

newbie

Vacuum pneumatic conveying calculation input screen

Client: File path: Product:

Gas medium
 Air
 Nitrogen

Gas pump
 Screwcompressor with pre-inlet
 Screwcompressor
 Predefined screwcompr. with preinlet
 Predefined screwcompressor
 Blower data with pre-inlet
 Blower data without pre-inlet
 Predefined blower with pre-inlet
 Predefined blower without pre-inlet
 Constant mass vacuum pump (Turbo)
 Vac. pump displ: m3/sec
 Maximum vacuum: bar

Ambient
 Ambient temperature: degr C
 Ambient/starting pressure: mbar

Temperatures
 Product temperature: degr C
 Screwcompressor air cooling: kcal/degC/m
 Heat transmission fact. pipewall:

Convey pipeline
 Convey length horizontal: m
 Convey length vertical: m
 Total length: m
 Number of Bends:
 Pipe diameter begin: mm
 Pipe diameter end: mm

PVC Powder
 Product density: kg/m3
 Bulk density: kg/m3
 Particle size: micron
 Suspension velocity: m/sec
 Product loss constant:
 Product loss factor:
 Wall friction factor:
 Intake pressure drop suction: mmWC
 v-waal / v-susp:
 Filter resistance factor:
 Specific heat content:
 product loss factor constant y/n:

Rotary lock
 Installed
 Capacity: tons/hr
 Lock volume: m3
 RPM: /min
 Leakage: m3/sec

Filter
 Filter area: m2

Calculation settings
Vacuum system
 Set capacity: tons/hr
 Set vacuum: mmWC

Calculation selection
 Vacuum fixed -> capacity calculated
 Capacity fixed -> vacuum calculated
 Vacuum and capacity fixed -> intake pressure drop calculated
 Vacuum and capacity fixed -> constant cwp calculated
 Vacuum and capacity fixed -> cwp-factor calculated
 product loss factor (cwp) kept constant



Calculation Table Vacuum Conveying

Client: Filepath: product: 5 of 5

Convey Length horizontal: m
 Convey Length vertical: m
 Total Length: m
 Number of Bends:
 Pump displ. at 0.65 bar(u): m3/sec
 Rotarylock leakage: m3/sec
 Gas displacement at end: m3/sec
 Capacity: tons/hr
 Vacuum: mmWC
 Rotarylock capacity: tons/hr
 Pressure drop: mmWc
 Loading ratio:
 Pipeline energy consumption: kWh/ton
 Vacuum pump power: kW
 Conveying energy: kW
 Pneumatic conveying efficiency: %
 Bend losses: kW
 Material intake loss: kW
 Re-number * 10⁵:
 Empty pipeline pressure drop: mmWc
 Empty pipeline filter press. drop: mmWc
 Material loss factor:
 Constant loss factor:
 Material intake pressure drop: mmWc

Table

Part	Part description	Length(l)	v-gas	v-product	Pressure drop	v-wall/v-susp	residence time	mass kg	kW	k-W%	Bend loss kW	% kW	Sediment
1	Intake	1.01	22.73	15.26	693	3.44	0.091	0	1.1	14.5			
2	Pipe	8	23.38	19.24	1137	3.58	0.527	0	0.7	9.4			
3	Bend		23.38	11.32	1137		0.5409	0	0		0.1	2.4	
4	Pipe	8	24.76	20.04	1664	3.68	0.9749	0	0.9	11.7			
5	Bend		24.76	11.8	1664		0.9883	0	0		0.2	2.6	
6	Pipe	8	26.51	21.05	2223	3.81	1.4043	0	1	13.2			
7	Diameter Transfer			21.05	2223		1.4043	0	0				
8	Pipe	0.02	26.51	21.06	2224	3.81	1.4053	0	0	0			26.51
9	Bend		26.51	12.29	2224		1.4181	0	0		0.2	2.9	
10	Pipe	5.01	28.37	20.88	2728	3.94	1.6841	0	0.9	12.8			
11	Diameter Transfer		28.37	20.88	2728	0	1.6841	0	0				
12	Pipe	5	30.06	21.98	3138	4.06	1.9171	0	0.8	11.1			
13	Bend		30.06	12.95	3138		1.9293	0	0		0.2	3.1	
14	Pipe	10	34.18	24.91	3972	4.32	2.3753	0	1.9	24.8			
15	Bend		34.18	14.72	3972		2.3861	0	0		0.3	4	
16													
17	Filter	24	0.6	m/min	4000		2.3861		0.1035				27 mmWC

Progress
 Filter: 
 Iteration: 

Calculation results vacuum discharge

Client: Filepath: Product:

Convey pipeline

Convey distance horizontal: m
 Convey distance vertical: m
 Total Length: m
 Number of Bends:
 Begin diameter: mm
 End diameter: mm

Calculation results

Capacity: tons/hr
 Vacuum: mmWC
 Pressure drop: mmWc
 Loading ratio:
 Empty pipeline vacuum: mmWc
 Residence time: seconds
 Re-number * 10⁻⁵:
 Mixture density: kg/m³
 Mass of material in pipeline: kg

Pressure drops

Product intake: mmWC
 Nozzle: mmWC
 Acceleration excl product resistance: mmWC
 Product resistance: mmWC
 Elevation: mmWC
 Suspension: mmWC
 Gas: mmWC
 Filter: mmWC

Vessel system

Installation system: 2-vessel system 3-vessel system

Discharge vessel volume: m³
 Filter vessel volume: m³
 Material volume: m³ vessel content: tons
 vacuum pump volume: m³/sec
 pressure begin vacuuming: bar
 vacuum: bar
 vacuum temperature begin vacuuming: C
 temperature after vacuuming: C
 begin mass kettle: kg gas
 tank pressure: bar(abs)
 end mass kettle: kg gas
 evacuated mass: kg gas
 gas density: kg/m³
 vacuumizing time: seconds
 Number of kettles/hr: -

Uninterrupted capacity: tons/hr
 Interrupted capacity: tons/hr
 at vacuum: bar
 Energy consumption/ton: kW/ton

Vacuum pump

Vacuum pump displacement: m³/sec

Energy

Vacuum pump power: kW
 Pipeline energy consumption/ton: kW/ton

Temperatures

Ambient temperature: degr C
 Outlet temperature vacuum pump: degr C
 Mixture temperature begin: degr C
 Mixture temperature end: degr C

Table calculation

Begin capacity: tons/hr
 Begin vacuum: mmWc
 vacuum decrement: mmWc
 lowest vacuum: mmWc

Buttons:

Bottom navigation:

Table calculation

Client: Convey distance horizontal: m
 Filepath: Convey distance vertical: m
 Product: Total conveying length: m
 Number of Bends: Pump displacement: m³/sec
 Pipe diameter begin: mm Rotary leakage: m³/sec at 0.22 bar vacuum
 Pipe diameter end: mm Gas volume end: m³/sec

Vacuum conveying

Pressure bar	Suction capacity tons/hr	Interrupted capacity tons/hr	Number of kettles/hr	Solid Loading Ratio SLR	gas velocity begin m/sec	gas velocity end m/sec	energy consumption kWh/ton	residence time seconds	sediment
0,4	5,5	5	9,8	8,8	23,1	34,5	2,71	2,35	No sedimentation
0,391	5,4	5	9,7	8,5	23,5	34,5	2,66	2,3	No sedimentation
0,382	5,3	5	9,5	8,2	23,8	34,6	2,61	2,26	No sedimentation
0,373	5,2	5	9,3	7,9	24,2	34,6	2,55	2,21	No sedimentation
0,364	5,1	5	9,1	7,5	24,5	34,6	2,5	2,17	No sedimentation
0,355	4,9	4	8,8	7,2	24,9	34,7	3,06	2,13	No sedimentation
0,346	4,8	4	8,5	6,9	25,2	34,7	3	2,09	No sedimentation
0,337	4,6	4	8,2	6,5	25,6	34,8	2,93	2,06	No sedimentation
0,328	4,4	4	7,8	6,1	25,9	34,8	2,86	2,02	No sedimentation
0,319	4,1	4	7,4	5,7	26,2	34,9	2,8	1,99	No sedimentation
0,31	3,9	3	6,9	5,2	26,6	34,9	3,65	1,96	No sedimentation
0,301	3,6	3	6,4	4,8	26,9	35	3,56	1,93	No sedimentation
0,292	3,3	3	5,9	4,3	27,2	35	3,47	1,9	No sedimentation
0,283	2,9	2	5,3	3,8	27,5	35,1	5,07	1,88	No sedimentation
0,274	2,6	2	4,6	3,3	27,7	35,1	4,94	1,85	No sedimentation
0,265	2,2	2	4	2,8	28	35,2	4,81	1,83	No sedimentation
0,256	1,8	1	3,3	2,2	28,2	35,3	9,36	1,81	No sedimentation
0,247	1,4	1	2,6	1,7	28,3	35,3	9,1	1,8	No sedimentation
0,238	1	1	1,9	1,2	28,4	35,4	8,83	1,78	No sedimentation
0,229	0,6	0	1,1	0,7	28,3	35,4	Infinity	1,76	No sedimentation
0,22	0,2	0	0,4	0,3	28	35,5	Infinity	1,74	No sedimentation

Empty pipeline system pressure drop: mmWC

Buttons: