TECHNOPLAN
ENGINEERING SA

PRESENTATION

Air Recycling Systems

for PET stretch blow molding machines

ARS
Air Recycling System

ARS+
Air Recycling System

TECHNOPLAN
ENGINEERING SA

Technoplan Engineering

A Swiss company, based in Geneva, Switzerland, specialised in PET bottle manufacturing, with a technician team in Mexico

25 years experience in industrial machine design
16 years with **ARS and ARS+**
3 years with ceramic **TOEO**

Over **1'600** blowers running with our solutions

Our range of energy-savings solutions

Air Recycling System
Saves up to
10% of High Pressure air
40% of Low Pressure air

Air Recycling System+High Pressure
Saves up to
30% of High Pressure air

Air Recycling System+Full
Saves up to
30% of High Pressure air
20% of Low Pressure air

TECHNOPLAN ENGINEERING SA

Our partners

KHS Filling and Packaging — Worldwide

SIPA Plastic Packaging Systems

Our clients


evian


Vittel


BRITVIC
soft drinks


Refresco
HOLDING


Coca-Cola


S.PELLEGRINO


Nestlé


pepsi


Volvic


中国驰名商标
娃哈哈


Eau Minérale Naturelle
MONT ROUCOUS


granini


EAU DE SOURCE
CRISTALINE
NATURELLE


BADOIT


Sant'Anna
di Vinadio


DANONE

...

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ENGINEERING SA

Benefits

Same **production** rate and **quality** of your bottles = we only save air

No modification of the software
No major modification of the blower

Mechanically & electrically **independent of the blower** = Production possible with the ARS switched OFF (normal blowing)

Standard Return On Investment **<18 months**

Rapidly installed : 3 to 5 days possible production during nightshift

When available, **local technical support** is provided **in your own language**, for operating questions, spare parts or maintenance services

Measurements

All our retrofit installations are measured in presence of the facility technician.

We also offer FlowMeters as option along the ARS system

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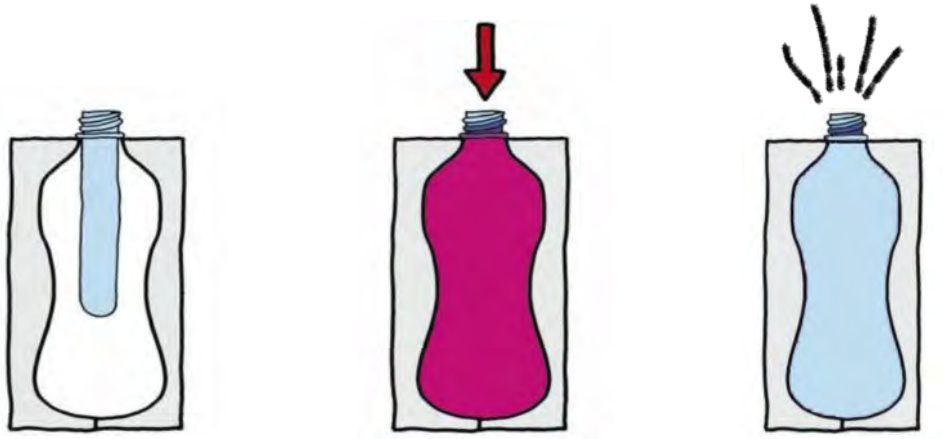
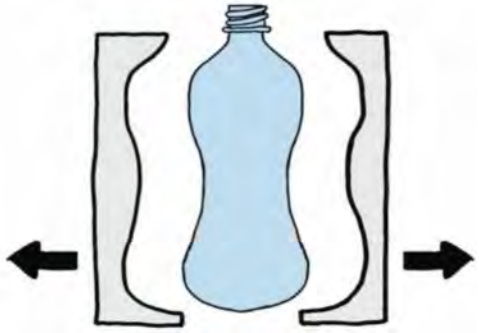
Efficiency

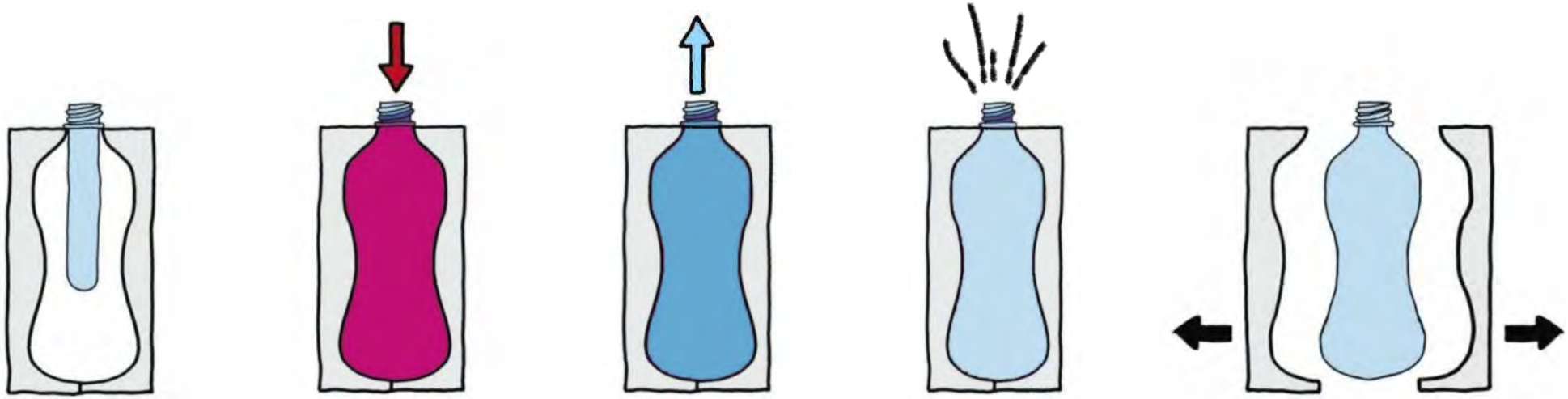


Compressing 1 Nm3 at 40 bar requires **0.25 kW**
Released into the air, this money is lost.



50%

Up to 50% of the discharged air flow can be directed into a recovery tank, before a final exhaust.



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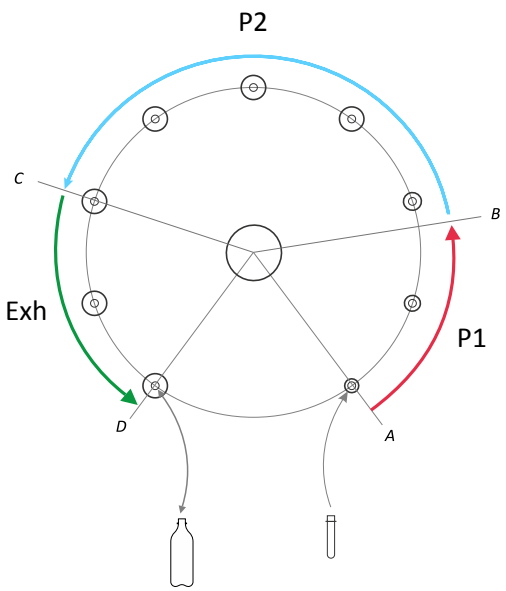
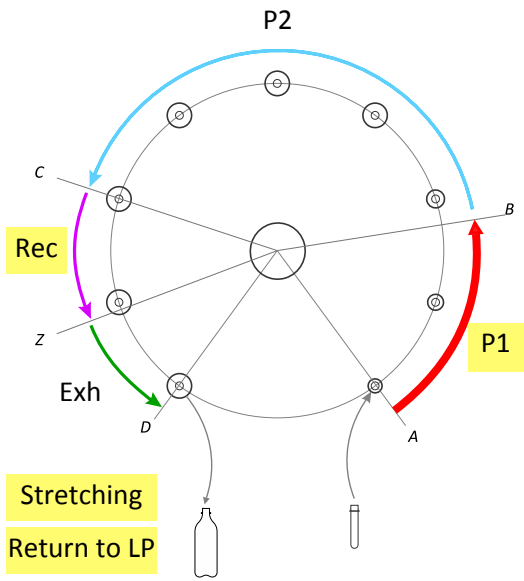
3 possible air recovery systems



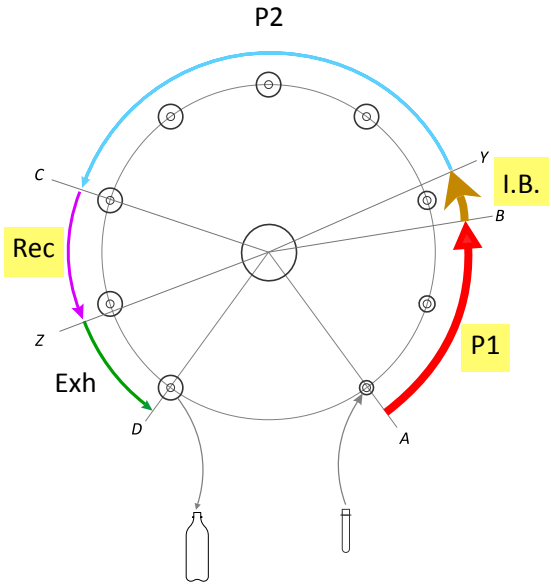
No recovery

- P1 supplied by 40 bar
- Stretching air supplied by 7 bar or reduced 40 bar



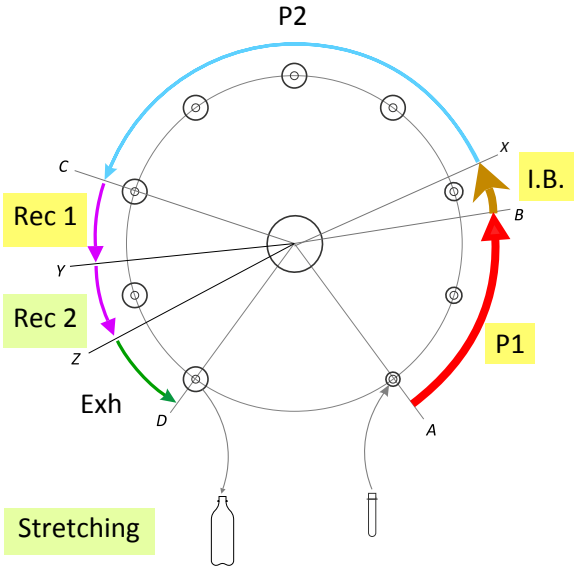
Standard ARS

- 1 recovery, controlled by cam
- P1 supplied by ARS
- Stretching air supplied ARS
- Excess of recovered air returned to LP line



ARS+HP

- 1 recovery, controlled from exhaust signal
- P1 supplied by ARS+HP
- Intermediate Blowing step, controlled with blowing signal, supplied by ARS+Full



ARS+Full

- 2 successive recoveries, controlled from exhaust signal
- P1 supplied by ARS+Full
- Intermediate Blowing step, controlled with blowing signal, supplied by ARS+Full
- Stretching air supplied ARS+Full
- Optionnal air returned to LP line

With standard ARS applied over 5 blowers in one plant (Nestlé France), one HP and 2 LP compressors are now on hold.
Please ask for our referrals.

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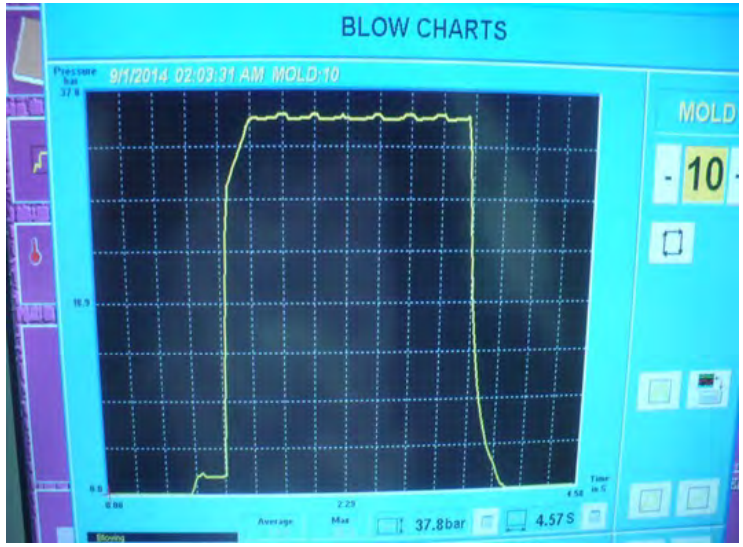
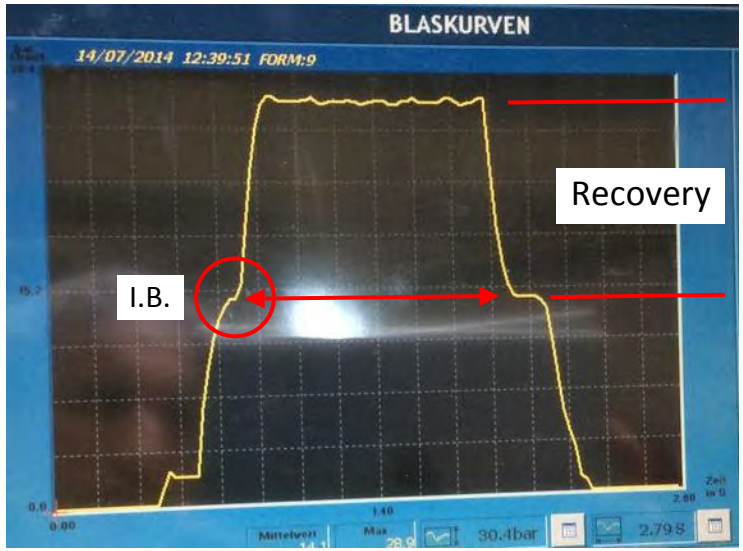
Blowing Curves

Without recovery

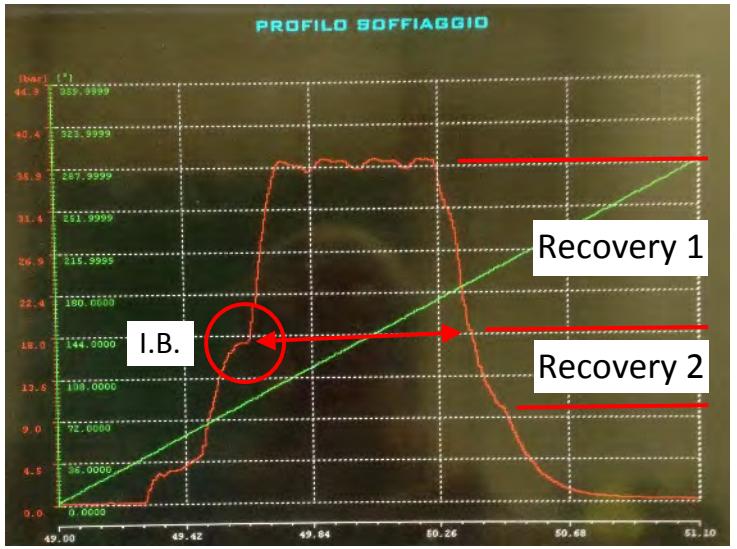


Standard ARS

ARS+HP



ARS+Full



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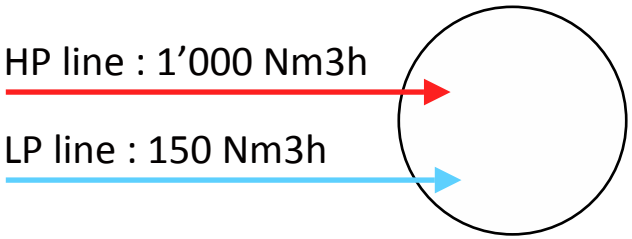
Air consumptions efficiencies

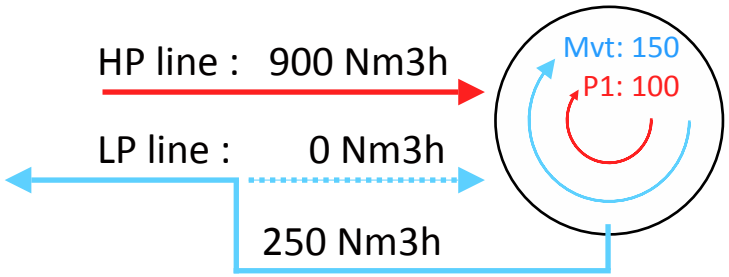
Machines with both HP & LP entry lines:

Sidel serie 2, Krones …

No air recovery unit



ARS



Savings :

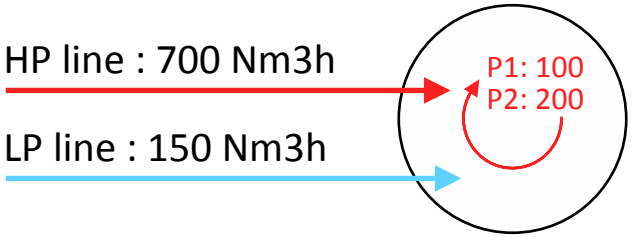
100 Nm3h

+ 150 Nm3h

+ 250 Nm3h

= 500 Nm3h

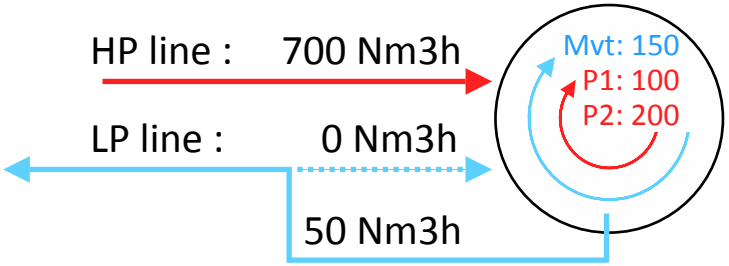
ARS+HP



Savings :

300 Nm3h

ARS+Full



Savings :

300 Nm3h

+ 150 Nm3h

+ 50 Nm3h

= 500 Nm3h

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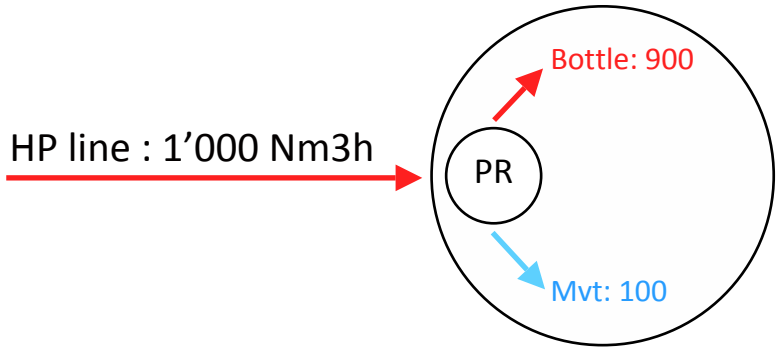
Air consumptions efficiencies

Machines with one entry lines

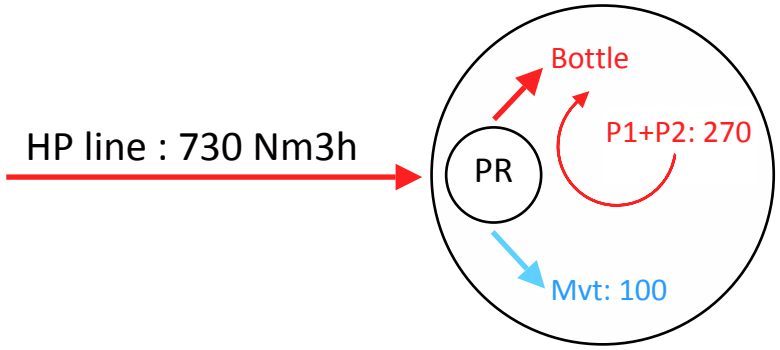
Ex: Krones blowers

No air recovery unit



For the 1-entry blowers, we recommand installing an ARS+HP or ARS+Full system.

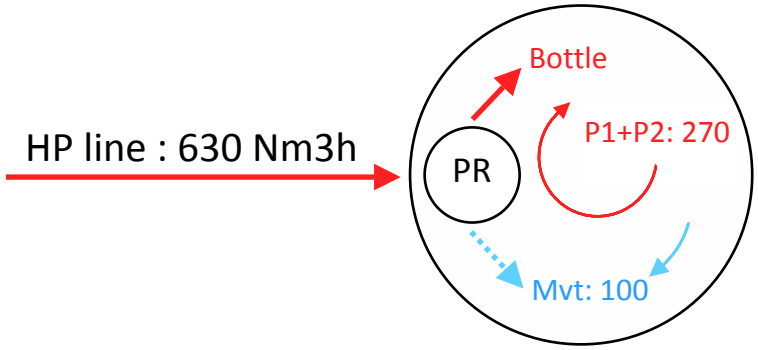
ARS+HP



Savings :

270 Nm3h

ARS+Full



Savings :

270 Nm3h

+ 100 Nm3h

= 370 Nm3h

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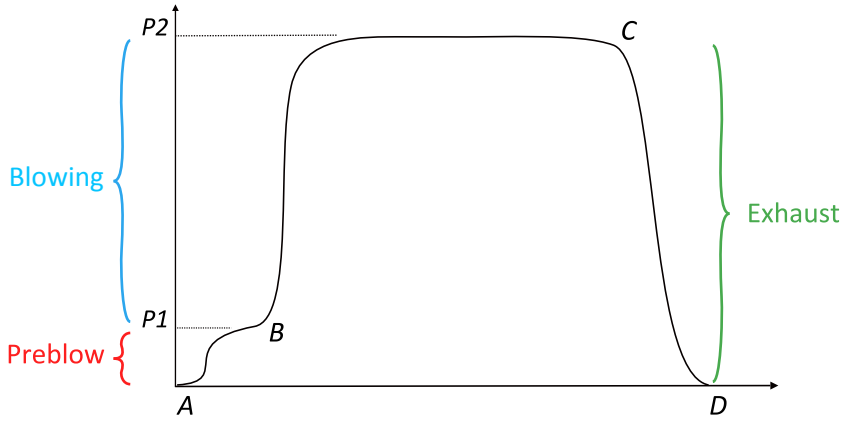
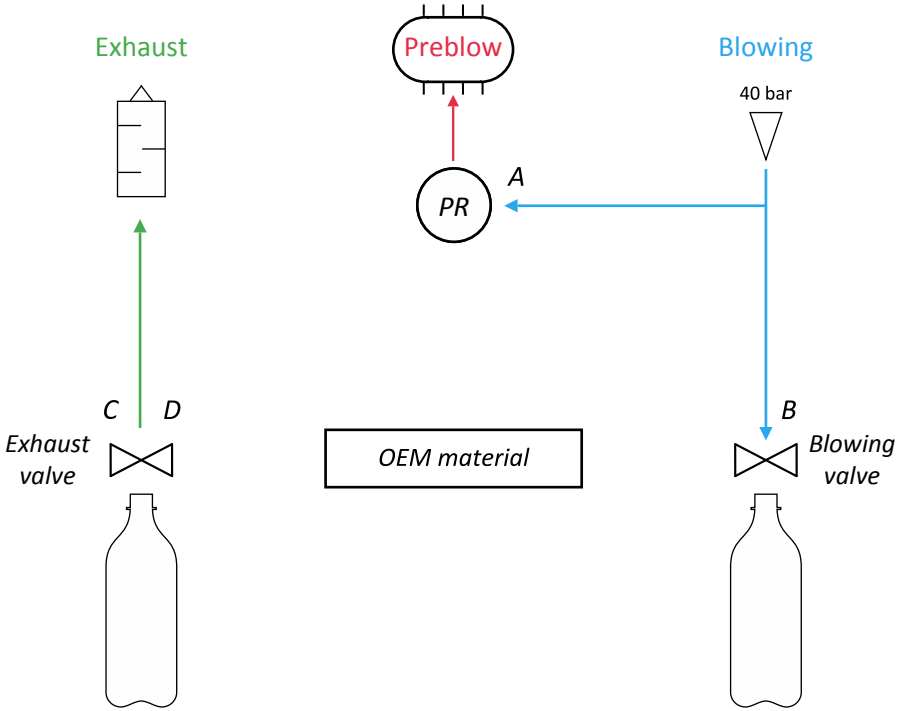
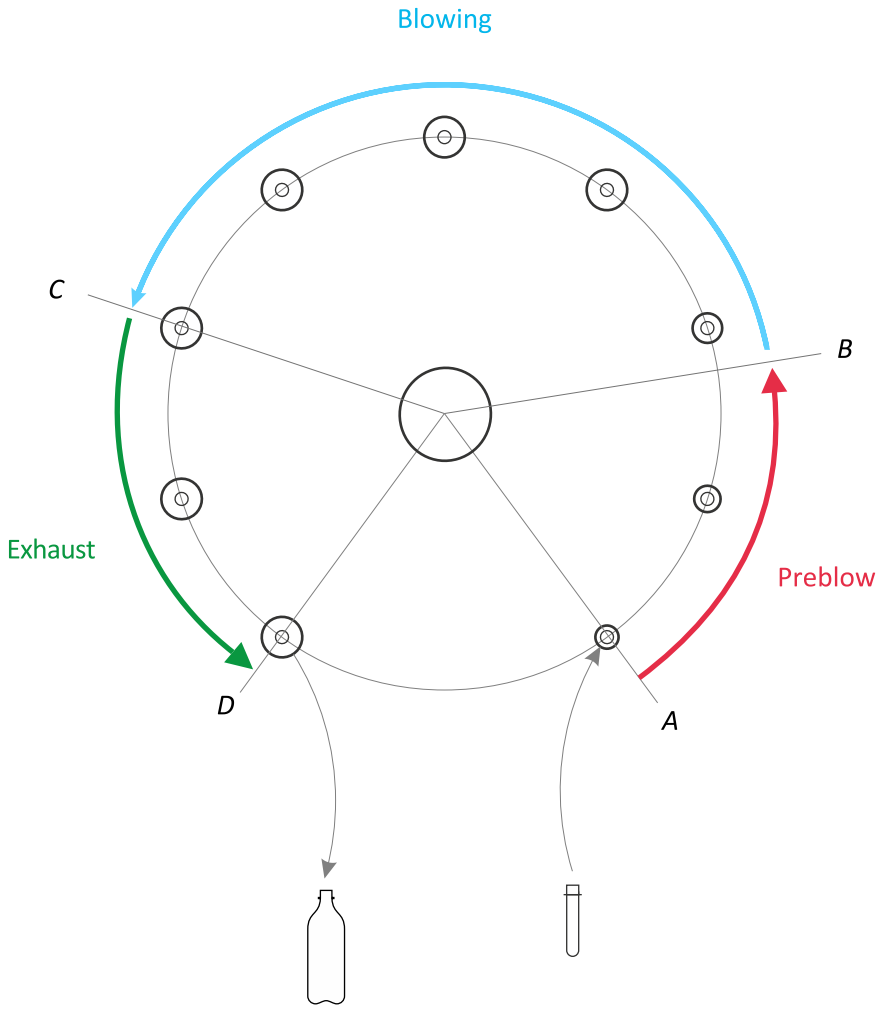
Blower without ARS

HP line : 1'000 Nm3h

LP line : 150 Nm3h







Air supplied by 40-bar line

A - B - C - D : blower's software

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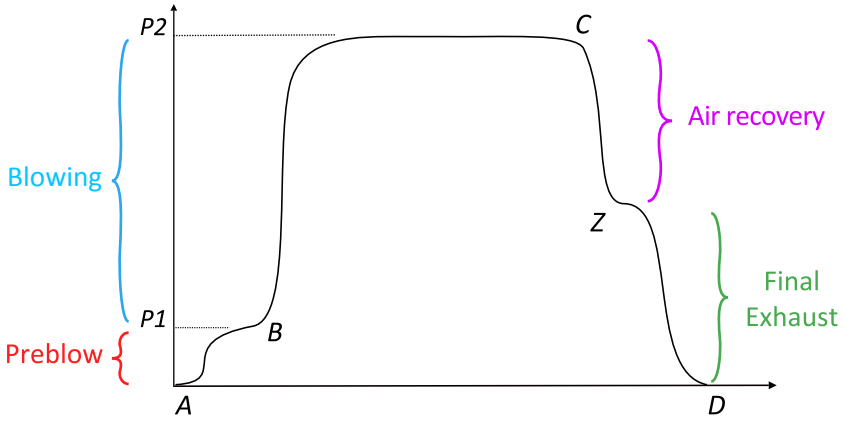
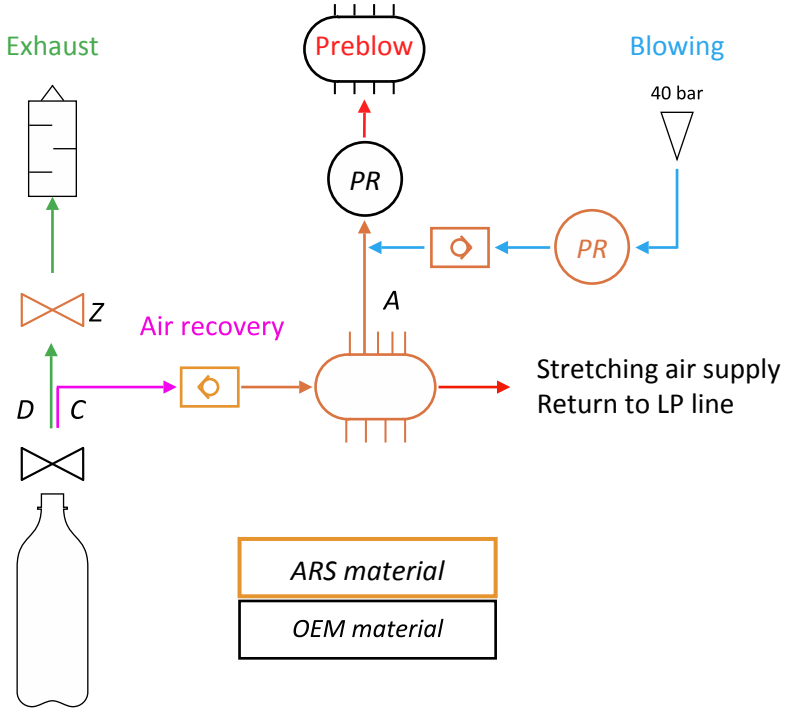
ARS on Sidel serie 2, Krones ...

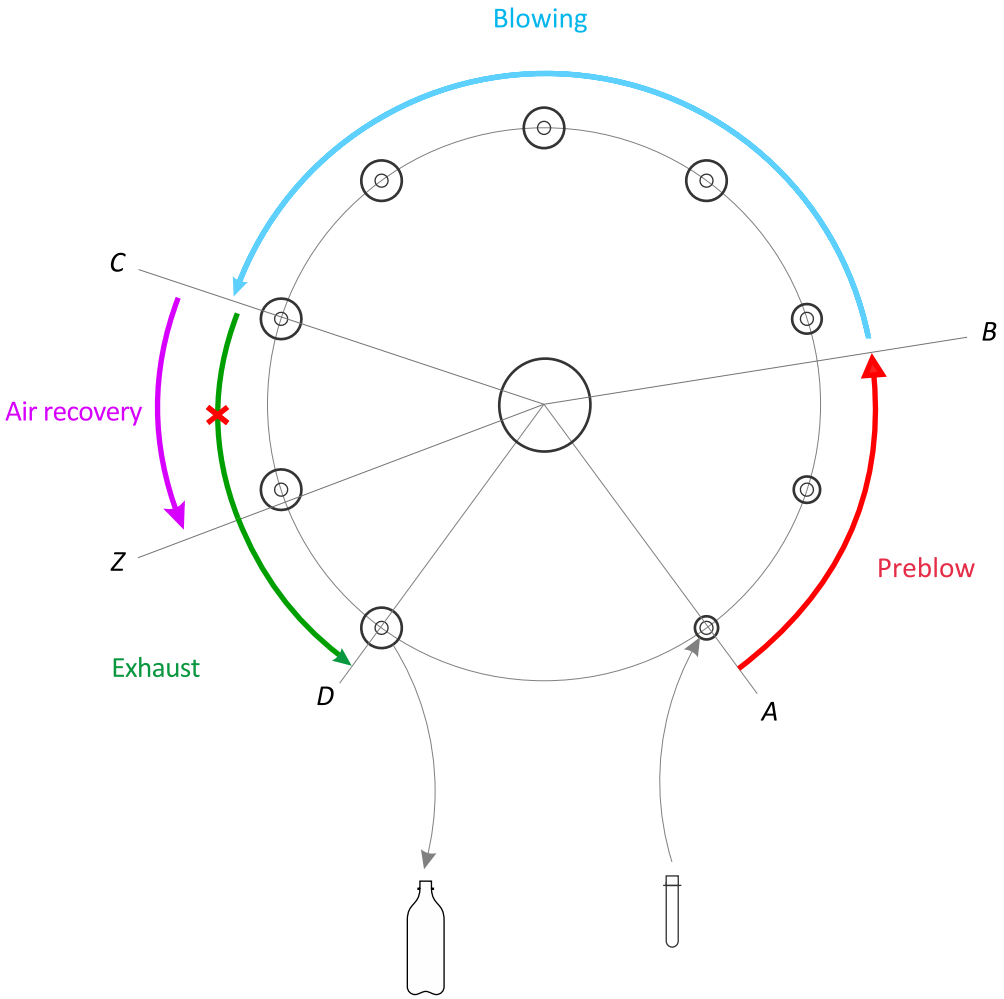
HP line : 900 Nm3h

LP line : 0 (line closed)

LP line : 250 Nm3h







Air supplied by 40-bar line

Air supplied by ARS

A - B - C - D : blower's software

Z : ARS software

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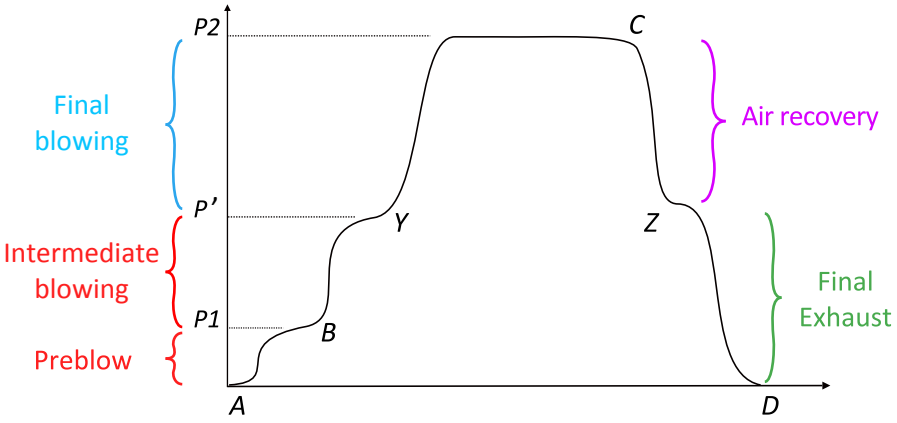
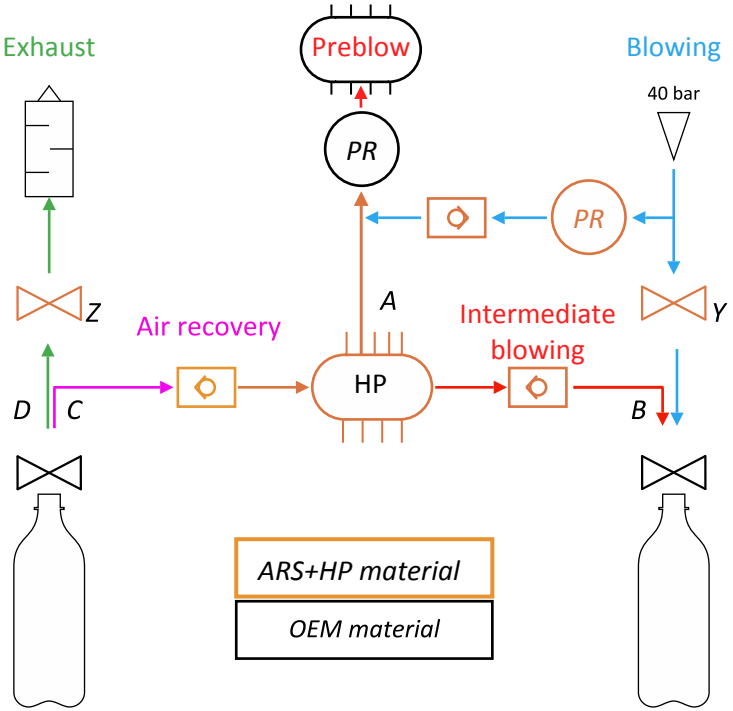
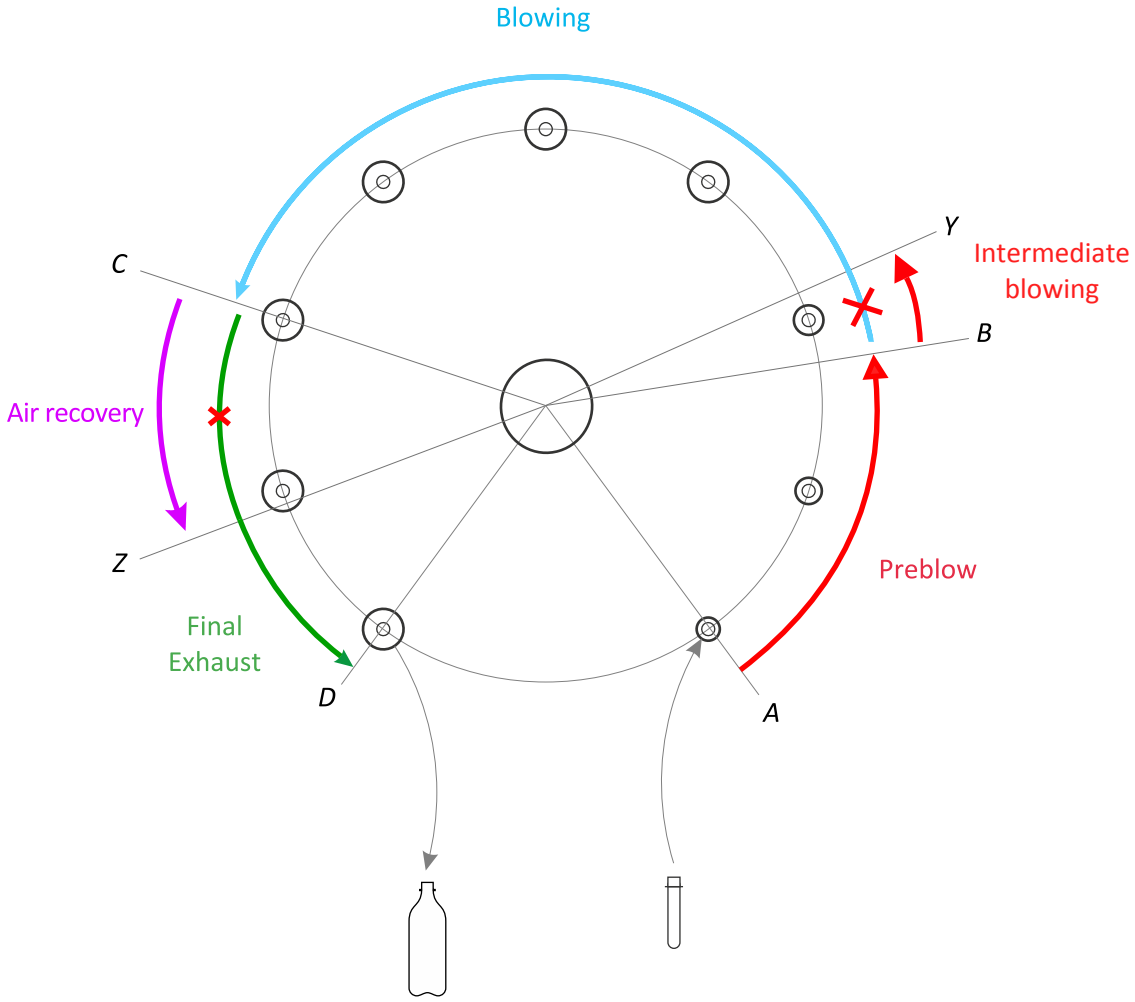
ARS+HP

HP line : 700 Nm3h

LP line : 150 Nm3h







Air supplied by 40-bar line

Air supplied by ARS+HP

A - B - C - D : blower software

Y - Z : ARS+HP software

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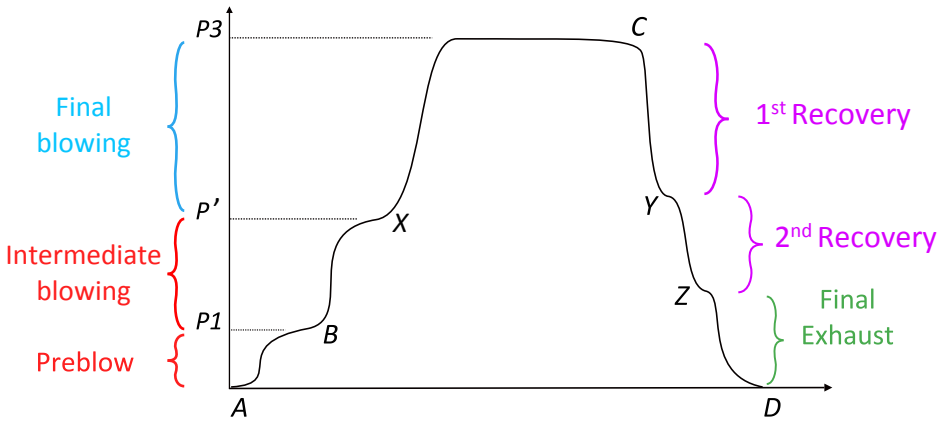
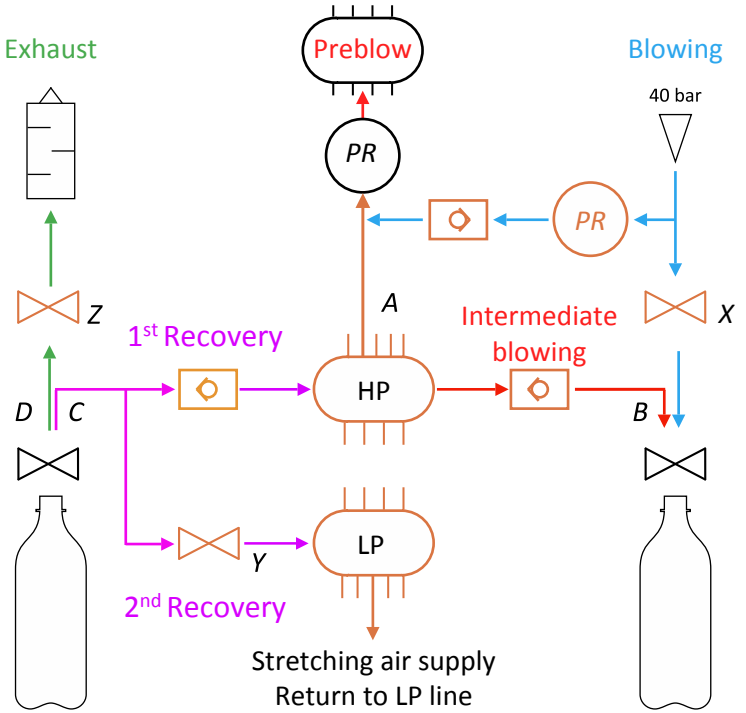
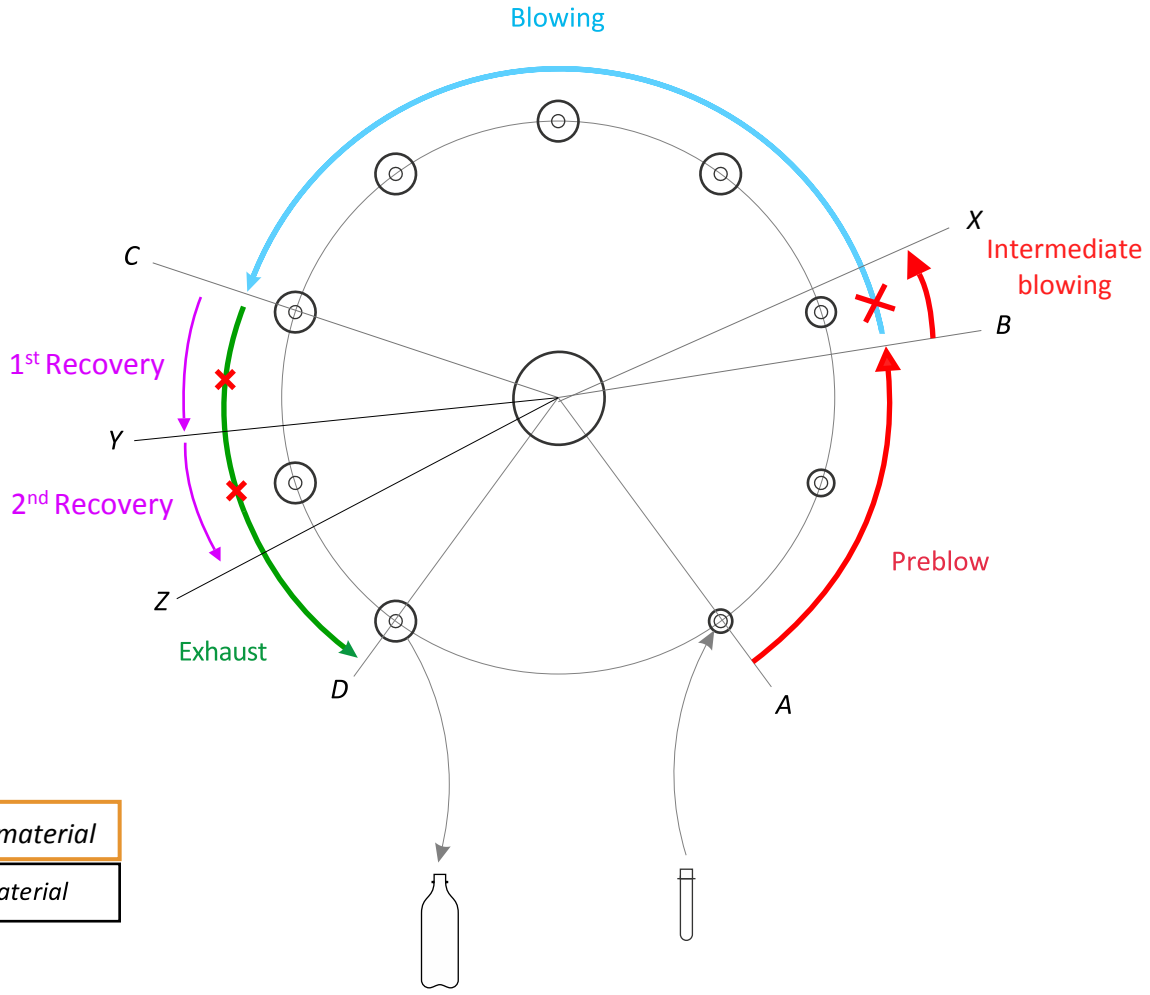
ARS+Full

HP line : 700 Nm3h
LP line : 0 Nm3h
LP line : 50 Nm3h





ARS+Full material
OEM material



Air supplied by 40-bar line
Air supplied by ARS+Full

A - B - C - D : blower software
X - Y - Z : ARS+Full software

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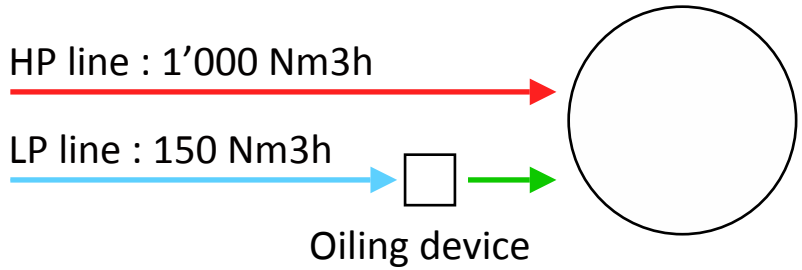
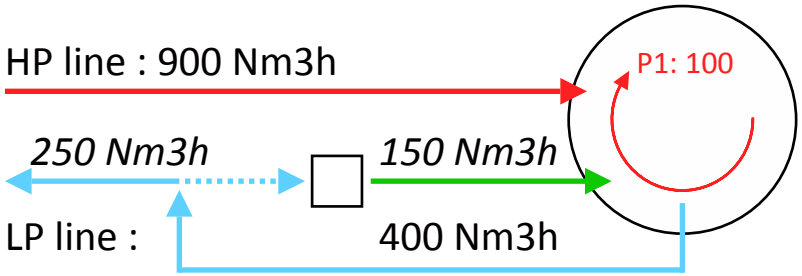
ARS on Sidel serie 1

No air recovery unit



ARS



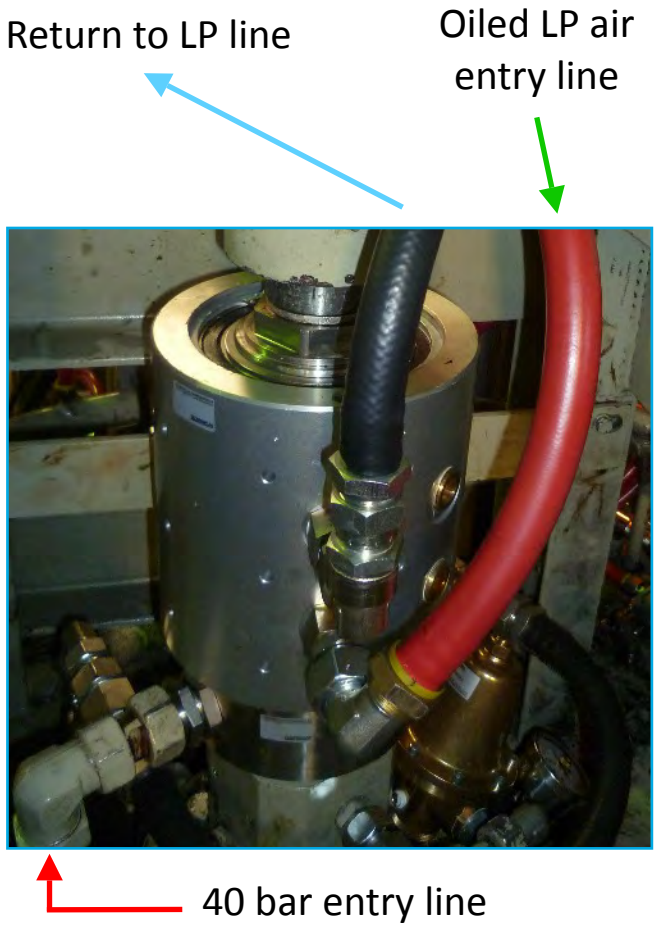
Savings :

100 Nm3h

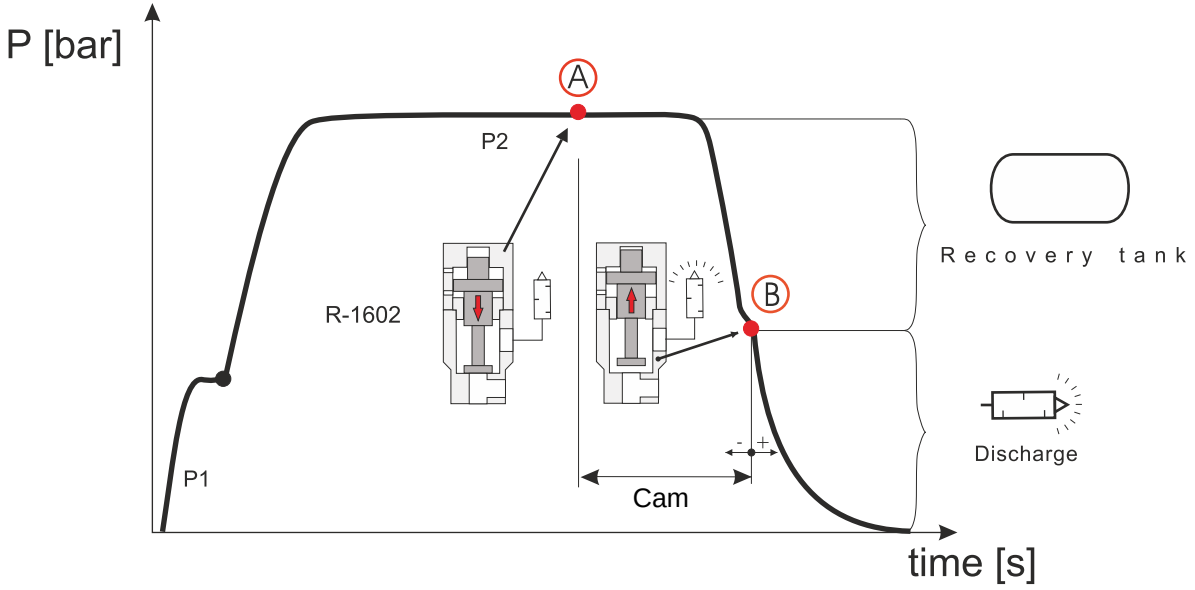
+ 400 Nm3h

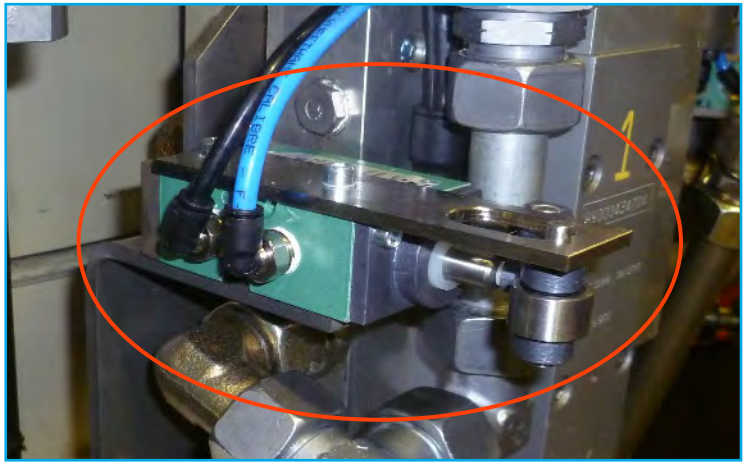
= 500 Nm3h

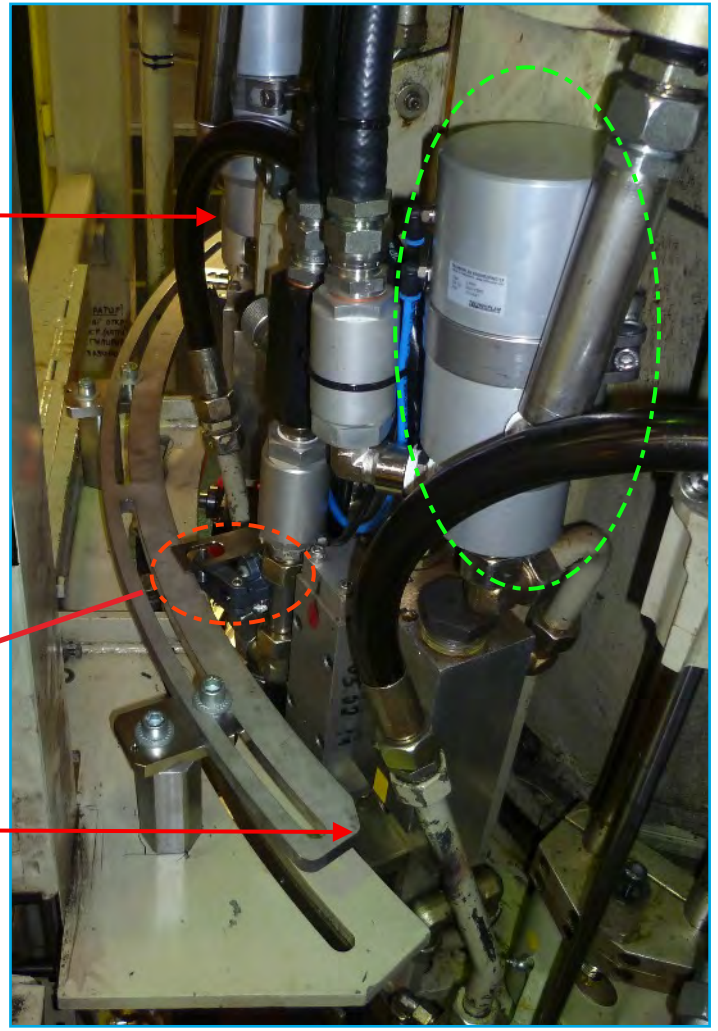
3-way collector



R-1602 recovery valve, cam and mechanic command







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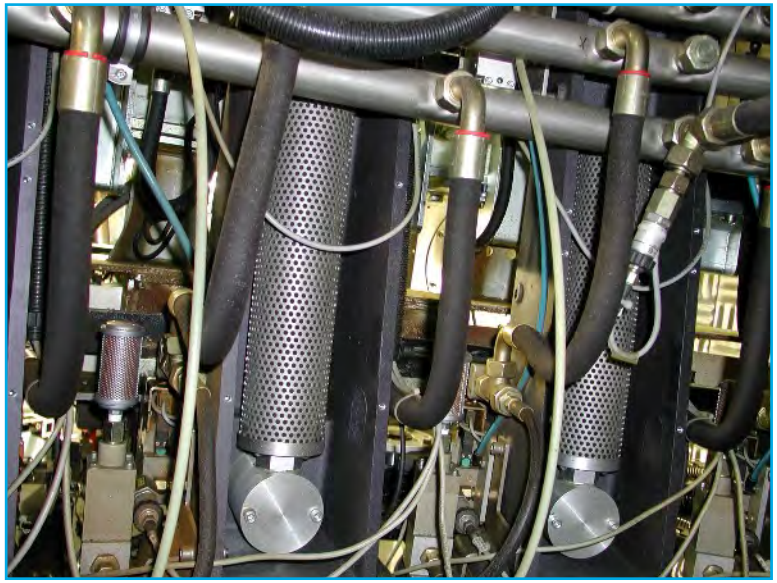
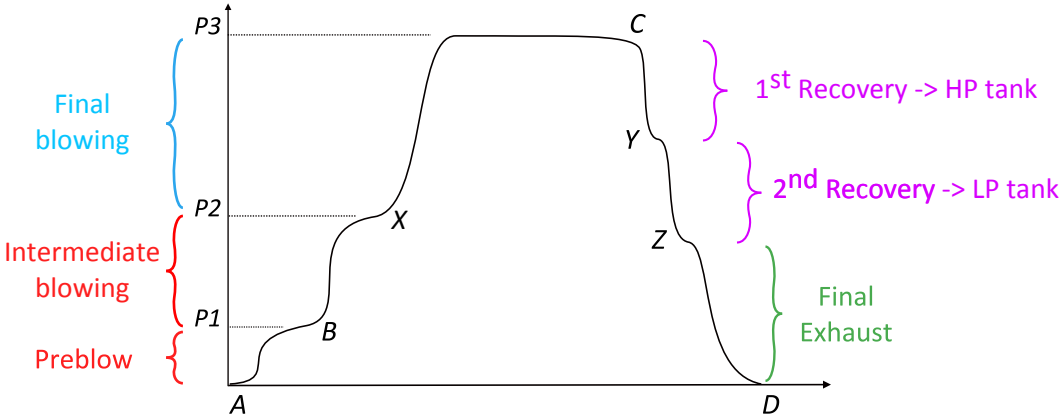
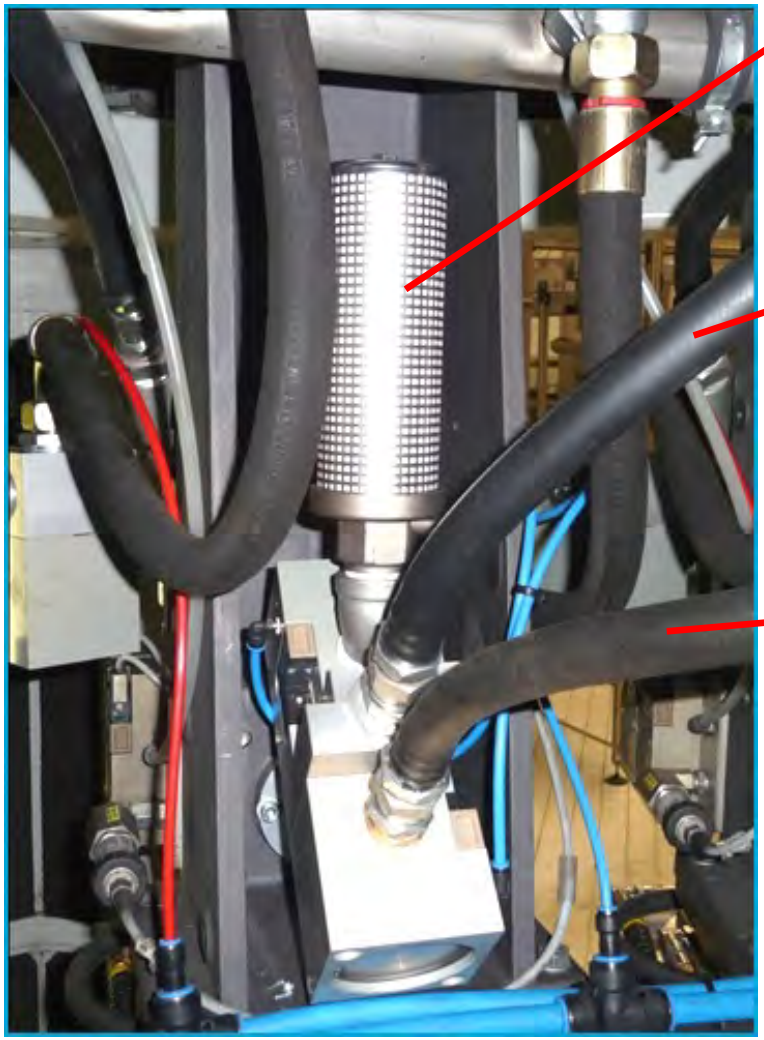
ARS+Full : 2 successive recoveries



Before ARS+Full





3. Final Exhaust (Silencer)

1. First Recovery (HP tank)

2. Second Recovery (LP tank)

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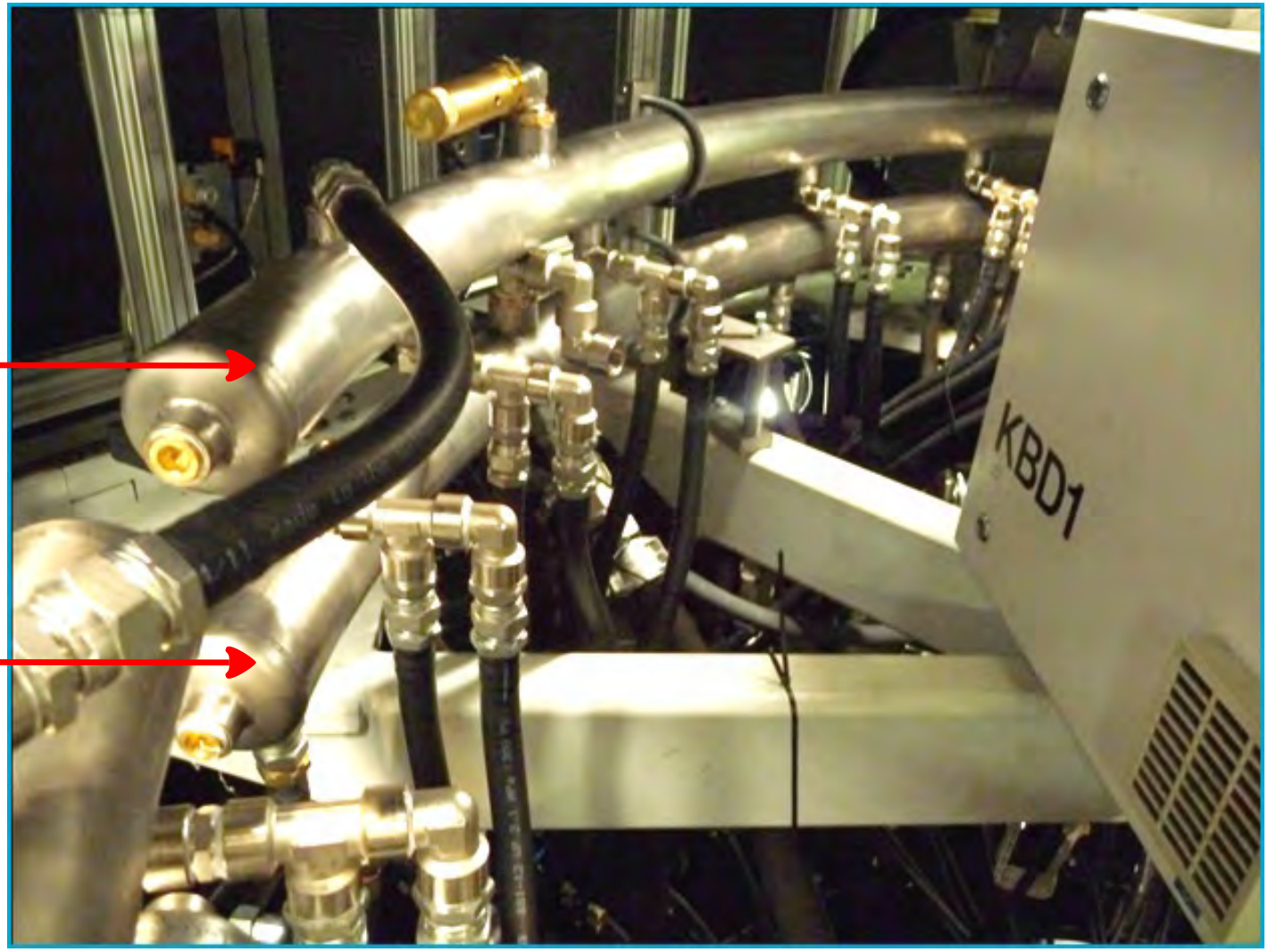
ARS+Full : 2 recovery tanks

High-Pressure
Recovery tank

Low-Pressure
Recovery tank



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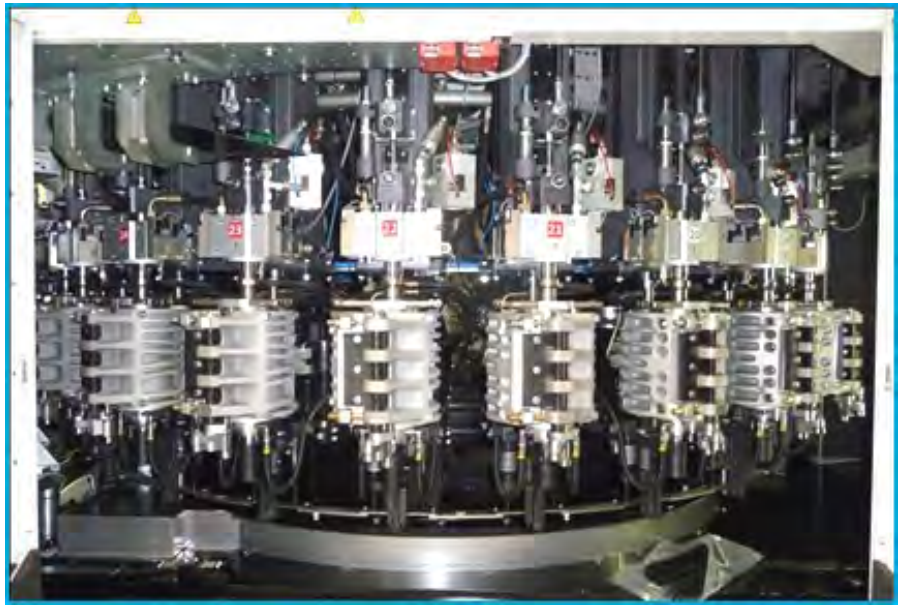
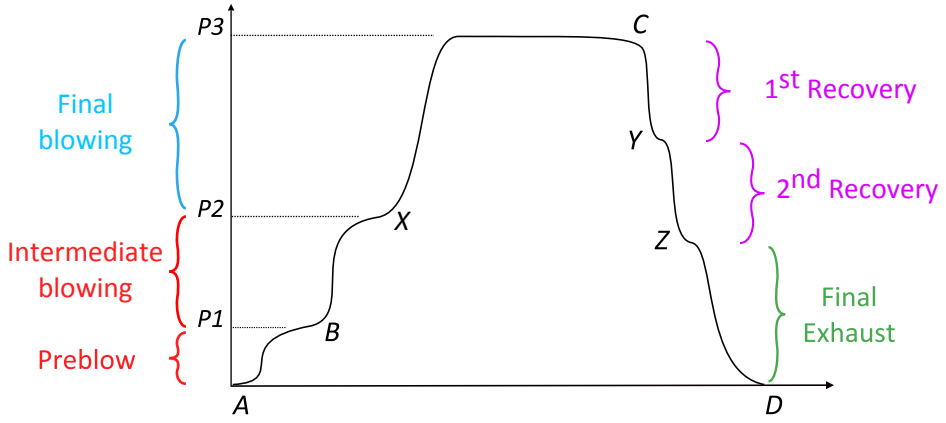
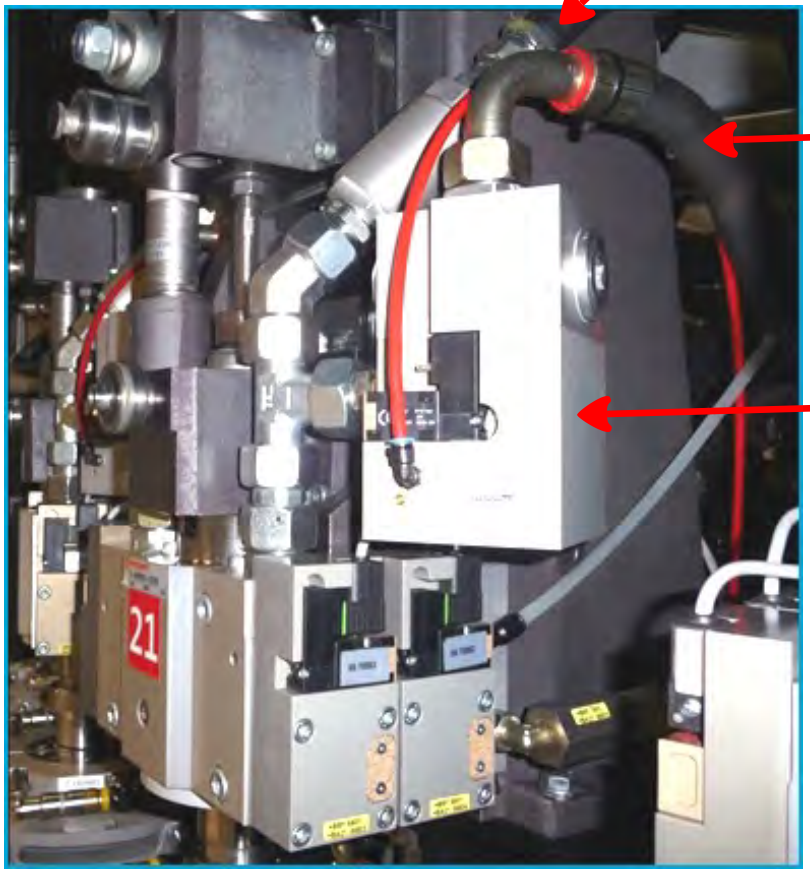
ARS+Full : intermediate blowing





Intermediate blowing coming from HP tank, after OEM blowing valve opening (ex, during first 100ms)



Air coming from 40-bar line (ex, after 100ms)

Valve blocking the 40-bar line (ex, during 100ms)

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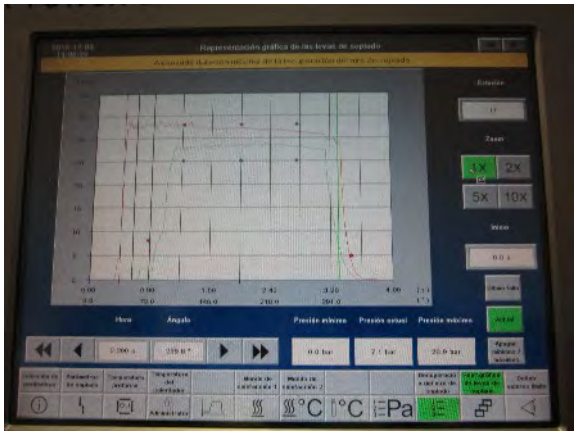
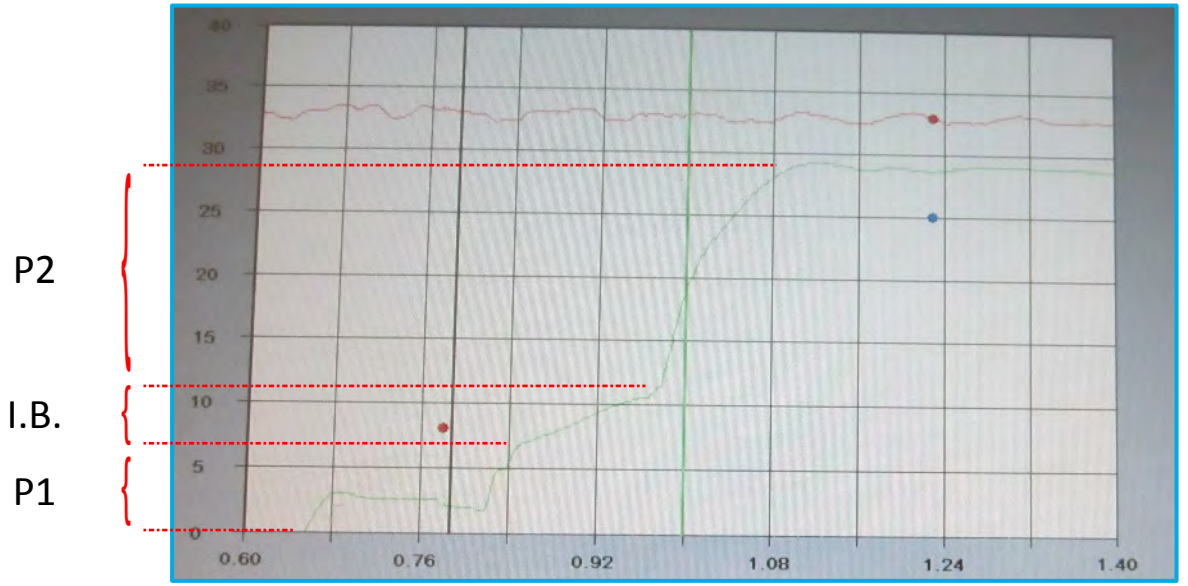
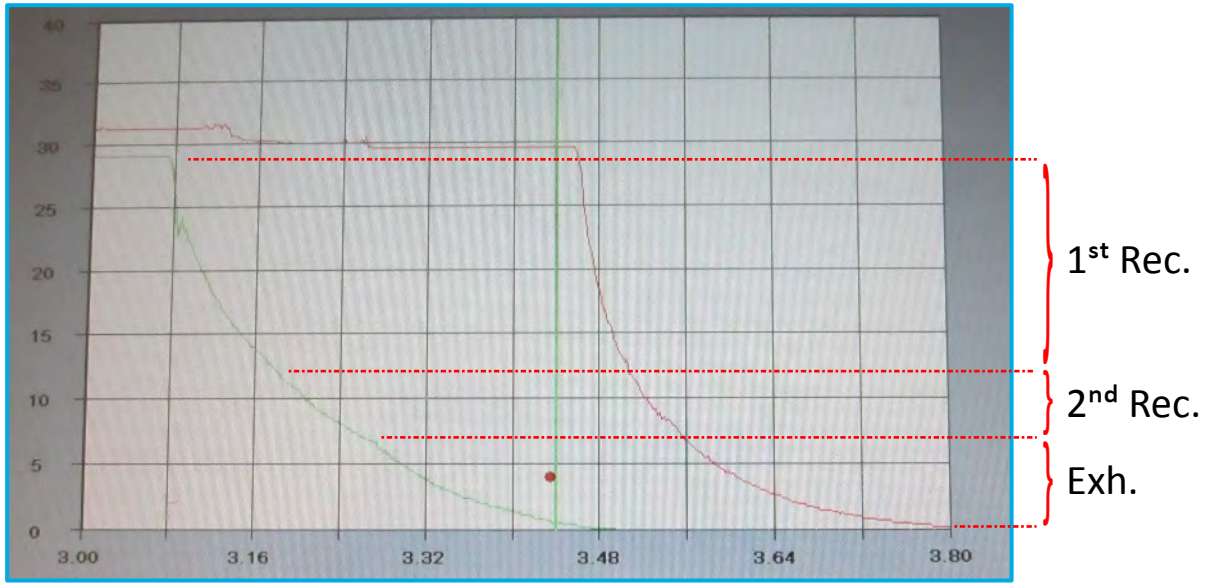
ARS+Full : Blowing curve study on Krones

Krones blowing curve x5
on Preblow side



Krones blowing curve x5
on Exhaust side





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Customer : Fonti Del Vulture
City : Rionero In Vulture
Country : Italy

Coca-Cola

Measurements

Machine	Krones S20 K787-017 Linea 2

ARS Installation on this machine : 17th April 2008

Last measurement : 47,8% - 17th April 2012

Measurements are made with an Endress-Hauser flowmeter

Production speed :	36000	[b/h]	Movements pressure :	8	[Bar]
Pre-blow pressure :	8	[Bar]	Factory network pressure :	8,5	[Bar]
Blow pressure :	32	[Bar]	Bottle volume :	1,5	[L]

Air consumption

A	Air consumption (P2), total leakage	0 [Nm3/h]	
B	Air consumption (P2), machine producing bottles, ARS system OFF	1605 [Nm3/h]	100
C	Air consumption (P2), machine producing bottles, ARS system ON	1500 [Nm3/h]	
D	**B - C : Savings in High-Pressure air = Preblow air supplied by the ARS system**	105 **[Nm3/h]**	6.5
E	Service air consumption, machine producing bottles, ARS system OFF (movements consumption)	301 [Nm3/h]	
F	Service air (service air line supplied by recovered air), machine producing bottle, ARS system ON	380 [Nm3/h]	
G	**E + F : Savings in Low-Pressure air = movements + service air supplied by the ARS system**	681 **[Nm3/h]**	42.5

Total amount of air recovered

H	= [D + G]	==>	H = 786 **[Nm3/h]**
I	= [H / (B - A)] x 100	==>	I = 49 **[%]**

Comments

Would you recommend the Air Recycling System ? YES NO

Date : 1/4/14
Technicien's signature :
Samuel GAUGUIN

Date :
Customer's signature :
Company's stamp

TECHNOPLAN ENGINEERING SA, 16 chemin des Aulx CH-1228 Plan-Les-Ouates / GE
Tél: (+41.22) 794 00 84 / Fax: (+41.22) 794 84 30 / E-Mail: info@technoplan.info

Standard ARS

Installed in 2008

Controlled in 2014

Energy saved

High-Pressure air

105 x 0.25 kW = 26.25 kW/h

Low Pressure air

681 x 0.125 kW = 85.125 kW/h

Total

26.25+85.125 = 111.375 kW/h

If blower works 6000h / year:

668’250 kW saved per year

Or 66’8250 USD per year

(with 1kW = 0.10 USD)

TECHNOPLAN
ENGINEERING SA

TECHNOPLAN ENGINEERING SA

Customer : PEPSICO
City : RODGAU
Country : GERMANY

PEPSICO

Measurements ARS+HP

Machine	SIDEL SBO 18-2 n°	Facility code

Measurements made with the cstomer's permanent flowmeter

Production speed :	23,100	[b/h]	Movements pressure :	7	[Bar]
Pre-blow pressure :	<1	[Bar]	Factory network pressure :		[Bar]
Blow pressure :	28.5	[Bar]	Bottle volume :	1.5	[L]

	Air consumption	Measurements		
A	High Pressure air consumption, total leakage	50	[Nm3/h]	
B	HP air consumption (P2), machine producing bottles ARS+ system **OFF**	1495	[Nm3/h]	
C	**B - A : High Pressure recoverable air (air entering the bottle)**	1445	[Nm3/h]	100%
D	HP air consumption (P2), machine producing bottles ARS+ system **ON**	850	[Nm3/h]	
E	**B - D : Savings in High-Pressure air = Preblow + double-blowing air supplied by the ARS+ system**	595	[Nm3/h]	
F	= [E / C] x 100 ==>	F = 41,17	[%]	

ARS+HP The **Air Recycling system Plus High-Pressure** is dedicated to the recovery of part of the High-Pressure air used to blow PET bottles, using as well a double-blowing process.

Comments _____

Would you recommend the Air Recycling System Plus ? YES NO

Date : 30.06.2014
Technicien's signature :
Antonino BATTIATO
Alejandro PEREZ

Date : 30.0.14
Customer's signature :
Customer's name : Titzmann

Company's stamp
PepsiCo Deutschland GmbH
Behringstraße 2
63110 Rodgau
Tel.: +49 (0) 6106 8706 - 0
Fax: +49 (0) 6106 7 99 54

ARS+HP

Energy saved

High-Pressure air

595 x 0.25 kW = 148.75 kW/h

If blower works 6000h / year:

892’500 kW saved per year

Or 89’250 USD per year

(with 1kW = 0.10 USD)

TECHNOPLAN ENGINEERING SA

TECHNOPLAN ENGINEERING SA

Customer : PBI Fruit Company
City : Zeebrugge
Country : Belgium

PEPSICO

Measurements

Machine	Sipa n° 6417	Model : SFR 16

ARS+Full installation on this machine : 24 Nov 2014

Measurements are made with an Endress-Hauser flowmeter

Production speed :	22 000	[b/h]	Movements pressure :	7 [Bar]
Pre-blow pressure :	8	[Bar]	Factory network pressure :	8 [Bar]
Blow pressure :	35	[Bar]	Bottle volume :	1 [L]

	Air consumption	7 Measurements	
A	Air consumption, total leakage (8 measurements finally	10 [Nm3/h]	
B	Blowing air consumption, machine producing bottles, ARS+Full system OFF	1281 [Nm3/h]	
C	Preblow air consumption, ARS+Full system OFF	186 [Nm3/h]	
D	Recoverable air : HP air consumption - Leakages (B+C - A) =	1457 [Nm3/h]	100%
E	Blowing air consumption, machine producing bottles, ARS+Full system ON	1019 [Nm3/h]	
F	Preblow air consumption, ARS system ON	00 [Nm3/h]	
G	New HP air consumption, ARS system ON : E + F =	1019 [Nm3/h]	
H	D - G : Savings in High-Pressure air = Intermediate + Preblow air supplied by the ARS+Full system	438 [Nm3/h]	30 %
I	Service air consumption, machine producing bottles, ARS+Full system OFF (movements consumption)	120 [Nm3/h]	
J	Service air consumption, machine producing bottle, ARS+Full system ON	00 [Nm3/h]	
K	I - J : Savings in Low-Pressu nts air supplied by the ARS system	327 [Nm3/h]	22 %

Total amount of air recovered — air returned to LP line : 207 Nm3h

L	= (H + K)	==>	L = 765 [Nm3/h]
M	= (L / D) x 100	==>	M = 52,5 [%]

Date : 09. 12. 2014

Technoplan :
Alejandro Perez
perez@technoplan.info

Sipa :
Daniele Casagrande
Daniele.Casagrande@zoppas.com

Date :

Customer's signature :

Technician name :
email address :

P.B.I. Fruit Juice Commercial
Tropicana
Jozef Verschaevelaan 6
USA Kaai 411/412
B-8380 ZEEBRUGGE
Tel. +32 50 207

Company's stamp

ARS+Full

Energy saved

High-Pressure air

438 x 0.25 kW = 109.5 kW/h

Low Pressure air

327 x 0.125 kW = 40.875 kW/h

Total

109.5 + 40.875 = 150.375 kW/h

If blower works 6000h / year:

902’250 kW saved per year

Or 90’225 USD per year

(with 1kW = 0.10 USD)

TECHNOPLAN ENGINEERING SA

TECHNOPLAN ENGINEERING SA

Customer : PepsiCo
City : Calgary, Alberta
Country : Canada

PEPSICO

Measurements

Machine	Krones n°	Model : 20	Facility code:

ARS+Full installation on this machine : 6th-10th November 2014

Air supply : 1 line (40-bar)

Measurements are made with an Endress-Hauser flowmeter

Production speed :	15000	[b/h]	Movements pressure :	7	[Bar]
Pre-blow pressure :	8	[Bar]	Factory network pressure :		[Bar]
Blow pressure :	26	[Bar]	Bottle volume :	2	[L]

	Air consumption	4 Measurements	
A	Air consumption, total leakage	5	[Nm3/h]
B	Air consumption, machine producing bottles ARS+Full system **OFF**	925	[Nm3/h]
C	Air consumption, machine producing bottles ARS+Full 1st recovery **ON** , 2nd recovery **OFF**		[Nm3/h]
D	Service air consumption = C - F **(non recoverable air)**		[Nm3/h]
E	**Recoverable air** (air entering the bottle) Air consumption - Leakages - Movements = (B - A - D) :		[Nm3/h] 100%
F	Air consumption, machine producing bottles ARS+Full system **ON**	564	[Nm3/h]
G	**B - F : Savings in air supply**	361	**[Nm3/h]**
H	**G / E x100 : Savings reported to the recoverable air**	39.02	%

Remarks :
The ARS+Full recovers part of the air entering the bottle (E) after the discharge, via 2 successives recoveries.
The 1st recovery will supply the preblowing and an intermediate blowing air.
The 2nd recovery will supply the movements air consumption (D).

Date :

Technoplan :

Samuel GAUGUIN
gauguin@technoplan.info

Alejandro PEREZ
perez@technoplan.info

Date : 12/11/2014

Customer's signature :

Technician name :
email address :

Company's stamp

ARS+Full

Energy saved

High-Pressure air

564 x 0.25 kW = 141 kW/h

If blower works 6000h / year:

846'000 kW saved per year

Or 84'600 USD per year

(with 1kW = 0.10 USD)

TECHNOPLAN
ENGINEERING SA

TECHNOPLAN ENGINEERING SA

Customer : Coca-Cola
City : Amatil
Country : Indonesia

Measurements

Machine	Sidel n° 5782 Model : SBO 18-2 Hot Fill Facility code:

ARS Installation on this machine :

Measurements are made with an Endress-Hauser flowmeter

Production speed :	22'000	[b/h]	Movements pressure :	7,9	[Bar]
Pre-blow pressure :	8	[Bar]	Factory network pressure :		[Bar]
Blow pressure :	34	[Bar]	Bottle volume :	0,5	[L]

	Air consumption	measurements		
A	Air consumption (P2), total leakage	78	[Nm3/h]	
B	Air consumption (P2), machine producing bottles, ARS system **OFF**	1700	[Nm3/h]	
C	**Recoverable air** : Air consumption - Leakages (B - C) =	1622	[Nm3/h]	100%
D	Air consumption (P2), machine producing bottles, ARS system **ON**	1700	[Nm3/h]	
E	**B - D : Savings in High-Pressure air = Preblow air supplied by the ARS system**		**[Nm3/h]**	%
F	Service air consumption, machine producing bottles, ARS system **OFF** (movements consumption)	182	[Nm3/h]	
G	Service air (service air line supplied by recovered air), machine producing bottle, ARS system **ON**	694	[Nm3/h]	
H	**F + G : Savings in Low-Pressure air = movements + service air supplied by the ARS system**	876	**[Nm3/h]**	%

Total amount of air recovered

I	= (E + H)	==>	H = 876	[Nm3/h]
J	= (H / C) x 100	==>	I = 54	[%]

Comments:

Date : 30/3/15
Technoplan :
Samuel GAUGUIN

Date : 30/07/15
Customer's signature :

Company's stamp

TECHNOPLAN ENGINEERING SA, 16 chemin des Aulx CH-1228 Plan-Les-Ouates / GE
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Standard ARS on Hot-Fill blower

Energy saved

Low-Pressure air

876 x 0.125 kW = 109.5 kW/h

If blower works 6000h / year:

657'000 kW saved per year

Or 65'700 USD per year

(with 1kW = 0.10 USD)

Thank you !

Contact

Technoplan Engineering SA
Chemin des Aulx 16
GE-1228, Plan-les-Ouates
SWITZERLAND

info@technoplan.info