NO.	SIG.	

RUNNING SEQUENCE REGARDING THE SWITCHBOARD SUPPLIED BY THE CUSTOMER		
ACTION		RESULT
1	INSERT THE MAIN SWITCH	A SWITCHBOARD ENERGIZED
		B
2	PUSH THE START BUTTON	A INSERT THE LUBRICATING OIL-PUMP MOTOR
		B INSERT THE COOLING FAN MOTOR ON THE MAIN MOTOR
		C INSERT THE MAIN MOTOR
		D INSERT THE SOLENOID VALVE FOR WATER SUPPLY
		A
3	PUSH THE STOP BUTTON	A DISCONNECT THE MAIN MOTOR
		B DISCONNECT THE LUBRICATING OIL-PUMP MOTOR
		C DISCONNECT THE CABINET COOLING FAN MOTOR
		D DISCONNECT THE SOLENOID VALVE FOR WATER SUPPLY
		A
4	INTERVENTION OF THE MAIN MOTOR PROTECTION	A REPEAT THE RESULT OF THE SEQUENCE DESCRIBED AT POINT 3
		A
5	INTERVENTION OF THE LUBRICATING OIL-PUMP MOTOR PROTECTION	A REPEAT THE RESULT OF THE SEQUENCE DESCRIBED AT POINT 3
		A
6	INTERVENTION OF THE CABINET COOLING FAN MOTOR PROTECTION	A LIGHTING OF THE "THERMAL PROTECTION CABINET COOLING FAN MOTOR" WARNING LIGHT
		A
7	INTERVENTION OF THE LUBRICATING OIL PRESSURE SWITCH	A REPEAT THE RESULT OF THE SEQUENCE DESCRIBED AT POINT 3, AFTER 15 SECONDS DELAY
		A
8	INTERVENTION OF THE WATER FLOW SWITCH	A REPEAT THE RESULT OF THE SEQUENCE DESCRIBED AT POINT 3, AFTER 15 SECONDS DELAY
		A
9	INTERVENTION ON THE EMERGENCY STOP PUSHBUTTON	A REPEAT THE RESULT OF THE SEQUENCE DESCRIBED AT POINT 3
		A
10	INTERVENTION ON THE EMERGENCY STOP PUSHBUTTON	A REPEAT THE RESULT OF THE SEQUENCE DESCRIBED AT POINT 3





Niro Soavi S.p.A

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**DECLARATION OF CONFORMITY**



MACHINE: *HOMOGENIZER ARIETE*  
Model: NS3037H  
Serial number: 4715  
Max Press. (MPa): 24  
Rated Flow (dm<sup>3</sup>/h): 5000  
Year: 2002

*The undersigned*

**DECLARES**

*under his own responsibility that the above mentioned Machine, object of this declaration,*


**IS IN CONFORMITY**

*with the precepts of the following EEC directives and standard norms:*

- 98/37/EEC
- 73/23/EEC and following updated 93/68 EEC
- 89/336/EEC
- EN 292-2/A1
- EN 60204-1

*The above identified Machine has successfully passed all the trials and tests to which it has been submitted.*

PARMA 07/10/2002

NIRO SOAVI S.p.A  
  
MOGENS HALBERG  
Managing Director



## GEA Niro Soavi Technical Datasheet

### Homogenizer & High Pressure Pump

# Ariete NS3037

From the world leader in high pressure homogenization: absolute quality and reliability with advanced technical solutions for any process need.



The Ariete series is the state-of-the-art technology for powerful reliable high pressure machines and customized solutions. The Ariete machines, compliant to EU safety rules (CE standards) and built according to EN ISO 9001:2008 Quality System, are the best fit for pharmaceutical, dairy, food & beverage, biotechnology, chemical and cosmetics industries.

#### Liquid end

- High quality stainless steel and special high wear resistant materials for best mechanical and corrosion resistance performance
- 3-A and electropolished versions available
- Ball (PVB) and poppet valves (PVP) interchangeable into the same block design for maximum product handling flexibility
- Aseptic version compression block available as option, with sterile condensate packing flushing
- Various materials for pumping plungers
- Monoblock construction, up to 600 bar, or multiblock, up to 1500 bar forged high grade Duplex or Super Duplex SS alloy

#### Homogenizing valve

- One stage (standard on homogenizers) with pneumatic adjustment from the machine's control panel
- High efficiency homogenizing valve NanoVALVE™, based on advanced fluid dynamics concepts, available as option
- Engineered for easy maintenance and cleaning
- Second homogenizing stage as option
- Wear parts made of tungsten carbide, ceramics as option

#### Power end

- Heavy duty and reliable power frame housing the transmission elements
- AC motor drive
- Forced lubrication with gear pump, low oil pressure switch and oil cooling
- "V" belts drive and gearbox speed reduction unit

#### Casing

- Made of polished stainless steel with sound proof lining
- Easy access and maintenance with removable panels
- Noise reduction execution ( $\leq 75\text{dB (A)}$ ) available as option

#### Tools and spare parts

- Ordinary maintenance tools and one set of emergency spare parts supplied with the machine
- O&M manual and spare part list on CD-ROM

#### Pump Valves

- High wear resistant Stellite™ alloy removable seats
- Ball type (PVB) or poppet type (PVP) in solid Stellite™
- Ceramic or tungsten carbide materials available as option

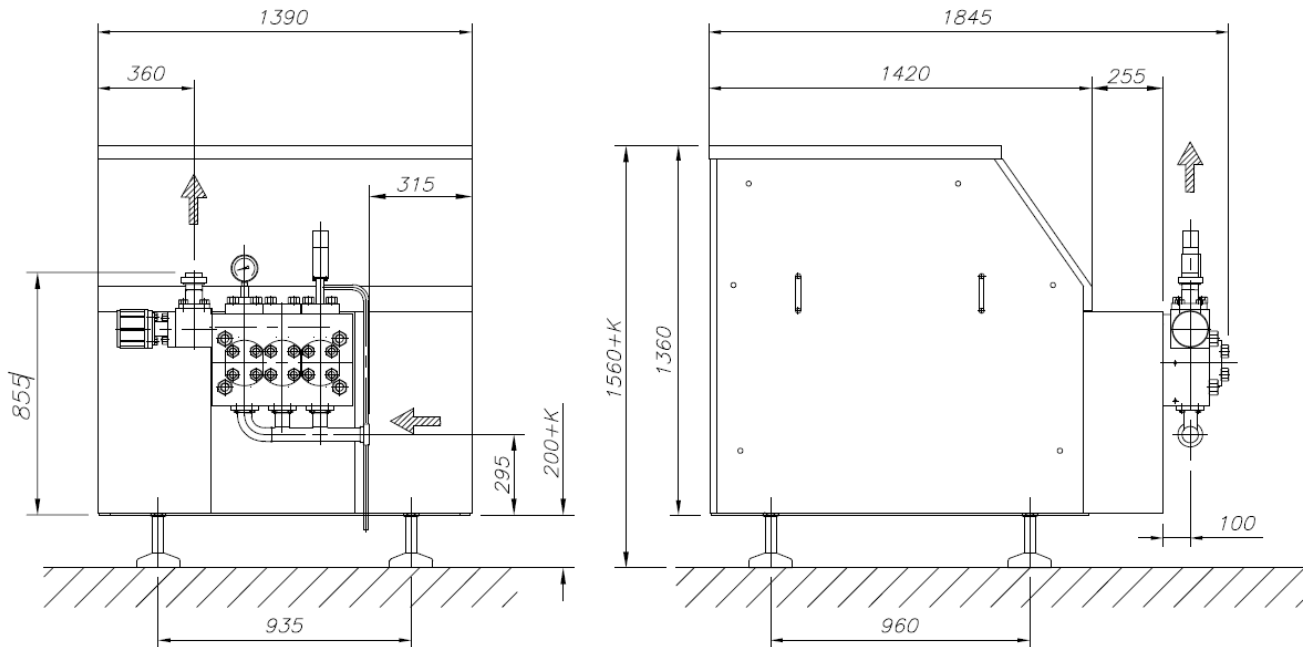
#### Plungers

- Chrome coated stainless steel
- Tungsten carbide coated stainless steel
- Solid ceramic
- HCR Chromium Carbide coated stainless steel



# Ariete NS3037

## Dimensional drawing



Available up to 1500 bar, suitable for CIP and SIP, the Ariete machines can be supplied with all necessary customizations for easy integration in any process line, sanitary or aseptic. The wide range of available materials, the low running speed and linear plunger velocity allow Ariete machines to perform at their best also on abrasive and viscous product.

### Pressure measurement & control

- Sanitary design analog high pressure gauge
- Pressure transmitters and transducers available as option
- Overpressure relief valve installed on compression block

### Product line connections

- DIN 11851, Tri-Clamp™, GEA Tuchenhausen Varivent™
- Others as option upon request

### Power end

- Cast iron power frame
- Forced lubrication with low oil pressure switch and oil cooling
- Polished SS machine casing on painted steel frame

### Main options on request

- High pressure pump version
- 2nd stage homogenizing valve
- Electric power board for fixed or variable capacity
- Machine automation and remote controls
- Aseptic execution
- 3-A execution, FDA approved gasket and cGMP documentation

### PERFORMANCE

Pressure (bar)	Max Flow Rate (l/h)
100	12000
150	8000
200	6000
250	5000
400	3000
600	2000
1000	1200
1200	1000
1500	800

Each line refers to a different machine, which is designed for the specific maximum pressure and the specific maximum capacity.

### TECHNICAL DATA

Number of plungers	3
Stroke	70 mm
Absorbed motor power up to	37 kW
Net weight	2100 kg
Gross weight	2450 kg
Lubricating and cooling water	90 l/h
Lubricating oil ISO VG 150	28 l
Gearbox oil EP 220	9 l

## GEA Mechanical Equipment

GEA Niro Soavi

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## GEA Niro Soavi Homogenizers

Technical Leaflet: OpenXFLO™



OpenXFLO is an innovative and revolutionary liquid-end design concept, developed by GEA Niro Soavi. The special clean configuration of OpenXFLO™ liquid-end allows a free flow to the homogenizing valve for viscous and liquids products containing

crystals, agglomerates, fibers, solid pieces. This technology is used to make the homogenization effect available in chemical slurries, Latex, and Polymers Nanodispersions in order to improve the final product quality.



# Design concept.

## Construction concept.

The High Pressure Homogenizer is a special reciprocating pump. When the product enters the machine, it is pumped across the high pressure block to the homogenizing valve, the core of the homogenizing process. The liquid product is transformed by means of high fluid dynamic energy.

The patented OpenXFLO™ compression block (EPO 2040828) features a special liquid-end clean design concept: the completely free pumping chambers and the pumping valve configuration without springs eliminate the risk of solids accumulation and clogging.

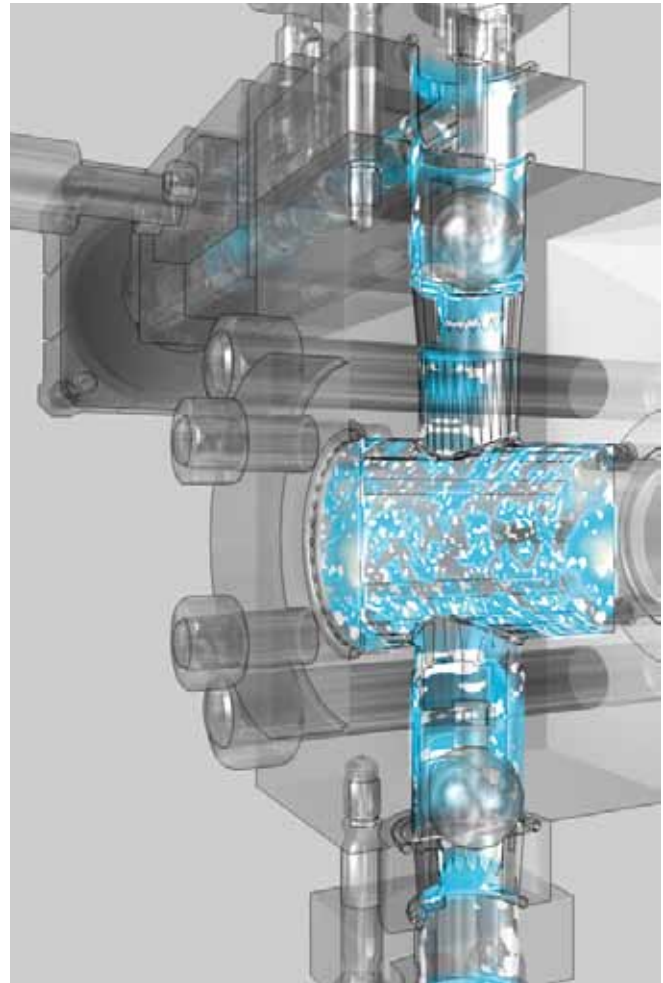
With OpenXFLO™ design concept the product with agglomerated fibers and solid particles, up to one centimetre in diameter or length (according to their concentration in the liquid phase, type and hardness) is free to be pumped and flow to the homogenizing valve.

## Main Features

- Clean design concept without dead-ends
- Reduced maintenance costs
- Pumping chambers without spacers
- No interfering flow across valve groups
- Special hygienic pumping valves assembly without springs
- Suitable for highly viscous and sticky products large particles or long fibers
- Corrosion resistance materials for a wide variety of products processing
- Production range: 1500 - 23000 l/h @ 150 - 600 bar
- Applicable on machine models Ariete NS3015, NS3024, NS3037, NS3075, NS3110, NS5132

## Technical Advantages

- No solid build up
- No production stops
- Optimized valve guide design
- Pumping plunger not interfering with valve bore in full forward position
- Free flow across the pumping valves
- Optimized product flow to the homogenizing valve
- Improved product quality by means of low product shear stress in the pumping section, combined with optimal homogenization





# New applications of homogenization.

## Latex and polymers Nanodispersions.

- Improved final product quality and performance
- Reduced production costs
- Reduced waste for non-compliance
- From batch to in-line processing
- Free flow across the pumping valves
- Increased production volumes
- Longer production time

## Chemical slurries, polymerizing & shear sensitive products.

- Micro-sizing of components for improved effectiveness
- Reduction of recipe costs
- Enhanced product properties (e.g. gloss, color)
- Updates process technology for safe and environmentally friendly products

## Speciality foods.

- Low product shear stress in pumping section for product with pieces
- Sanitary design
- Processing food products with high fibers and solids content

## Waste water slurries.

- Reduced foam inside waste water
- Improved effectiveness of bioreactors
- Increased energy recovery from biogas
- Reduction of sludge processing time
- Reduction of waste solids for disposal or incineration
- Ecologic energy recycling and reduced environmental impact





# Feature and solutions.

Production range:

1500-23000 l/h @ 150-600 bar.

OpenXFLO™ is a compression block design which can be installed on standard drive end configuration as option, to comply with special products requirements.

Typical working pressure rating is 150- 450 bar, special executions for flow rate and pressure rating are available upon request.

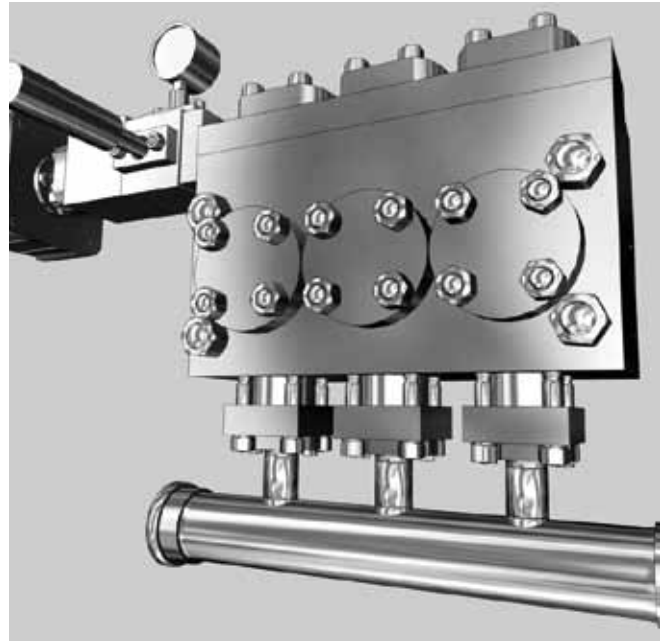
OpenXFLO™ is applicable on machine models Ariete NS3015, NS3024, NS3037, NS3075, NS3110, NS 5132.

GEA Niro Soavi in the world.

GEA Niro Soavi, part of GEA Group, is the global technology leader in high pressure homogenizers and high pressure pumps for dairy & food, pharmaceutical, chemical and biotechnology industries. It provides leading technology with the widest product range available, R&D facilities and first class after sales service to its business partners.

GEA Niro Soavi engineering and manufacturing is certified according to ISO 9001:2008 Quality System to supply homogenizing technology through a worldwide sales and service organization.

GEA Niro Soavi sales organization worldwide with their know-how and expertise, is available to respond to all questions and queries about homogenization issues. Please check GEA Niro Soavi website for the closest local branch.



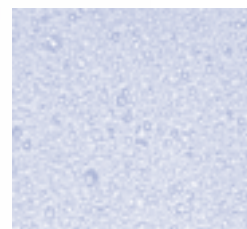
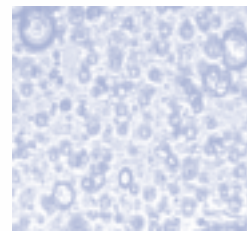
## GEA Mechanical Equipment

GEA Niro Soavi

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info.GeaNiroSoavi@gea.com www.niro-soavi.com



# High-Pressure Pumps and Homogenizers





# Niro Soavi

**Niro Soavi** established in 1947 is today an international leader in High-Pressure Pumping and Homogenization. It is part of GEA, a global technology leader with more than 150 operating companies worldwide.

In North America, Niro Soavi is a division of Niro Inc. The latter specializes in food, dairy, pharmaceutical, biotechnology and chemical processing equipment – manufacturing of dryers and agglomerators, evaporators, membrane filtration plants, powder packaging and handling systems and liquid processing.

Niro Soavi North America is a full service technology center covering all your needs for units, systems, service and application development.

A reliable partner in your industry demonstrating an unmatched degree of application knowledge and expertise with more than 400 machines installed in North America and 4,000 worldwide.



*Niro Soavi North America in Hudson, WI., USA*



*NS5160H VHP 5-piston production unit.*



*NS5160H Sanitary 5-piston production unit.*



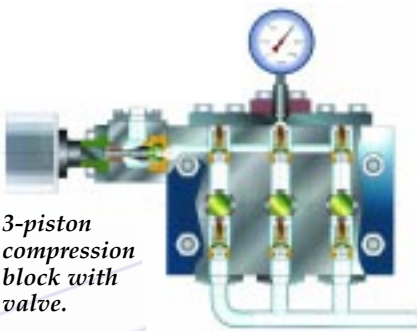
*NS1001L 2K Panda 2K laboratory table-top homogenizer.*

**Niro Soavi** is a world leader in high pressure pumping and homogenization technology and offers an unparalleled range of high-efficiency machines i.e. operating pressures, flow rates and features to match your specific production and regulatory requirements.

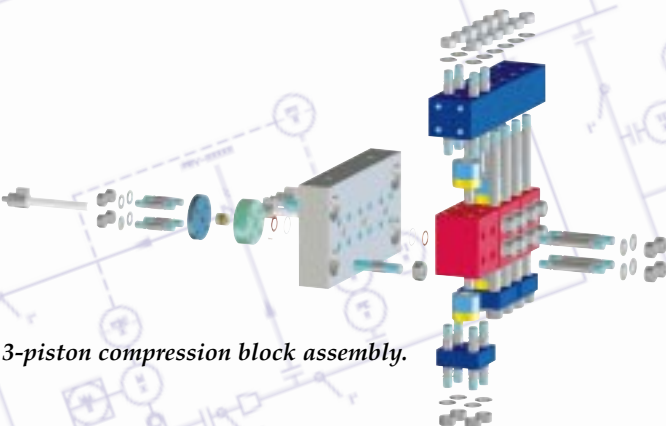
- High-pressure pumps
- High-pressure homogenizers
- Homogenizing valves – including NanoValve® technology
- Homogenizer cGMP skid systems
- Homogenizer parts and spare parts
- Controls and automation

Special design features and options include:

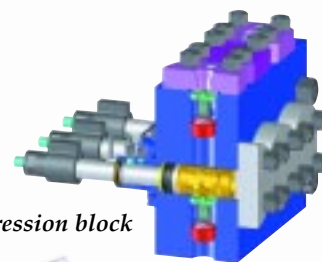
- Pumping valves can be changed freely between poppet and ball valves depending on the application.
- First and second stage homogenizer valves are adaptable modular parts prepared for easy reconfigurations.
- Non aseptic machines can be upgraded to full aseptic design.
- Interchangeable pumping pistons (plungers) - chrome plated, tungsten carbide or ceramic.
- The ceramic pumping pistons are made of solid ceramic and can be turned around for usage at both ends. Thermal cracking is less likely to occur with solid ceramic as opposed to coated ceramic plungers.
- The homogenizer valve parts can be changed to suit your applications as they develop.



*3-piston compression block with valve.*



*3-piston compression block assembly.*



*Aseptic design compression block*



# Applications...

**Niro Soavi** technology can be used in numerous applications in the food, dairy, beverage, pharmaceutical and biotechnology industries. Thousands of Niro Soavi machines have been installed in these markets. Following are some of the main process applications all involving Niro core technologies.

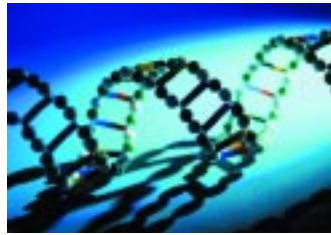
## ...for Food, Dairy, and Beverage Industries



- Niro Soavi homogenization system, in aseptic design, integrates with UHT and HTST systems.
- Niro Soavi VHP technology provides stable flavor emulsions for both liquid and solid flavor applications.
- Niro Soavi VHP technology enables the extraction of valuable nutraceuticals for health food formulations.
- Niro Soavi high-pressure pumping and homogenization system integrated with Niro evaporation and spray drying technologies.
- Niro Soavi high-pressure pumping integrates in meat and poultry high pressure processing systems.



*Infant formula plant*



## *...for Pharmaceutical, Biotechnology and Cosmetics Industries*

- Homogenization of cosmetic products in order to secure stable emulsions with micron level particle sizes and high water content.
- Homogenization of dispersions providing a stable and even distribution of particles.
- Niro Soavi VHP technology for high-efficient particle and cell rupture applications.
- Niro Soavi VHP technology for extraction of intracellular materials.



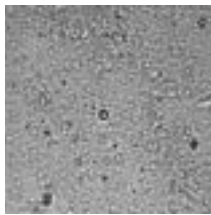
*Multi-purpose biotechnology cell rupture skid system*



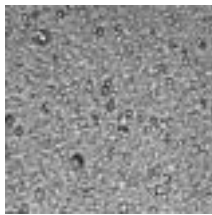


# Testing

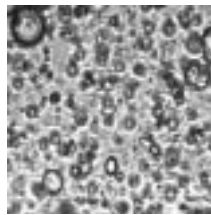
- Pilot plant testing facility.
- Comprehensive rental machine program including tabletop, pilot-, skid- and production size units.
- Particle size distribution analysis and digital photo analysis.



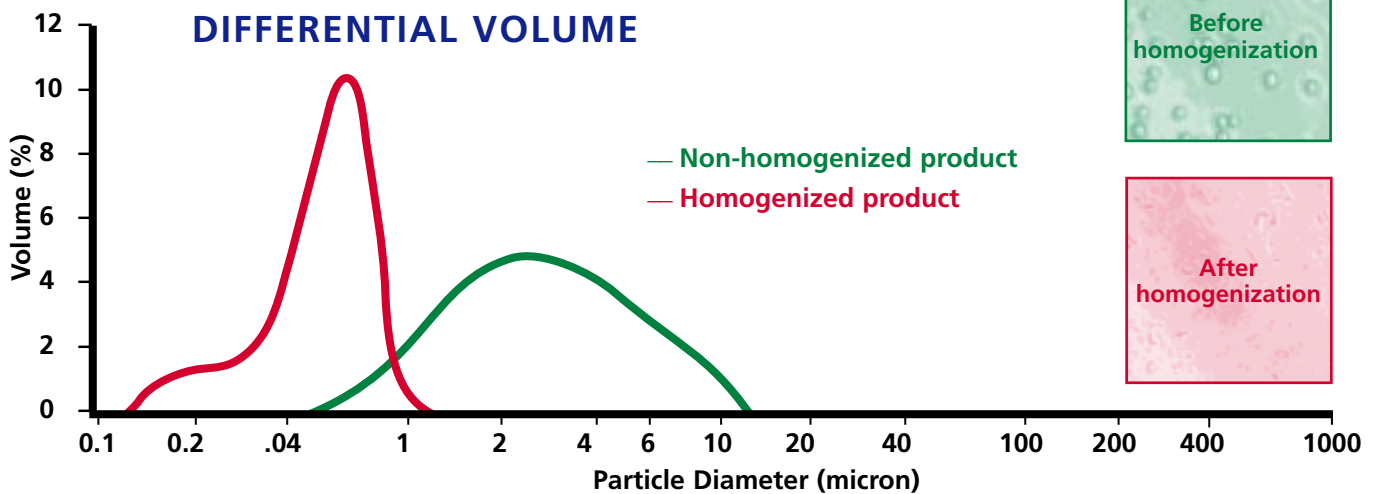
*Baby lotion at 250 bar with 20% water added*



*Baby lotion at 250 bar*



*Baby lotion*



# Services

## Engineering

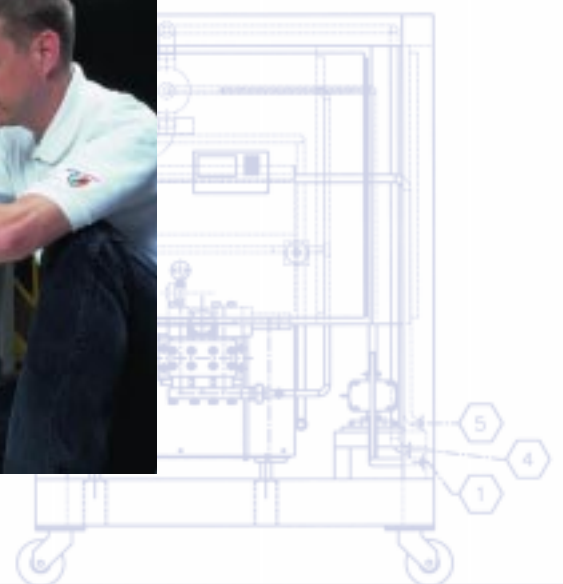
- Full process integration
- Skid fabrication
- Commissioning and training in conjunction with product delivery
- Instrumentation and control customization
- Complete engineering and documentation solutions

## Validation

- Equipment Qualification (EQ) packages
- Factory Acceptance Test (FAT)

## After Sales Service and Spare Parts

- Full spare parts coverage and service
- 24-hour emergency spare parts and technical service
- Preventive maintenance programs





# High-Pressure Technology – *Pumping and Homogenization*

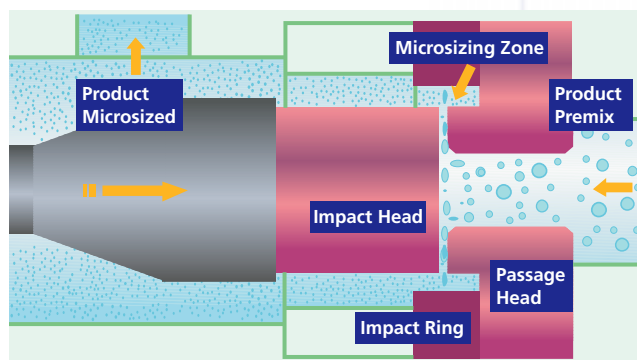
Handling fluids under high pressure, up to 1,500 bar / 21,750 psi under continuous full-scale operation, is a technology in its own right. This incorporates the disciplines of machine design, strength of materials, and a significant fluid mechanical knowledge, which combines the highest skills in mechanical engineering and more than 50 years of expertise.

Homogenization is a fluid mechanical process that involves the subdivision of particles or droplets into micron sizes to create a stable dispersion or emulsion for further processing.

This is an important stage in the treatment for many products. It provides improved product stability, shelf life, digestion, and taste. Homogenizing can also significantly reduce the amount of additives required. It prepares feeds so that subsequent spray drying produces the best quality of powders. This is especially important for baby foods and many dairy and food products.

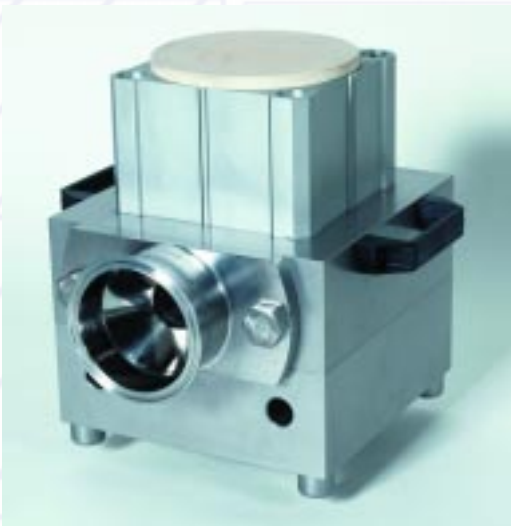
After homogenization, the particles are of a uniform size, typically from 0.2 to 2 micron, depending on the operating pressure. The homogenizer is the most efficient device for particle and droplet size reduction. The actual properties of the product vary with pressure and product type in a complex relationship. In general, higher processing pressure produces smaller particles.

The process occurs in a special homogenizing valve, the design of which is the heart of the homogenizing equipment. The fluid passes through a minute gap in the homogenizing valve. This creates conditions of high turbulence and shear, combined with compression, acceleration, pressure drop, and impact. Causing the disintegration of particles and dispersion throughout the product.



*Homogenizing valve*

The patented NanoValve® enables homogenization in standard milk applications to take place at a lower homogenizing pressure through a more efficient valve design for low pressure and a high flow rate application.



The special Niro Soavi rupture type (R-type) valve is particularly suitable for cell rupture applications. This proprietary Niro Soavi technology can also be applied to existing production units in order to improve performance on old machines.

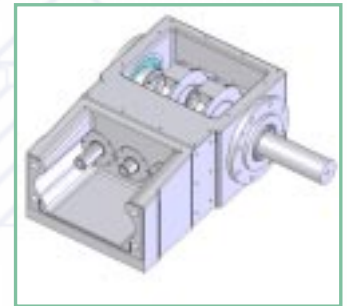
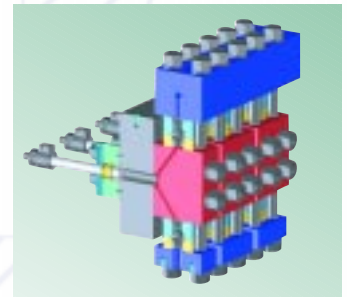
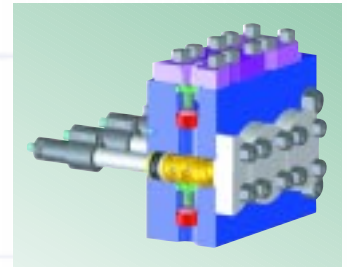


*Homogenizing valve group*

A properly designed positive displacement pump is crucial to the homogenization process. This involves Finite Element Method (FEM) and Finite Volume Method (FVM) for mechanical structure and fluid mechanical analysis. A constant sourcing of the best stainless steel, high alloy compositions and new ceramic materials enables the incorporation of highly abrasive resistant and durable components.

Operating continuously at full industrial scale from 600 to 1,500 bar (8,700 to 21,750 psi) requires a unique mechanical design. Niro Soavi identifies this class of machines as VHP (Very-High-Pressure).

The Soavi crankcase is heavy duty cast iron, containing the power end components that create the reciprocating movement of the pumping plungers. The crankshaft is machined from a solid forged bar and supported by roller bearings at the ends, and by sleeve bearings between each crank pin.

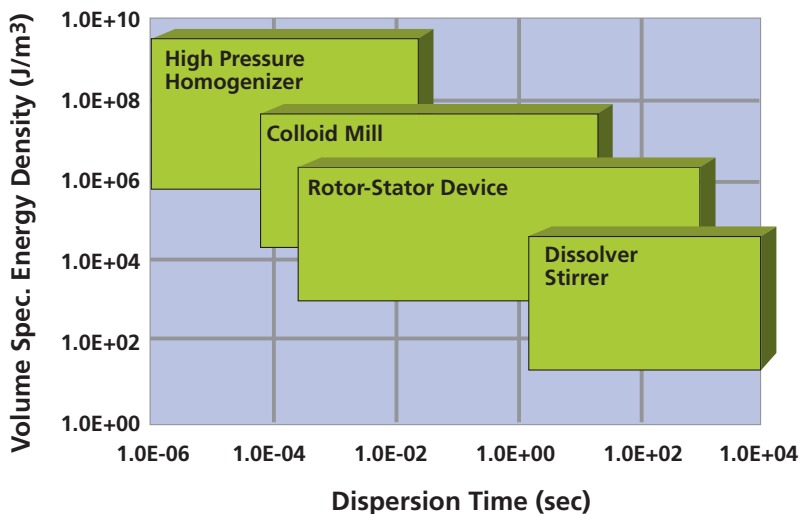
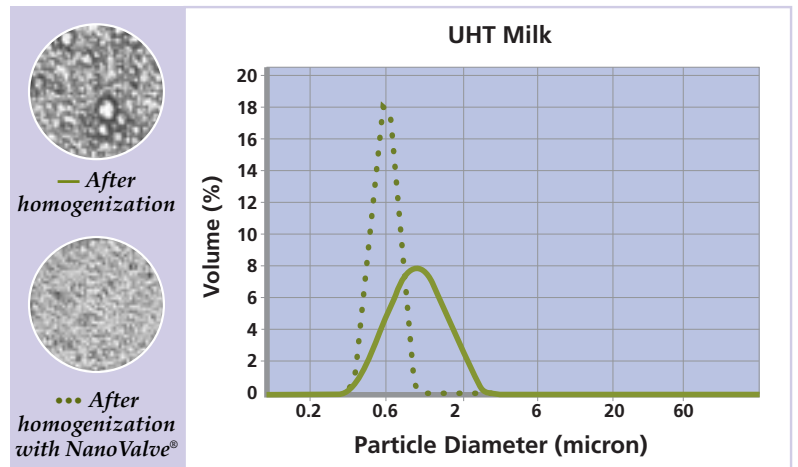
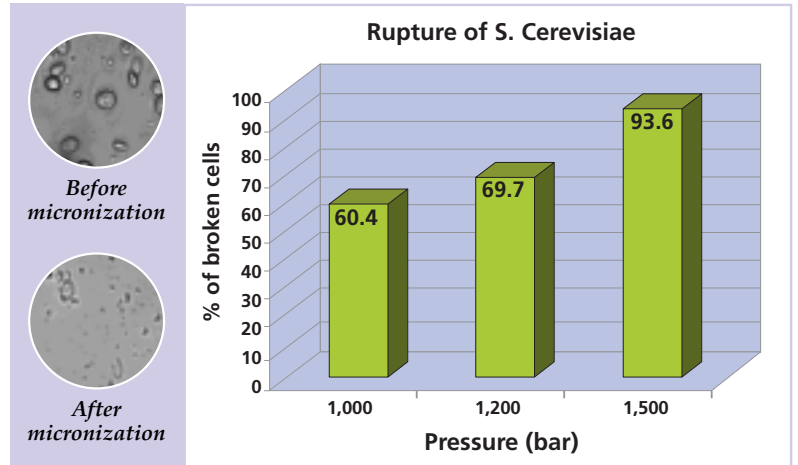




# Homogenization compared to Mixing and Blending

Homogenization is often wrongly categorized together with mixers, mills and other low pressure blending devices. Niro Soavi is bench marking high-pressure homogenization and has for a long time educated the industry via the leading technology forums about the substantial differences between traditional blending devices and the added benefits that can only be achieved in a Niro Soavi high-pressure homogenizer.

The difference is considerable from a technological point of view and more importantly the result in any product application is dependent on the right choice of technology. The increasingly more complex food and dairy recipes as well as biotech cell rupture applications require true and reliable high-pressure technology.



# Niro Soavi Machine Models

The relationship between capacity and operating pressures is given in the table below.

## Metric Units (EU)

Machine Model	Max. Pressures (bar)															Max. kW	Machine Size W x D mm
	100	120	150	180	200	250	300	350	400	450	600	700	1000	1200	1500		
NS1001	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.0	415 x 780
NS2006L/Pony	80	80	80	80	80	80	80	80	80	80	80	80	80	30	30	1.0	790 x 1195
NS3006L/Panther	120	120	120	120	120	120	120	120	120	120	120	120	120	50	50	1.0	790 x 1195
NS2006	650	650	650	420	420	320	250	250	180	180	120	80	80	80	35	5.5	655 x 800
NS3006	1000	1000	1000	750	700	550	400	400	300	300	200	120	120	120	50	5.5	745 x 850
NS3011	2800	2700	2200	1800	1600	1300	1100	900	800	700	550					11.0	925 x 940
NS3015	4000	3700	3000	2500	2200	1800	1500	1200	1100	850	750	600	400	300	180	15.0	1115 x 1440
NS3018	5500	4600	3700	3000	2700	2200	1800	1500	1300	1000	900	750	500	350	350	18.5	1180 x 1485
NS3022	5800	5800	4800	4000	3500	2800										22	1390 x 1925
NS3030	8000	8000	6500	5400	4800	3800	3200	2700	2400	2100	1600					30	1390 x 1925
NS3037	9500	9500	8000	6600	6000	4800	4000	3400	3000	2600	2000	1700	1200	900	800	37.0	1390 x 1925
NS3045	10000	10000	9800	8000	7300	5800	4800	4200	3600	3200						45.0	1470 x 2035
NS3055	12000	12000	12000	10000	9000	7200	6000	5000	4500	4000	3000					55.0	1470 x 2035
NS3075	14000	14000	14000	12000	11000	9500	7000	6000	4800	4800	3800	2000	1500	1400	1000	75.0	1470 x 2035
NS3090	17000	17000	17000	16000	14500	11500	9500	8000	7200	6500	4800					90.0	1800 x 2445
NS3110	22000	22000	22000	19000	17000	14000	11000	9500	8500	7000	5500	4500	2600	2500	1800	110.0	1800 x 2445
NS5132	28000	28000	28000	23000	21000	17000	14000	12000	10500	9500	7000					132.0	2010 x 2890
NS5160	36000	36000	34000	28000	25000	20000	17000	14500	13000	11500	8500	7000	4500	4000	3000	160.0	2010 x 2890
NS6200	40000	40000	40000	35000	32000	25000	20000	17000	15000	14000	10000	9000				200.0	2100 x 3090
NS8315	50000	50000	50000	45000	45000	36000	27000	26000	23000	20000	14000					315.0	2350 x 3105

## Imperial Units (GB & US)

Machine Model	Maximum Pressure (psi)															Max. HP	Machine Size W x D inches
	1,500	1,700	2,200	2,600	2,900	3,600	4,400	5,100	5,800	6,500	8,700	10,000	15,000	17,000	22,000		
NS1001	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	1.3	16.3 x 30.7
NS2006L/Pony	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	7.9	7.9	1.3	31 x 47
NS3006L/Panther	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	13.2	13.2	1.3	31 x 47
NS2006	172	172	172	111	111	85	66	66	48	48	32	21	21	21	9	7	25.8 x 31.5
NS3006	264	264	264	198	185	145	106	106	79	79	53	32	32	32	13	7	29.3 x 33.5
NS3011	740	713	581	476	423	343	291	238	211	185	145					15	36.4 x 37.0
NS3015	1057	978	793	661	581	476	396	317	291	225	198	159	106	79	48	20	43.9 x 56.7
NS3018	1453	1215	978	793	713	581	476	396	343	264	238	198	132	92	92	25	46.5 x 58.5
NS3022	1532	1532	1268	1057	925	740										29	54.7 x 75.8
NS3030	2114	2114	1717	1427	1268	1004	845	713	634	555	423					40	54.7 x 75.8
NS3037	2510	2510	2114	1744	1585	1268	1057	898	793	687	528	449	317	238	211	50	54.7 x 75.8
NS3045	2642	2624	2589	2114	1929	1532	1268	1110	951	845						60	57.9 x 80.1
NS3055	3170	3170	3170	2642	2378	1902	1585	1321	1189	1057	793					74	57.9 x 80.1
NS3075	3699	3699	3699	3170	2906	2510	1849	1585	1268	1268	1004	528	396	370	264	101	57.9 x 96.3
NS3090	4491	4491	4491	4227	3831	3038	2510	2114	1902	1717	1268					121	70.9 x 96.3
NS3110	5812	5812	5812	5020	4491	3699	2906	2510	2246	1849	1453	1189	687	661	476	147	70.9 x 96.3
NS5132	7398	7398	7398	6077	5548	4491	3699	3170	2774	2510	1849					177	79.1 x 113.8
NS5160	9511	9511	8983	7398	6605	5284	4491	3831	3435	3038	2246	1849	1189	1057	753	214	79.1 x 113.8
NS6200	10568	10568	10568	9247	8454	6605	5284	4491	3963	3699	2642	2378				268	82.7 x 121.6
NS8315	13210	13210	13210	11889	11889	9511	7133	6869	6077	5284	3699					422	92.5 x 122.2

### Machine Model Nomenclature:

- N - Niro
- S - Soavi
- 3 - Number of pistons, e.g. 3
- 0 } - Motor size,
- 7 } e.g. 75 kW (100 HP)
- 5 }
- H - Homogenizer (H), High-Pressure Pump (P), Laboratory Unit (L).

The capacity data are subject to updates and revisions.



# Setting Standards

The Niro name stands for quality, reliability and a sustained presence in the pharmaceutical and biotechnology industries.

The Niro Soavi product and service range provides the best of both European and North American standards.



- **FDA approved materials.**  
FDA approved and certified materials, in addition to 3A approved plastic and rubber materials, are available.



- **ISO 9001 approved.**  
The Niro Soavi machines are manufactured and tested in accordance with the ISO9001 credited QA program. This includes full testing of each machine verified by a test certificate audited by Det Norske Veritas (DNV).



- **3A sanitary standard.**  
Niro Soavi has an active role in the continuous fulfillment and improvement of the 3A sanitary standards.



- **USDA accepted.**  
Niro Soavi has obtained an acceptance based on a focused cooperation with the USDA.



- **cGMP compliance.**  
Niro Soavi is designing its products in compliance with cGMP. Customized control systems are available in line with GAMP guidelines.

This total knowledge base is unmatched in the industry and secures the optimum solution for our customers' specific needs.

[WWW.NIROINC.COM](http://WWW.NIROINC.COM)

NSNA F&D/P&B 9/2004

