PRESENTATION

Air Recycling Systems
for PET stretch blow molding machines

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 Pessure air

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

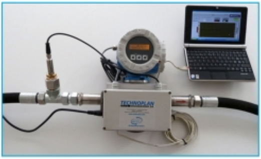
Rapidly installed : 3 to 5 days possible production during nightshift

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

Measurements

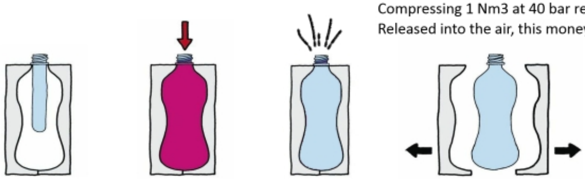
All our retrofit installations are measured in presence of the facility technician.

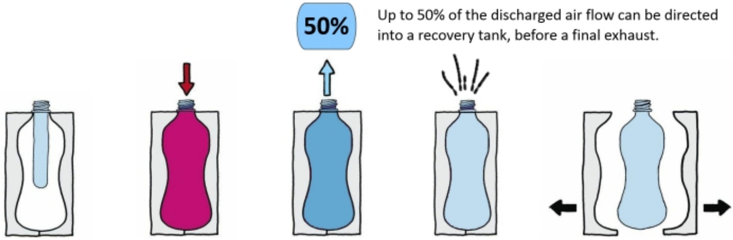
We also offer FlowMeters as option along the ARS system



Efficiency

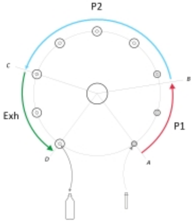
Compressing 1 Nm3 at 40 bar requires **0.25 kW**
Released into the air, this money is lost.





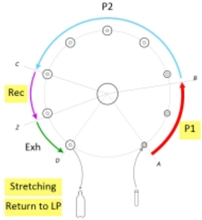
Up to 50% of the discharged air flow can be directed into a recovery tank, before a final exhaust.

3 possible air recovery systems



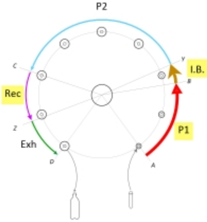
No recovery

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



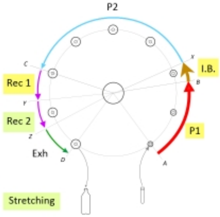
Standard ARS

- ➪ 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+HP

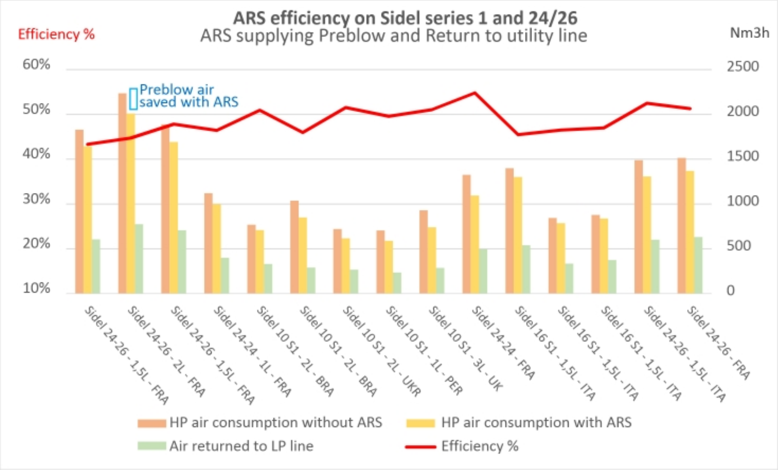


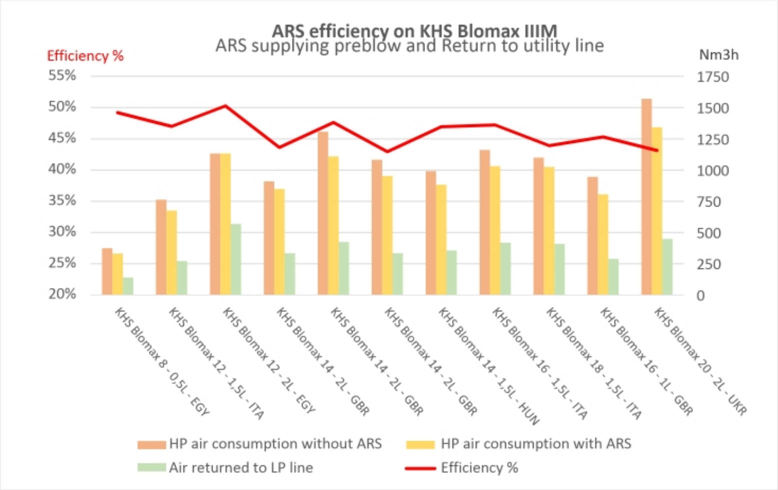
ARS+Full

- ➪ 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

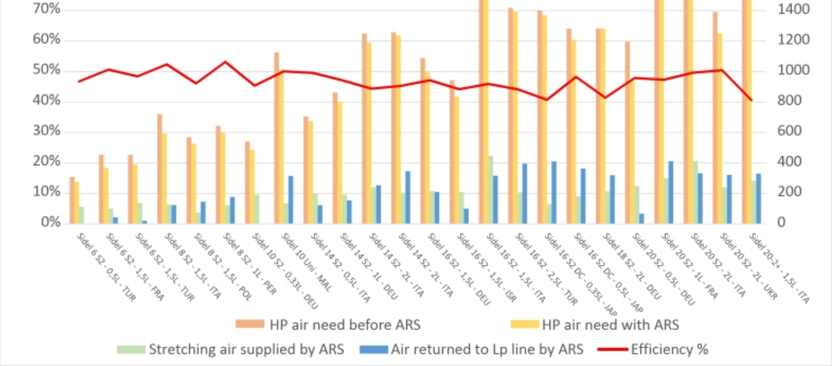
With standard ARS applied over 5 blowers in one plant (Nestlé France), one HP and 2 LP compressors are now on hold.
Please ask for our referrals.

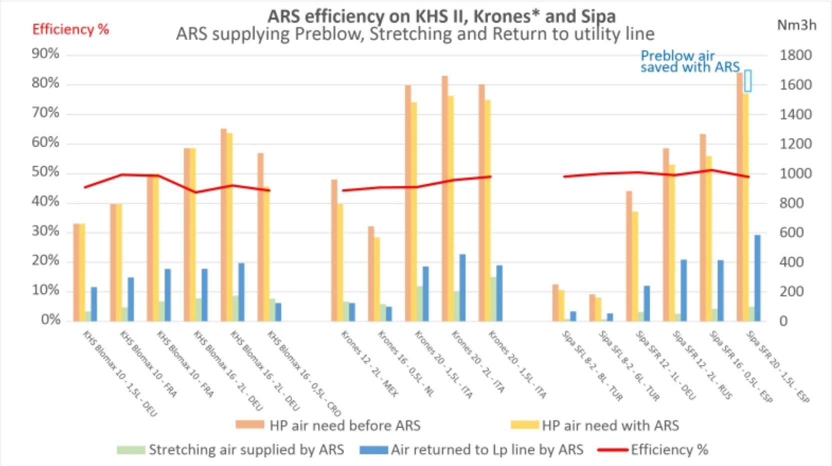
Air flows - recovery & savings





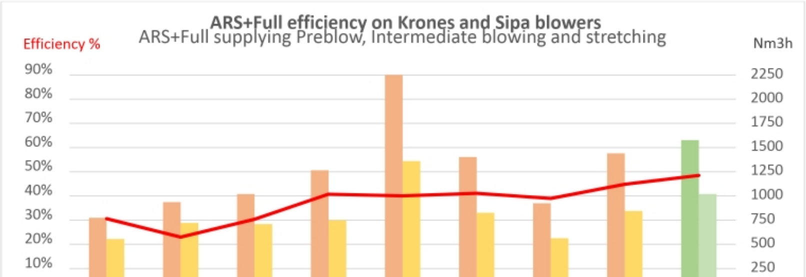
ARS efficiency on Sidel S2 and Universal
ARS supplying Preblow, Stretching and Return to utility line
Efficiency %
Nm3h
90%
80%
1800
1600
Preblow air saved with ARS



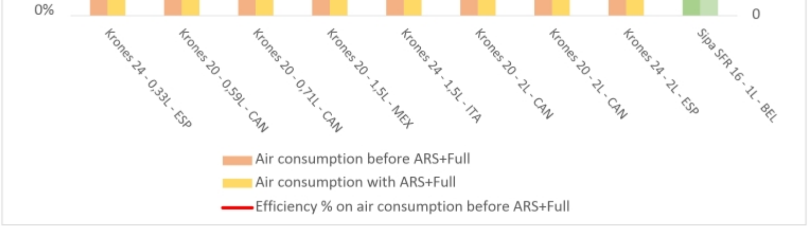

ARS efficiency on KHS II, Krones* and Sipa

ARS supplying Preblow, Stretching and Return to utility line

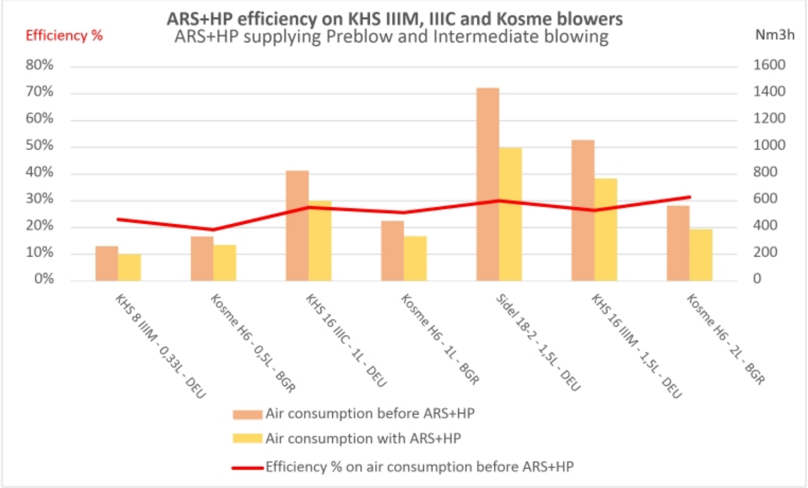
*Krones : machine with 2-way rotary joint


ARS+Full efficiency on Krones and Sipa blowers

ARS+Full supplying Preblow, Intermediate blowing and stretching



🟩 Sipa SFR 16, 1L bottles : in addition to HP air savings, ARS+Full returns 207 Nm3h of air to the utility line.



Efficiency reports

TECHNOPLAN ENGINEERING SA

Customer : [redacted]
City : [redacted]
Country : Italy

[redacted]

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 :	30'000	[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 :

[redacted]

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

TECHNOPLAN
ENGINEERING SA

Customer : [redacted]

City : [redacted]

Country : GERMANY

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 :	4	[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 :
[redacted]

TECHNOPLAN
ENGINEERING SA

Customer : [redacted]
City : [redacted]
Country : Belgium
[redacted]

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

(8 measurements finally done : see LP line)

A	Air consumption, total leakage	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 ıts air supplied by the ARS system**	327	**[Nm3/h]**	22 %

air returned to LP line : 207 Nm3h

Total amount of air recovered

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

Date : 09. 12. 2014

Technoplan :
Alejandro Perez
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Sipa :
Daniele Casagrande
Daniele.Casagrande@zoppas.com

Date :

Customer's signature :

[redacted]

TECHNOPLAN
ENGINEERING SA

Customer : [redacted]
City : [redacted]
Country : Canada

[redacted]

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 : [redacted]

Technician name :
email address :

Company's stamp
[redacted]

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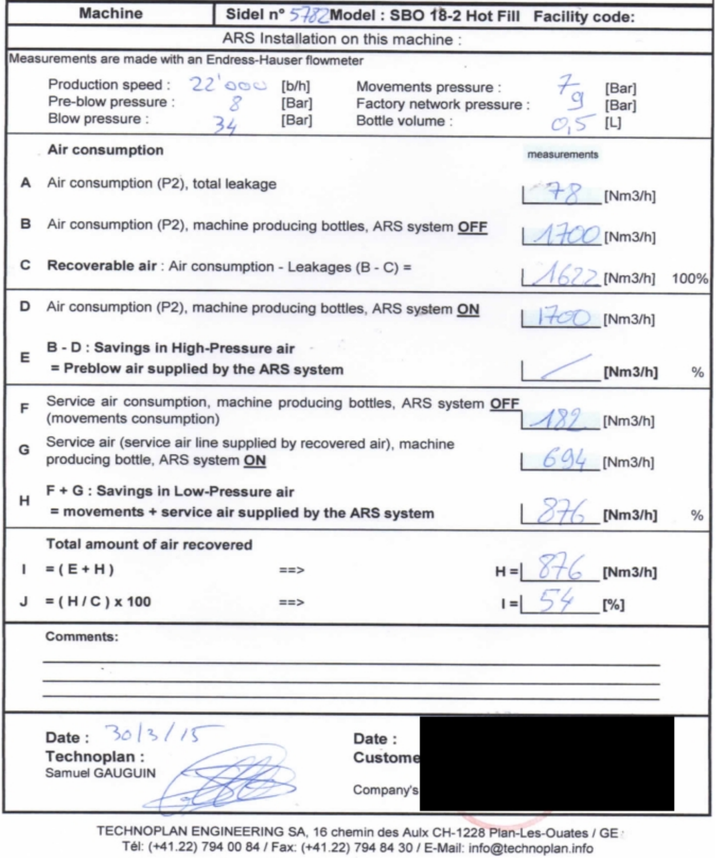
TECHNOPLAN
ENGINEERING SA

Customer : [redacted]
City : [redacted]
Country : Indonesia

[redacted]

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]
Pre-blow pressure : 8 [Bar]
Blow pressure : 34 [Bar]
Movements pressure : 7 [Bar]
Factory network pressure : 9 [Bar]
Bottle volume : 0,5 [L]

		measurements		
	Air consumption			
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 :
Custome
Company's
[redacted]

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Depending on your machines, production and air network, switching OFF an HP compressor with ARS+ or a LP compressor with ARS can be considered, with significant savings on the compressor's maintenance