

Pressure pneumatic conveying calculation Input screen

Client:

File path: Product:

Gas medium

Air
 Nitrogen

Gas pump

Screwcompressor
 Predefined screwcompressor
 Blower data
 Predefined blower

Gas Volume: m3/sec
Maximum pressure: bar

Booster

Installed
 Screwcompressor
 Predefined screwcompressor
 Blower data
 Predefined blower

Gas Volume: m3/sec
Injection point:

Rotary lock

Installed

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

Filter

Filter area: m2

Ambient

Ambient temperature: degr C
Ambient pressure: mbar

Temperatures

Fly ash temperature: degr C
 Screwcompressor air cooling degr C
 Booster air cooling degr C
Heat transmission factor pipewall: kCal/degC/m

Fly ash

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 pressure discharge: mmWC
v-waal / v-susp:
Filter resistance factor:
Specific heat content: kCal/kg/C
product loss factor constant y/n:

Convey pipeline

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

Calculation settings

Set capacity: tons/hr
Pressure: mmWC
Back pressure: mmWC
Set pressure drop: mmWC

Calculation selection

Pressure fixed -> capacity calculated
 Capacity fixed -> pressure calculated
 Pressure and capacity fixed -> intake pressure drop calculated
 Pressure and capacity fixed -> constant loss factor calculated
 Pressure and capacity fixed -> material loss factor calculated
 product loss factor (cwp) kept constant

Client	Part	Part description	Length(l)	v-gas	v-product	Pressure drop	v-wall/v-susp	residence time	Sediment
Filepath: Quick modeling	1	Intake	1	10,42	9,61	416	5,9	0,108	
product: Fly ash	2	Pipe	323	12,25	12,01	8275	6,81	30,484	
	3	Bend		12,25	1,99	8275		30,8172	
Convey Length horizontal: 980 m	4	Pipe	323	19,07	18,45	17966	8,46	53,0871	
Convey Length vertical: 20 m	5	Bend		19,07	1,99	17966		53,4435	
Total Length: 1000 m	6	Pipe	19,66	20,6	19,87	19249	8,79	54,4615	
Number of Bends: 5	7	Diameter Transfer			19,87	19273		54,4615	
	8	Pipe	303,34	17,19	16,56	22985	6,29	75,7245	
Pump displacement at 2.5 bar(e): 1 m3/sec	9	Bend			1,99	22985		75,989	
Booster displacement: 0 m3/sec	10	Pipe	0	18,13	4,63	23005	6,63	75,989	
Rotarylock leakage: 0 m3/sec	11	Diameter Transfer		18,13	4,63	23005		75,989	
Gas displacement at end: 1,0025 m3/sec	12	Pipe	20	19,47	18,02	24390	6,69	77,166	
	13	Bend		19,47	1,99	24390		77,869	
Capacity: 64,9 tons/hr	14	Pipe	10	20,46	19,54	24912	6,86	78,403	
Pressure: 25000 mmWC	15	Bend		20,46	1,99	24912		78,828	
Back pressure: 0 mmWC	16								
Pressure drop: 25000 mmWC	17								
Loading ratio: 15,2	18								
	19								
Compressor + (booster) power: 239 kW	20								
Pipeline energy consumption: 3,69 kW/ton	21								
	22								
Re-number * 10 ⁻⁵ : 3,147	23								
Empty pipeline pressure drop: 6522 mmWC	24								
Empty pipeline filter press. drop: 101 mmWC	25								
Material loss factor: 4,58E-12	26								
Lossfactor at end: 0,006	27								
Intake pressure drop: 100 mmWC	28								
	29								
	30								
Progress Filter									
Iteration									
	16	Outlet		20,46	1,99	24912		78,828	
	17	Filter	120	0,5	m/min	25000		78,828	87 mmWC

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New Calculation

Print calculation

Calculation results

Calculation results pressure conveying

Client

Filepath: Quick modeling

product: Fly ash

Convey distance horizontal: 980 m

Convey distance vertical: 20 m

Total conveying length: 1000 m

Number of Bends: 5

Compressor displacement: 1 m³/sec

Booster displacement: 0 m³/sec

Calculation results

Capacity: 64,9 tons/hr

Pressure: 25000 mmWC

Booster pressure: 0 mmWC

Back pressure: 0 mmWC

Pressure drop: 25000 mmWC

Loading ratio: 15,2

Empty pipeline pressure: 6825 mmWC

Residence time: 78,82 seconds

Re-number * 10⁻⁵: 3,147

Mixture density: 19,3 kg/m³

Mass of material in pipeline: 1418 kg

Pressure drops

Product intake: 100 mmWC

Nozzle: 416 mmWC

Acceleration excl product resistance: 2539 mmWC

Product resistance: 10999 mmWC

Elevation: 359 mmWC

Suspension: 4483 mmWC

Gas: 6432 mmWC

Filter: 87 mmWC

Vessel system

Installation system:

2-vessel system Rotary lock feeder silo unloading airslides

3-vessel system screw feeder

Vessel factor: 1000 tons/hr/bar(a)	vessel capacity: 285,7 tons/hr
Nominal capacity: 60 tons/hr	
vessel volume: 12 m ³	
Vessel product volume: 10 m ³	Vessel content: 9,69 tons
pipevolume: 37,3 m ³	pipe content: 1418,3 kgs
pressure begin pressurizing: -0,05 bar	
pressure valve open: 2,5 bar	
temperature begin pressurizing: 35 C	
temperature after pressurizing: 60 C	
pressurizing time: 17 seconds	
Discharging time: 53,7 seconds	
purging time: 59,1 seconds	
valve time: 2 seconds	
overlap time: seconds	
cyclotime: 615,9 seconds	
Number of kettles/hr: 5,8	

Kettle capacity > capacity

Energy

Compressor power: 239 kW

Booster power: 0 kW

Pipeline energy consumption/ton: 3,69 kW/ton

Temperatures

Ambient temperature: 25 degr C

Outlet temperature compressor: 222 degr C

Outlet temperature booster: 0 degr C

Mixture temperature begin: 53 degr C

Mixture temperature end: 25 degr C

Table calculation

Begin capacity: 64,9 tons/hr

Begin pressure: 25000 mmWC

pressure decrement: 1125 mmWC

lowest pressure: 2500 mmWC