

Developing Applications for Data Analysis

- › Query on Corporate Databases
- › Reporting
- › Operator Interface for Data Collection
- › Statistical Analysis with Minitab

Custom Development

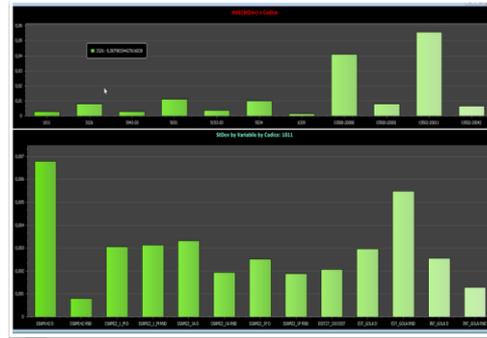
FP Quality Review Report

Finished SB Product - FP Quality Review

Period: From 07/05/2010 to 07/05/2011

Product	Bin Num	Plan Class	Loaded	T O Dr	Prod	Rear	% Tot	Reason	Comment
0751	12624	T2	100	94.3	101.42	95	0	0	
PA24202	12622	T1	99	104.2	104.76	75	0	0	SDSI Panels Passed By Colour Group
0762	12622	T2	96	96	100	0	-2.2		
PA24289	13187	T2	100	102	106	103	0	0	
1191222	12194	T2	89	99	102	43	0	5.1	
0764	13183	T1	100	101	104.86	1007	0	0	METALSHIELD RECORD ONLY
PA24280	12646	T2	95	102	102	106	0	0	
PA24223	12683	T1	100	97	97	73	0	0	SI WAS RECHECKED USC 1 - 17 & 24 D
PA24238	12639	T1	100	99	101.2	0	0	0	
NA22	13382	T1	100	79	109	0	0	0	GLOSS + STRENGTH
0762	12627	T1	100	97.8	101	96	0	0	
NA22	13381	T1	100	75	103.2	0	0	0	GLOSS + STRENGTH
PA2421	13056	T2	98	97.8	98	108	0	41.5	SI RECHECKED TWICE FOR STRENGTH
1196522	12688	T4	100	11.2	10.82	106	0	14.5	SI WEAR SO RECHECK AFTER 2 RECHECK
0762	12626	T2	100	106	104	0	-1.7		
0760	12422	T1	100	104.2	104.27	83	0	0	METALSHIELD RECORD ONLY
PA24262	12638	T1	94	105.8	105.4	120	0	0	
PA24261	12638	T1	1	100	100	100	0	0	
ONE ROW								# 531	
								0.88	

➤ Custom Reports

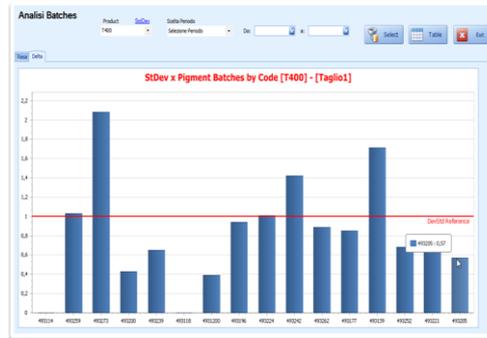


➤ Dashboards

CSE395 - CSE395

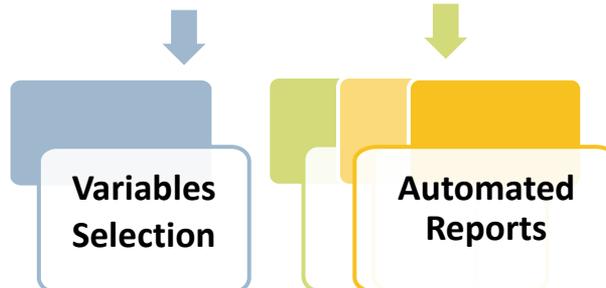
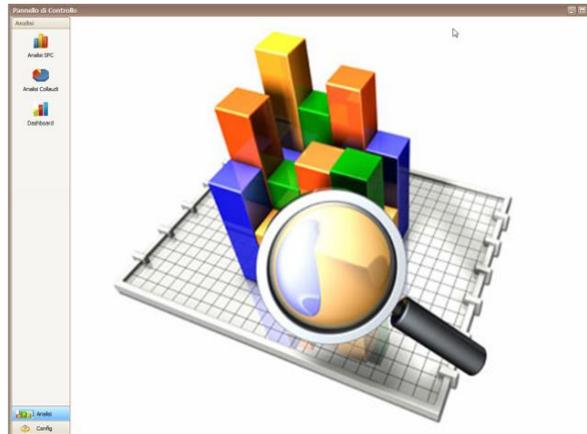
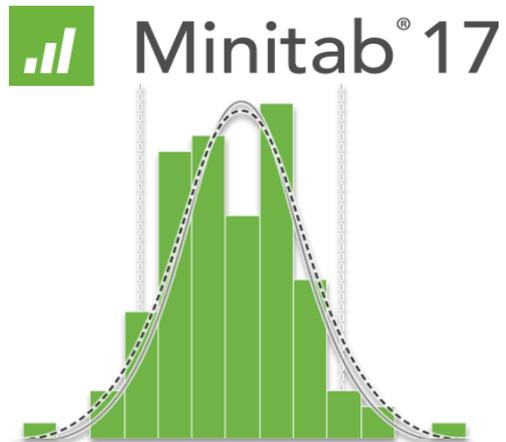
Variable	11/16	11/17	11/20	11/21
CSE395-17094 D 18.2	C_p.k	0.39	0.58	
CSE395-17094 D 20 A	C_p	0.45	0.47	
CSE395-17094 D 20 A	C_p.k	0.29	0.37	
CSE395-17094 D 20 B	C_p	0.45	0.64	
CSE395-17094 D 20 B	C_p.k	0.25	0.40	
CSE395-17094 L 11.5	C_p	0.51	0.50	
CSE395-17094 L 11.5	C_p.k	0.16	0.49	
CSE395-17094 L 214	C_p	0.93	2.75	
CSE395-17094 L 214	C_p.k	0.88	3.67	
CSE395-17094 L 275	C_p	0.44	0.65	
CSE395-17094 L 275	C_p.k	0.26	0.62	
CSE395-17094 L 290	C_p	1.52	1.92	
CSE395-17094 L 290	C_p.k	0.39	0.76	
CSE395-17094 L 4.5	C_p	1.17	1.47	
CSE395-17094 L 4.5	C_p.k	0.21	0.81	
CSE395-17094 L 58.5	C_p	0.33	0.70	
CSE395-17094 L 58.5	C_p.k	-0.22	0.02	
CSE395-d18 0.05 B	C_p	0.49	1.12	
CSE395-d18 0.05 B	C_p.k	0.49	0.64	
CSE395-d18 D 12.5	C_p	2.31	4.68	
CSE395-d18 D 12.5	C_p.k	2.64	3.06	
CSE395-d18 D 12.90	C_p	3.08	3.33	
CSE395-d18 D 12.90	C_p.k	1.70	2.21	
CSE395-d18 D 13	C_p	2.45	3.70	

➤ Automated Analyses



➤ Alert Systems

Company Data Access and Analysis

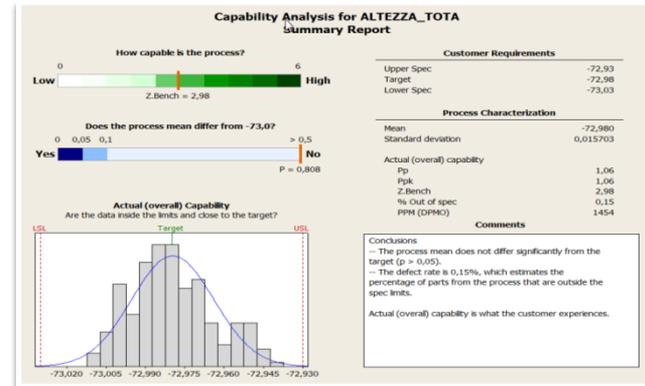
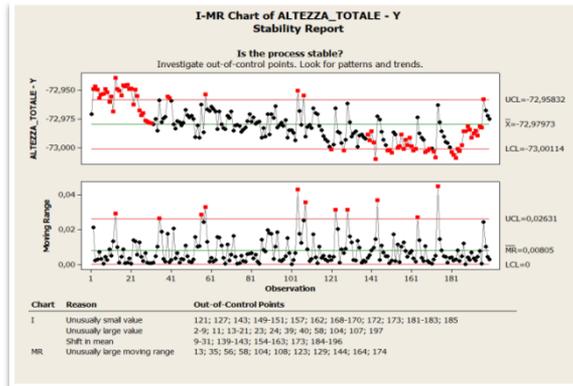
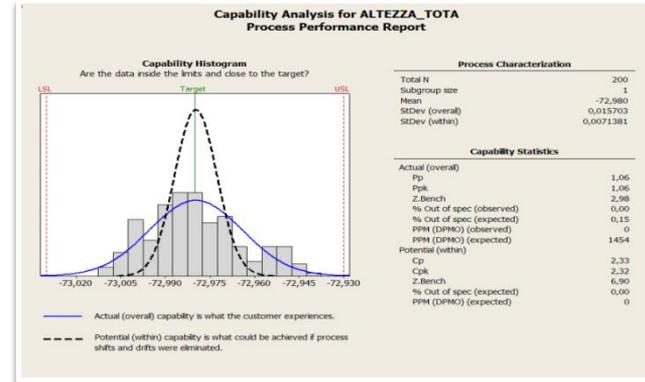


- Databases
(SQL, MySQL, Access)
- Excel
- Instruments
- Data files

Management of Measurement Data

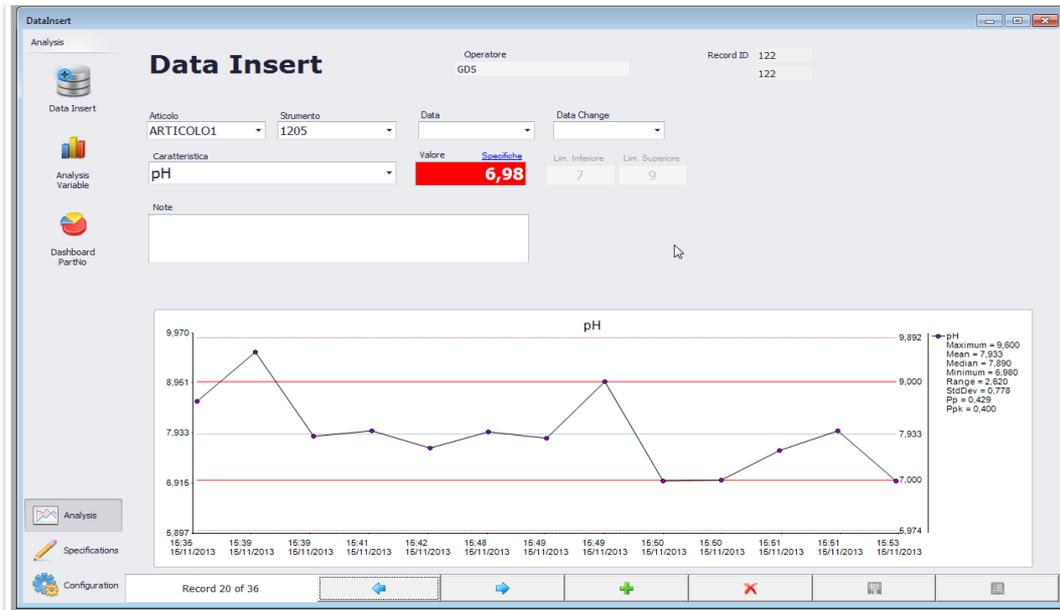
The need to automate the management of repetitive analysis is typical of people who use Minitab to process production data.

Simplify the availability of data and the implementation of the analysis or report, with a tool which is a standard reference, becomes of primary importance



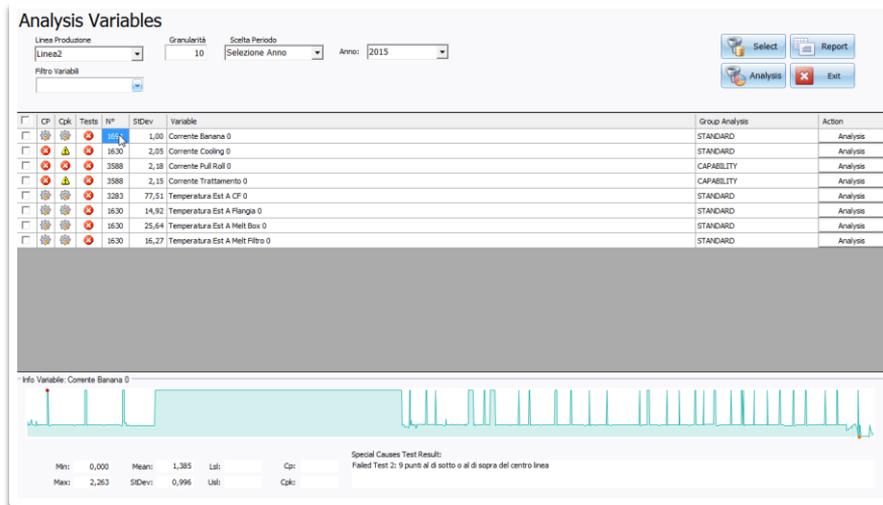
Data Insert Interface

Having a *smart* interface, help people who have to carry out the data collection instruments for measuring, or who have to import data from other sources

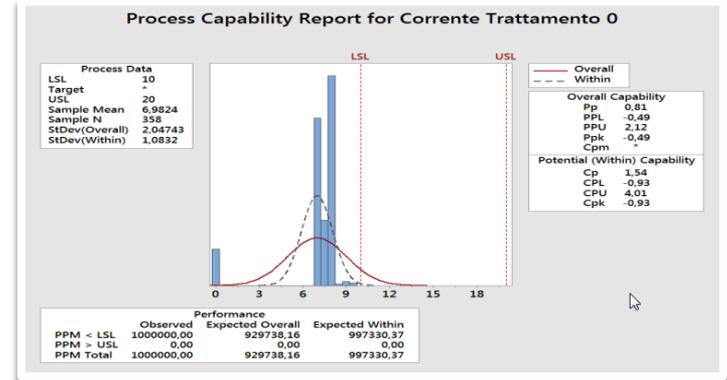


Example of interface for the integration of laboratory's data. Notice how for the variable pH there are limits set to the values 7 to 9 (for example), and then the entered value 6.98 proves to be out of specification, and then in red. The lower part displays a graph with the evolution of the variable pH

Analysis Interface



Simplify the identification of the filtered data or a specific date range

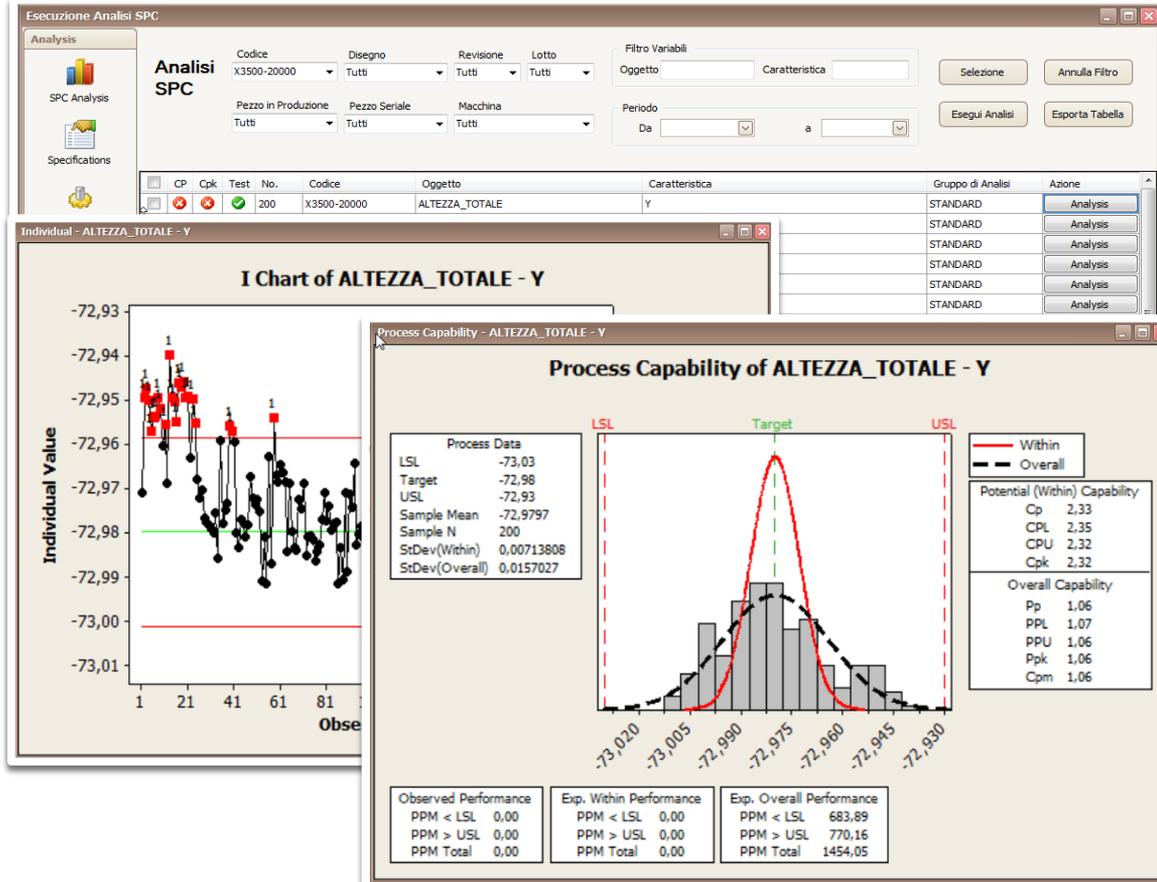


In this interface variables can be extracted, based on filters that are defined for the project. If in the Database there are more variables, then there will be multiple lines. The lower display part shows some information such as: Mean, Standard Deviation, Cp and Cpk, SPC Special Causes Tests and the Shape of Variable's Values

Databases Query and Analysis

The application can be designed to read data from databases available on the corporate network. If the project requires it, is possible to connect different databases, combining everything into a single tool for the company analysis.

The selected data are extracted and used with Minitab statistical functions, to create SPC graphs and reports according to the Company needs.



Tabular Report

Also the easiest report could be done with a simple click in order to help the user in the definition of the problem

The screenshot shows the 'Analysis Admin' software interface. The main window is titled 'Analysis Characteristic' and contains several input fields: 'Article' (set to X123), 'Operator' (set to All), and 'Period' (From and to). There are buttons for 'Selection', 'Report', 'Run Analysis', and 'Remove Filter'. Below these fields is a table listing characteristics with columns for CP, Cpk, Tests, N°, Characteristic, Group Analysis, and Action.

CP	Cpk	Tests	N°	Characteristic	Group Analysis	Action
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	17	Assorbimento Bianco	STANDARD	Analysis
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	Pressione	STANDARD	Analysis
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5	Viscosità	STANDARD	Analysis

Below the table is an 'Info Variable' section with fields for Min, Mean, Max, and StDev.

Overlaid on the main window is a 'Preview' window showing an 'SPC REPORT'. The report includes the following data:

Name	N	Mean	StDev	LSL	USL	Cpk	Cp	% inf	% sup
Assorbimento Bianco	17	14,72	2,61	12,00	14,00	-0,09	0,13	5,9	47,1
Pressione	2	124,50	0,71						
Viscosità	5	22,40	0,62	20,00	24,00	0,65	0,81	0,0	0,0

Selecting the Item X123 were extracted 3 variables: Absorption White (17 samples), Pressure (2) Viscosity (5). In the figure the columns Cp and Cpk display a kind of semaphore to indicate whether the variable has an acceptable value. If you have not set the specification limits this calculation is not possible. Clicking the Report button, you can obtain a tabular report with a summary of the characteristics of the variables

Customized Reports

Reports can be developed in according to customer/company needs

SB Trends Report

Reports

SB Trends Report

All

Product	Plan Class	4nd from last	3nd from last	2nd from last				
1.191.2223		FRC	FRC	RMT				
D700		RST	FRC	RST				
D740		FRC	FRC	RST				
D753		FRC	RST	FRC				
D789		RMT	RMT	FRC	FRC	1,00	-0,250000	8
D946		FRC	FRC	RST	FRC	0,50	-0,250000	8
N222		RST	RMT	RST	RST	1,10	-0,250000	8
P383-901		FRC	FRC	FRC	FRC	0,50	-0,750000	6
P420-905		RST	RMT	FRC	RST	1,00	0,500000	6
P420-952		RST	RST	RST	RST	0,56	0,750000	8
P425-900		FRC	FRC	RMT	RST	0,67	-0,250000	8
P425-984		FRC	FRC	FRC	FRC	0,00	0,000000	6
P429-923		FRC	RST	RST	RMT	0,50	1,000000	8
P488-951		FRC	RST	FRC	FRC	0,30	0,000000	8
P488-963		FRC	RST	RST	FRC	0,57	0,000000	6
P498-9944		RMT	FRC	RST	RST	1,09	-0,500000	8
P498-9956		RST	RMT	RST	FRC	0,67	1,000000	6
P498-9983		RST	FRC	FRC	FRC	0,67	-1,000000	8

FP Quality Review Report

Reports

Finished SB Product - FP Quality Review

from 07/05/2010 to 07/05/2013

Test Result: FRC (44,26%)

Product	Bx Num	Plan Class	Loaded	T O Str	Final ...	Mixer	N. Tint	Loade...	Reason	Comment
Test Result: FRC (44,26%)										
D751	32624	T2	100	99,3	101,42	65	0	0		
P472-KT03	32182	T4	99	104,3	104,34	75	0	0		50:50 Panels Passed by Colour Group
D952	32622	T2	90	96	96	1010	0	-2.2		
P425-989	31997	T2	100	102	106	103	0	0		
1.191.2220	31704	T3	85	99	103	45	0	1.1		
D740	33383	T1	105	105	104,89	1007	0	0		METALSHADE RECORD ONLY
P429-980	32646	T3	95	102	102	1006	0	0		
P429-923	31865	T1	95	97	97	73	0	0		
N218	34210	T1	100	29		1012	0	0		BX WAS RECHECKED VISC 'S = 17 & 24 (5
N222	33382	T1	100	78		1009	0	0		GLOSS = STRENGTH
D725	33837	T5	100	97,8	101	Pan	0	0		
N222	33381	T1	100	73		1012	0	0		GLOSS = STRENGTH
P425-921	30906	T3	98	97,8	98	1008	0	+0.5		BX RECHECKED TWICE FOR STRENGTH.
1.200.5252	30869	T4	110	91,2	95,83	PAN	0	+3	Referred/	BX WEAK SO REFERRED AFTER 2 RECH
D772	32626	T2	100	106	106	124	0	-1.7		
D740	33422	T1	105	104,2	104,27	83	0	0		METALSHADE RECORD ONLY
P420-952	33538	T1	94	100,6	100,6	119	0	0		
P488-963	32285	T3	2	102	102	76	0	2		

Cnt: 601
531

0,88

Customized Analysis

In the example a the representation of Cp and Cpk depends on the article for week 16-21 of 2011

CSV Misure - Cp e CPK						
Articolo		Fase		Macchina		
CSE395		Tutti		Tutti		
Variabile		11/16	11/17	11/20	11/21	
CSE395-170MX D 18.2	C_pk	0.38	0.58			
CSE395-170MX D 20 A	C_p	0.45	0.47			
CSE395-170MX D 20 A	C_pk	0.29	0.37			
CSE395-170MX D 20 B	C_p	0.45	0.64			
CSE395-170MX D 20 B	C_pk	0.23	0.40			
CSE395-170MX L 11.5	C_p	0.51	0.56			
CSE395-170MX L 11.5	C_pk	0.16	0.49			
CSE395-170MX L 214	C_p	0.91	2.75			
CSE395-170MX L 214	C_pk	0.88	1.97			
CSE395-170MX L 275	C_p	0.44	0.65			
CSE395-170MX L 275	C_pk	0.26	0.62			
CSE395-170MX L 290	C_p	1.62	1.92			
CSE395-170MX L 290	C_pk	0.39	0.70			
CSE395-170MX L 4.5	C_p	1.17	1.47			
CSE395-170MX L 4.5	C_pk	0.71	0.81			
CSE395-170MX L 58.5	C_p	0.19	0.30			
CSE395-170MX L 58.5	C_pk	-0.12	0.02			
CSE395-d18 0.05 B	C_p			0.89	1.12	
CSE395-d18 0.05 B	C_pk			0.49	0.64	
CSE395-d18 D 12.5	C_p			3.31	4.08	
CSE395-d18 D 12.5	C_pk			2.64	3.06	
CSE395-d18 D 12.90	C_p			3.08	3.33	
CSE395-d18 D 12.90	C_pk			1.70	2.21	
CSE395-d18 D 13	C_p			2.85	3.70	

Interactive Dashboard

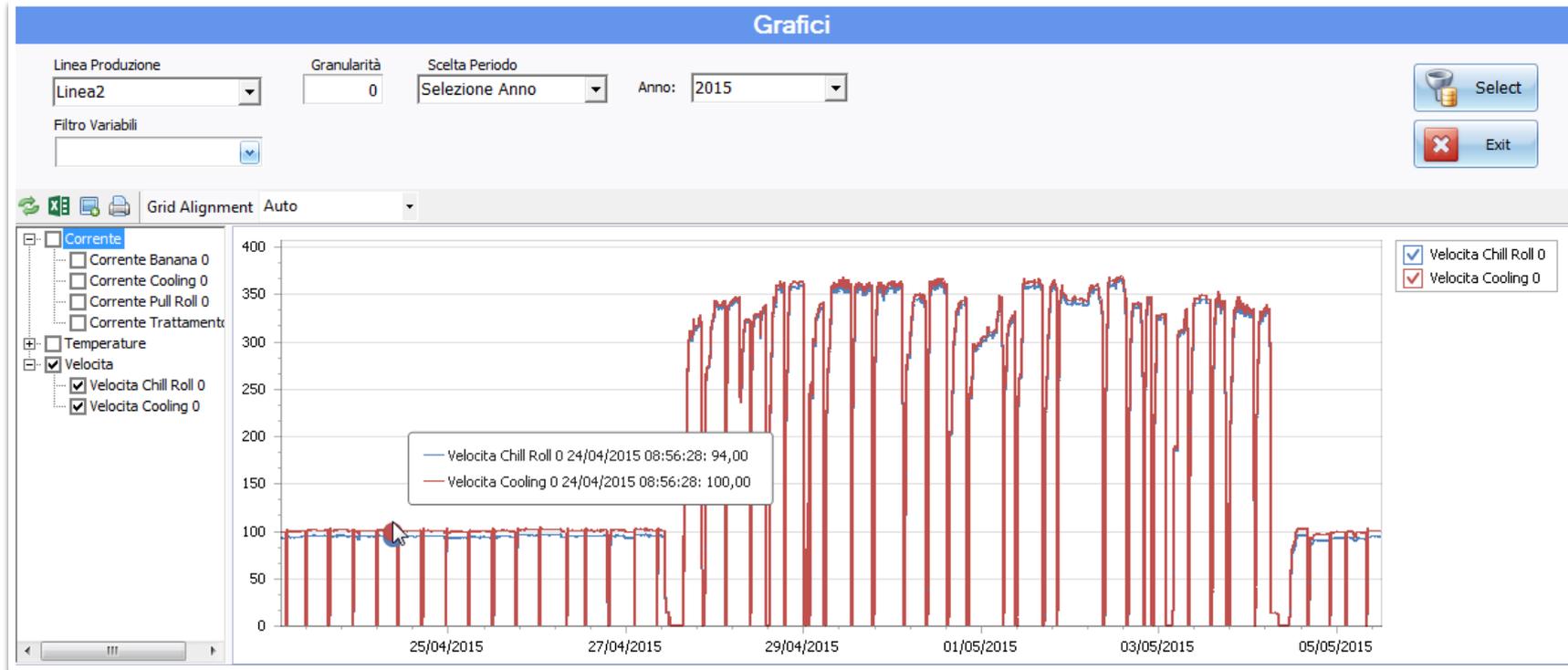
The Dashboard is a special interface that shows the quality of the variables by analyzing their Standard Deviation.

The histogram at the top shows the MAX (or could be the SUM) of the Standard Deviation of all the variables which are referred to the Product Code.



The chart at the bottom shows the individual characteristics associated with Standard Deviation based on the product code selected by a mouse click.

Graphical Analysis



In some cases the statistical analysis are not necessary, but would be useful to have a graphical visualization of the data

Before After Analysis

This is Before After Analysis useful when the user want to evaluate the impact of a process improvement. Analysis are done using Minitab Statistical Software.

If the specification limits are available also the Capability analysis will be created.

Before After Analysis

Class: TV301

Period: From 27/08/2013 to 27/11/2013

Data Improvement: 20/11/2013

Lower Spec Limit:

Target [Opt]:

Upper Spec Limit:

Chart

Individual

Before/After I-MR Chart of Channeling_Freq_4o_Gradino by Shift
Summary Report

Was the process standard deviation reduced?

Yes No P = 0,314

Did the process mean change?

Yes No P = 0,100

Comments

After a process change, you may want to test whether the standard deviation or mean changed:

- The standard deviation was not reduced significantly ($p > 0.05$).
- The mean did not change significantly ($p > 0.05$).

Stage	N	Mean	StDev(Within)	StDev(Overall)	Control limits use StDev(Within)
1	175	446.25	1.5814	2.0205	
2	27	445.65	1.5681	1.6754	

Diagnostic Report

Before/After I-MR Chart of Channeling_Freq_4o_Gradino by Shift
Diagnostic Report

Compare the mean and variation before and after the process change. The I chart plots the individual data values and the MR chart plots the moving ranges. Look for differences in the center line and control limits, which are calculated independently for each stage, to determine how the change affects the process.

Out Of Specification Report

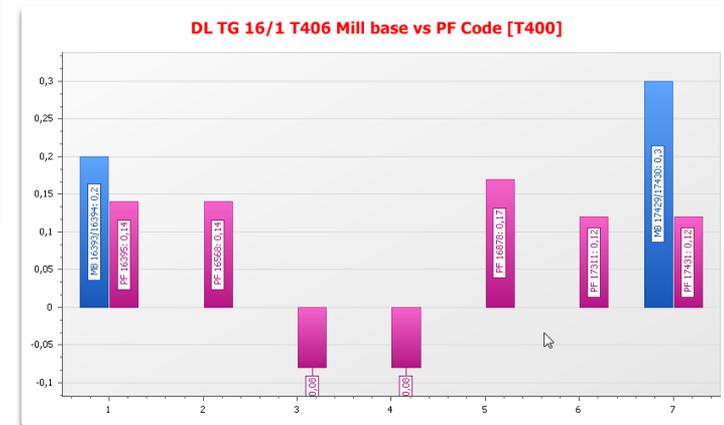
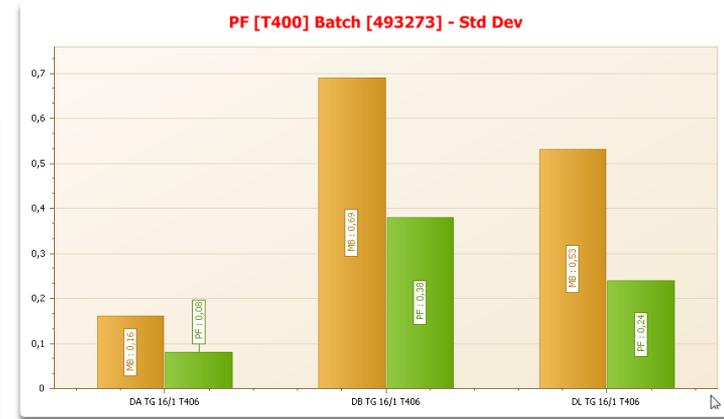
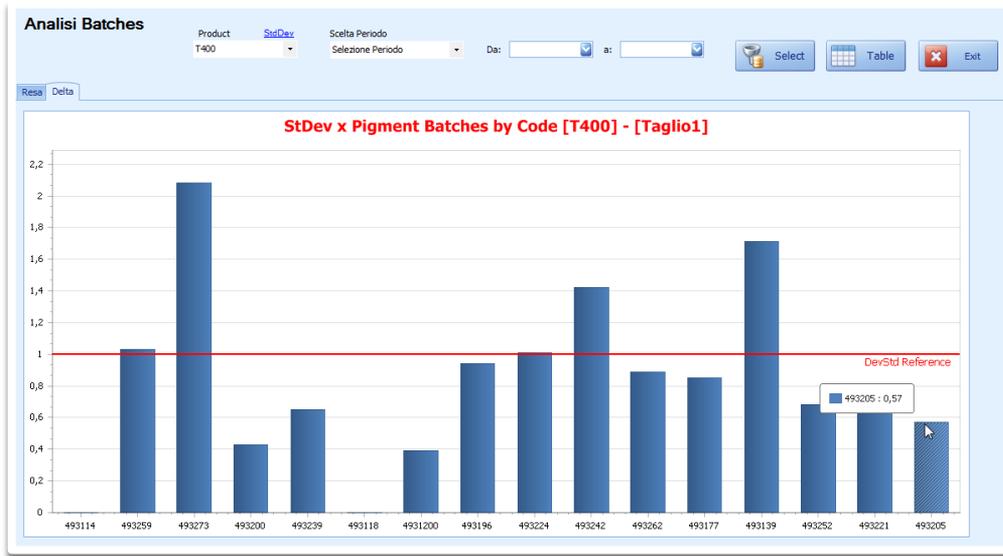
This is another example of interface of analysis that helps the user to understand better the results of the industrial processes

Out of Specification Scelta Periodo

[Expand / Collapse](#) [Expand / Collapse](#)

Allumini - Perlati						Pastelli					
Codice	Batch	Ok	Ok	OOS	Rigettato	Codice	Batch	Ok	Ok	OOS	Rigettato
PA-36-3856	12	8,33%	25,00%	33,33%	33,33%	PQK-163	14	21,43%	21,43%	21,43%	35,71%
80002						PLQ-3109	2	0,00%	0,00%	0,00%	100,00%
11G0002						PB-36-9327	11	18,18%	54,55%	9,09%	18,18%
11G0003						PB-57-7792	22	4,55%	40,91%	4,55%	50,00%
11G0005						PB-59-9875	13	53,85%	38,46%	7,69%	0,00%
11G0006						PG-78-5535	8	0,00%	25,00%	37,50%	37,50%
12G0001						419077					
12G0002						3243235					
12G0003						4018153					
13G0001						4340229					
13G0002						0004419077					
13G0003						0005139630					
10G0004						0005261009					
PA-36-6814	31	9,68%	70,97%	9,68%	9,68%	0005320704					
PA-41-2262	17	11,76%	29,41%	11,76%	47,06%	PG-81-8224	7	28,57%	57,14%	0,00%	14,29%
PA-44-4905	55	7,27%	38,18%	27,27%	27,27%	PJ-92-7013	8	0,00%	0,00%	62,50%	37,50%
10G0009						PL-34-9996	11	9,09%	36,36%	0,00%	54,55%
10G0010						PL-36-1799	1	100,00%	0,00%	0,00%	0,00%
10G0011						PL-47-9184	9	33,33%	33,33%	22,22%	11,11%
10G0014						PP-28-6310	2	0,00%	50,00%	50,00%	0,00%
10G0015						PP-37-1845	13	0,00%	38,46%	15,38%	46,15%
10G0016						PP-71-1900	9	0,00%	11,11%	11,11%	77,78%
10G0017						AMEG00EB					
11G0002						AMEG00EB					
11G0001						AMEI007B					
11G0004						AMFD005F					
11G0003						AMFH013C					
11G0005						AMGED012					
11G0008						AMGJ0269					
11G0009						AMGG02B0					
11G0010						AMGK02DE					
11G0014						PQ-41-6396	7	0,00%	100,00%	0,00%	0,00%
11G0015						PR-36-9563	22	59,09%	27,27%	9,09%	4,55%
11G0011						PR-44-8553	9	11,11%	33,33%	33,33%	22,22%
11G0012						PR-56-7826	7	0,00%	57,14%	14,29%	28,57%
11G0013						PR-89-4864	5	20,00%	60,00%	0,00%	20,00%
11G0016						PS-51-9405	10	10,00%	50,00%	0,00%	40,00%
11G0017						PS-92-5790	6	16,67%	16,67%	50,00%	16,67%

Drill Down Analysis



This is an example of Drill Down analysis

Test equipment as data sources

What happens when the measured values come from instruments or measuring machines and are available in Excel, CSV, TXT, etc...? These are some examples

Appunti		Carattere		Allineamento			
I26		fx					
A	B	C	D	E	F	G	
Calypso Measuring Result							
Measurement Plan		Date		Order			
C 5F361 - 000 CARC		03-dic-13		CAMPIONATURA 21			
Drawing No.			Time		Part No.		
			14:47:53		2		
Operator			CMM				
Master							
Characteristic	Actual	Nominal	Upper Tol	Lower To	Deviation		
Val. Z_Punto2	6,078003	6	0,05	-0,05	0,078003		
Val. Z_Punto4	6,000027	6	0,05	-0,05	0,0000272		
6.30 +0.30 -0.10	-6,45622	-6,3	0,1	-0,3	-0,1562196		
23.20 -0.25 +0.10	-23,0959	-23,2	0,25	-0,1	0,1041035		
11.60 ±0.10 DX	11,5833	11,6	0,1	-0,1	-0,0167026		
19 11.60 ±0.10 SX	11,47877	11,6	0,1	-0,1	-0,121234		
20 17.30 -0.30 DX	-17,2771	-17,3	0,3	0	0,0228865		
21 17.30 -0.30 DX1	-17,2625	-17,3	0,3	0	0,0375264		
22 6.10 +0.20 SX	6,041734	6,1	0,1	-0,1	-0,0582657		
23 6.10 +0.20 DX	6,117085	6,1	0,1	-0,1	0,0170854		
24 6.00 +0.20 SX	6,228338	6	0,2	0	0,2283376		
25 6.00 +0.20 DX	6,198742	6	0,2	0	0,1987416		
26 5.30 +0.15 -0.50	5,38729	5,3	0,15	-0,5	0,0872897		

Excel file

```

Codice Oms:X3502-20006
Descrizione:ROTORE TU 81
Disegno:X3502-20006
Revisione:05
Nr Lotto Produzione:64-2013
Nr Pezzo in Produzione:0
Nr Pezzo Seriale:0019A
Macchina di misura:DeaGlobal
#
# # nr commessa 64-2013
# nr pezzo produzione 0
# nr pezzo seriale 0019A
@D13_57[1]
D 13.5750 0.0250 -0.0250 13.5694
RND 0.0000 0.0200 0.0000 0.0011

@CAR1P[1]
D 13.0220 0.0150 0.0150 13.0205
RND 0.0000 0.0200 0.0000 0.0024

@CAR1A[1]
D 13.0220 0.0150 0.0150 13.0208
RND 0.0000 0.0200 0.0000 0.0033

@DIAH_8_2[1]
D 8.2000 0.0500 0.0500 8.2005
RND 0.0000 0.0500 0.0000 0.0004

@PIAN08_88[1]
Z -8.8800 0.0100 0.0100 -8.8835

@CAR2_PLN40[1]
DIST 8.3500 0.0100 -0.0100 8.3547

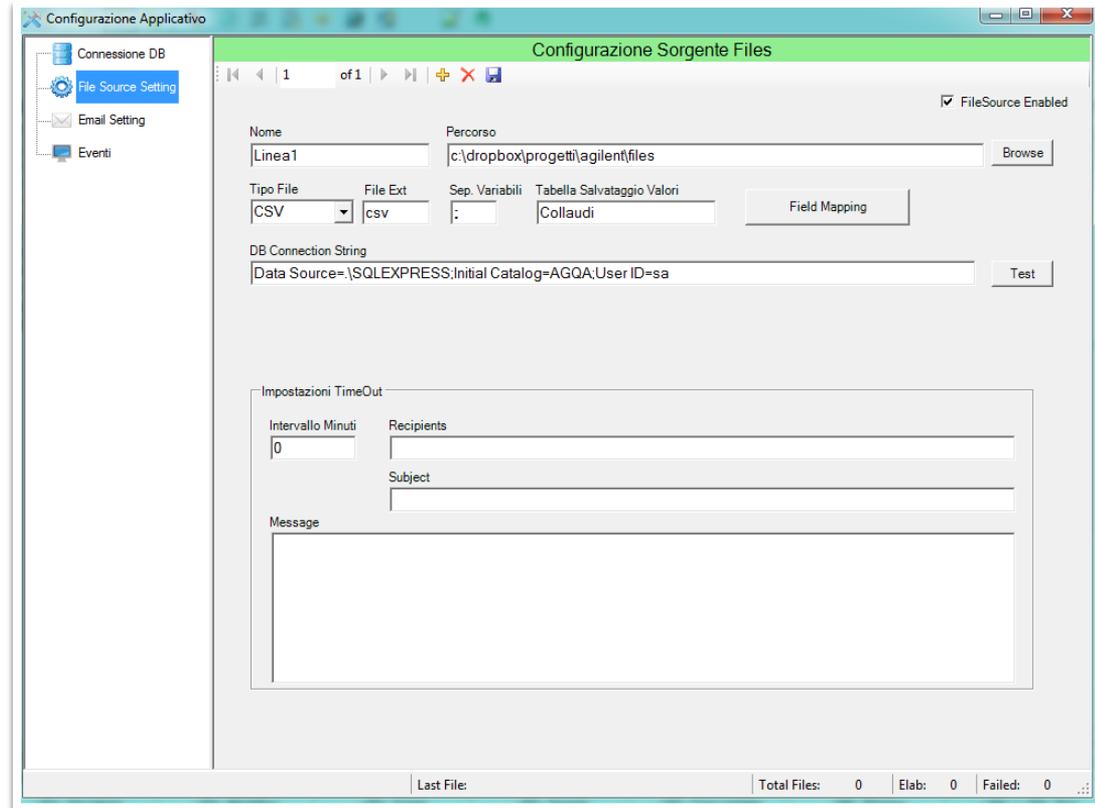
@CAR2_PLN60[1]
DIST 8.3500 0.0100 -0.0100 8.3545

@CONCEN1[1]
CNC 0.0000 0.0100 -0.0000 0.0023
    
```

3D Test equipment output

Import data from files

If the project needs to collect data from various sources files (csv, txt, excel, etc...), we can create a little stand-alone application that automatically imports the measurements values in the Databases



Remember...

We are able to provide:

- › Web demo of some projects we have developed
- › Little example using customer's subset of data

Contact us:

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