J. Schmalz GmbH
72293 Glatten, Germany

Press Release
July 2009

Title:

Energy Efficiency with Vacuum Technology: The SMPi/SCPi Vacuum Ejector

Subheading:

The vacuum ejector with air-saving function saves its users up to 65 % on operating costs compared to with conventional vacuum ejectors.

Body copy:

The SMPi/SCPi vacuum ejector from Schmalz allows the user to optimise work processes, utilise resources more efficiently, dramatically reduce operating costs and help to protect the environment. This can be shown by comparing the efficiency of this system with that of a conventional vacuum ejector.

Integrated air-saving regulation for low compressed air consumption

Here, we used a cycle time of 15 seconds. The compressed air consumption is the same for suction and blow-off of the workpiece. The most significant difference between the two vacuum ejectors is the "suction" function during the actual transportation of the workpiece. The conventional ejector must be in operation for 4.22 seconds in order to safely secure the workpiece. The Schmalz SMPi/SCPi vacuum ejector requires only 0.3 seconds of switch-on time. This is facilitated by the integrated energy saving function: It interrupts vacuum generation as soon as a safe vacuum value has been reached. Vacuum generation is switched back on only once the value exceeds the preset minimum vacuum value. The length of the "suction" function, or the time during which the vacuum generator is operational over the course of the complete cycle, lasts only 1.19 seconds per cycle time. In comparison, the conventional vacuum ejector requires 5.11 seconds per cycle. Calculated over for 245 work days per year, with 3,840 handling cycles per day and two operating shifts, the user can save around 11,000 m^3 of compressed air. This translates to around 65 % less compressed air compared to a conventional vacuum ejector.

Significant savings on operating costs, better for the environment

At an average cost of compressed air of EUR 0.05/m³, the user can save around EUR 550 annually on operating costs. Thanks to the reduction in energy consumption, the user helps to protect the environment by reducing CO_2 emissions by 365 kg.

This shows that when developing new products, Schmalz focuses on advancing technology as well as developing resource-efficient solutions. The user benefits from the long service life of the products, reduces energy consumption and lowers operating costs. In addition, the user is helping to protect the environment.

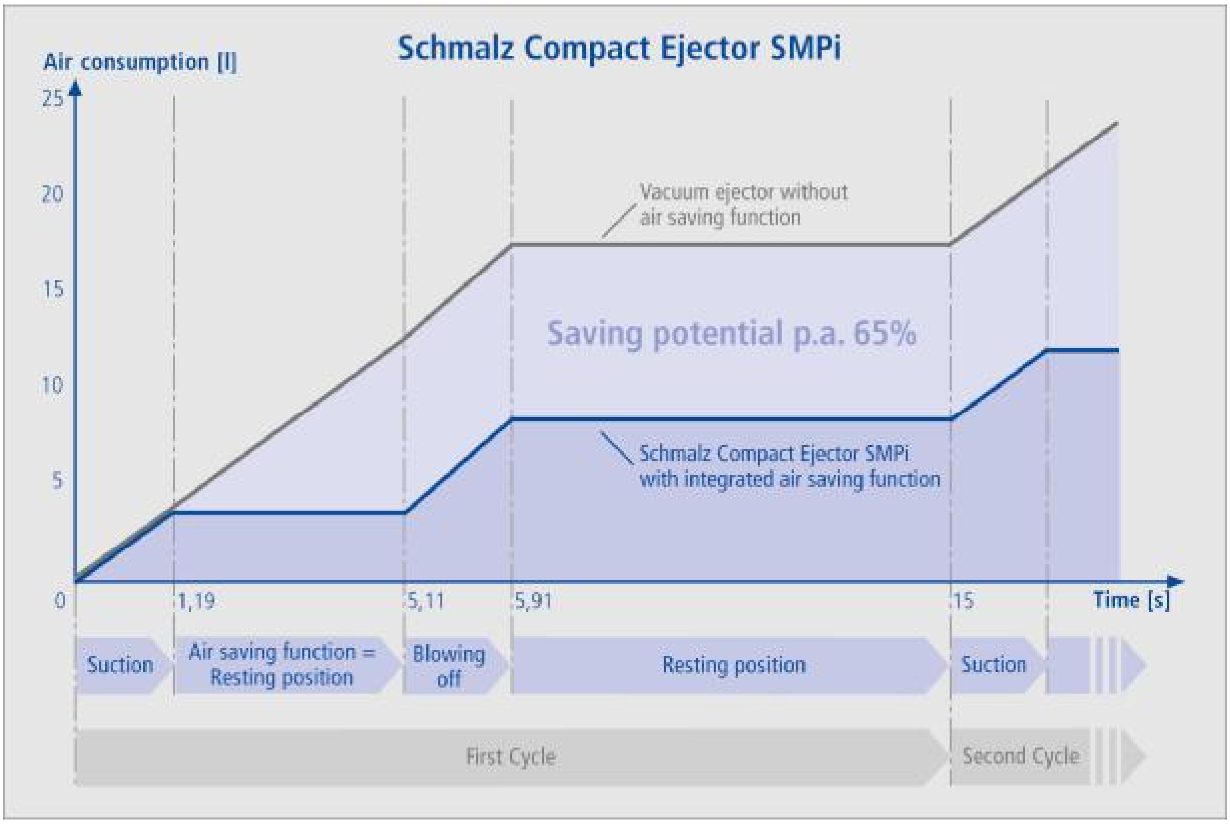

Image 2:
By using Schmalz SMPi vacuum ejectors with their integrated air-saving function, it is possible to obtain compressed air savings of up to 65% per year.

Energy efficiency and sustainability – The SMPi vacuum ejector from Schmalz

Sample calculation:

	Vacuum ejector without air-saving function	SMPi vacuum ejector with integrated air-saving function
Basic ejector data (nozzle size 2.0 mm)		
Compressed air consumption (suction) [l./min.]	180	180
Compressed air consumption (blow-off) [l./min.]	200	200
Basic application data		
Total cycle time [sec.]	15	15
Transportation (gripped workpiece) [sec.]	4.22	4.22
Consideration of evacuation times:		
- Evacuation time (up to -600 mbar) [sec.]	0.89	0.89
- Evacuation time (up to -750 mbar) [sec.]	1.19	1.19
Consideration of the duration of the "Suction" function		
- For part presence signal [sec.][1]	0.89	0.89
- During transportation of the workpiece [sec.]	+ 4.22	+ 0.30
= Total duration for "Suction" function [sec.]	= 5.11	= 1.19
Duration of "Blow-off" function [sec.]	0.80	0.80
Number of cycles per day (double-shift system) [2]	3,840	3,840
Days of operation per year [3]	245	245
Calculation of annual compressed air consumption		
Compressed air consumption with "Suction" function per cycle [l.]4	15.33	3.57
Compressed air consumption with "Blow-off" function per cycle [l.] 5	+ 2.67	+ 2.67
Total compressed air consumption per cycle [l.]	= 18.00	= 6.24
Daily compressed air consumption [l.] 6	69,120.00	23,961.60
Annual compressed air consumption [l.] 7	16,934,400.00	5,870,592.00
Annual compressed air consumption [m³]	16,934.40	5,870.59
Calculation of the resulting CO_2 emissions		
CO_2 emissions for compressed air generation (at 5 bar) [kg CO_2 / m³] [8]	0.033	0.033
Annual CO2 emissions [kg CO_2] [9]	558.84	193.73
Calculation of annual operating costs		
Cost of compressed air [€ / m³]10	0.05	0.05
Annual operating costs [€] 11	846.72	293.53

Potential savings for compressed air (input factor)	**11,063.81 m³ compressed air per year**
Reduction in emissions	**365.11 kg CO_2 per year**
Savings in operating costs	**€553.19 per year**
Savings in operating costs	**65% per year**

1 Duration until the workpiece is gripped securely = Duration before the transportation process can begin
2 Assuming that 1 cycle = 15 seconds → 4 cycles per minute → 240 cycles per hour → 1,920 cycles per day (single shift) → 3,840 cycles per day (double shift)
3 Assuming the average number of working days per year on a company level
4 Total duration of "Suction" function [sec.] * Compressed air consumption (suction) [l./min.] / 60
5 Duration of "Blow-off" function [sec.] * Compressed air consumption (blow-off) [l./min.] / 60
6 Compressed air consumption per cycle [l.] * Number of cycles per day (double-shift system)
7 Daily compressed air consumption [l.] * Days of operation per year
8 Based on an average compressor output for generating 1 m³ of compressed air at 5 bars and generally accepted emission values for generating electrical power
9 CO2 emissions for compressed air generation (at 5 bar) [kg CO2 / m³] * Annual compressed air consumption [m³]
10 Average cost of compressed air, depending on the technical data, efficiency and reservoir of the compressor etc.
11 Cost of compressed air [€ / m³] * Annual compressed air consumption [m³]

Energieeffizienz und Nachhaltigkeit – Der Vakuum-Ejektor SMPi von Schmalz
Beispielrechnung für leckagefreies Werkstück

	Vakuum-Ejektor ohne Luftsparfunktion	Vakuum-Ejektor SMPi mit integrierter Luftsparfunktion
Basisdaten Ejektor mit Düsengröße 2,0 mm		
Druckluftverbrauch Saugen [l/min]	180	180
Druckluftverbrauch Abblasen [l/min]	200	200
Basisdaten zur Anwendung		
Zykluszeit, gesamt [sek]	15	15
Transport (Werkstück gegriffen) [sek]	4,22	4,22
Betrachtung Evakuierungszeiten:		
- Evakuierungszeit bis -600 mbar [sek]	0,89	0,89
- Evakuierungszeit bis -750 mbar [sek]	1,19	1,19
Betrachtung Dauer Funktion „Saugen“		
- Für Part-Presence-Signal [sek][12]	0,89	0,89
- Während des Transports des Werkstücks [sek]	+ 4,22	+ 0,30
= Gesamtdauer Funktion „Saugen“ [sek]	= 5,11	= 1,19
Dauer Funktion „Abblasen“ [sek]	0,80	0,80
Anzahl Zyklen pro Tag, 2-Schicht-Betrieb [13]	3.840	3.840
Betriebstage pro Jahr [14]	245	245
Berechnung Druckluftverbrauch pro Jahr		
Druckluftverbrauch Funktion „Saugen“ pro Zyklus [l][15]	15,33	3,57
Druckluftverbrauch Funktion „Abblasen“ pro Zyklus [l] [16]	+ 2,67	+ 2,67
Gesamter Druckluftverbrauch pro Zyklus [l]	= 18,00	= 6,24
Druckluftverbrauch pro Tag [l] [17]	69.120,00	23.961,60
Druckluftverbrauch pro Jahr [l] [18]	16.934.400,00	5.870.592,00
Druckluftverbrauch pro Jahr [m³]	16.934,40	5.870,59
Berechnung des resultierenden CO2-Ausstoßes		
CO_2-Ausstoß zur Drucklufterzeugung (bei 5 bar) [kg CO_2 / m³][19]	0,033	0,033
CO2-Ausstoß pro Jahr [kg CO_2][20]	558,84	193,73
Berechnung der Betriebskosten pro Jahr		
Kosten für Druckluft [€ / m³][21]	0,05	0,05
Betriebskosten pro Jahr [€] [22]	846,72	293,53

Einsparpotenzial Inputfaktor Druckluft	**11.063,81 m³ Druckluft p. a.**
Umweltentlastung	**365,11 kg CO_2 p. a.**
Betriebskostenersparnis	**553,19 € p. a.**
Betriebskostenersparnis	**65 % p. a.**

12 Dauer bis das Werkstück sicher gegriffen ist = Zeit bis der Transportvorgang beginnen kann

13 Annahme: 1 Zyklus = 15 Sekunden → 4 Zyklen pro Minute → 240 Zyklen pro Stunde → 1920 Zyklen pro Tag (1 Schicht) → 3840 Zyklen pro Tag (2 Schichten)

14 Annahme: Durchschnittliche Anzahl Arbeitstage pro Jahr auf Unternehmensebene

15 Gesamtdauer Funktion „Saugen“ [sek] * Druckluftverbrauch Saugen [l/min] / 60

16 Dauer Funktion „Abblasen“ [sek] *Druckluftverbrauch Abblasen [l/min] / 60

17 Druckluftverbrauch pro Zyklus [l] * Anzahl Zyklen pro Tag, 2-Schicht-Betrieb

18 Druckluftverbrauch pro Tag [l] * Betriebstage pro Jahr

19 Bezogen auf eine durchschnittliche Kompressorleistung zur Erzeugung von einem m³ Druckluft bei 5 bar und allgemein anerkannten Werten für Emissionen zur Erzeugung von elektrischer Energie

20 CO2-Ausstoß zur Drucklufterzeugung (bei 5 bar) [kg CO2 / m³] * Druckluftverbrauch pro Jahr [m³]

21 Durchschnittliche Druckluftkosten u.a. abhängig von den technischen Daten des Kompressors, dessen Nutzungsgrad und Speicher

22 Kosten für Druckluft [€ / m³] * Druckluftverbrauch pro Jahr [m³]