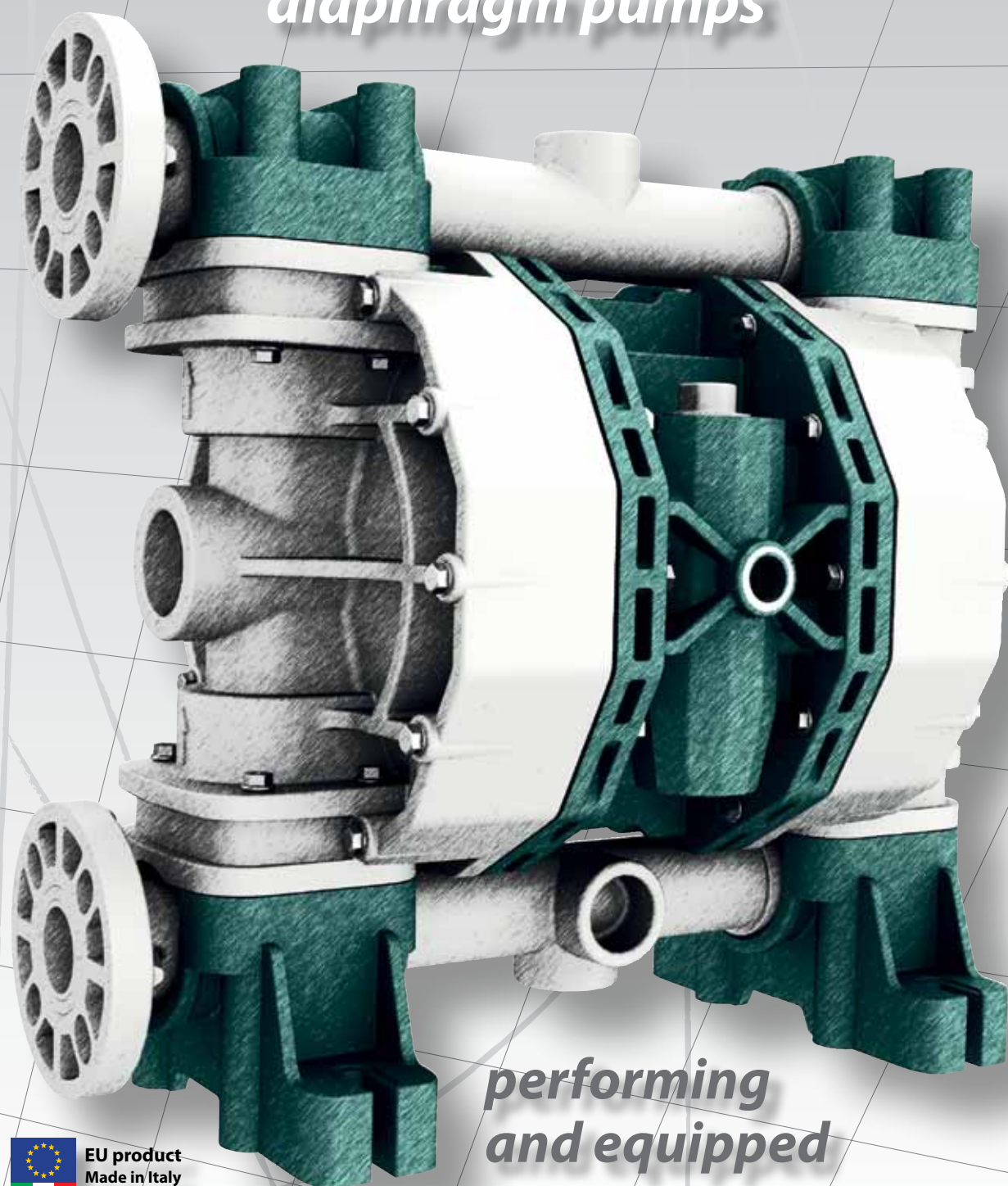


ARGAL

CHEMICAL PUMPS

ASTRA range

***Air operated double
diaphragm pumps***



***performing
and equipped***



EU product
Made in Italy

Argal manufactures since 1973 horizontal and vertical centrifugal pumps made of thermoplastic and fluoro polymer chemically resistant materials and its design has been always innovative and appreciated worldwide.

The company complies to the quality system ISO 9001:2000 certified by the Swiss association for quality and Management System SQS belonging to the International Certification IQ Network.

Argal with its new air operated double diaphragm pumps "ASTRA" joins the group of the major European manufacturers of such versatile pumps meant for a broad choice of industries and type of liquids ranging from low to high viscosity, neutral or highly corrosive or even edible (food industry).

PUMPS CONFIGURATION

Pump with reciprocating coaxial chambers with in built valves seats and manifolds located above and below of the chambers (R version, reversible, excluded).

Un balanced air distributor with air spring assisted differential air distributor spool.

Separate pilot spool valve coaxial to the shaft of the diaphragm. (mod. 50C excluded).

Air distributor command reversed at the end of each stroke of the pilot spool valve.

Air flow to diaphragms' pressurisation chambers adjustable. Performance regulation on request from the model 50 and above.

OPERATING PRINCIPLE

Astra pump are double chamber volumetric pumps.

The diaphragms linked by a common shaft move of alternative motion within coaxial chambers and are displaced by pressurised air alternatively delivered to their rear side by an air distributor such that while one diaphragm draws the fluid into one chamber from a common manifold the other diaphragm pumps the fluid from the opposite chamber in to the other common manifold.

SIZES

Depending upon the application we propose different designs for the same pump size aimed to obtain specific benefits like compact dimensions, reduced cost or superior performance.

Currently the range proposed includes the sizes 1/4" - 3/8" - 1/2" - 3/4" - 1" - 1 1/4" - 1 1/2" - 2". In the near future we will manufacture the larger sizes 3" e 4".

MAIN CHARACTERISTICS

- Can run dry.
- Dry lift up to 6 m.
- Operates pneumatically. Doesn't need electrical actuators.
- Stall free pneumatic circuit.
- Easy to install.
- Submersible.
- Lube free.
- Adjustable flow.
- Pumps fluids laden with solids.
- Pumps viscous liquids.
- Pumps liquid with low flash point.

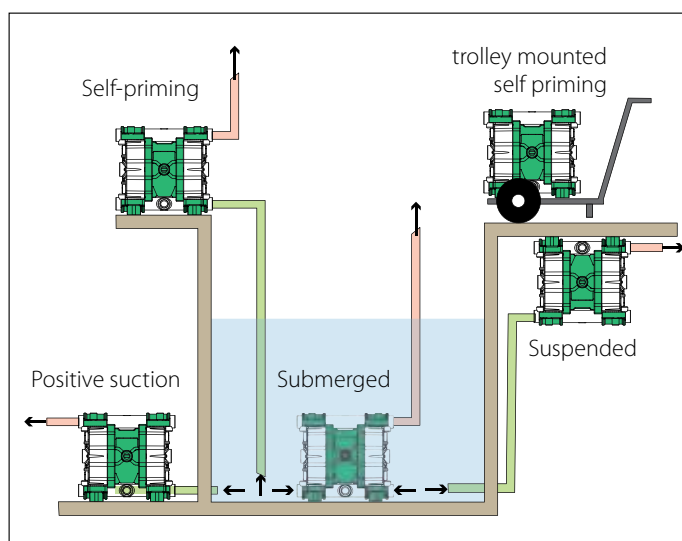
ATEX

All metallic and plastic standard executions are adequate to operate in environments at risk of explosion classified as "Zone 2" (Series II 3/3GD IIB T 135°C) of European ATEX regulation.

For operations in ATEX areas classified as "Zone 1" (II 2/2gd IIB T 135°C) Argal offers pumps manufactures with conductive parts for all thermoplastic and metallic version.

INSTALLATION

ASTRA AODD pumps can be installed like here illustrated for the operations of transfer, feeding, circulation, injection, emptying, dosage.



In this catalog:

Introduction.....	page 2-3
DDA 25R – 38R – 50R (1/4" - 3/8" - 1/2")	page 4-5
DDA 50C (1/2").....	page 6-7
Presentation of pumps "Normal" e "Progress" ...	page 8-9
DDA 50 – 75 – 100C (1/2" - 3/4" - 1")	page 10-11
DDA 100 – 125 (1" - 1 1/4").....	page 12-13
DDA 150 – 200 (1 1/2" - 2").....	page 14-15
Presentation ASTRAFOOD.....	page 16-17
ASTRAFOOD - DFA 75 – 125	page 18
ASTRAFOOD - DFA 150 – 200.....	page 19
Pulsation dampeners SELENE.....	page 20-21
General technical notes	page 22-23
Main application sectors	page 24

MATERIAL OF CONSTRUCTION

Argals' AODD pumps are manufactured either with thermoplastic or metallic materials.

Available thermoplastic materials are glass fibre reinforced polypropylene (GFR PP), and carbon fibre filled polyvinylidene fluoride (CFF PVDF); construction with pure PVDF is available for a restricted range of models.

PP: resists to aqueous solutions of acids alkalis, salts and several organic solvents; is not resistant to concentrated oxidant acids.

PVDF: resists to acids, saline solutions, aromatics hydrocarbons, aliphatic and chlorinates, alcohols and halogens.

Metallic pumps are made of Aluminium e Stainless Steel SUS 316 for industrial use or of electro polished Stainless Steel SUS 316 with clamp connections and compliant to FDA regulations for food application.

CODES AND APPLICATIONS

table 1

Code	Pump case material	Characteristics Indications Applications
WR	GFR - PP	Good chemical resistance (diluted acids) ; max. temperature 75°C
FC	CFF-PVDF	Excellent chemical resistance (concentrated acids); max. temperature 95°C
DF	PVDF	Excellent chemical resistance ;
SS	SUS 316	Strong alkali (hydroxides) ; high Viscosity ; high temperature max. 150°C
AL	Aluminum	Paint, Solvents, various hydrocarbons ; low replacement cost in case of abrasion
SP	SUS 316 polished	Auxiliary services in Food Pharmaceuticals and Cosmetic Industries

CODE AND APPLICATIONS OF WETTED PARTS

table 2

EXEC.	Code	Diaphragm	Balls	Ball seats	Application
10	UDZ	Polyurethane	EPDM	Polyethylene	Abrasion
11	HTDZ	PTFE	EPDM	Polyethylene	Abrasion and average chemical resistance
12	MTZ	Santoprene®	PTFE	Polyethylene	Depuration (economical alternative to execution 13)
13	HTTZ	PTFE	PTFE	Polyethylene	Standard version ; Depuration , filtered oil ; low noise level)
14	HTSZ	PTFE	SUS 316	Polyethylene	Depuration (As execution 13 but with heavy ball)
15	MSZ	Santoprene®	SUS 316	Polyethylene	Depuration (economical alternative to 13, mild liquids with presence of solid)
16	MDS	Santoprene®	EPDM	SUS 316	Depuration (economical alternative to 13 in presence of solids)
17	HTSS	PTFE	SUS 316	SUS 316	Dense fluids; Crude Oil ; best dry lift
18	MSS	Santoprene®	SUS 316	SUS 316	Dense fluids
19	HTTK	PTFE	PTFE	E-CTFE	Excellent chemical resistance ; ultra Pure liquids
20	HTTS	PTFE	PTFE	SUS 316	Solvents ; Inks ; paint ; enamels
21	HTTA	PTFE	PTFE	Aluminum	Economical for pure hydrocarbons
22	HTA	Keyflex®	PTFE	Aluminum	Economical for dirty hydrocarbons
23	HTTS	PTFE	PTFE	SUS 316 polished	Auxiliary services food and / cosmetic sector
24	HTSS	PTFE	SS 316	SUS 316 polished	Auxiliary services food sector / cosmetics; high Viscosity

Thermoplastic diaphragms

Offer high chemical resistance, abrasion resistance and long life ; are made of Keyflex®, Santoprene® and Polyurethane ; the broad range of application these materials are adequate to, eases the choice of the correct pump execution.

Elastomeric diaphragms

Deploy blend of rubbers embedding nylon made reinforcing mesh designed to increase their mechanical resistance. Most common elastomeric rubbers are nitrilic (NBR) and ethylene propylene diene monomer (EPDM) based. On request we deliver also fluorinated rubber FKM diaphragms (e.g.: Viton®).

PTFE diaphragms

Il PTFE is the fluoro-polymer material with the broadest chemical resistance.

Our PTFE diaphragms are manufactured with a special process to be flexible and resistant.

In our ASTRA pumps the PTFE diaphragm is always backed up by a rear diaphragm of thermoplastic rubber which increases the resistance and its service life.



DDA 25 R - 38 R - 50 R (Reversible) 1/4" - 3/8" - 1/2"

Zone 2 

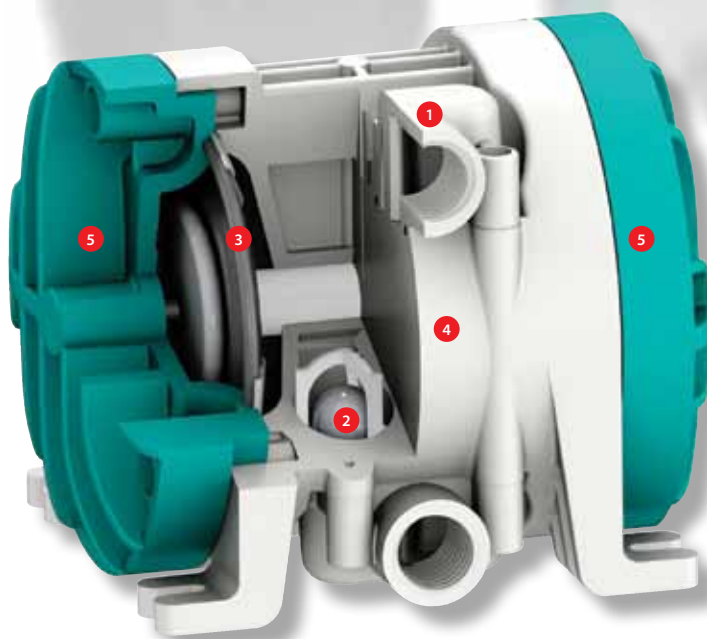
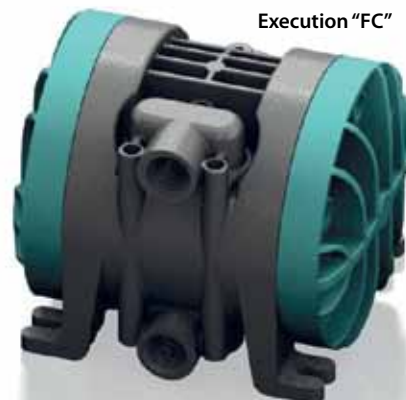
Execution "WRX"

Zone 1 

Execution "WR"



Execution "FC"



Since the range of performances delivered by this series of models is limited 40 l' the goal was to design practical, economical and compact pumps. It was achieved with un conventional "reversed" pump design where flow pass straight through the pumping section central to the pump instead of being delivered by external chambers through external manifolds; the solution eliminates the external manifolds and the associated hydraulic losses, physical dimension and cost of extra parts.

Main advantages vs. conventional constructions are:

Compact design, improved efficiency, smoother flow, reduced air consumption, improved access to components, more affordable cost.

- 1 Delivery manifold
- 2 Ball valve
- 3 Diaphragm
- 4 Pump casing
- 5 Cover casing
- 6 Suction manifold

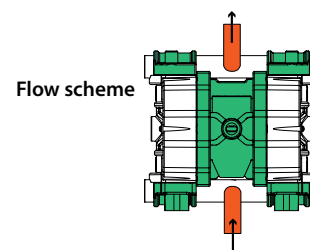
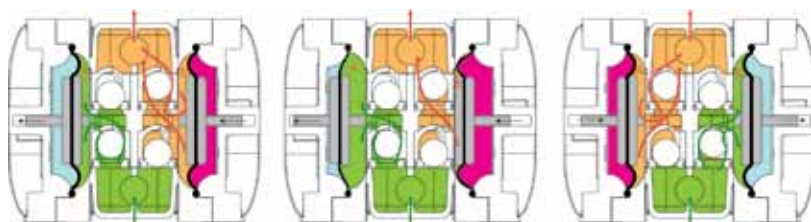
OPERATION SYSTEM**PUMP IDENTIFICATION LABEL**

table 3

DDA		38 R		N		WR		M		T		P		N		G		2		O		
MODEL				MATERIALS										CONNECTIONS								
Code	SIZE	Code	DISTRIBUTOR	Code	FLUID CHAMBER	ATEX (1)	Code	DIAPHRAGMS	Code	BALLS	Code	SEATS	Code	O-Rings	Code	TYPE	SCHEME		Code	DIRECTION		
																	Code	Code		Code	IN	HORIZ
25R	1/4"	N	standard	WR	GFR-PP	X	H	Keyflex®	T	PTFE	P	PP	D	EPDM	G	Thread BSP	1		O		IN	HORIZ
				FC	CFF-PVDF	X	M	Santoprene®	S	SUS 316 SS	K	PVDF	V	FKM	N	Thread NPT					OUT	HORIZ
38R	3/8"			DF	PVDF		HT	Keyflex®+PTFE	D	EPDM	S	SUS 316	N	NBR								
50R	1/2"			DL	POM		MT	Santoprene®+PTFE	N	NBR	A	Aluminum	T	PTFE								
											Z	PE UHMW										

(1) - ATEX Zone 1

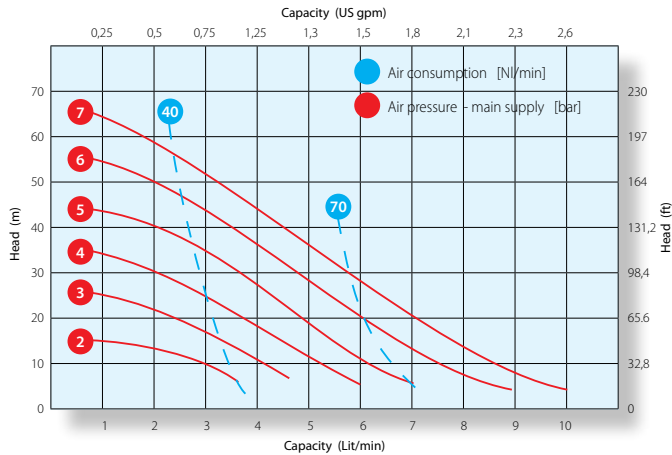
DDA 25 R (1/4")

table 4

Technical Data	
Max. capacity	10 l/min
Max. head	70 m
Air Inlet	1/4" BSP
Suction Lift	5 m
Max. Solids	3 mm
Max. solids (positive suction)	8.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (GFR-PP)	
FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)	
DF - Polyvinylidene fluoride (PVDF)	

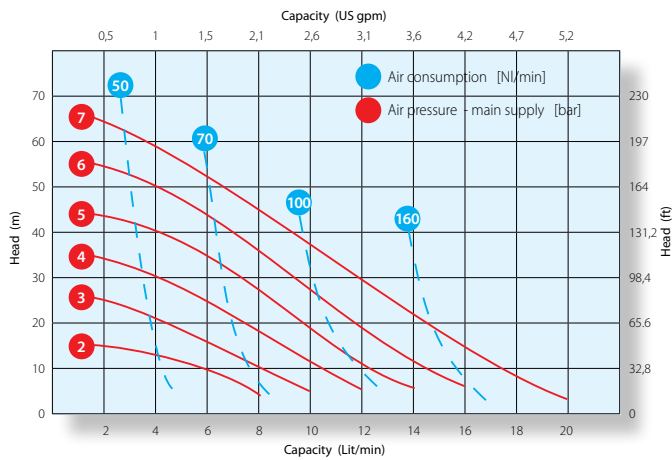
DDA 38 R (3/8")

table 5

Technical Data	
Max. capacity	20 l/min
Max. head	70 m
Air Inlet	1/4" BSP
Suction Lift	5 m
Max. Solids	3 mm
Max. solids (positive suction)	8.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (GFR-PP)	
FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)	
DF - Polyvinylidene fluoride (PVDF)	

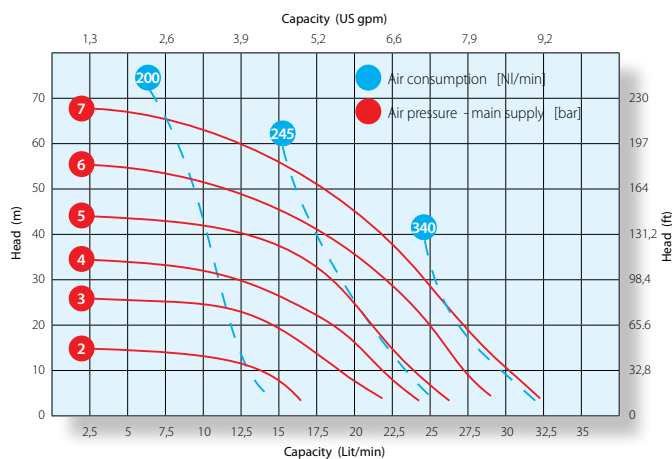
DDA 50 R (1/2")

table 6

Technical Data	
Max. capacity	32 l/min
Max. head	70 m
Air Inlet	1/4" BSP
Suction Lift	5 m
Max. Solids	3 mm
Max. solids (positive suction)	8.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (GFR-PP)	
FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)	
DF - Polyvinylidene fluoride (PVDF)	

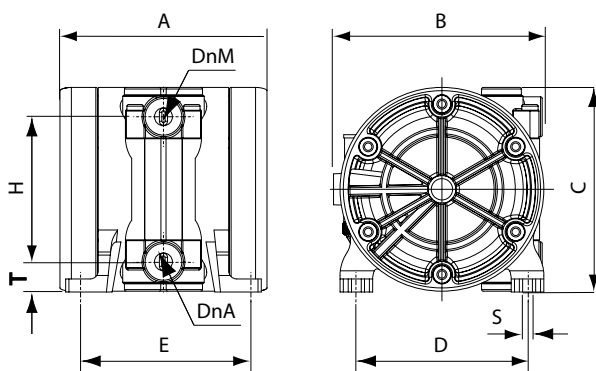
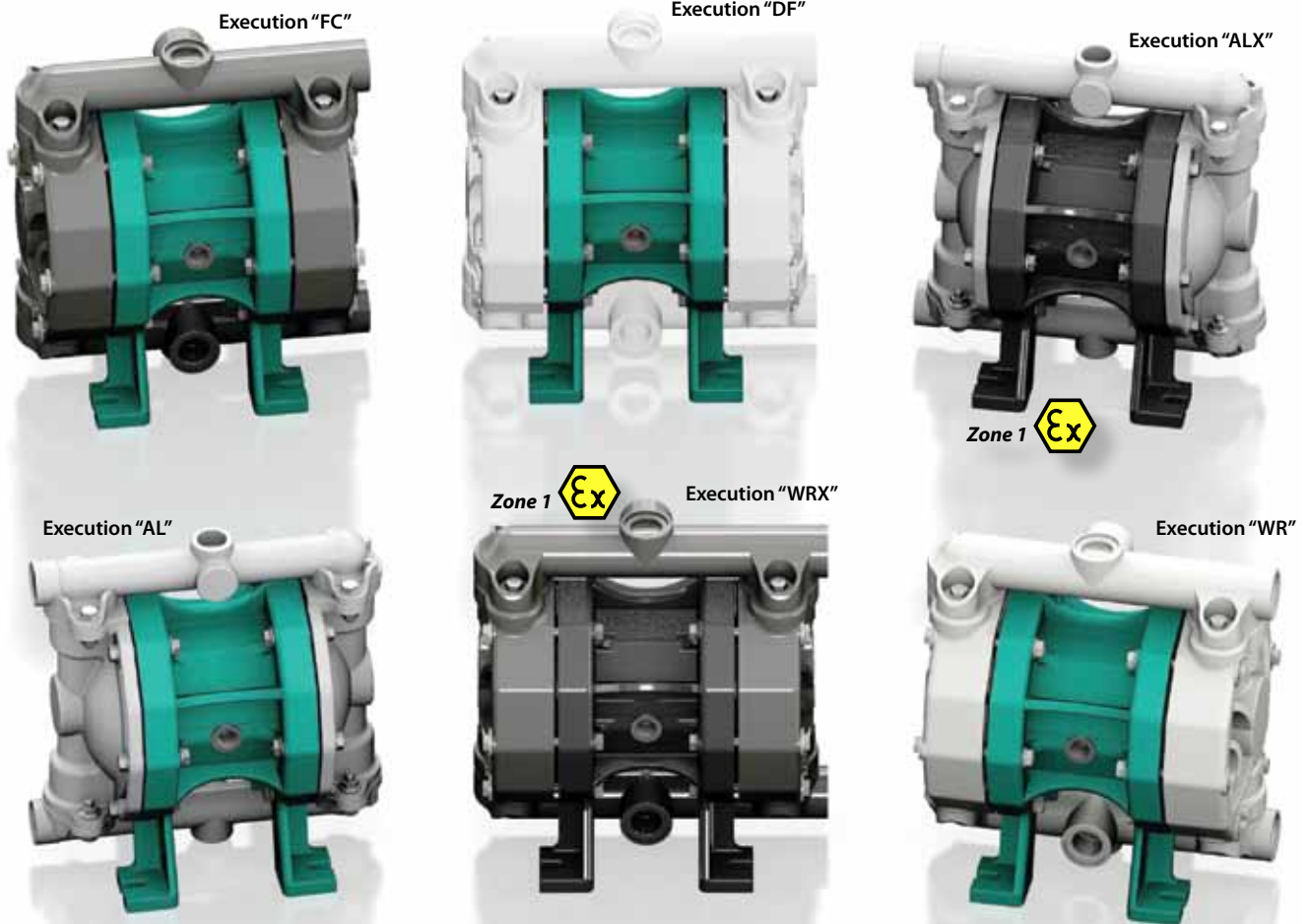
**DIMENSIONS**

table 7

	Plastic		Metal	
	WR	FC - DF	AL	SS
[mm]	25R 38R 50R	25R 38R 50R		
A	155	155	na	na
B	135	135		
C	125	125		
D	99	99		
E	112	112		
H	93	93		
S	6	6		
T	16,5	16,5		
Peso [kg]	1	1,5		
Connections	Threads			
DnA = DnM	1/4" 3/8" 1/2" 1/4" 3/8" 1/2"			

DDA 50 C (Compact) 1/2"

Zone 2 

This pump size is in large market demand and Argal wants to offer a perfectly balanced solution with a modern pump complete and characterised by high quality and top performances.

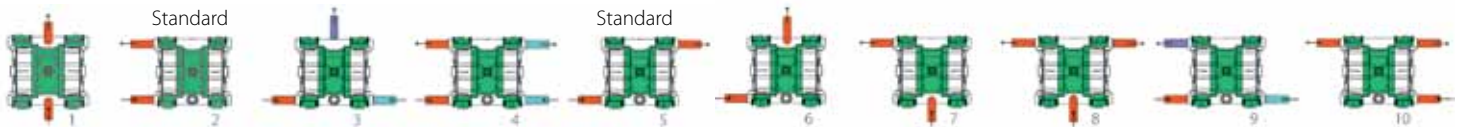
PUMP CONFIGURATION

The pumping casings are bolted to the central casing and to the manifolds by stainless steel bolts to assure reliable operation free from losses of pressurized air or fluids. Valves are integrated in the liquids' chambers to improve

dry lift.

The distributor is unbalanced with air spring assisted differential air distributor spool and command spool integrated in the distributor spool.

The original design of the distributor optimizes the performances of the pumps and contributes to the reduction of air consumption. The pump operates also with minimal pneumatic pressure supply. Flow and speed vary adjusting the air flow while the head depends from the pressure of the air supply.



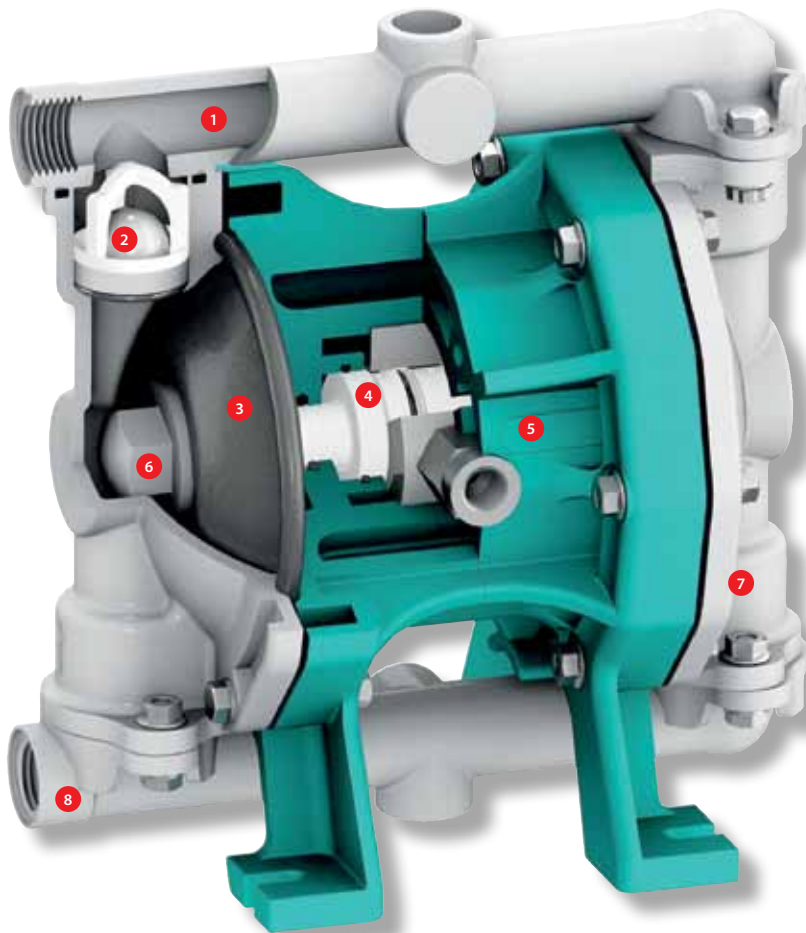
PUMP IDENTIFICATION LABEL

table 8

DDA	50 C	N	WR	M	T	P	N	G	2	O											
MODEL				MATERIALS										CONNECTIONS							
Code	SIZE	Code	DISTRIBUTOR	Code	FLUID CHAMBER	ATEX (1)	Code	DIAPHRAGMS	Code	BALLS	Code	SEATS	Code	O-Rings	Code	TYPE	SCHEME			DIRECTION	
																	Code	Code	Code		
50 C	1/2"	N	standard	WR	GFR-PP	X	H	Keyflex®	T	PTFE	P	PP	D	EPDM	G	Thread BSP	1	6	O	IN OUT	HORIZ. HORIZ.
				FC	CFF-PVDF	X	M	Santoprene®	S	SUS 316 SS	K	PVDF	V	FKM	N	Thread BSP	2	7	V	IN OUT	VERT. VERT.
				DF	PVDF		D	EPDM	D	EPDM	S	SUS 316	N	NBR	I	Thread (2)	3	8	H	IN OUT	VERT. HORIZ.
				AL	Aluminum	X	N	NBR	N	NBR	A	Aluminum	T	PTFE			4	9	K	IN OUT	HORIZ. VERT.
							U	Polyurethane			Z	PE UHMW					5	10			
							HT	Keyflex®+PTFE													
							MT	Santoprene®+PTFE													

(1) - ATEX Zone 1 (2) - Available on request

DDA 50 C (1/2")



- 1 Delivery manifold
- 2 Ball valve
- 3 Diaphragm
- 4 Air pneumatic distributor
- 5 Central casing
- 6 Wetted washer
- 7 Pump casing
- 8 Suction manifold

Major applications:

Ink for flexographic and traditional printing.
Painting application and appliances.
Industrial washing and de greasing.
Fluid transfer from drums.
Transfer of restricted quantities of fluids.

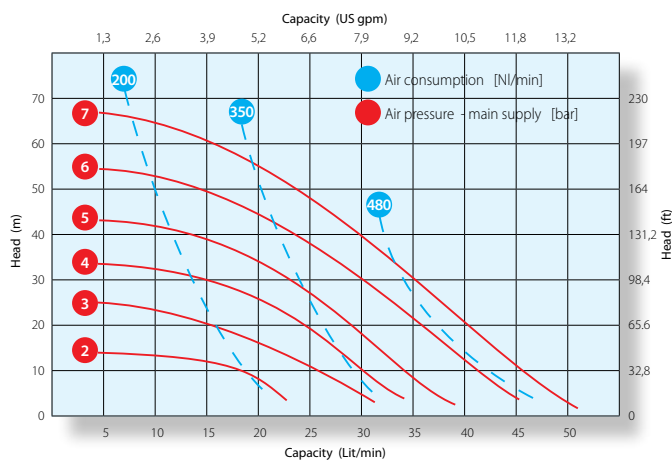


table 9

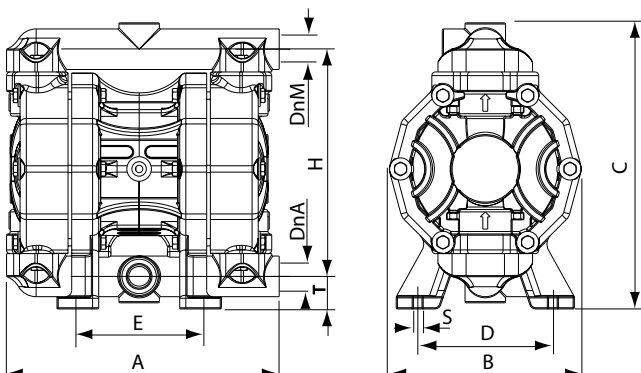
Technical Data	
Max. capacity	50 l/min
Max. head	70 m
Air Inlet	1/4" BSP
Suction Lift	5 m
Solids pass	3 mm
Max. solids (positive suction)	10.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (GFR-PP)	
FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)	
DF - Polyvinylidene fluoride (PVDF)	
AL - Aluminum	

DIMENSIONS

table 10

[mm]	Plastic		Metal	
	WR	FC - DF	AL	SS
A	222	222	225	na
B	156	156	156	
C	233	233	230	
D	110	110	110	
E	110	110	110	
H	185	185	183	
S	7	7	7	
T	26,5	26,5	25,5	
Weight [kg]	4	4,5	5	
Connections	Threads (")			na
DnA = DnM	1/2"	1/2"	1/2"	

(¹) Conessioni flangiate ISO-ANSI disponibili su richiesta



DDA 50 - 75 - 100 C - 100 - 125 - 150 - 200

The range of pumps with sizes from 1/2" to 2" offers increased flow compared to common pumps of the same size. This translates in economical advantage for a smaller and less expensive pump can be applied to deliver same performances or in a technical advantage for by same size same performances are delivered at a lesser speed and consequent reduced mechanical stress and wear of all parts. For mentioned reasons the user enjoys a longer operational life, lesser LCC (Life Cycle Cost) and devices with less vibration and attenuated noise compared to conventional pumps.

PNEUMATIC DISTRIBUTOR SYSTEM ARGAL

is made up by:

- Unbalanced air distributor system with pneumatic air assistance.
- Pilot spool coaxial to the rod connecting the diaphragms.
- In built by directional air flow regulator to diaphragms' air chambers.
- Pneumatic signals' management system.

DESCRIPTION OF THE SYSTEM

The unbalanced air distributor, combined with the command valve realises a system with intrinsic stall free characteristics.

In details the pilot spool supplies or cuts off the pressurised air command to the distributor only at the end of each of its strokes.

This arrangement prevents the pilot spool to generate ambiguous commands even at very low pumping speed or low air supply pressures or even with a shut off delivery valve, which typically happens to less sophisticate distributors which in such conditions easily stall.

PUMP CONFIGURATION

ARGAL AODD pumps are available in two version **Normal** and **Progress**. Both version are designed an pre set for following options:

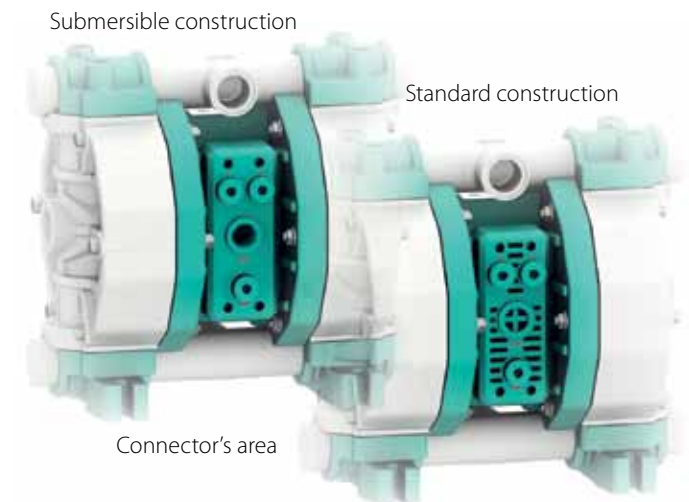
- "Two in one" delivery manifold;
- Detection of cycles with normalised probe;
- Extra low pressure operation with actuation circuit of diaphragms independent from pilot command circuit;
- Pneumatic signals in response of the end of run positions of the diaphragms;
- Adaptors to feed air chambers from external source.
- Submersible configuration.

Short description.

It is possible to feed the actuation circuit and the pilot circuit of the distributor with air at different pressures; this allows to deliver the fluid at very low pressures variable at will and always controllable from the outside of the pump without the risk to stall the distributor because of insufficient air command pressure. The actuation circuit (that distributes pressurised air in the chamber of the diaphragms)

fed with air at low pressure, offers performances ideal to fine dose fluids and supply devices operating at low fluid pressure (as spraying guns).

Other connections provide pneumatic signals in correspondence of the extreme positions of the diaphragms. These connections fitted with simple adaptors ease the installation of pneumatic or electric cycle counting devices also adequate to ATEX classified areas if provided with adequate electrical transducers. All pumps are pre set to these functions by connections located in a dedicate space close by to the air distributors' exhaust cover.



PROGRESS VERSION

All the pump models can be fitted with an integrated control dial distribution valve easily adjustable to set the device on pre set positions optimised to pump problematic fluids as liquids laden with solids or very viscous.

This in built regulator device is valuable for, either at the installation or at later times allows, by selecting the best set up, to fine tune the pump to the specific application thus reducing significantly the air consumption of the pump and its overall efficiency and flexibility.

PADS: THE NEW AIR DISTRIBUTOR AND REGULATOR

To enrich this new series of Argal pumps with new features we introduced in its pneumatic distributor a bidirectional valve; this valve controls the airflow during the pressurisation and de pressurisation of the chamber behind the diaphragms.

Conventional AODD pumps deploy only one air valve applied along the air supply line of the pump (or built in the pump) to control the pressurisation of the air chambers while the release of the pressurised air once stroke is concluded is not controlled and the discharge is rather violent and transmits to the liquid pumped pulsations.

The by directional valve integrated in the central casing of Argal pumps effectively controls both pressurisation and de pressurisation of the air chambers: the flow of the liquid delivered is still impulsive but amplitude of pulsations are significantly smaller and pump operations are easier to be

adapted to the characteristic of the liquid pumped. This original design feature never marketed before is surely a plus that coupled with the high specific efficiency (litre of compressed air per litre of liquid pumped) and low energetic consumption of these pumps makes this a state of the art solution and a new reference point.



Normal Version



Progress Version

- | | |
|---------------------|---------------------|
| 1 Delivery manifold | 6 Command spool |
| 2 Ball valve | 7 Central casing |
| 3 Diaphragm | 8 Wetted washer |
| 4 Air Regulator | 9 Pump casing |
| 5 Regulation knob | 10 Suction manifold |

OPTIONALS

Batch dosing system.

Pneumatic cycle counter contained in a waterproof box actuates an air operated double diaphragm pump for a pre settable number of cycles; simple, economical and effective device that coupled to an air operated double diaphragm delivers a full pneumatic batch dosing system.

Electronic batch dosing system.

Electronic cycle counter instead of pneumatic compliant to ATEX regulation. Cycle counter with on/off switch output. Compact transducer to be installed at the foreseen pumps' connector delivers to cycle counter on /off signal

Electric cycle counter.

Compact transducer installable on a foreseen connection of the pump delivers on/off switch signal at any pumping cycle; this signal can be utilized as input for a remote cycle counter device that coupled to the air operated double diaphragm pump may constitute a simple and effective dosing system.

Electric cycle counter.

Electric cycle counter for classified areas. Delivers the same functions of the on/off cycle counter dosing system above described but the transducer is an ATEX classified electronic probe to be installed on the pump by a dedicated adaptor.

Pulsation dampener (see page 22, 23).

Pneumatic
batch dosing
systemElectronic batch
dosing systemElectric cycle
counterPulsation
dampener

ACCESSORIES

Air regulator kit.

Pneumatic and electric control valve/s.

Connector flange kit.

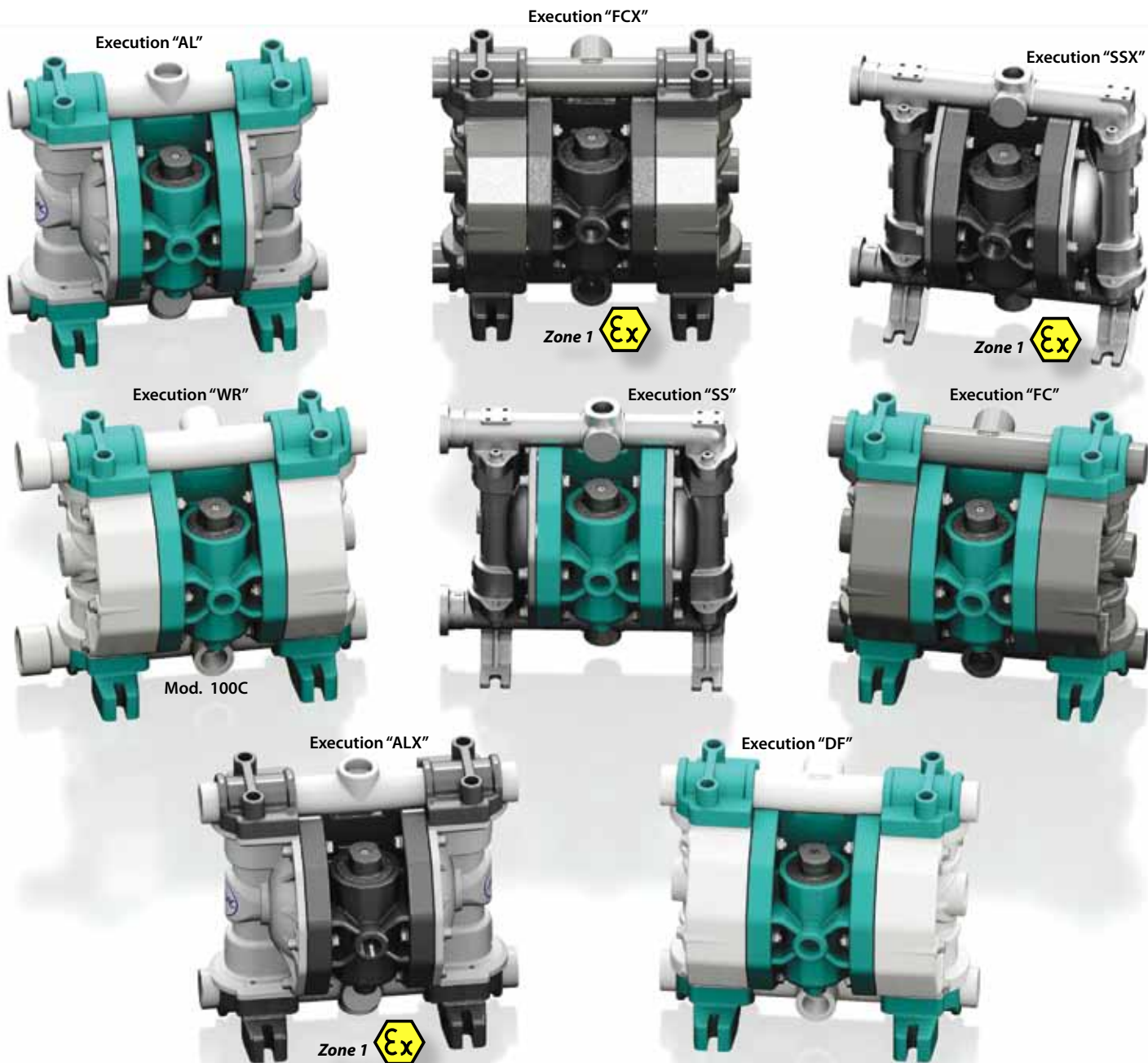
Shock adsorber kit for pumps.

Flexible connections kit.

Valve adaptors made of pp, pvdf, inox.

Stainless steel trolley for pumps.

DDA 50 - 75 - 100 C 1/2" - 3/4" 1"

Zone 2 

PUMP IDENTIFICATION LABEL

table 11

DDA	50	N	WR	M	T	P	N	G	2	O											
MODEL				MATERIALS										CONNECTIONS							
Code	SIZE	Code	DISTRIBUTOR	Code	FLUID CHAMBER	ATEX (1)	Code	DIAPHRAGMS	Code	BALLS	Code	SEATS	Code	O-Rings	Code	TYPE	SCHEME		Code	DIRECTION	
50	1/2"	N	normal	WR	GFR-PP	X	H	Keyflex®	T	PTFE	P	PP	D	EPDM	G	Thread BSP	1	6	O	IN OUT	HORIZ. HORIZ.
		P	progress	FC	CFF-PVDF	X	M	Santoprene®	S	SUS 316 SS	K	PVDF	V	FKM	N	Thread BSP	2	7	V	IN OUT	VERT. VERT.
	3/4"			DF	PVDF		D	EPDM	D	EPDM	S	SUS 316	N	NBR	I	Flanged (3)	3	8	H	IN OUT	VERT. HORIZ.
				AL	Aluminum	X	N	NBR	N	NBR	A	Aluminum	T	PTFE			4	9	K	IN OUT	HORIZ. VERT.
75	3/4"			AL	Aluminum	X	N	NBR	N	NBR	A	Aluminum	T	PTFE				4	9	K	
100C	1"			SS	SUS 316	X	U	Polyurethane									5	10			
								HT	Keyflex®+PTFE				Z	PE UHMW							
								MT	Santoprene®+PTFE												

(1) - ATEX Zone 1 - (2) SCHEME: 1-V / 3-K / 8-H / 6-K / 7-H not available for thermoplastic versions - (3) available on request.

DDA 50 (1/2")

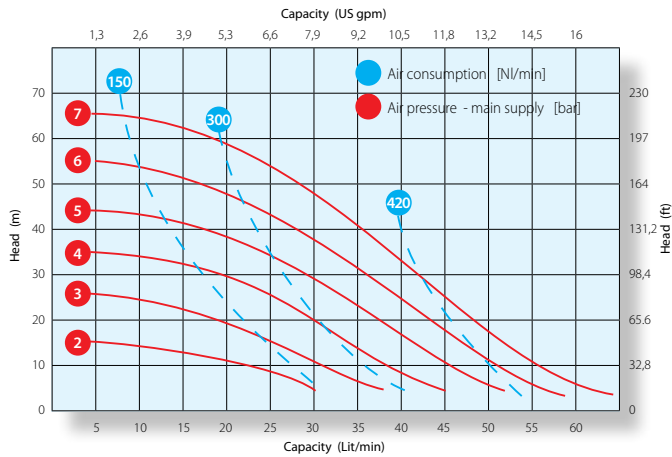


table 12

Technical Data	
Max. capacity	65 l/min
Max. head	70 m
Air Inlet	3/8" BSP
Suction Lift	6 m
Max. Solids	3,5 mm
Max. solids (positive suction)	10.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (GFR-PP)	
FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)	
DF - Polyvinylidene fluoride (PVDF)	
AL - Aluminum	
SS - SUS 316	

DDA 75 (3/4") DDA 100C (1")

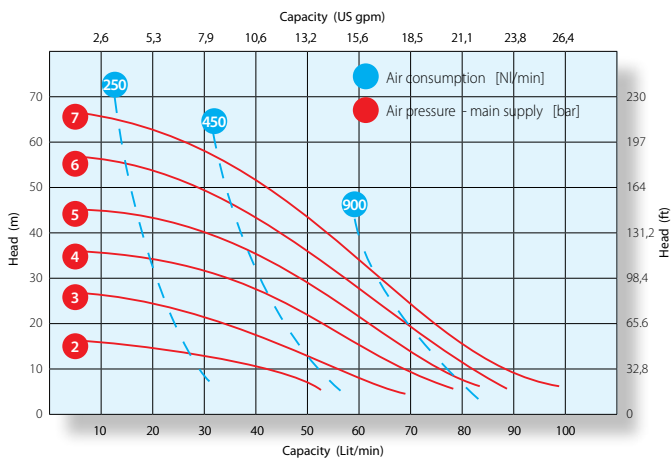
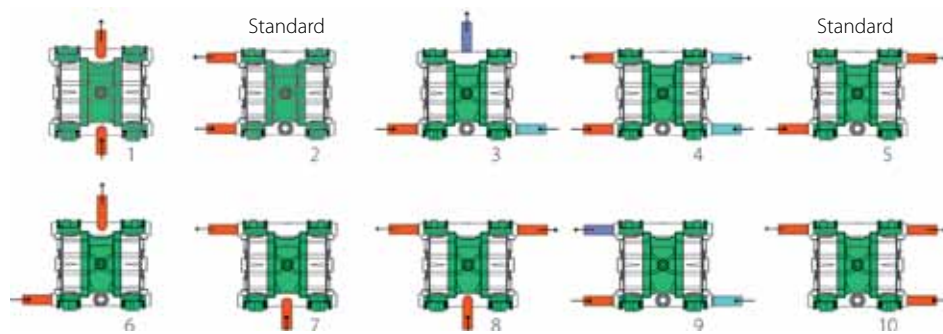


table 13

Technical Data	
Max. capacity	100 l/min
Max. head	70 m
Air Inlet	3/8" BSP
Suction Lift	6 m
Max. Solids	3,5 mm
Max. solids (positive suction)	10.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (GFR-PP)	
FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)	
DF - Polyvinylidene fluoride (PVDF)	
AL - Aluminum (not available for 100C)	
SS - SUS 316 (not available for 100C)	

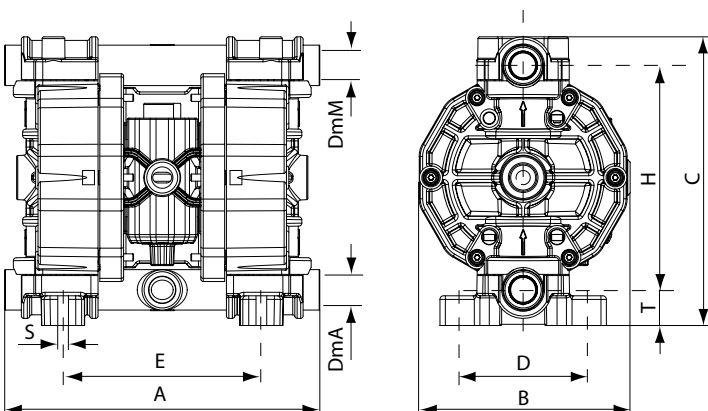


DIMENSIONS

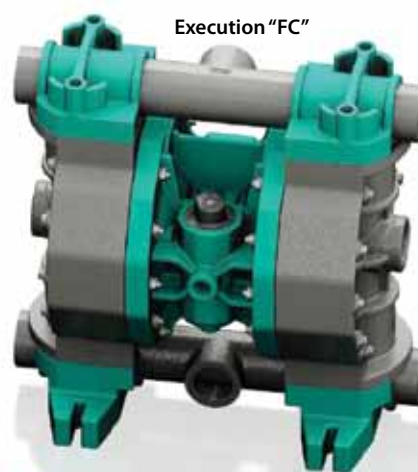
table 14

	Plastic						Metal			
	WR			FC - DF			AL		SS	
[mm]	50	75	100C	50	75	100C	50	75	50	75
A	265	291		265	290		265	247		
B	177			177			177	177		
C	246			246			246	249		
D	110			110			110	89		
E	167			167			167	176		
H	189			189			189	185		
S	9			9			9	9		
T	30			30			30	40		
Weight [kg]	6,5			7			7	9		
Connections	Threads (")									
DnA = DnM	1/2"	3/4"	1"	1/2"	3/4"	1"	1/2"	3/4"	1/2"	3/4"

(") ISO-ANSI flanged connections available on request



DDA 100 - 125 1" - 1 1/4"

Zone 2 

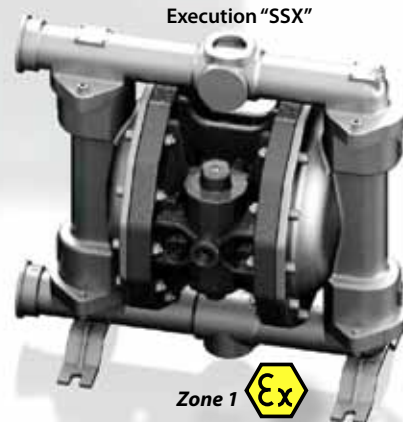
Execution "SS"



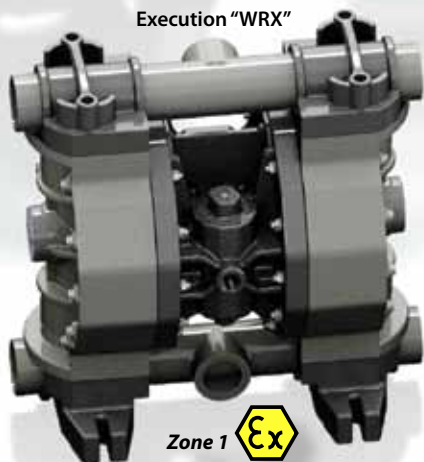
Execution "WR"



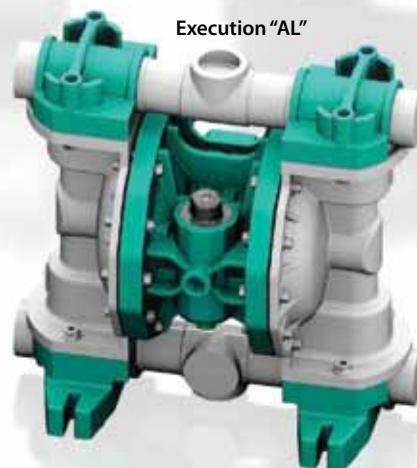
Execution "SSX"



Execution "WRX"



Execution "AL"



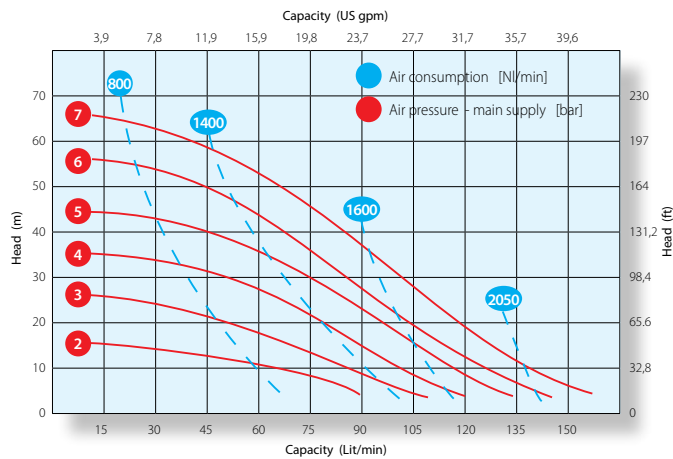
PUMP IDENTIFICATION LABEL

table 15

DDA		125		P		AL		M		T		P		N		G					
MODEL				MATERIALS										CONNECTIONS							
Code	SIZE	Code	DISTRIBUTOR	Code	FLUID CHAMBER	ATEX (1)	Code	DIAPHRAGMS	Code	BALLS	Code	SEATS	Code	O-Rings	Code	TYPE	SCHEME		Code	DIRECTION	
100	1"	N	normal	WR	GFR-PP	X	H	Keyflex®	T	PTFE	P	PP	D	EPDM	G	Thread BSP	1	6	O	IN OUT	HORIZ
		P	progress	FC	CFF-PVDF	X	M	Santoprene®	S	SUS 316 SS	K	PVDF	V	FKM	N	Thread BSP	2	7	V	IN OUT	VERT
				DF	PVDF		D	EPDM	D	EPDM	S	SUS 316	N	NBR	I	Flangead (3)	3	8	H	IN OUT	VERT
				AL	Aluminum	X	N	NBR	N	NBR	A	Aluminum	T	PTFE			4	9	K	IN OUT	HORIZ
				SS	SUS 316	X	U	Polyurethane			Z	PE UHMW					5	10			VERT
125	1/4"					X	HT	Keyflex®+PTFE													
							MT	Santoprene®+PTFE													

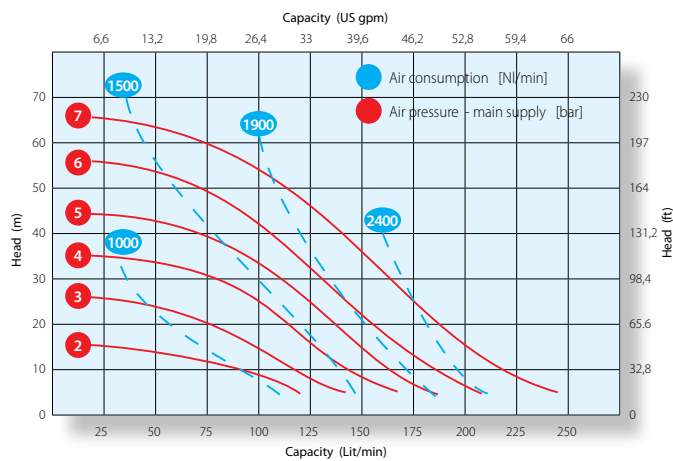
(1) - ATEX Zone 1 - (2) SCHEME: 1-V / 3-K / 8-H / 6-K / 7-H not available for thermoplastic versions - (3) available on request

DDA 100 (1")

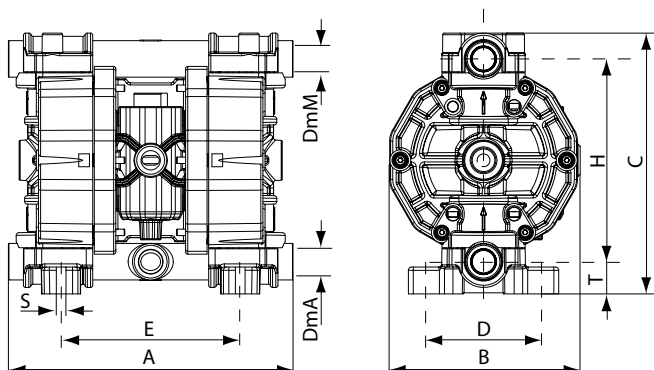
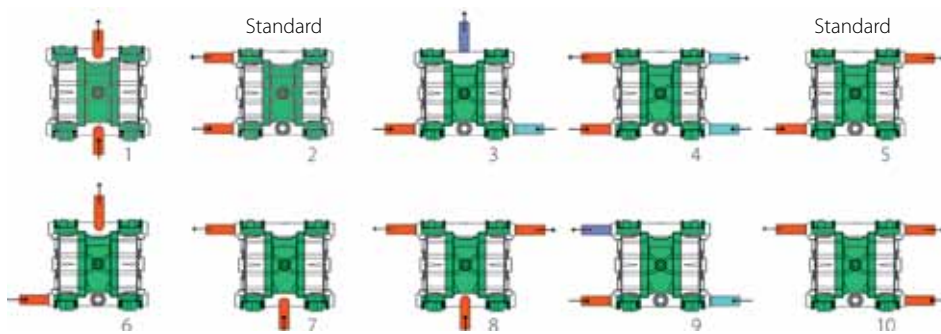
[illegible]

Technical Data	
Max. capacity	165 l/min
Max. head	70 m
Air Inlet	1/2" BSP
Suction Lift	6 m
Max. Solids	7,5 mm
Max. solids (positive suction)	15.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (PP + V)	
FC - Polyvinylidene fluoride + carbon fibre (PVDF + C)	
DF - Polyvinylidene fluoride puro (PVDF)	
AL - Aluminum	
SS - SUS 316	

DDA 125 (1 1/4")

[illegible]

Technical Data	
Max. capacity	250 l/min
Max. head	70 m
Air Inlet	1/2" BSP
Suction Lift	6 m
Max. Solids	3,5 mm
Max. solids (positive suction)	15.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (PP + V)	
FC - Polyvinylidene fluoride + carbon fibre (PVDF + C)	
DF - Polyvinylidene fluoride puro (PVDF)	
AL - Aluminum (not available for 00C)	
SS - SUS 316 (not available for 100C)	



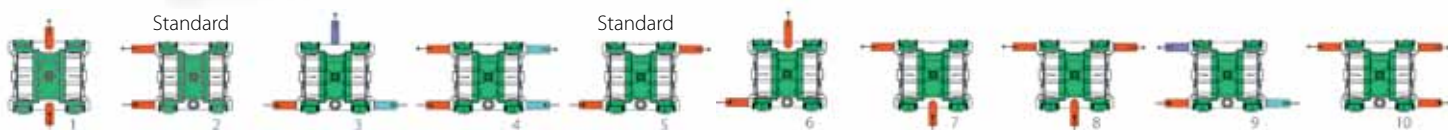
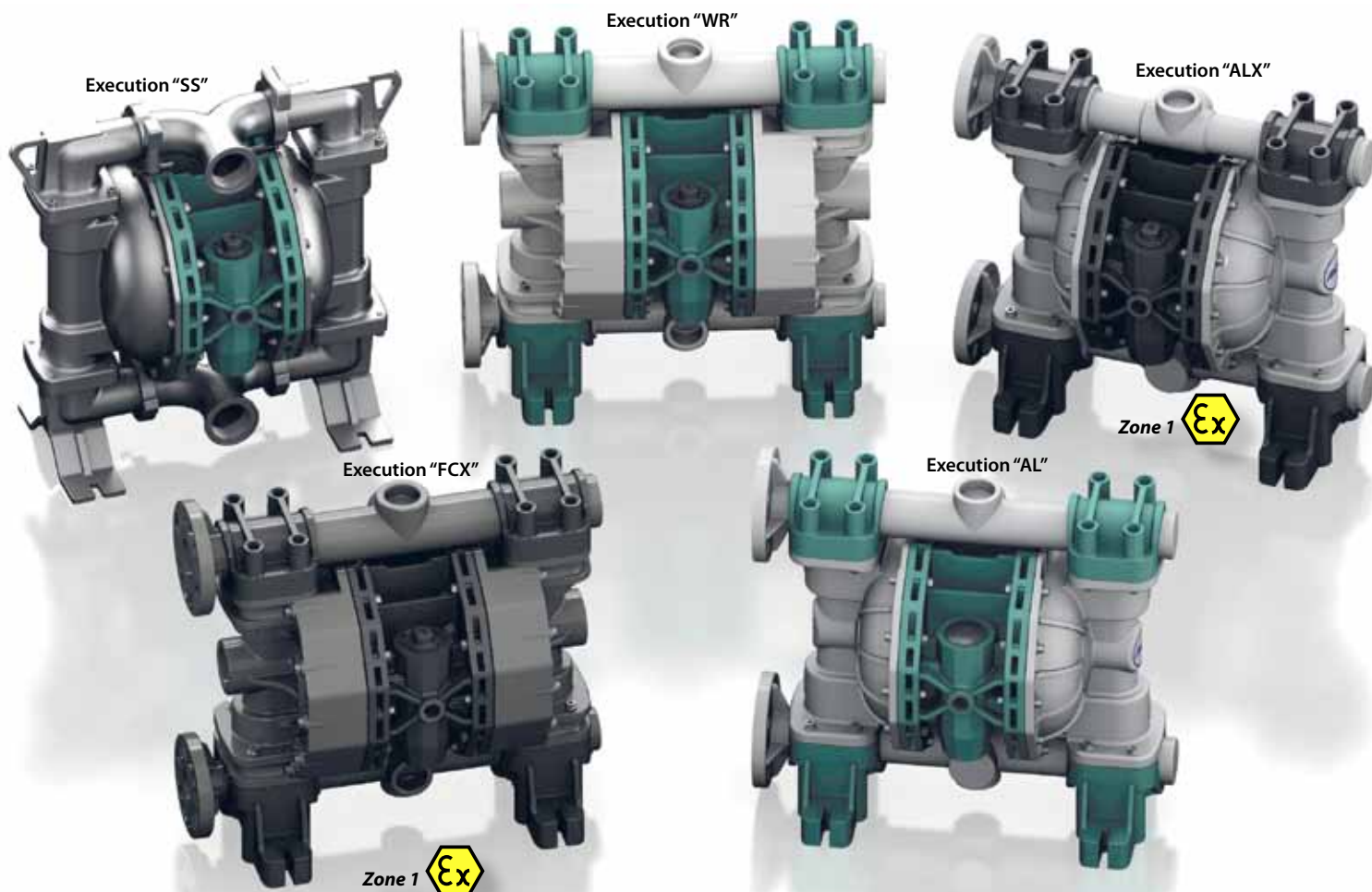
DIMENSIONS

[illegible]

	<i>Thermoplastic</i>				<i>Metallic</i>			
	WR		FC - DF		AL		SS	
[mm]	100	125	100	125	100	125	100	125
A	370		370		370		359	
B	222		222		222		222	
C	365		365		370		348	
D	155		155		155		129	
E	231		231		231		254	
H	292		292		292		272	
S	9		9		9		9	
T	39		39		39		46	
Weight [kg]	15		16		16		20	
Connections DnA = DnM	Threads (¹)							
	1"	1 1/4"	1"	1 1/4"	1"	1 1/4"	1"	1 1/4"

(¹) ISO-ANSI flanged connections available on request

DDA 150 - 200 1 1/2" - 2"

Zone 2 

PUMP IDENTIFICATION LABEL

table 19

DDA	200	P	AL	M	T	P	N	G	2	O
-----	-----	---	----	---	---	---	---	---	---	---

MODEL				MATERIAL										CONNECTIONS (2)							
Code	SIZE	Code	DISTRIBUTOR	Code	FLUID CHAMBER	ATEX (1)	Code	DIAPHRAGMS	Code	BALLS	Code	SEATS	Code	O-Rings	Code	TYPE	SCHEME		Code	DIRECTION	
																	Code	Code			
150 200	1 1/2" 2"	N	normal	WR	GFR-PP	X	H	Keyflex®	T	PTFE	P	PP	D	EPDM	G	Thread BSP	1	6	O	IN OUT	HORIZ. HORIZ.
		P	progress	FC	CFF-PVDF	X	M	Santoprene®	S	SUS 316 SS	K	PVDF	V	FKM	N	Thread BSP	2	7	V	IN OUT	VERT. VERT.
				DF	PVDF		D	EPDM	D	EPDM	S	SUS 316	N	NBR	I	Flanged (3)	3	8	H	IN OUT	VERT. HORIZ.
				AL	Aluminum	X	N	NBR	N	NBR	A	Aluminum	T	PTFE			4	9	K	IN OUT	HORIZ. HORIZ.
				SS	SUS 316	X	U	Polyurethane									5	10			
								HT	Keyflex®+PTFE				Z	PE UHMW							
							MT	Santoprene®+PTFE													

(2) SCHEME: 1-V / 3-K / 8-H / 6-K / 7-H not available for thermoplastic versions. - SCHEME: 2-O / 5-O / 6-K / 7-H / 9-O / 10-O not available for stainless steel executions.

(1) - ATEX Zone 1 - (3) Standard for thermoplastic and aluminum versions; on request for Stainless Steel executions

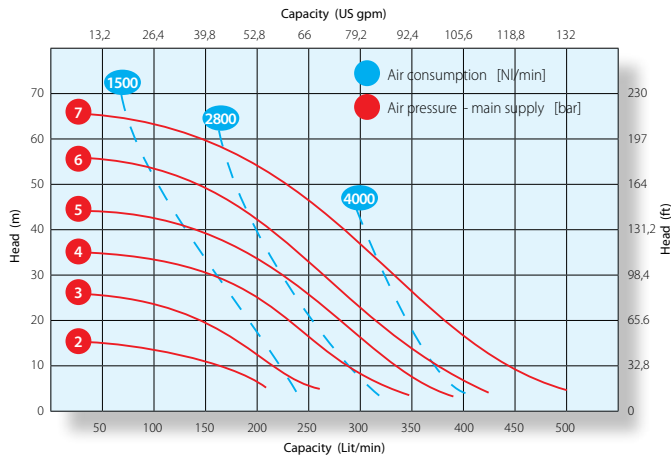
DDA 150 (1 1/2")

table 20

Technical Data	
Max. capacity	500 l/min
Max. head	70 m
Air Inlet	3/4" BSP
Suction Lift	6 m
Max. Solids	8,5 mm
Max. solids (positive suction)	40.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (PP + V)	
FC - Polyvinylidene fluoride + carbon fibre (PVDF + C)	
DF - Polyvinylidene fluoride puro (PVDF)	
AL - Aluminum	
SS - SUS 316	

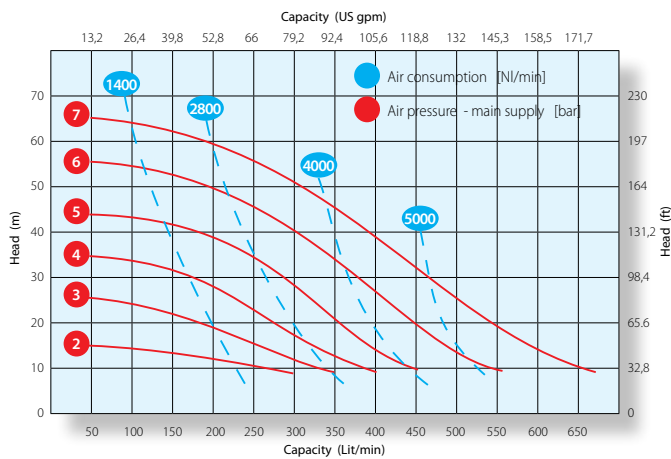
DDA 200 (2")

table 21

Technical Data	
Max. capacity	680 l/min
Max. head	70 m
Air Inlet	3/4" BSP
Suction Lift	6 m
Max. Solids	8,5 mm
Max. solids (positive suction)	50.000 cP
Pump Materials	
WR - Polypropylene + glass fibre (PP + V)	
FC - Polyvinylidene fluoride + carbon fibre (PVDF + C)	
DF - Polyvinylidene fluoride puro (PVDF)	
AL - Aluminum	
SS - SUS 316	

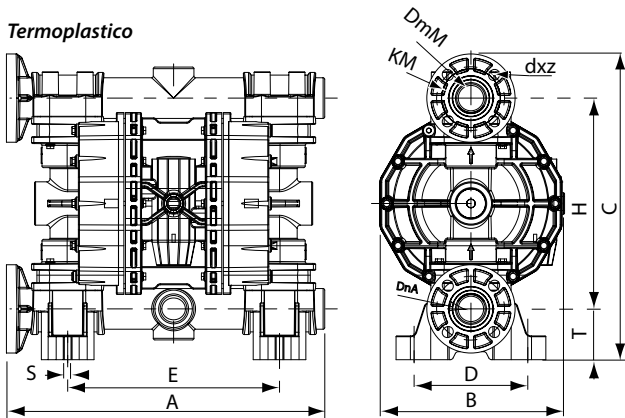
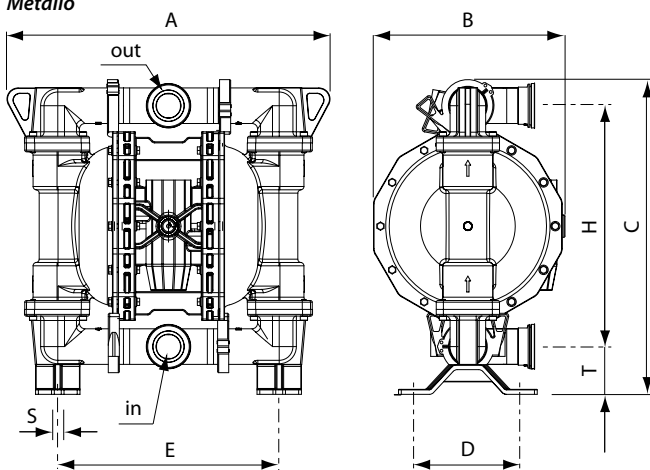
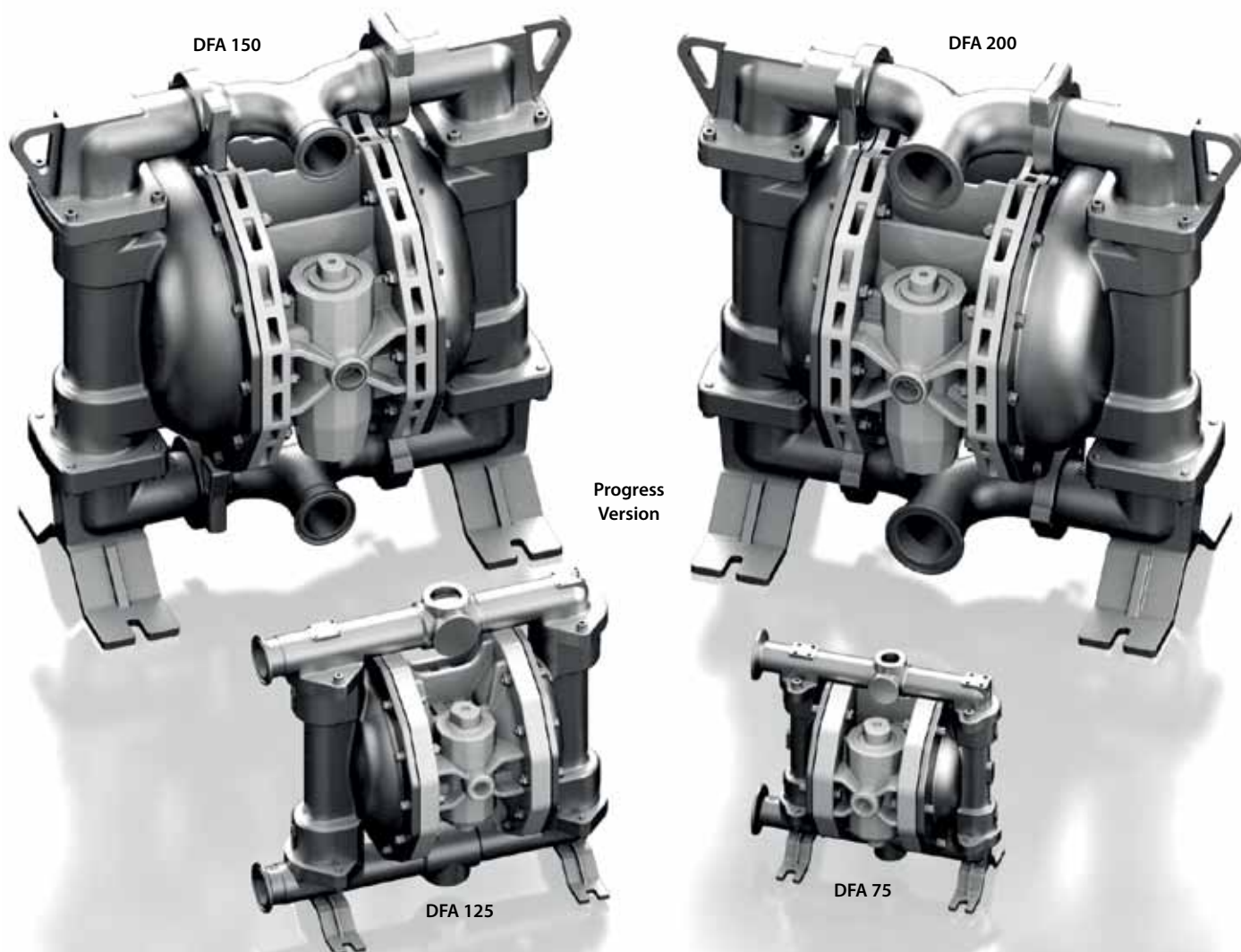
Termoplastico**Metallo****DIMENSIONS**

table 22

	Thermoplastic				Metallic			
	WR		FC - DF		AL		SS	
[mm]	150	200	150	200	150	200	150	200
A	595		595		595		582	
B	340		340		345		345	
C	565	572	565	572	568	572	567	
D	213		213		213		203	
E	396		369		396		399	
H	394		394		394		434	
S	12,5		12,5		12,5		12,5	
T	95		95		95		86	
Weight [kg]	30		35		35	36	58	60
Connections DnA = DnM	Flanged (¹)						Threaded (²)	
	1 1/2"	2"	1 1/2"	2"	1 1/2"	2"	1 1/2"	2"
KM	iso	110	125	110	125	110	125	/
	ansi	18x4	18x4	18x4	18x4	18x4	18x4	
dxz	iso	98	121	98	121	98	121	/
	ansi	16x4	19x4	16x4	19x4	16x4	19x4	
(¹) Available treads connections - (²) available ISO-ANSI flange connections								

(1) Available treads connections - (2) available ISO-ANSI flange connections

Astrafood DFA 75 - 125 - 150 - 200 1" - 1 1/2" - 2" - 2 1/2"

 Zone 2 


FDA

c o m p l i a n t

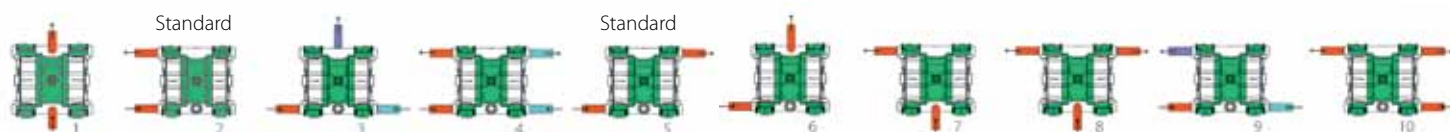

PUMP IDENTIFICATION LABEL

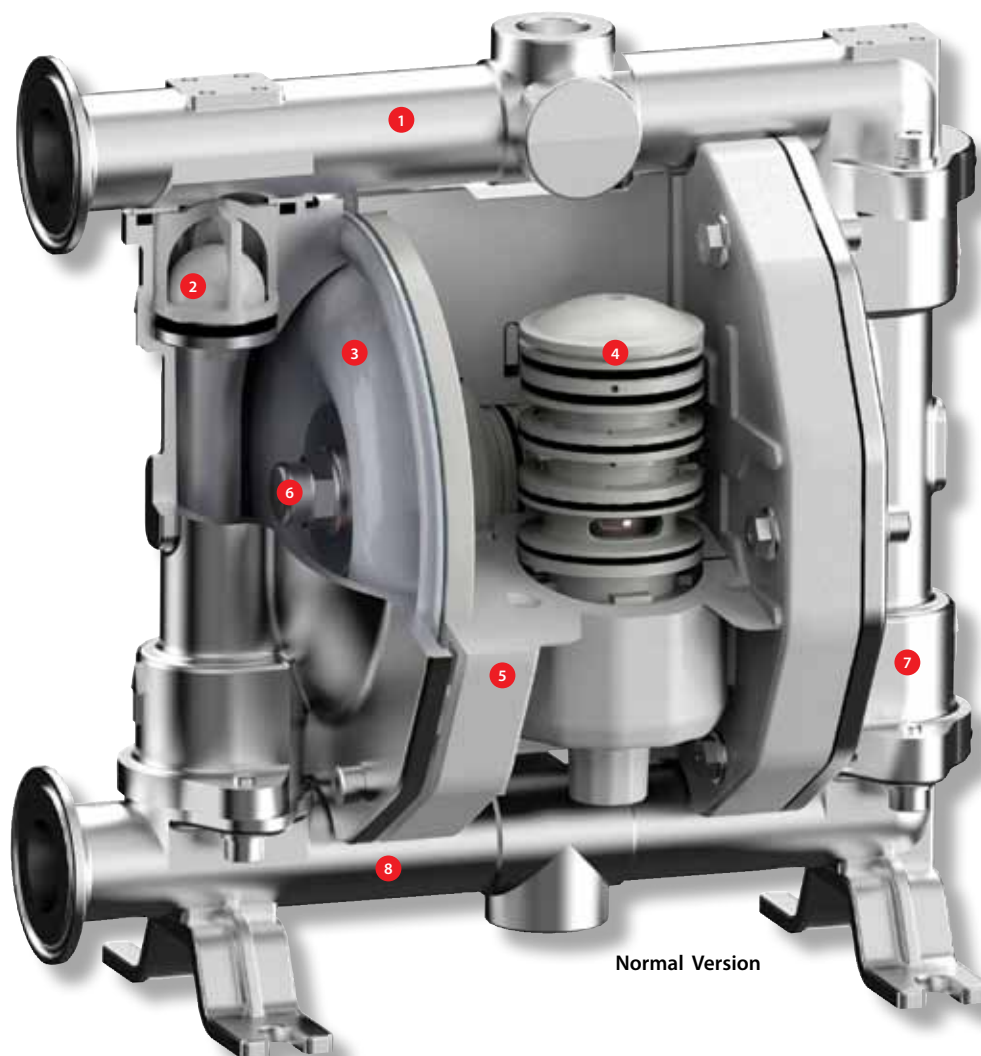
table 23

DFA	125	P	SP	HT	T	S	T	C	2	O
-----	-----	---	----	----	---	---	---	---	---	---

MODEL				MATERIALS										CONNECTIONS							
Code	SIZE	Code	DISTRIBUTOR	Code	FLUID CHAMBER	ATEX (1)	Code	DIAPHRAGMS	Code	BALLS	Code	SEATS	Code	O-Rings	Code	TYPE	SCHEMA			Code	DIRECTION
																	Code	Code	Code		
75	1"	N	Normal	SP	SUS 316 polished	X	H	Keyflex®+PTFE	T	PTFE	S	SUS 316	D	EPDM	C	CLAMP	1	6	O	IN	HORIZ
		P	Progress						S	SUS 316			V	FKM			2	7	V	OUT	HORIZ
125	1 1/2"												N	NBR			3	8	H	IN	VERT.
150	2"												T	PTFE			4	9	K	OUT	HORIZ
																	5	10			
200	2 1/2"																				

(1) - ATEX Zone 1 - (2) SCHEME: 2-O / 5-O / 6-O / 6-K / 7-H / 9-O / 10-O not available for 150 and 200 models.

Note: Add 'X' for configure zone 1 pump after fluid chamber code (SPX).

DFA 75 - 125 - 150 - 200 1" - 1 1/2" - 2" - 2 1/2"Zone 2 

- 1 Delivery manifold
- 2 Ball valve
- 3 Diaphragm
- 4 Air Distributor
- 5 Central casing
- 6 Wetted washer
- 7 Pump casing
- 8 Suction manifold

Normal Version



ASTRAFOOD "DFA" serie thanks to their characteristics and design can be applied for the transfer of fluids deployed in industries as food, the cosmetics, pharmaceuticals, or chemical additives, beverages, dairy, biotechnologies, medical appliances, paint and in all those applications where a quick release clam connection is required or appreciated. Usually are used to transfer or to remove the products from the mixing contains or storage basins or to pack them in bottles or similar containers.

The air operated double diaphragm pumps ASTRAFOOD are constructed with materials compliant to FDA regulation, wet parts of electro polished SUS 316 with surface finish to 125 Ra (average 2,7 µm) (centre line average height 2,7 µm) and PTFE, both certified for food applications.

All ASTRAFOOD pumps comply to ATEX, Zona 2, regulation and are adequate to operate in areas with atmosphere potentially explosive and, with the variant of the conductive executions can operate also in areas classified as ATEX Zone 1.

These pumps are capable to pump fluids with very high viscosity and temperature up to 95°C.

All other constructive and functional characteristics are equal to those of the ASTRA pumps described at page 9 and 10 of this catalogue.

ASTRAFOOD are available in the **Normal** or **Progress** version with the air distributor equipped with the original "Performance regulation valve"

Astrafood DFA 75 (1")

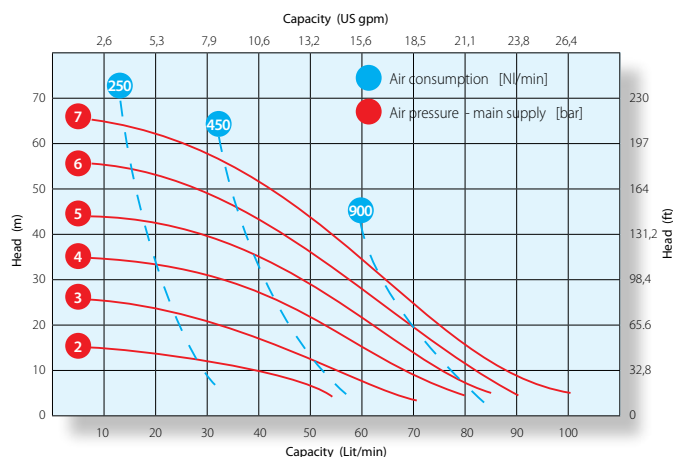
 Zone 2 


table 24

Technical Data	
Max. capacity	100 l/min
Max. head	70 m
Air Inlet	1/2" BSP
Suction Lift	6 m
Max. Solids	3,5 mm
Weight	9 Kg
Max. solids (positive suction)	10.000 cP



Astrafood DFA 125 (1 1/2")

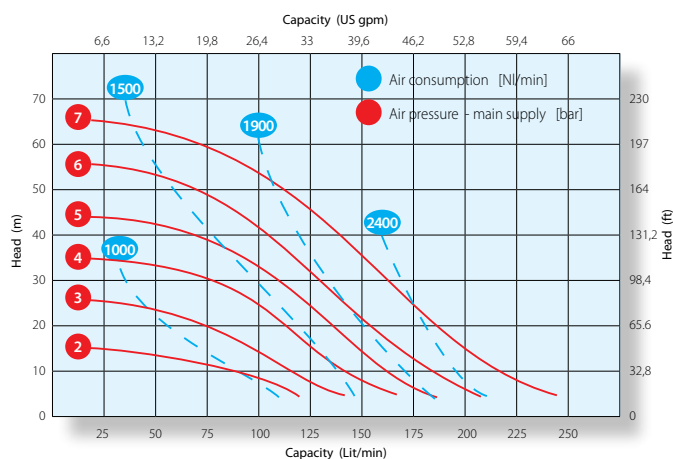


table 25

Technical Data	
Max. capacity	250 l/min
Max. head	70 m
Air Inlet	1/2" BSP
Suction Lift	6 m
Max. Solids	7,5 mm
Weight	20 Kg
Max. solids (positive suction)	15.000 cP

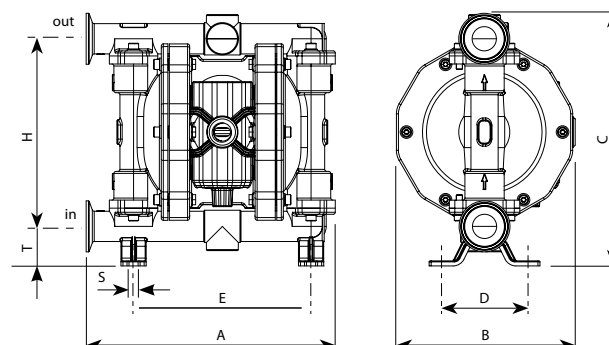


DIMENSIONS

table 26

[mm]	SP	
	75	125
A	247	359
B	177	222
C	249	348
D	89	129
E	176	254
H	185	272
S	9	9
T	40	40
Connections in / out	CLAMP (*) 1"	CLAMP (*) 1 1/2"

(*) Threaded connections available on request



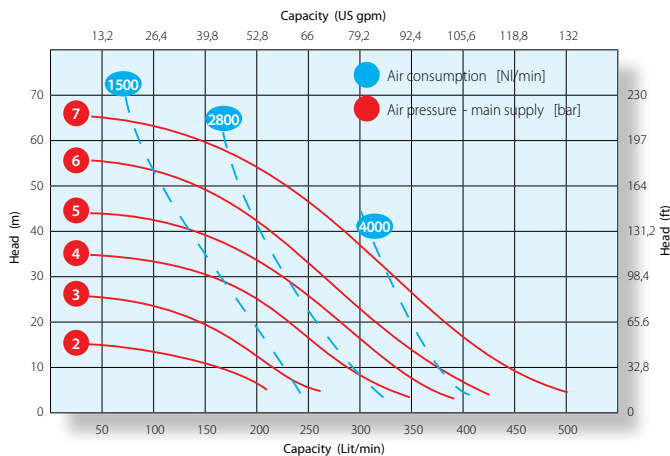
Astrafood DFA 150 (2")Zone 2 

table 27

Technical Data	
Max. capacity	500 l/min
Max. head	70 m
Air Inlet	3/4" BSP
Suction Lift	6 m
Max. Solids	8,5 mm
Weight	58 Kg
Max. solids (positive suction)	40.000 cP

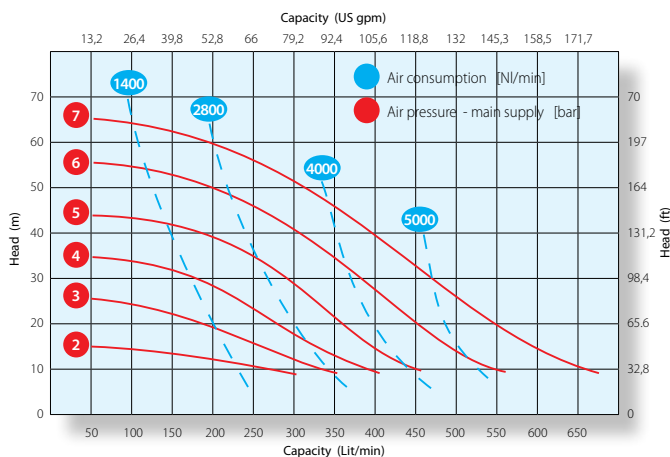
**Astrafood DFA 200 (2 1/2")**

table 28

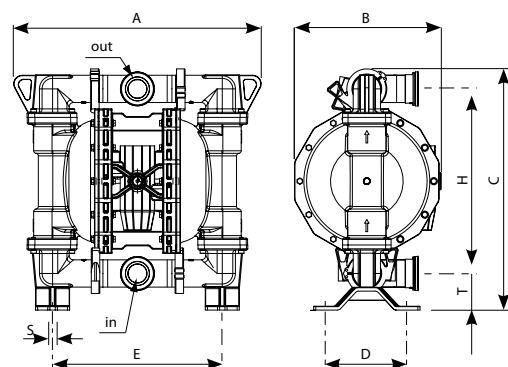
Technical Data	
Max. capacity	680 l/min
Max. head	70 m
Air Inlet	3/4" BSP
Suction Lift	6 m
Max. Solids	8,5 mm
Weight	60 Kg
Max. solids (positive suction)	50.000 cP

**DIMENSIONS**

table 29

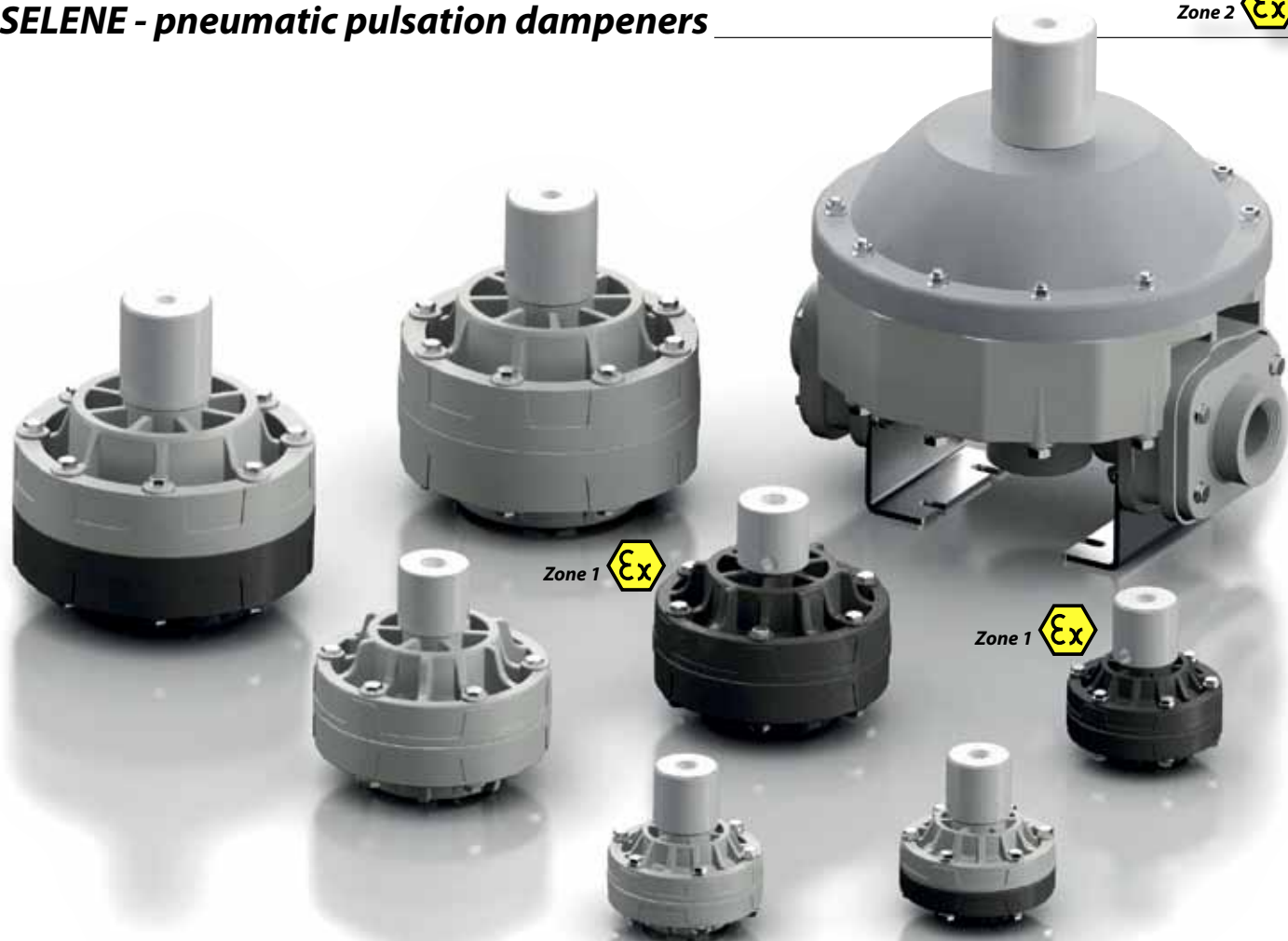
[mm]	SP	
	150	200
A	582	582
B	345	345
C	567	567
D	203	203
E	399	399
H	434	434
S	12,5	12,5
T	40	46
Connections in / out	CLAMP (*) 2"	CLAMP (*) 2 1/2"

(*) Threaded connections available on request



SELENE - pneumatic pulsation dampeners

Zone 2



CHARACTERISTICS AND ADVANTAGES

The range of **SELENE** flow pulsation dampeners exploits a new technology which minimises the pulsation typical of the flow delivered by air operated double diaphragm pumps. All volumetric pumps as dosing pumps with double diaphragm or plunger piston generate pulsations from their pumping alternative motion and hydraulic shocks potentially capable to damage the complete device.

The pulsation dampeners Selene are mounted on the line where the liquid is delivered and reduce drastically pulsation, liquid hammers and vibration of the pump.

The dampener needs its source of pressurised air supply.

Its use is advised when the hydraulic circuit the pump suffers peaks of pressure, thermal expansions, sudden starts add stops or fast valve shut offs of delivery valves.

SELENE dampeners are "active" and do not need tuning or pre loading for they are self adaptive; they can dampen the amplitude of the pulsations up to 90% of their max. amplitude.

Dampener require a minimal maintenance and are available in the same construction materials of the liquid chambers and diaphragms for thermoplastic pumps and in stainless steel SUS 316 for the metallic versions.

For aluminum made pumps the SELENE dampeners are constructed in PPS (Ryton®).

SELENE dampeners are available in ATEX compliant version and are adequate to operate in areas at risk of explosion areas classified as Atex Zone 1.

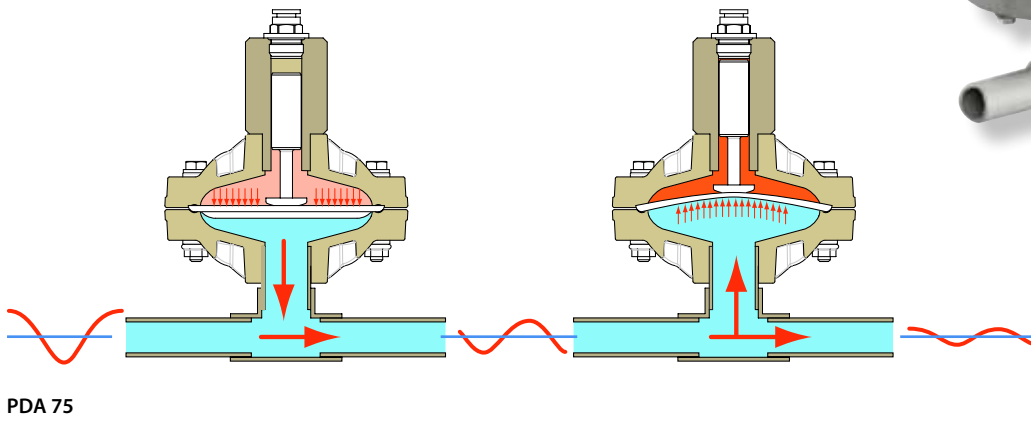
Ryton® is a trade mark registered by Chevron Phillips



The major advantages of the Selene dampener are:

- Stabilizes the flow generated by volumetric pumps
- Reduces significantly the vibrations
- Reduces liquid hammers
- Prevents potentially damaging pressure peaks
- Reduces significantly the noise of the system
- Protects the appliances connected along the same hydraulic line
- Reduces the maintenance cost of the plant
- Increases global productivity
- Is adequate to operate with liquids viscous or laden with solids.

PDA - dampener



PDA 75

table 30

Technical Data		Pump Materials		Applicability
Inlet / outlet	3/4"	WR - Polypropylene + glass fibre (GFR-PP)		DDA 25R
Air connection	3/8"	FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)		DDA 38R
Air exhaust plug	1/4"	DF - Polyvinylidene fluoride (PVDF)		DDA 50R
Max pressure	7 bar	AL - Aluminum		DDA 50C
Dimension	ø 120 x 125 mm	SS - SUS 316		

PDA 100

table 31

Technical Data		Pump Materials		Applicability
Inlet / outlet	1"	WR - Polypropylene + glass fibre (GFR-PP)		DDA 50
Air connection	1/2"	FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)		DDA 75
Air exhaust plug	1/4"	DF - Polyvinylidene fluoride (PVDF)		DDA 100C
Max pressure	7 bar	AL - Aluminum		
Dimension	ø 182 x 175 mm	SS - SUS 316		

PDA 150

table 32

Technical Data		Pump Materials		Applicability
Inlet / outlet	1 1/2"	WR - Polypropylene + glass fibre (GFR-PP)		DDA 100
Air connection	3/8"	FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)		DDA 125
Air exhaust plug	1/4"	DF - Polyvinylidene fluoride (PVDF)		
Max pressure	7 bar	AL - Aluminum		
Dimension	ø 231 x 252 mm	SS - SUS 316		

PDA 200

table 33

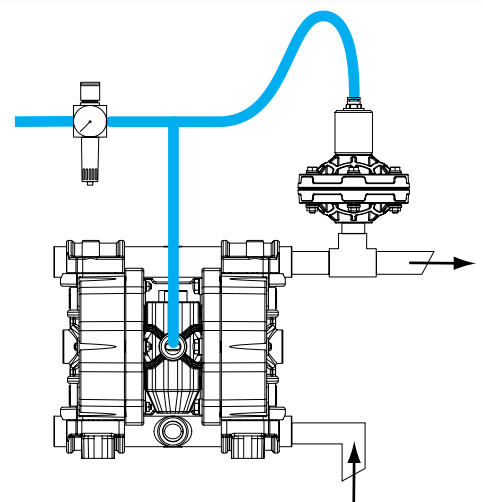
Technical Data		Pump Materials		Applicability
Inlet / outlet	2"	WR - Polypropylene + glass fibre (GFR-PP)		DDA 150
Air connection	1/2"	FC - Polyvinylidene fluoride + carbon fibre (CFF-PVDF)		DDA 200
Air exhaust plug	1/2"	DF - Polyvinylidene fluoride (PVDF)		
Max pressure	7 bar	AL - Aluminum		
Dimension	ø 350 x 405 mm	SS - SUS 316		

DAMPENER IDENTIFICATION LABEL

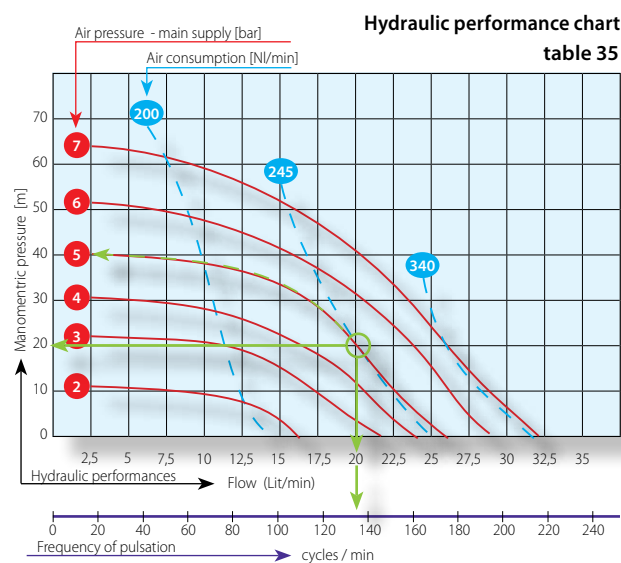
table 34

PDA		50		WR		M		0		G	
MODEL		MATERIALS							CONNECTIONS		
COD.	SIZE	COD.	FLUID CHAMBER (1)	ATEX (1)	COD.	DIAPHRAGMS	COD.	O-Rings	COD.	TYPE	
75 100 150 200	3/4" 1" 1 1/2" 2"	WR	GFR-PP	X	H	Keyflex®	D	EPDM	G	Threaded BSP	
		FC	CFF-PVDF	X	M	Santoprene®	V	FKM	N	Threaded NPT	
		DF	PVDF		D	EPDM	N	NBR	I	Flanged (²)	
		RY	PPS	X	N	NBR	T	PTFE			
		SS	SUS 316	X	U	Polyurethane	O	no o-ring			
					HT	Keyflex®+PTFE					
					MT	Santoprene®+PTFE					

(1) - ATEX Zone 1 - (3) Available on request



Instructions for the choice of the Astra pumps



Duty point – example: Flow 20 l/min - Manometric pressure 20 m.

● Air pressure main supply: 5 bar

● Air consumption: 245 NL/min

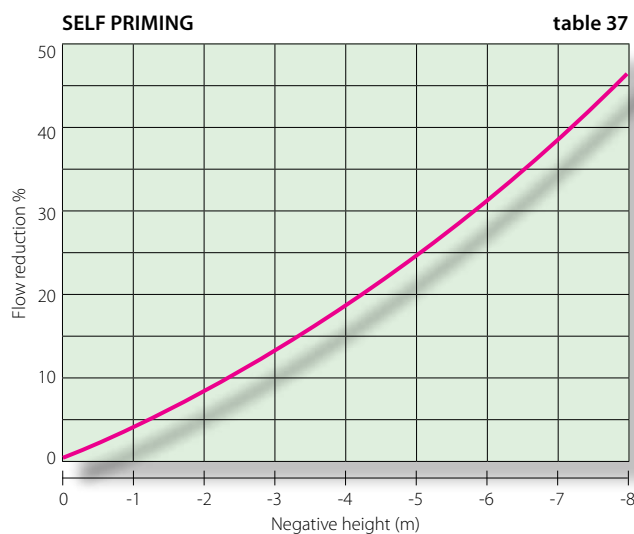
● Frequency of cycles: 135 cicli/min

Air supply

table 36

Air consumption	Pump intake air pipe external Ø	Air compressor adsorbed power (approx.)
Nl / min	mm	HP
50	6	0.5
100	6	1
200	6	2
250	8	2.5
350	8	3.5
450	8	4.5
550	8	5.5
850	10	8.5
1000	10	10
1500	12	15
2000	12	20
3500	12	30
4000	15	40

The power truly adsorbed by the air compressor its appreciatively = 70% of the value indicated in the table



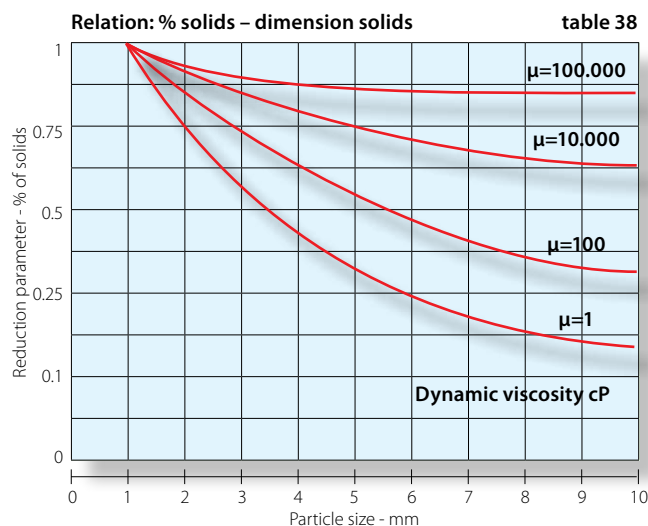
To lift the liquid from a negative height reduces the flow of the pump as in standard circumstances (flooded suction).

The max. negative head is a function of:

Characteristics of the plant (hydraulic losses);

physical characteristics of the fluid (density, viscosity, boiling point);

differential pressure exerted on the diaphragms as between the fluid side of the priming diaphragm and the air side of opposite diaphragm.



The admissible dimension of solids in suspension depends by:

- DN of the pump (max. valve passage),

- Viscosity of the fluid.

Dimension limits the admissible % concentration of solids in suspension.

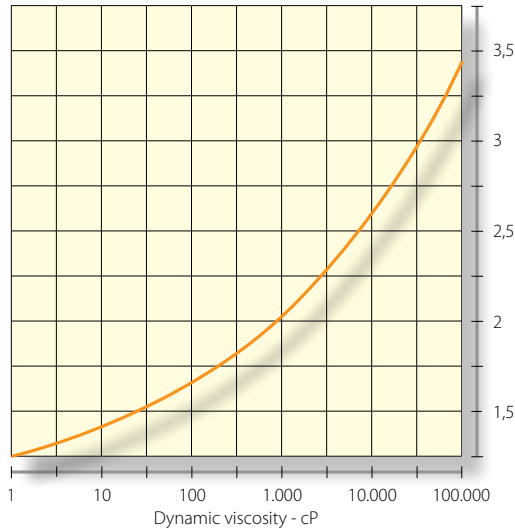
Solid particles of larger dimension reduce significantly the max admissible % of solids in suspension if the liquid is low viscosity but do not reduce it much if the liquid is of high viscosity.

Viscous fluids

If the fluid is viscous increase the section (diameter) of the pipe lines by the multiply coefficient reported.

Pipe lines DN

table 39



Multiply coefficient for pipe line diameter referred to a non viscous fluid and constant hydraulic losses.

Products viscosity

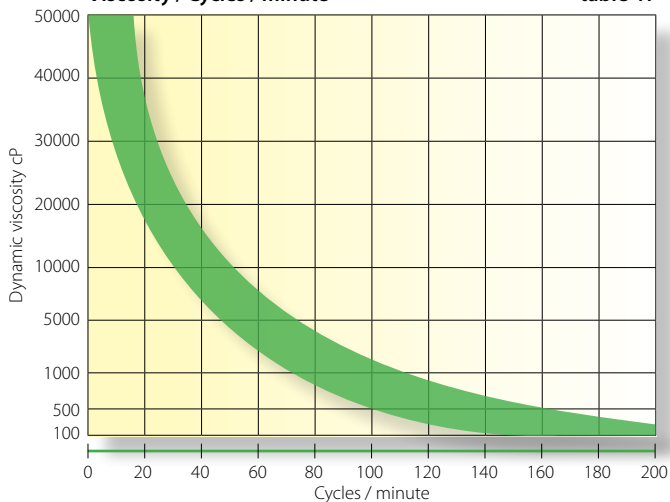
table 40

Food industry		Cosmetic Pharmaceutical industry		Various Industries	
Product	cP	Product	cP	Product	cP
Butter	50000	Yoothpaste	5000	Oil SAE70	18000
Whipped acid cream	13000	Gel	2000	Pater pul in water	15000
Mayonnaise	6000	Glycerine	1400	Barbotine	2000
Honey	1500 ÷ 3000	Shampoo	250	Grease lubr.	2000
Marmalade	<1000			Mineral oil	800
Tomato sauce	180			Oil SAE30	350
Yogurt	100			Varnish	300
Olive Oil	100				

Viscosity is an important parameter to select the right pump for the application. Viscosity is measured in Centipoise - cP

Viscosity / Cycles / minute

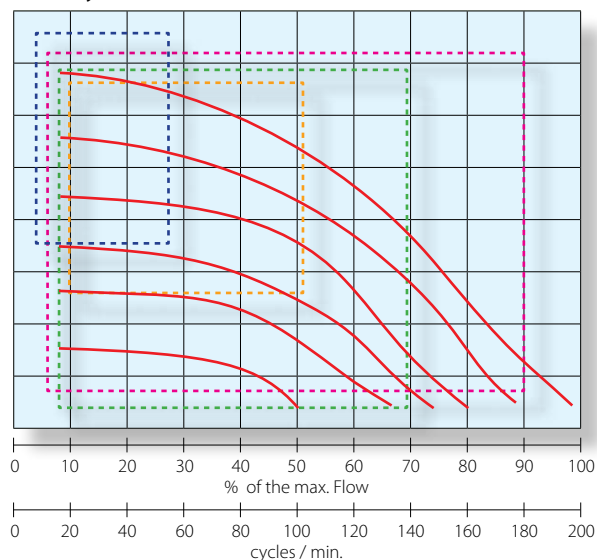
table 41



As a general indication assume that; the more viscous the liquid is, the lower is the n° of cycles per minute it has to be pumped at: (cycles per minute = complete cycle of a single diaphragm).

Viscosity

table 42



Viscosity of moving fluids can be constant or variable: Fluids with variable viscosity will be pumped within the limits of flow and head inscribed by border line relevant to the specific viscosity characteristic as shown in the attached diagram chart.

- **Not viscous fluids ($1 < \mu < 10$)**
(water, acid solutions, basic solutions, organic solvents).
- **Fluids with constant viscosity**
(sulphuric acid, sodium hydroxide, oil, acetyl ethanolamine, glycerine, toothpaste, mayonnaise, margarine, slurries).
- **Fluids with increasing viscosity**
(corn starch, silconic oils, row sugar, colloidal dispersion, whipped cream).
- **Fluids with decreasing viscosity**
(paper pulp in water, acrylic paint, latex, blood, ketchup, jellified enamels, jellified hydro carbons, lip gloss).

Main Applications



CHEMICAL &
PETROCHEMICAL



RESINS



PAINT & VARNISH



ELETTROPLATING &
SEMICONDUCTOR



DYEING & LAUNDRY



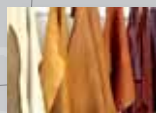
CERAMICS



COSMETIC



PHARMACEUTICAL



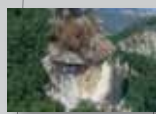
TEXTILE & LEATHER



MINING



LUBRICATING



EXPLOSIVES



WASTE TREATMENT



INKS & PRINT



NAVAL



METALWORKER



CONSTRUCTION
INDUSTRY



ADHESIVES



PULP & PAPER



ENOLOGY



AGRICULTURE & BIOGAS



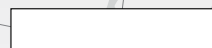
FOOD AND
DAIRY FACTORIES



DRINKS & LIQUIDS



SUGAR INDUSTRY



ARGAL
CHEMICAL PUMPS



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associazione
industriale
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