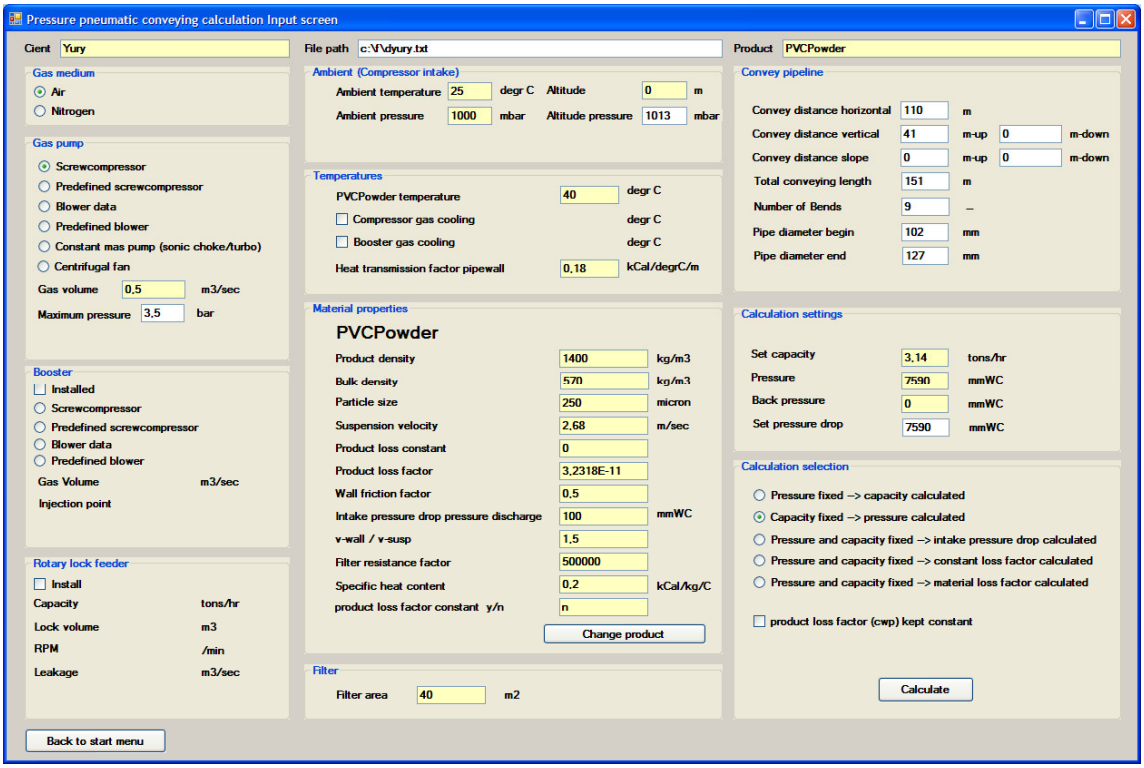
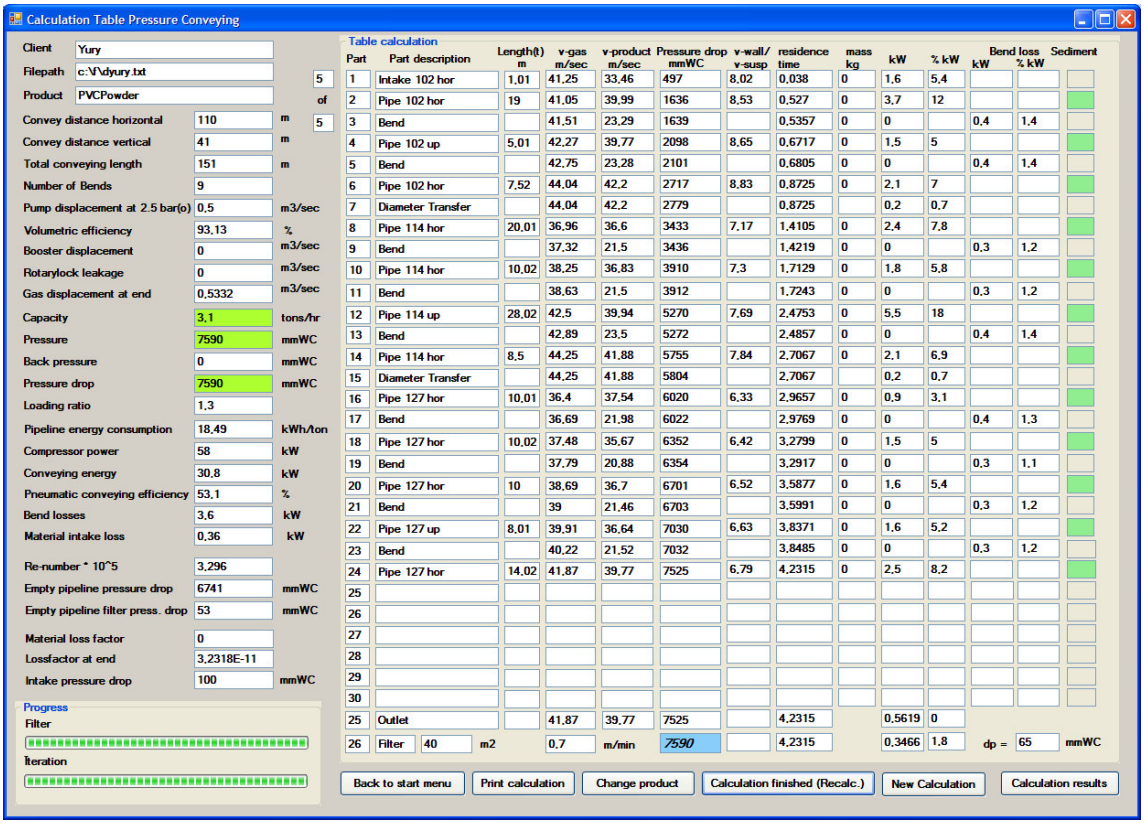
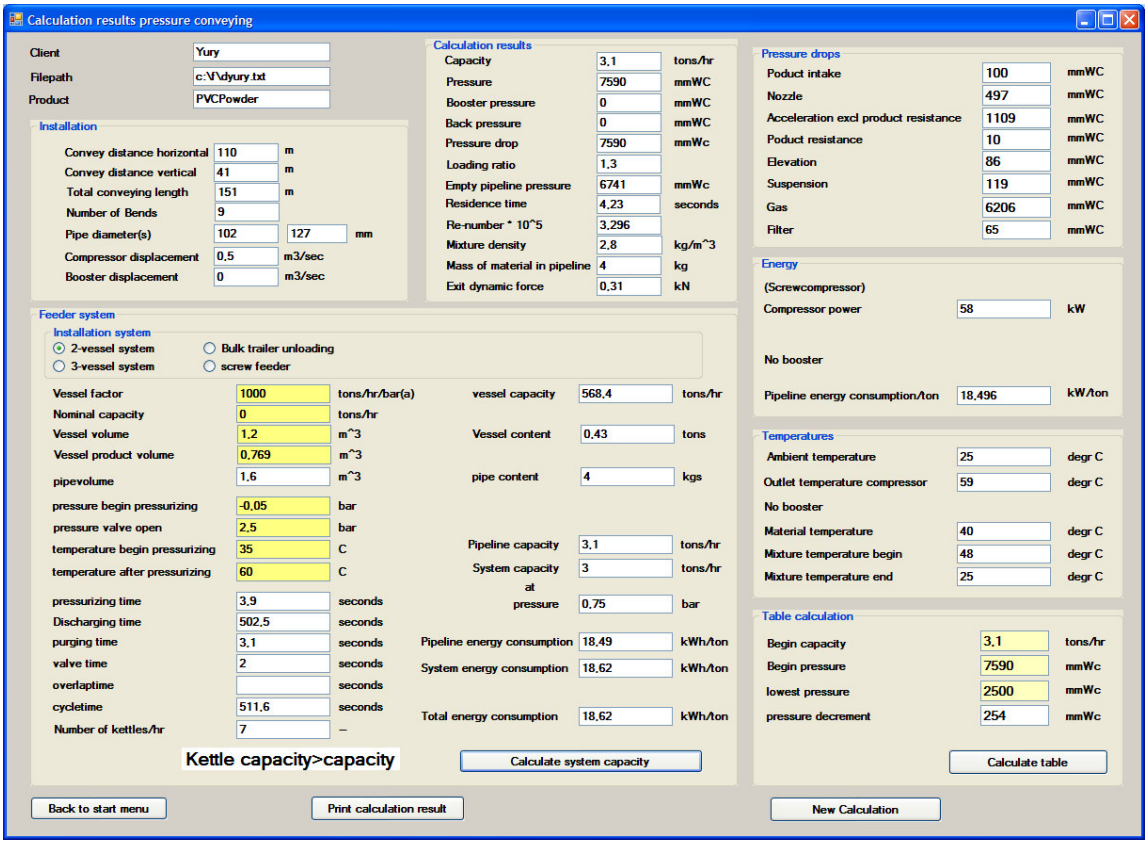

Pressure pneumatic conveying calculation Input screen
Cient Yury
File path c:\T\dyury.txt
Product PVCPowder
Gas medium
Air
Nitrogen
Gas pump
Screwcompressor
Predefined screwcompressor
Blower data
Predefined blower
Constant mas pump (sonic choke/turbo)
Centrifugal fan
Gas volume 0,5 m3/sec
Maximum pressure 3,5 bar
Booster
Installed
Screwcompressor
Predefined screwcompressor
Blower data
Predefined blower
Gas Volume m3/sec
Injection point
Rotary lock feeder
Install
Capacity tons/hr
Lock volume m3
RPM /min
Leakage m3/sec
Ambient (Compressor intake)
Ambient temperature 25 degr C
Altitude 0 m
Ambient pressure 1000 mbar
Altitude pressure 1013 mbar
Temperatures
PVCPowder temperature 40 degr C
Compressor gas cooling degr C
Booster gas cooling degr C
Heat transmission factor pipewall 0,18 kCal/degrC/m
Material properties
PVCPowder
Product density 1400 kg/m3
Bulk density 570 kg/m3
Particle size 250 micron
Suspension velocity 2,68 m/sec
Product loss constant 0
Product loss factor 3,2318E-11
Wall friction factor 0,5
Intake pressure drop pressure discharge 100 mmWC
v-wall / v-susp 1,5
Filter resistance factor 500000
Specific heat content 0,2 kCal/kg/C
product loss factor constant y/n n
Change product
Filter
Filter area 40 m2
Convey pipeline
Convey distance horizontal 110 m
Convey distance vertical 41 m-up 0 m-down
Convey distance slope 0 m-up 0 m-down
Total conveying length 151 m
Number of Bends 9 –
Pipe diameter begin 102 mm
Pipe diameter end 127 mm
Calculation settings
Set capacity 3,14 tons/hr
Pressure 7590 mmWC
Back pressure 0 mmWC
Set pressure drop 7590 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
Calculate
Back to start menu


Calculation Table Pressure Conveying
Client Yury
Filepath c:\T\dyury.txt
Product PVCPowder
Convey distance horizontal 110 m
Convey distance vertical 41 m
Total conveying length 151 m
Number of Bends 9
Pump displacement at 2.5 bar(o) 0,5 m3/sec
Volumetric efficiency 93,13 %
Booster displacement 0 m3/sec
Rotarylock leakage 0 m3/sec
Gas displacement at end 0,5332 m3/sec
Capacity 3,1 tons/hr
Pressure 7590 mmWC
Back pressure 0 mmWC
Pressure drop 7590 mmWC
Loading ratio 1,3
Pipeline energy consumption 18,49 kWh/ton
Compressor power 58 kW
Conveying energy 30,8 kW
Pneumatic conveying efficiency 53,1 %
Bend losses 3,6 kW
Material intake loss 0,36 kW
Re-number * 10^5 3,296
Empty pipeline pressure drop 6741 mmWC
Empty pipeline filter press. drop 53 mmWC
Material loss factor 0
Lossfactor at end 3,2318E-11
Intake pressure drop 100 mmWC
Progress
Filter
Iteration
Table calculation
Part Part description Length(t) m v-gas m/sec v-product m/sec Pressure drop mmWC v-wall/ v-susp residence time mass kg kW % kW Bend loss kW Bend loss % kW Sediment
1 Intake 102 hor 1,01 41,25 33,46 497 8,02 0,038 0 1,6 5,4
2 Pipe 102 hor 19 41,05 39,99 1636 8,53 0,527 0 3,7 12
3 Bend 41,51 23,29 1639 0,5357 0 0 0,4 1,4
4 Pipe 102 up 5,01 42,27 39,77 2098 8,65 0,6717 0 1,5 5
5 Bend 42,75 23,28 2101 0,6805 0 0 0,4 1,4
6 Pipe 102 hor 7,52 44,04 42,2 2717 8,83 0,8725 0 2,1 7
7 Diameter Transfer 44,04 42,2 2779 0,8725 0,2 0,7
8 Pipe 114 hor 20,01 36,96 36,6 3433 7,17 1,4105 0 2,4 7,8
9 Bend 37,32 21,5 3436 1,4219 0 0 0,3 1,2
10 Pipe 114 hor 10,02 38,25 36,83 3910 7,3 1,7129 0 1,8 5,8
11 Bend 38,63 21,5 3912 1,7243 0 0 0,3 1,2
12 Pipe 114 up 28,02 42,5 39,94 5270 7,69 2,4753 0 5,5 18
13 Bend 42,89 23,5 5272 2,4857 0 0 0,4 1,4
14 Pipe 114 hor 8,5 44,25 41,88 5755 7,84 2,7067 0 2,1 6,9
15 Diameter Transfer 44,25 41,88 5804 2,7067 0,2 0,7
16 Pipe 127 hor 10,01 36,4 37,54 6020 6,33 2,9657 0 0,9 3,1
17 Bend 36,69 21,98 6022 2,9769 0 0 0,4 1,3
18 Pipe 127 hor 10,02 37,48 35,67 6352 6,42 3,2799 0 1,5 5
19 Bend 37,79 20,88 6354 3,2917 0 0 0,3 1,1
20 Pipe 127 hor 10 38,69 36,7 6701 6,52 3,5877 0 1,6 5,4
21 Bend 39 21,46 6703 3,5991 0 0 0,3 1,2
22 Pipe 127 up 8,01 39,91 36,64 7030 6,63 3,8371 0 1,6 5,2
23 Bend 40,22 21,52 7032 3,8485 0 0 0,3 1,2
24 Pipe 127 hor 14,02 41,87 39,77 7525 6,79 4,2315 0 2,5 8,2
25 Outlet 41,87 39,77 7525 4,2315 0,5619 0
26 Filter 40 m2 0,7 m/min 7590 4,2315 0,3466 1,8 dp = 65 mmWC
Back to start menu
Print calculation
Change product
Calculation finished (Recalc.)
New Calculation
Calculation results


Calculation results pressure conveying
Client
Yury
Filepath
c:\I\dyury.txt
Product
PVCPowder
Installation
Convey distance horizontal
110
m
Convey distance vertical
41
m
Total conveying length
151
m
Number of Bends
9
Pipe diameter(s)
102
127
mm
Compressor displacement
0,5
m3/sec
Booster displacement
0
m3/sec
Calculation results
Capacity
3,1
tons/hr
Pressure
7590
mmWC
Booster pressure
0
mmWC
Back pressure
0
mmWC
Pressure drop
7590
mmWc
Loading ratio
1,3
Empty pipeline pressure
6741
mmWc
Residence time
4,23
seconds
Re-number * 10^5
3,296
Mixture density
2,8
kg/m^3
Mass of material in pipeline
4
kg
Exit dynamic force
0,31
kN
Pressure drops
Poduct intake
100
mmWC
Nozzle
497
mmWC
Acceleration excl product resistance
1109
mmWC
Poduct resistance
10
mmWC
Elevation
86
mmWC
Suspension
119
mmWC
Gas
6206
mmWC
Filter
65
mmWC
Energy
(Screwcompressor)
Compressor power
58
kW
No booster
Pipeline energy consumption/ton
18,496
kW/ton
Temperatures
Ambient temperature
25
degr C
Outlet temperature compressor
59
degr C
No booster
Material temperature
40
degr C
Mixture temperature begin
48
degr C
Mixture temperature end
25
degr C
Feeder system
Installation system
2-vessel system
3-vessel system
Bulk trailer unloading
screw feeder
Vessel factor
1000
tons/hr/bar(a)
Nominal capacity
0
tons/hr
Vessel volume
1,2
m^3
Vessel product volume
0,769
m^3
pipevolume
1,6
m^3
pressure begin pressurizing
-0,05
bar
pressure valve open
2,5
bar
temperature begin pressurizing
35
C
temperature after pressurizing
60
C
pressurizing time
3,9
seconds
Discharging time
502,5
seconds
purging time
3,1
seconds
valve time
2
seconds
overlaptime
seconds
cycletime
511,6
seconds
Number of kettles/hr
7
–
vessel capacity
568,4
tons/hr
Vessel content
0,43
tons
pipe content
4
kgs
Pipeline capacity
3,1
tons/hr
System capacity
3
tons/hr
at
pressure
0,75
bar
Pipeline energy consumption
18,49
kWh/ton
System energy consumption
18,62
kWh/ton
Total energy consumption
18,62
kWh/ton
Kettle capacity>capacity
Calculate system capacity
Table calculation
Begin capacity
3,1
tons/hr
Begin pressure
7590
mmWc
lowest pressure
2500
mmWc
pressure decrement
254
mmWc
Calculate table
Back to start menu
Print calculation result
New Calculation