

ANEXO No. 14. Análisis del Experimento para la corriente 723: Modelo que contiene todos los efectos y el modelo que contiene sólo los 24 efectos significativos (Exclude).

MODELO CON TODOS LOS EFECTOS

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Analysis Summary

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Estimated effects for Ol y Ona 723

average	= 170,344	+/- 0,669187
A:Carga	= 24,4681	+/- 1,48268
B:Vapor_E530	= 12,48	+/- 1,48268
C:P_C525	= 24,243	+/- 1,48268
D:Nivel_V540	= 24,113	+/- 1,48268
E:Vapor_E532	= 11,2793	+/- 1,48268
AA	= 0,038642	+/- 0,856026
AB	= 2,57389	+/- 0,605302
AC	= 0,886296	+/- 0,605302
AD	= 2,05185	+/- 0,605302
AE	= -0,177778	+/- 0,605302
BB	= -0,748025	+/- 0,856026
BC	= 4,60407	+/- 0,605302
BD	= 1,19796	+/- 0,605302
BE	= -2,65648	+/- 0,605302
CC	= -5,92321	+/- 0,856026
CD	= 4,65426	+/- 0,605302
CE	= 8,53093	+/- 0,605302
DD	= 1,64642	+/- 0,856026
DE	= -2,28352	+/- 0,605302
EE	= -4,14432	+/- 0,856026
AAB	= 1,57093	+/- 1,04841
AAC	= -1,38444	+/- 1,04841
AAD	= -1,06704	+/- 1,04841
AAE	= 0,0877778	+/- 1,04841
ABB	= -1,13019	+/- 1,04841
ABC	= 3,36944	+/- 0,741341
ABD	= -0,5875	+/- 0,741341
ABE	= -0,805278	+/- 0,741341
ACC	= -3,14852	+/- 1,04841
ACD	= -1,53361	+/- 0,741341
ACE	= 3,27361	+/- 0,741341
ADD	= -0,880741	+/- 1,04841
ADE	= -1,62167	+/- 0,741341
AEE	= -1,64185	+/- 1,04841
BBC	= -3,02556	+/- 1,04841
BBD	= -0,537593	+/- 1,04841
BBE	= -0,483889	+/- 1,04841
BCC	= -0,052963	+/- 1,04841
BCD	= -0,360833	+/- 0,741341
BCE	= 0,4775	+/- 0,741341
BDD	= -1,13574	+/- 1,04841
BDE	= -0,254722	+/- 0,741341
BEE	= -0,967963	+/- 1,04841
CCD	= -2,84315	+/- 1,04841
CCE	= -6,77611	+/- 1,04841
CDD	= -0,699444	+/- 1,04841
CDE	= 3,87611	+/- 0,741341
CEE	= 6,18722	+/- 1,04841
DDE	= -0,929444	+/- 1,04841
DEE	= -3,54093	+/- 1,04841

Standard errors are based on total error with 192 d.f.

The StatAdvisor

This table shows each of the estimated effects and interactions. Also shown is the standard error of each of the effects, which measures their sampling error. To plot the estimates in decreasing order of importance, select Pareto Charts from the list of Graphical Options. To test the statistical significance of the effects, select ANOVA Table from the list of Tabular Options. You can then remove insignificant effects by pressing the alternate mouse button, selecting Analysis Options, and pressing the Exclude button.

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Analysis of Variance for Ol y Ona 723

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
A:Carga	2694,11	1	2694,11	272,34	0,0000
B:Vapor E530	700,877	1	700,877	70,85	0,0000
C:P C525	2644,75	1	2644,75	267,35	0,0000
D:Nivel V540	2616,46	1	2616,46	264,49	0,0000
E:Vapor_E532	572,498	1	572,498	57,87	0,0000
AA	0,0201582	1	0,0201582	0,00	0,9640
AB	178,872	1	178,872	18,08	0,0000
AC	21,2091	1	21,2091	2,14	0,1448
AD	113,673	1	113,673	11,49	0,0008
AE	0,853333	1	0,853333	0,09	0,7693
BB	7,5538	1	7,5538	0,76	0,3833
BC	572,332	1	572,332	57,85	0,0000
BD	38,7481	1	38,7481	3,92	0,0492
BE	190,536	1	190,536	19,26	0,0000
CC	473,64	1	473,64	47,88	0,0000
CD	584,877	1	584,877	59,12	0,0000
CE	1964,97	1	1964,97	198,63	0,0000
DD	36,5944	1	36,5944	3,70	0,0559
DE	140,79	1	140,79	14,23	0,0002
EE	231,868	1	231,868	23,44	0,0000
AAB	22,2103	1	22,2103	2,25	0,1357
AAC	17,2502	1	17,2502	1,74	0,1882
AAD	10,2471	1	10,2471	1,04	0,3101
AAE	0,0693444	1	0,0693444	0,01	0,9334
ABB	11,4959	1	11,4959	1,16	0,2824
ABC	204,357	1	204,357	20,66	0,0000
ABD	6,21281	1	6,21281	0,63	0,4291
ABE	11,6725	1	11,6725	1,18	0,2787
ACC	89,2185	1	89,2185	9,02	0,0030
ACD	42,3353	1	42,3353	4,28	0,0399
ACE	192,898	1	192,898	19,50	0,0000
ADD	6,98134	1	6,98134	0,71	0,4019
ADE	47,3364	1	47,3364	4,79	0,0299
AEE	24,2611	1	24,2611	2,45	0,1190
BBC	82,3859	1	82,3859	8,33	0,0044
BBD	2,60105	1	2,60105	0,26	0,6087
BBE	2,10734	1	2,10734	0,21	0,6449
BCC	0,0252457	1	0,0252457	0,00	0,9598
BCD	2,34361	1	2,34361	0,24	0,6270
BCE	4,10411	1	4,10411	0,41	0,5203
BDD	11,6092	1	11,6092	1,17	0,2800
BDE	1,1679	1	1,1679	0,12	0,7315
BEE	8,43257	1	8,43257	0,85	0,3570
CCD	72,7514	1	72,7514	7,35	0,0073
CCE	413,241	1	413,241	41,77	0,0000
CDD	4,403	1	4,403	0,45	0,5055
CDE	270,436	1	270,436	27,34	0,0000
CEE	344,535	1	344,535	34,83	0,0000
DDE	7,7748	1	7,7748	0,79	0,3764
DEE	112,843	1	112,843	11,41	0,0009
Total error	1899,37	192	9,89254		
Total (corr.)	71424,4	242			

R-squared = 97,3407 percent
 R-squared (adjusted for d.f.) = 96,6482 percent
 Standard Error of Est. = 3,14524
 Mean absolute error = 2,02512
 Durbin-Watson statistic = 1,53607 (P=0,0001)
 Lag 1 residual autocorrelation = 0,231383

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The ANOVA table partitions the variability in Ol y Ona 723 into separate pieces for each of the effects. It then tests the statistical significance of each effect by comparing the mean square against an estimate of the experimental error. In this case, 26

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effects have P-values less than 0,05, indicating that they are significantly different from zero at the 95,0% confidence level.

The R-Squared statistic indicates that the model as fitted explains 97,3407% of the variability in Ol y Ona 723. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 96,6482%. The standard error of the estimate shows the standard deviation of the residuals to be 3,14524. The mean absolute error (MAE) of 2,02512 is the average value of the residuals. The Durbin-Watson (DW) statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in your data file. Since the P-value is less than 0.05, there is an indication of possible serial correlation. Plot the residuals versus row order to see if there is any pattern which can be seen.

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Regression coeffs. for Ol y Ona 723

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-----
constant      = 170,344
A:Carga       = 12,2341
B:Vapor E530  = 6,24
C:P C525      = 12,1215
D:Nivel V540  = 12,0565
E:Vapor E532  = 5,63963
AA            = 0,019321
AB            = 1,28694
AC            = 0,443148
AD            = 1,02593
AE            = -0,0888889
BB            = -0,374012
BC            = 2,30204
BD            = 0,598981
BE            = -1,32824
CC            = -2,9616
CD            = 2,32713
CE            = 4,26546
DD            = 0,82321
DE            = -1,14176
EE            = -2,07216
AAB           = 0,0
AAC           = 0,0
AAD           = 0,0
AAE           = 0,0
ABB           = -0,565093
ACC           = -1,57426
ADD           = -0,44037
AEE           = -0,820926
BBC           = 0,0
BBD           = 0,0
BBE           = 0,0
BCC           = -0,0264815
BDD           = -0,56787
BEE           = -0,483981
CCD           = 0,0
CCE           = 0,0
CDD           = -0,349722
CEE           = 3,09361
DDE           = 0,0
DEE           = -1,77046
ABC           = 0,265185
ABD           = -0,310602
ABE           = 0,184769
ACD           = -3,41412
ACE           = -2,39958
ADE           = -1,76519
BCD           = -3,38356
BCE           = -4,90403
BDE           = -1,10282
CDE           = -3,3363
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The StatAdvisor

 This pane displays the regression equation which has been fitted to the data. The equation of the fitted model is

$$\begin{aligned}
 \text{Ol y Ona 723} = & 170,344 + 12,2341 \cdot \text{Carga} + 6,24 \cdot \text{Vapor_E530} + \\
 & 12,1215 \cdot \text{P_C525} + 12,0565 \cdot \text{Nivel_V540} + 5,63963 \cdot \text{Vapor_E532} + \\
 & 0,019321 \cdot \text{Carga}^2 + 1,28694 \cdot \text{Carga} \cdot \text{Vapor_E530} + 0,443148 \cdot \text{Carga} \cdot \text{P_C525} + \\
 & 1,02593 \cdot \text{Carga} \cdot \text{Nivel_V540} - 0,0888889 \cdot \text{Carga} \cdot \text{Vapor_E532} - \\
 & 0,374012 \cdot \text{Vapor_E530}^2 + 2,30204 \cdot \text{Vapor_E530} \cdot \text{P_C525} + \\
 & 0,598981 \cdot \text{Vapor_E530} \cdot \text{Nivel_V540} - 1,32824 \cdot \text{Vapor_E530} \cdot \text{Vapor_E532} - \\
 & 2,9616 \cdot \text{P_C525}^2 + 2,32713 \cdot \text{P_C525} \cdot \text{Nivel_V540} + \\
 & 4,26546 \cdot \text{P_C525} \cdot \text{Vapor_E532} + 0,82321 \cdot \text{Nivel_V540}^2 - \\
 & 1,14176 \cdot \text{Nivel_V540} \cdot \text{Vapor_E532} - 2,07216 \cdot \text{Vapor_E532}^2 + \\
 & 0,0 \cdot \text{Carga}^2 \cdot \text{Vapor_E530} + 0,0 \cdot \text{Carga}^2 \cdot \text{P_C525} + 0,0 \cdot \text{Carga}^2 \cdot \text{Nivel_V540} + \\
 & 0,0 \cdot \text{Carga}^2 \cdot \text{Vapor_E532} - 0,565093 \cdot \text{Carga} \cdot \text{Vapor_E530}^2 + \\
 & 0,265185 \cdot \text{Carga} \cdot \text{Vapor_E530} \cdot \text{P_C525} -
 \end{aligned}$$

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$$\begin{aligned} &0,310602 * \text{Carga} * \text{Vapor E530} * \text{Nivel V540} + \\ &0,184769 * \text{Carga} * \text{Vapor E530} * \text{Vapor E532} - 1,57426 * \text{Carga} * \text{P C525}^2 - \\ &3,41412 * \text{Carga} * \text{P C525} * \text{Nivel V540} - 2,39958 * \text{Carga} * \text{P C525} * \text{Vapor E532} - \\ &0,44037 * \text{Carga} * \text{Nivel V540}^2 - 1,76519 * \text{Carga} * \text{Nivel V540} * \text{Vapor E532} - \\ &0,820926 * \text{Carga} * \text{Vapor E532}^2 + 0,0 * \text{Vapor E530}^2 * \text{P C525} + \\ &0,0 * \text{Vapor E530}^2 * \text{Nivel V540} + 0,0 * \text{Vapor E530}^2 * \text{Vapor E532} - \\ &0,0264815 * \text{Vapor E530} * \text{P C525}^2 - 3,38356 * \text{Vapor E530} * \text{P C525} * \text{Nivel V540} - \\ &4,90403 * \text{Vapor E530} * \text{P C525} * \text{Vapor E532} - 0,56787 * \text{Vapor E530} * \text{Nivel V540}^2 \\ &- 1,10282 * \text{Vapor E530} * \text{Nivel V540} * \text{Vapor E532} - \\ &0,483981 * \text{Vapor E530} * \text{Vapor E532}^2 + 0,0 * \text{P C525}^2 * \text{Nivel V540} + \\ &0,0 * \text{P C525}^2 * \text{Vapor E532} - 0,349722 * \text{P C525} * \text{Nivel V540}^2 - \\ &3,3363 * \text{P C525} * \text{Nivel V540} * \text{Vapor E532} + 3,09361 * \text{P C525} * \text{Vapor E532}^2 + \\ &0,0 * \text{Nivel V540}^2 * \text{Vapor E532} - 1,77046 * \text{Nivel V540} * \text{Vapor E532}^2 \end{aligned}$$

where the values of the variables are specified in their original units. To have STATGRAPHICS evaluate this function, select Predictions from the list of Tabular Options. To plot the function, select Response Plots from the list of Graphical Options.

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Estimation Results for Ol y Ona 723

Row	Observed Value	Fitted Value	Lower 95,0% CL for Mean	Upper 95,0% CL for Mean
1	136,84	135,461	131,852	139,071
2	142,94	142,259	139,203	145,316
3	149,02	149,889	146,28	153,498
4	137,28	137,254	134,197	140,31
5	144,62	144,13	141,501	146,758
6	151,49	153,409	150,352	156,465
7	144,02	143,475	139,866	147,084
8	149,22	149,299	146,242	152,356
9	158,34	159,097	155,488	162,706
10	145,2	139,886	136,829	142,943
11	150,64	146,839	144,211	149,468
12	152,44	153,239	150,182	156,296
13	145,9	143,777	141,148	146,405
14	155,0	152,493	150,215	154,77
15	165,1	162,227	159,598	164,855
16	146,65	149,071	146,014	152,128
17	157,09	158,419	155,791	161,048
18	171,97	170,357	167,3	173,414
19	148,7	151,209	147,6	154,818
20	152,44	155,168	152,111	158,225
21	152,41	157,19	153,581	160,799
22	153,94	157,144	154,088	160,201
23	163,41	164,552	161,923	167,18
24	170,34	171,592	168,535	174,649
25	160,68	161,458	157,849	165,067
26	171,51	171,183	168,126	174,24
27	182,4	182,112	178,502	185,721
28	138,38	137,826	134,769	140,883
29	147,62	148,496	145,867	151,124
30	159,5	158,929	155,872	161,986
31	137,97	141,656	139,027	144,284
32	150,74	152,109	149,832	154,387
33	163,33	163,898	161,27	166,527
34	147,72	149,376	146,32	152,433
35	158,77	158,485	155,856	161,113
36	172,52	170,499	167,442	173,556
37	148,89	145,359	142,73	147,987
38	156,78	155,416	153,139	157,694
39	167,73	163,853	161,225	166,482
40	150,79	151,106	148,828	153,383
41	163,15	162,632	160,724	164,541
42	174,55	174,11	171,832	176,387
43	159,81	157,719	155,091	160,348
44	170,4	169,585	167,307	171,862
45	181,49	182,972	180,344	185,601
46	153,42	156,946	153,889	160,003
47	162,25	163,243	160,614	165,871
48	168,81	166,535	163,478	169,592
49	166,3	164,558	161,929	167,186
50	174,94	174,009	171,731	176,286
51	181,37	182,026	179,397	184,654
52	169,29	170,01	166,953	173,067
53	179,2	181,485	178,856	184,113
54	195,41	193,097	190,04	196,154
55	143,93	145,483	141,874	149,092
56	156,32	159,143	156,086	162,199
57	168,82	171,5	167,891	175,109
58	154,16	150,214	147,157	153,27
59	162,89	163,364	160,736	165,993
60	174,15	176,783	173,726	179,84
61	157,94	158,298	154,689	161,908
62	168,33	169,809	166,753	172,866
63	181,91	183,16	179,55	186,769
64	156,32	155,424	152,367	158,48
65	168,17	167,705	165,076	170,333
66	179,08	177,299	174,242	180,355
67	162,02	161,892	159,263	164,52
68	176,27	175,348	173,071	177,626

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69	187,37	187,689	185,06	190,317
70	171,31	168,688	165,631	171,745
71	182,44	182,19	179,562	184,819
72	193,94	196,147	193,09	199,203
73	161,68	166,575	162,966	170,185
74	177,27	174,329	171,272	177,386
75	178,19	178,012	174,402	181,621
76	175,78	174,728	171,671	177,785
77	186,45	185,342	182,714	187,971
78	191,03	193,455	190,399	196,512
79	178,87	180,184	176,574	183,793
80	192,67	192,528	189,471	195,584
81	209,32	203,942	200,333	207,551
82	137,86	139,907	136,85	142,964
83	143,69	146,97	144,341	149,598
84	157,18	154,952	151,895	158,009
85	138,3	141,388	138,759	144,016
86	146,11	148,126	145,849	150,404
87	156,0	157,355	154,726	159,984
88	148,74	146,814	143,757	149,871
89	150,44	152,098	149,47	154,727
90	162,47	161,443	158,386	164,5
91	145,79	145,078	142,449	147,707
92	154,17	153,933	151,655	156,21
93	161,95	162,322	159,693	164,951
94	146,95	148,896	146,619	151,174
95	158,12	159,111	157,202	161,02
96	170,08	170,432	168,154	172,709
97	151,18	153,634	151,005	156,262
98	165,62	164,079	161,801	166,356
99	175,72	177,201	174,572	179,829
100	150,81	150,371	147,314	153,428
101	158,86	157,868	155,24	160,497
102	166,64	163,517	160,46	166,573
103	159,23	156,473	153,844	159,101
104	168,01	167,016	164,738	169,293
105	177,31	177,28	174,651	179,908
106	163,74	160,469	157,412	163,526
107	176,56	172,927	170,298	175,555
108	190,0	186,677	183,62	189,733
109	141,03	142,365	139,737	144,994
110	151,26	152,488	150,211	154,766
111	163,3	162,464	159,835	165,092
112	145,35	145,756	143,479	148,034
113	155,47	155,261	153,353	157,17
114	167,19	166,189	163,912	168,467
115	152,93	152,555	149,926	155,183
116	165,13	160,311	158,034	162,589
117	176,23	171,062	168,434	173,691
118	149,4	152,582	150,305	154,86
119	159,65	163,73	161,822	165,639
120	169,75	173,346	171,069	175,624
121	155,94	158,13	156,221	160,038
122	170,71	170,344	169,024	171,664
123	183,48	182,598	180,689	184,506
124	163,59	164,059	161,782	166,337
125	176,2	176,21	174,302	178,119
126	173,15	189,971	187,694	192,248
127	161,28	160,077	157,449	162,706
128	169,49	169,102	166,824	171,379
129	176,52	175,21	172,581	177,838
130	169,97	167,728	165,451	170,006
131	181,91	179,504	177,596	181,413
132	189,49	189,934	187,657	192,212
133	175,26	172,736	170,107	175,364
134	185,8	186,133	183,855	188,41
135	199,73	199,755	197,126	202,384
136	148,6	149,186	146,129	152,243
137	163,43	161,489	158,86	164,117
138	177,27	172,577	169,52	175,634
139	155,48	153,351	150,722	155,979
140	168,37	164,742	162,464	167,019
141	182,43	176,489	173,86	179,117

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142	161,28	160,386	157,329	163,443
143	171,77	169,735	167,106	172,363
144	188,22	181,011	177,954	184,068
145	161,45	163,749	161,121	166,378
146	172,91	176,31	174,033	178,588
147	183,9	186,272	183,643	188,9
148	168,35	169,89	167,613	172,168
149	180,1	183,224	181,315	185,133
150	195,15	195,529	193,252	197,807
151	172,39	175,876	173,247	178,504
152	186,17	188,852	186,575	191,13
153	197,74	202,371	199,743	205,0
154	181,19	172,747	169,69	175,804
155	181,19	182,418	179,789	185,046
156	189,41	188,105	185,048	191,162
157	181,83	180,812	178,183	183,44
158	192,35	192,94	190,662	195,217
159	199,78	202,655	200,026	205,284
160	184,76	185,695	182,638	188,752
161	196,64	199,15	196,522	201,779
162	210,36	211,764	208,707	214,821
163	140,64	140,171	136,562	143,781
164	146,92	145,857	142,8	148,914
165	153,88	152,55	148,941	156,159
166	141,4	140,373	137,317	143,43
167	147,28	145,332	142,704	147,961
168	153,48	152,869	149,812	155,926
169	145,29	144,037	140,428	147,646
170	147,62	147,138	144,082	150,195
171	153,77	154,389	150,78	157,998
172	148,49	152,276	149,219	155,333
173	159,96	161,391	158,762	164,019
174	169,69	170,127	167,071	173,184
175	151,74	155,054	152,425	157,682
176	161,19	165,126	162,849	167,403
177	176,08	176,392	173,763	179,02
178	164,57	158,268	155,211	161,324
179	168,37	168,167	165,539	170,796
180	181,37	180,831	177,774	183,888
181	160,11	157,726	154,117	161,335
182	166,15	167,121	164,064	170,177
183	175,13	174,753	171,144	178,362
184	166,44	163,027	159,97	166,084
185	181,72	175,064	172,435	177,692
186	185,24	186,909	183,853	189,966
187	160,87	165,738	162,128	169,347
188	167,44	179,287	176,23	182,343
189	196,75	194,216	190,606	197,825
190	141,99	139,182	136,126	142,239
191	149,99	147,118	144,489	149,746
192	152,81	154,993	151,936	158,05
193	142,79	141,167	138,538	143,795
194	148,67	148,082	145,804	150,359
195	155,61	156,507	153,878	159,136
196	143,54	146,075	143,018	149,132
197	149,27	150,839	148,21	153,467
198	155,67	158,684	155,627	161,741
199	158,37	158,271	155,642	160,899
200	168,48	168,868	166,591	171,145
201	179,77	178,021	175,392	180,649
202	161,12	162,651	160,373	164,928
203	176,3	173,912	172,003	175,82
204	188,15	185,299	183,022	187,577
205	169,23	166,929	164,3	169,557
206	179,89	177,724	175,446	180,001
207	194,03	190,216	187,587	192,844
208	167,67	167,862	164,805	170,918
209	179,28	177,972	175,343	180,6
210	181,05	185,253	182,196	188,31
211	168,54	174,584	171,955	177,212
212	189,07	187,043	184,765	189,32
213	198,21	198,244	195,615	200,872
214	179,02	178,179	175,122	181,235

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215	193,24	191,856	189,227	194,485
216	204,81	205,846	202,789	208,903
217	144,99	141,626	138,017	145,236
218	150,56	150,931	147,874	153,987
219	154,12	159,108	155,498	162,717
220	144,28	144,258	141,201	147,314
221	150,64	152,247	149,619	154,876
222	157,57	160,681	157,624	163,738
223	145,06	149,275	145,666	152,884
224	150,86	154,82	151,763	157,877
225	157,46	162,38	158,77	165,989
226	164,83	166,999	163,942	170,056
227	179,22	178,198	175,57	180,827
228	190,41	186,886	183,829	189,943
229	172,28	171,845	169,217	174,474
230	183,92	183,414	181,137	185,692
231	197,23	194,043	191,415	196,672
232	178,85	176,052	172,995	179,109
233	192,66	186,861	184,233	189,49
234	204,98	198,301	195,244	201,358
235	179,33	180,031	176,422	183,64
236	189,07	189,976	186,919	193,033
237	196,96	196,026	192,417	199,635
238	184,99	187,039	183,982	190,096
239	197,35	199,039	196,411	201,668
240	206,47	208,715	205,658	211,771
241	191,66	190,382	186,773	193,991
242	203,54	203,307	200,25	206,364
243	216,03	215,478	211,869	219,087

The StatAdvisor

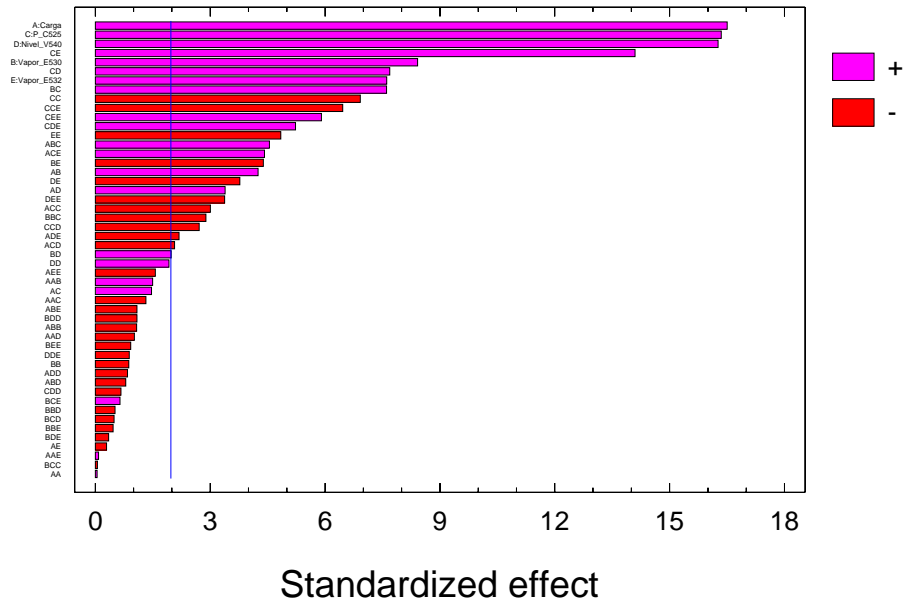
 This table contains information about values of Ol_y_Ona_723 generated using the fitted model. The table includes:

- (1) the observed value of Ol y Ona 723 (if any)
- (2) the predicted value of Ol y Ona 723 using the fitted model
- (3) 95,0% confidence limits for the mean response

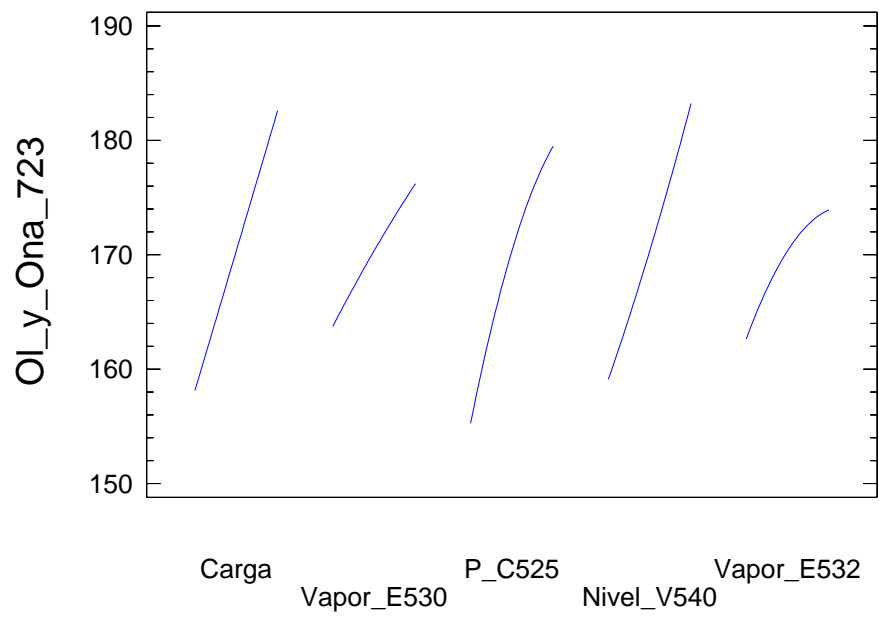
Each item corresponds to the values of the experimental factors in a specific row of your data file. To generate forecasts for additional combinations of the factors, add additional rows to the bottom of your data file. In each new row, enter values for the experimental factors but leave the cell for the response empty. When you return to this pane, forecasts will be added to the table for the new rows, but the model will be unaffected.

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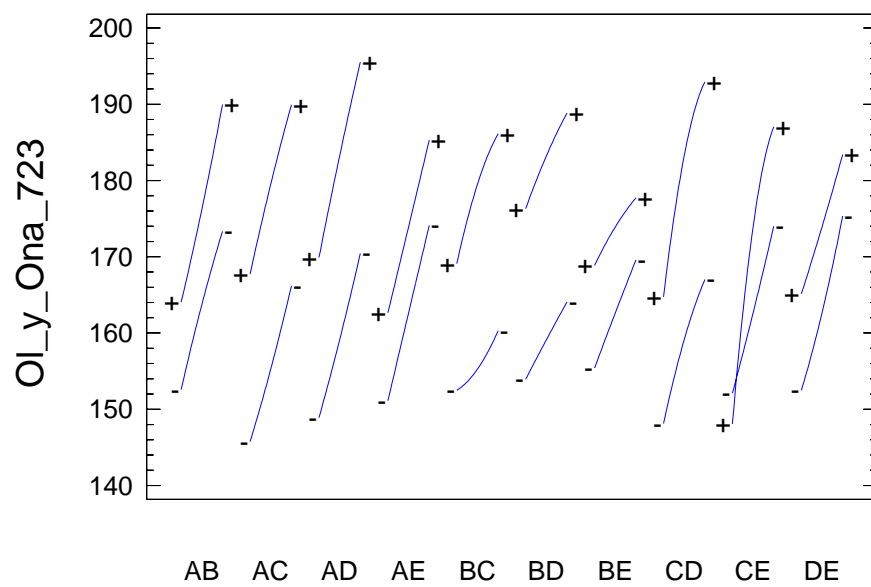
Standardized Pareto Chart for Ol_y_Ona_723



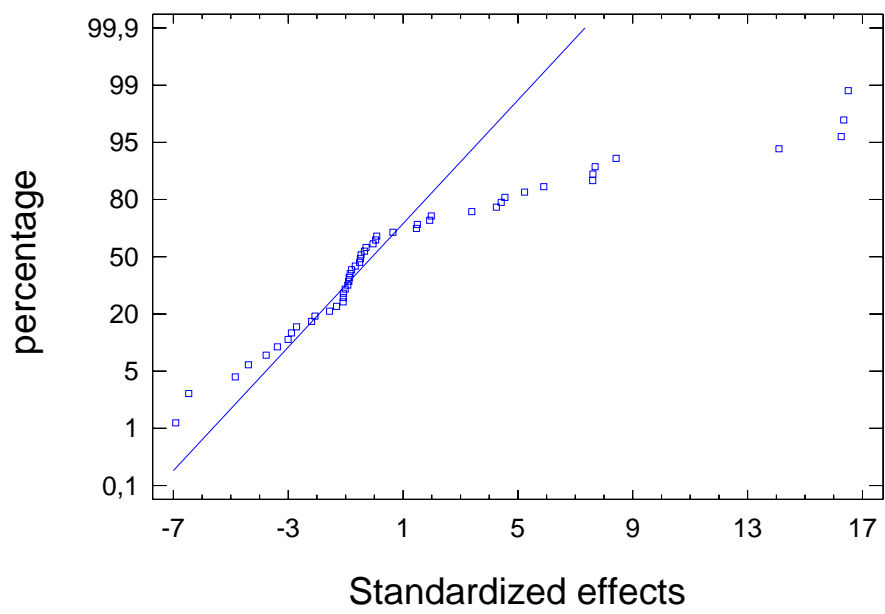
Main Effects Plot for Ol_y_Ona_723



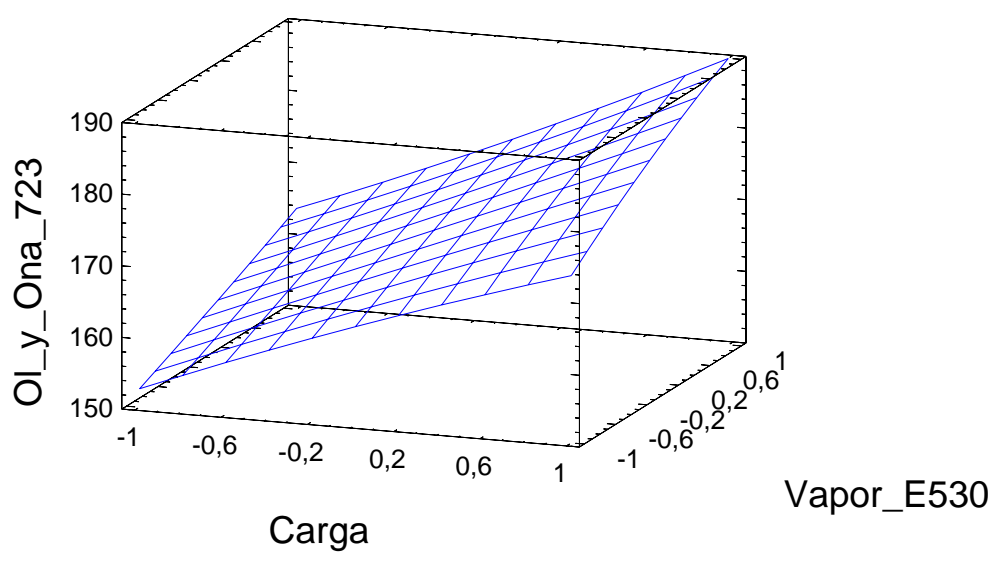
Interaction Plot for Ol_y_Ona_723



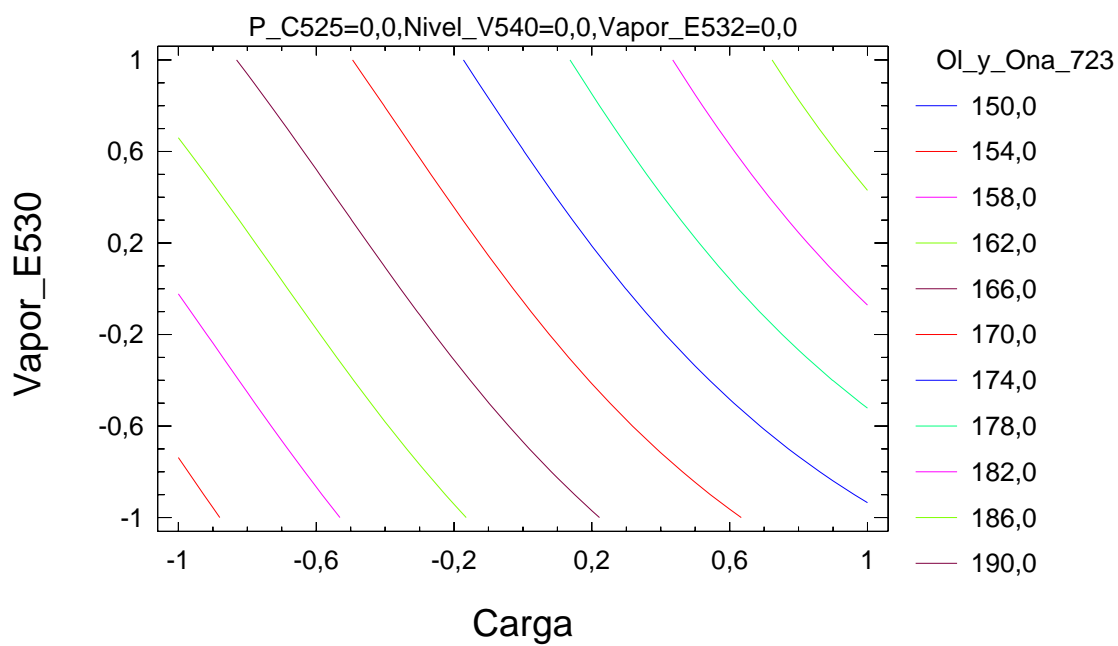
Normal Probability Plot for Ol_y_Ona_723



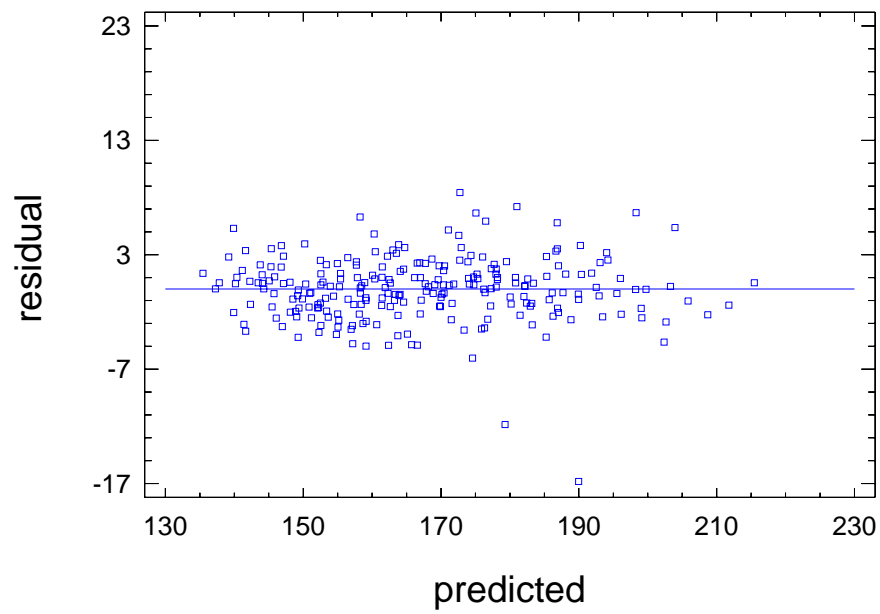
Estimated Response Surface
P_C525=0,0,Nivel_V540=0,0,Vapor_E532=0,0



Contours of Estimated Response Surface



Residual Plot for Ol_y_Ona_723



MODELO EXCLUDE

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Analysis Summary

File name: C:\Documents and Settings\Edward A. Moscoso\Mis documentos\Statgraphics\CB_723_SQ_03

Estimated effects for Ol y Ona 723

```
-----  
average      = 170,657 +/- 0,44945  
A:Carga      = 22,033 +/- 0,852771  
B:Vapor_E530 = 12,0895 +/- 0,492348  
C:P_C525     = 22,8537 +/- 1,10092  
D:Nivel_V540 = 23,0432 +/- 1,10092  
E:Vapor_E532 = 10,3956 +/- 0,852771  
AB           = 2,57389 +/- 0,603  
AD           = 2,05185 +/- 0,603  
BC           = 4,60407 +/- 0,603  
BD           = 1,19796 +/- 0,603  
BE           = -2,65648 +/- 0,603  
CC           = -5,92321 +/- 0,852771  
CD           = 4,65426 +/- 0,603  
CE           = 8,53093 +/- 0,603  
DE           = -2,28352 +/- 0,603  
EE           = -4,14432 +/- 0,852771  
ABC          = 3,36944 +/- 0,738521  
ACC          = -3,14852 +/- 1,04443  
ACD          = -1,53361 +/- 0,738521  
ACE          = 3,27361 +/- 0,738521  
ADE          = -1,62167 +/- 0,738521  
BBC          = -3,02556 +/- 1,04443  
CCD          = -2,84315 +/- 1,04443  
CCE          = -6,77611 +/- 1,04443  
CDE          = 3,87611 +/- 0,738521  
CEE          = 6,18722 +/- 1,04443  
DEE          = -3,54093 +/- 1,04443  
-----
```

Standard errors are based on total error with 216 d.f.

The StatAdvisor

This table shows each of the estimated effects and interactions. Also shown is the standard error of each of the effects, which measures their sampling error. To plot the estimates in decreasing order of importance, select Pareto Charts from the list of Graphical Options. To test the statistical significance of the effects, select ANOVA Table from the list of Tabular Options. You can then remove insignificant effects by pressing the alternate mouse button, selecting Analysis Options, and pressing the Exclude button.

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Analysis of Variance for Ol y Ona 723

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
A:Carga	6553,59	1	6553,59	667,55	0,0000
B:Vapor_E530	5919,32	1	5919,32	602,94	0,0000
C:P_C525	4230,56	1	4230,56	430,92	0,0000
D:Nivel_V540	4301,02	1	4301,02	438,10	0,0000
E:Vapor_E532	1458,91	1	1458,91	148,60	0,0000
AB	178,872	1	178,872	18,22	0,0000
AD	113,673	1	113,673	11,58	0,0008
BC	572,332	1	572,332	58,30	0,0000
BD	38,7481	1	38,7481	3,95	0,0482
BE	190,536	1	190,536	19,41	0,0000
CC	473,64	1	473,64	48,24	0,0000
CD	584,877	1	584,877	59,58	0,0000
CE	1964,97	1	1964,97	200,15	0,0000
DE	140,79	1	140,79	14,34	0,0002
EE	231,868	1	231,868	23,62	0,0000
ABC	204,357	1	204,357	20,82	0,0000
ACC	89,2185	1	89,2185	9,09	0,0029
ACD	42,3353	1	42,3353	4,31	0,0390
ACE	192,898	1	192,898	19,65	0,0000
ADE	47,3364	1	47,3364	4,82	0,0292
BBC	82,3859	1	82,3859	8,39	0,0042
CCD	72,7514	1	72,7514	7,41	0,0070
CCE	413,241	1	413,241	42,09	0,0000
CDE	270,436	1	270,436	27,55	0,0000
CEE	344,535	1	344,535	35,09	0,0000
DEE	112,843	1	112,843	11,49	0,0008
Total error	2120,57	216	9,81745		
Total (corr.)	71424,4	242			

R-squared = 97,031 percent
 R-squared (adjusted for d.f.) = 96,6737 percent
 Standard Error of Est. = 3,13328
 Mean absolute error = 2,21932
 Durbin-Watson statistic = 1,5014 (P=0,0000)
 Lag 1 residual autocorrelation = 0,244781

The StatAdvisor

The ANOVA table partitions the variability in Ol y Ona 723 into separate pieces for each of the effects. It then tests the statistical significance of each effect by comparing the mean square against an estimate of the experimental error. In this case, 26 effects have P-values less than 0,05, indicating that they are significantly different from zero at the 95,0% confidence level. The R-Squared statistic indicates that the model as fitted explains 97,031% of the variability in Ol y Ona 723. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 96,6737%. The standard error of the estimate shows the standard deviation of the residuals to be 3,13328. The mean absolute error (MAE) of 2,21932 is the average value of the residuals. The Durbin-Watson (DW) statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in your data file. Since the P-value is less than 0.05, there is an indication of possible serial correlation. Plot the residuals versus row order to see if there is any pattern which can be seen.

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Regression coeffs. for Ol y Ona 723

```
-----  
constant      = 170,657  
A:Carga       = 11,0165  
B:Vapor E530  = 6,04475  
C:P C525      = 11,4269  
D:Nivel V540  = 11,5216  
E:Vapor E532  = 5,19778  
AB            = 1,28694  
AD            = 1,02593  
BC            = 2,30204  
BD            = 0,598981  
BE            = -1,32824  
CC            = -2,9616  
CD            = 2,32713  
CE            = 4,26546  
DE            = -1,14176  
EE            = -2,07216  
ACC          = -1,57426  
BBC          = 0,0  
CCD          = 0,0  
CCE          = 0,0  
CEE          = 3,09361  
DEE          = -1,77046  
ABC          = 0,171944  
ACD          = -2,18838  
ACE          = -1,75125  
ADE          = -0,810833  
BCD          = -2,93435  
BCE          = -4,90083  
CDE          = -2,87157  
-----
```

The StatAdvisor

This pane displays the regression equation which has been fitted to the data. The equation of the fitted model is

$$\begin{aligned} \text{Ol y Ona 723} = & 170,657 + 11,0165 * \text{Carga} + 6,04475 * \text{Vapor E530} + \\ & 11,4269 * \text{P C525} + 11,5216 * \text{Nivel V540} + 5,19778 * \text{Vapor E532} + \\ & 1,28694 * \text{Carga} * \text{Vapor E530} + 1,02593 * \text{Carga} * \text{Nivel V540} + \\ & 2,30204 * \text{Vapor E530} * \text{P C525} + 0,598981 * \text{Vapor E530} * \text{Nivel V540} - \\ & 1,32824 * \text{Vapor E530} * \text{Vapor E532} - 2,9616 * \text{P C525}^2 + \\ & 2,32713 * \text{P C525} * \text{Nivel V540} + 4,26546 * \text{P C525} * \text{Vapor E532} - \\ & 1,14176 * \text{Nivel V540} * \text{Vapor E532} - 2,07216 * \text{Vapor E532}^2 + \\ & 0,171944 * \text{Carga} * \text{Vapor E530} * \text{P C525} - 1,57426 * \text{Carga} * \text{P C525}^2 - \\ & 2,18838 * \text{Carga} * \text{P C525} * \text{Nivel V540} - 1,75125 * \text{Carga} * \text{P C525} * \text{Vapor E532} - \\ & 0,810833 * \text{Carga} * \text{Nivel V540} * \text{Vapor E532} + 0,0 * \text{Vapor E530}^2 * \text{P C525} - \\ & 2,93435 * \text{Vapor E530} * \text{P C525} * \text{Nivel V540} - \\ & 4,90083 * \text{Vapor E530} * \text{P C525} * \text{Vapor E532} + 0,0 * \text{P C525}^2 * \text{Nivel V540} + \\ & 0,0 * \text{P C525}^2 * \text{Vapor E532} - 2,87157 * \text{P C525} * \text{Nivel V540} * \text{Vapor E532} + \\ & 3,09361 * \text{P C525} * \text{Vapor E532}^2 - 1,77046 * \text{Nivel V540} * \text{Vapor E532}^2 \end{aligned}$$

where the values of the variables are specified in their original units. To have STATGRAPHICS evaluate this function, select Predictions from the list of Tabular Options. To plot the function, select Response Plots from the list of Graphical Options.

Análisis de la Corriente, 723 (Experimento para determinación de Curvatura)
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Estimation Results for Ol y Ona 723

Row	Observed Value	Fitted Value	Lower 95,0% CL for Mean	Upper 95,0% CL for Mean
1	136,84	132,643	129,874	135,413
2	142,94	141,517	139,397	143,636
3	149,02	150,39	147,62	153,16
4	137,28	136,0	133,582	138,418
5	144,62	144,476	142,591	146,36
6	151,49	152,951	150,533	155,369
7	144,02	142,383	139,613	145,153
8	149,22	150,461	148,341	152,58
9	158,34	158,538	155,769	161,308
10	145,2	137,827	135,521	140,133
11	150,64	145,72	143,883	147,557
12	152,44	153,613	151,307	155,918
13	145,9	143,314	141,309	145,32
14	155,0	152,494	150,934	154,054
15	165,1	161,674	159,668	163,679
16	146,65	148,801	146,495	151,107
17	157,09	159,268	157,431	161,105
18	171,97	169,734	167,429	172,04
19	148,7	149,855	147,085	152,625
20	152,44	153,619	151,499	155,739
21	152,41	157,383	154,613	160,152
22	153,94	157,472	155,054	159,89
23	163,41	164,208	162,323	166,092
24	170,34	170,943	168,525	173,361
25	160,68	162,064	159,294	164,834
26	171,51	171,771	169,651	173,891
27	182,4	181,478	178,708	184,248
28	138,38	138,523	136,474	140,572
29	147,62	150,0	148,44	151,56
30	159,5	161,477	159,428	163,526
31	137,97	142,479	140,828	144,13
32	150,74	153,558	152,2	154,916
33	163,33	164,637	162,986	166,289
34	147,72	149,461	147,412	151,51
35	158,77	160,142	158,582	161,702
36	172,52	170,823	168,774	172,872
37	148,89	146,284	144,58	147,988
38	156,78	156,014	154,656	157,372
39	167,73	165,743	164,039	167,447
40	150,79	152,37	150,97	153,771
41	163,15	163,387	162,266	164,507
42	174,55	174,403	173,002	175,804
43	159,81	158,456	156,752	160,16
44	170,4	170,76	169,402	172,118
45	181,49	183,063	181,359	184,767
46	153,42	158,047	155,998	160,096
47	162,25	162,88	161,321	164,44
48	168,81	167,714	165,665	169,763
49	166,3	166,263	164,611	167,914
50	174,94	174,068	172,71	175,426
51	181,37	181,874	180,222	183,525
52	169,29	171,453	169,404	173,502
53	179,2	182,23	180,671	183,79
54	195,41	193,007	190,958	195,056
55	143,93	144,403	141,633	147,173
56	156,32	158,483	156,364	160,603
57	168,82	172,564	169,794	175,333
58	154,16	148,958	146,54	151,376
59	162,89	162,64	160,756	164,525
60	174,15	176,323	173,905	178,741
61	157,94	156,538	153,769	159,308
62	168,33	169,823	167,703	171,943
63	181,91	183,108	180,338	185,878
64	156,32	154,741	152,435	157,047
65	168,17	166,308	164,471	168,145
66	179,08	177,874	175,568	180,18
67	162,02	161,426	159,421	163,432
68	176,27	174,28	172,72	175,839

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69	187,37	187,133	185,127	189,138
70	171,31	168,111	165,806	170,417
71	182,44	182,252	180,415	184,089
72	193,94	196,392	194,086	198,698
73	161,68	166,238	163,468	169,008
74	177,27	172,142	170,022	174,261
75	178,19	178,045	175,276	180,815
76	175,78	175,053	172,635	177,471
77	186,45	183,929	182,044	185,813
78	191,03	192,804	190,386	195,222
79	178,87	180,843	178,073	183,612
80	192,67	192,69	190,57	194,809
81	209,32	204,537	201,767	207,306
82	137,86	138,817	136,448	141,186
83	143,69	146,864	144,996	148,733
84	157,18	154,912	152,543	157,28
85	138,3	140,846	138,811	142,88
86	146,11	148,495	146,791	150,199
87	156,0	156,145	154,11	158,179
88	148,74	145,9	143,531	148,269
89	150,44	153,152	151,283	155,021
90	162,47	160,403	158,035	162,772
91	145,79	144,986	142,995	146,976
92	154,17	153,689	152,092	155,286
93	161,95	162,393	160,402	164,384
94	146,95	149,144	147,406	150,883
95	158,12	159,135	157,734	160,536
96	170,08	169,126	167,387	170,864
97	151,18	153,303	151,313	155,294
98	165,62	164,581	162,984	166,178
99	175,72	175,858	173,868	177,849
100	150,81	151,223	148,854	153,591
101	158,86	157,434	155,565	159,303
102	166,64	163,646	161,277	166,014
103	159,23	157,512	155,477	159,546
104	168,01	166,695	164,991	168,399
105	177,31	175,878	173,843	177,912
106	163,74	160,775	158,406	163,144
107	176,56	172,93	171,061	174,798
108	190,0	185,085	182,716	187,453
109	141,03	144,198	142,41	145,987
110	151,26	154,038	152,638	155,439
111	163,3	163,878	162,09	165,667
112	145,35	146,826	145,384	148,268
113	155,47	156,268	154,954	157,582
114	167,19	165,71	164,268	167,152
115	152,93	152,479	150,691	154,267
116	165,13	161,524	160,123	162,924
117	176,23	170,568	168,78	172,356
118	149,4	154,882	153,44	156,324
119	159,65	164,612	163,602	165,622
120	169,75	174,341	172,899	175,784
121	155,94	159,64	158,419	160,861
122	170,71	170,657	169,771	171,542
123	183,48	181,673	180,452	182,894
124	163,59	164,398	162,956	165,84
125	176,2	176,701	175,691	177,711
126	173,15	189,005	187,563	190,447
127	161,28	162,792	161,003	164,58
128	169,49	169,262	167,862	170,663
129	176,52	175,733	173,945	177,521
130	169,97	169,68	168,238	171,122
131	181,91	179,122	177,808	180,436
132	189,49	188,564	187,122	190,006
133	175,26	173,542	171,754	175,33
134	185,8	185,956	184,555	187,357
135	199,73	198,37	196,581	200,158
136	148,6	149,579	147,211	151,948
137	163,43	161,212	159,343	163,081
138	177,27	172,845	170,476	175,214
139	155,48	152,806	150,772	154,841
140	168,37	164,041	162,337	165,745
141	182,43	175,276	173,241	177,311

Análisis de la Corriente, 723 (Experimento para determinación de Curvatura)
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142	161,28	159,058	156,69	161,427
143	171,77	169,896	168,027	171,764
144	188,22	180,733	178,364	183,101
145	161,45	164,779	162,788	166,77
146	172,91	175,534	173,937	177,132
147	183,9	186,29	184,299	188,281
148	168,35	170,136	168,398	171,874
149	180,1	182,178	180,778	183,579
150	195,15	194,221	192,482	195,959
151	172,39	175,493	173,502	177,483
152	186,17	188,822	187,225	190,419
153	197,74	202,151	200,161	204,142
154	181,19	174,361	171,992	176,73
155	181,19	181,09	179,222	182,959
156	189,41	187,82	185,451	190,189
157	181,83	181,848	179,813	183,882
158	192,35	191,549	189,845	193,253
159	199,78	201,25	199,216	203,285
160	184,76	186,309	183,94	188,678
161	196,64	198,982	197,113	200,851
162	210,36	211,655	209,286	214,024
163	140,64	138,2	135,43	140,97
164	146,92	145,421	143,302	147,541
165	153,88	152,643	149,873	155,412
166	141,4	138,901	136,483	141,318
167	147,28	145,724	143,84	147,608
168	153,48	152,548	150,13	154,966
169	145,29	142,627	139,857	145,396
170	147,62	149,052	146,933	151,172
171	153,77	155,478	152,708	158,248
172	148,49	151,541	149,235	153,847
173	159,96	161,055	159,218	162,892
174	169,69	170,57	168,264	172,876
175	151,74	154,371	152,366	156,377
176	161,19	165,173	163,613	166,733
177	176,08	175,974	173,969	177,98
178	164,57	157,202	154,896	159,508
179	168,37	169,29	167,453	171,127
180	181,37	181,379	179,073	183,685
181	160,11	158,174	155,404	160,944
182	166,15	166,833	164,714	168,953
183	175,13	175,492	172,723	178,262
184	166,44	163,135	160,717	165,553
185	181,72	174,766	172,881	176,65
186	185,24	186,396	183,978	188,814
187	160,87	165,07	162,3	167,84
188	167,44	179,672	177,553	181,792
189	196,75	194,275	191,505	197,044
190	141,99	139,542	137,493	141,591
191	149,99	147,745	146,185	149,305
192	152,81	155,948	153,899	157,997
193	142,79	140,841	139,19	142,493
194	148,67	148,647	147,289	150,005
195	155,61	156,452	154,801	158,103
196	143,54	145,166	143,117	147,215
197	149,27	152,574	151,014	154,134
198	155,67	159,982	157,933	162,031
199	158,37	159,336	157,632	161,04
200	168,48	169,066	167,708	170,424
201	179,77	178,795	177,091	180,499
202	161,12	162,766	161,365	164,166
203	176,3	173,782	172,662	174,903
204	188,15	184,799	183,398	186,199
205	169,23	166,195	164,491	167,899
206	179,89	178,499	177,141	179,857
207	194,03	190,802	189,098	192,506
208	167,67	169,58	167,531	171,629
209	179,28	177,687	176,127	179,247
210	181,05	185,795	183,746	187,844
211	168,54	175,139	173,488	176,791
212	189,07	186,219	184,86	187,577
213	198,21	197,298	195,646	198,949
214	179,02	177,674	175,625	179,723

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215	193,24	191,724	190,165	193,284
216	204,81	205,775	203,726	207,824
217	144,99	140,884	138,114	143,653
218	150,56	150,069	147,949	152,188
219	154,12	159,254	156,484	162,023
220	144,28	142,782	140,364	145,2
221	150,64	151,569	149,685	153,454
222	157,57	160,357	157,939	162,775
223	145,06	147,706	144,936	150,476
224	150,86	156,096	153,976	158,215
225	157,46	164,485	161,715	167,255
226	164,83	167,132	164,826	169,437
227	179,22	177,076	175,239	178,913
228	190,41	187,021	184,715	189,327
229	172,28	171,16	169,155	173,166
230	183,92	182,392	180,832	183,951
231	197,23	193,623	191,618	195,629
232	178,85	175,189	172,883	177,494
233	192,66	187,707	185,87	189,544
234	204,98	200,226	197,92	202,531
235	179,33	180,986	178,216	183,755
236	189,07	188,541	186,422	190,661
237	196,96	196,097	193,327	198,867
238	184,99	187,144	184,726	189,562
239	197,35	197,672	195,787	199,556
240	206,47	208,199	205,781	210,617
241	191,66	190,277	187,508	193,047
242	203,54	203,776	201,657	205,896
243	216,03	217,275	214,506	220,045

The StatAdvisor

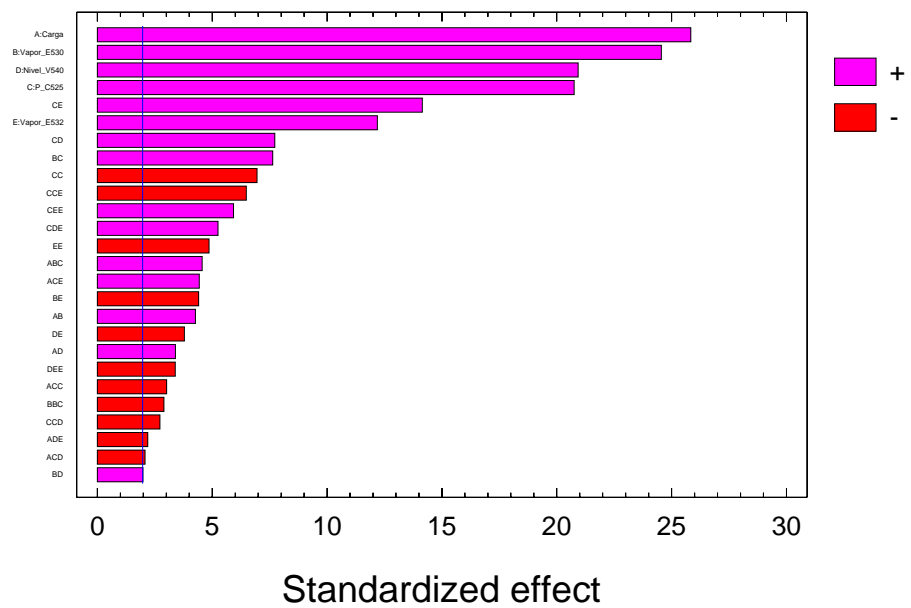
 This table contains information about values of Ol_y_Ona_723 generated using the fitted model. The table includes:

- (1) the observed value of Ol y Ona 723 (if any)
- (2) the predicted value of Ol y Ona 723 using the fitted model
- (3) 95,0% confidence limits for the mean response

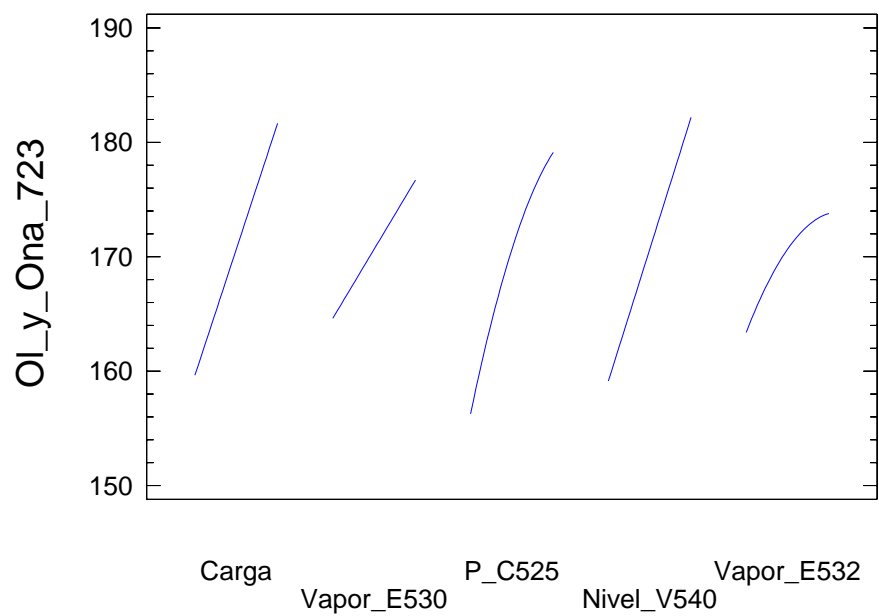
Each item corresponds to the values of the experimental factors in a specific row of your data file. To generate forecasts for additional combinations of the factors, add additional rows to the bottom of your data file. In each new row, enter values for the experimental factors but leave the cell for the response empty. When you return to this pane, forecasts will be added to the table for the new rows, but the model will be unaffected.

Análisis de la Corriente, 723 (Experimento para determinación de Curvatura)
CB_723_SQ_03252006.sgp (CB_723_SQ_03262006.sfx)
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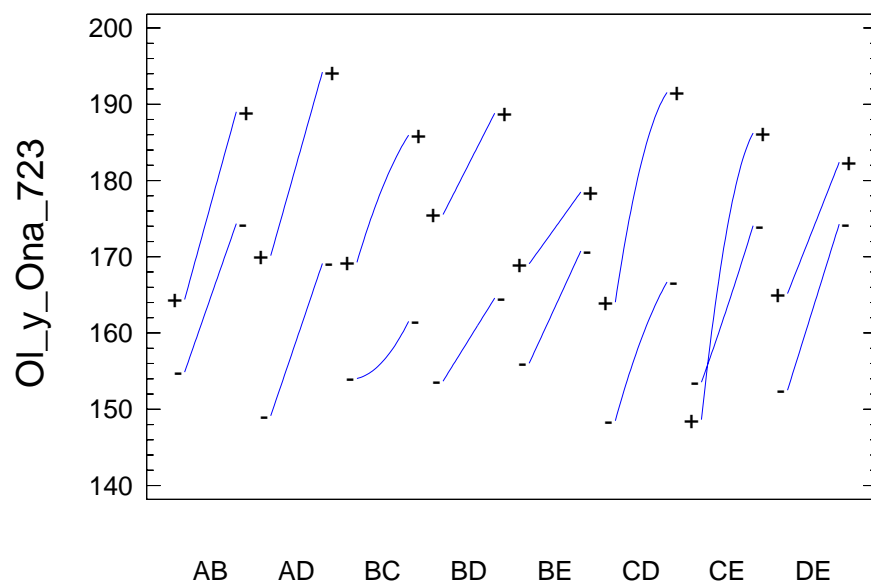
Standardized Pareto Chart for Ol_y_Ona_723



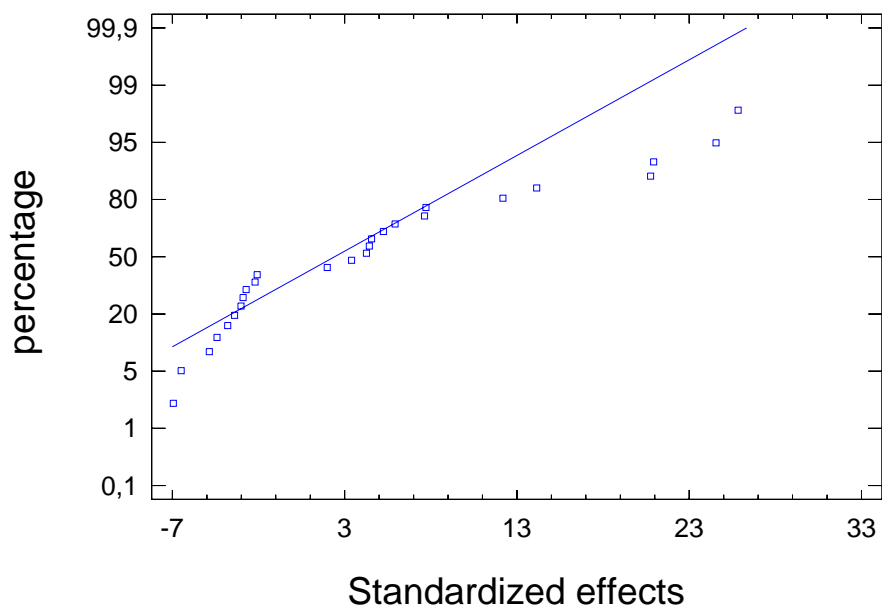
Main Effects Plot for Ol_y_Ona_723



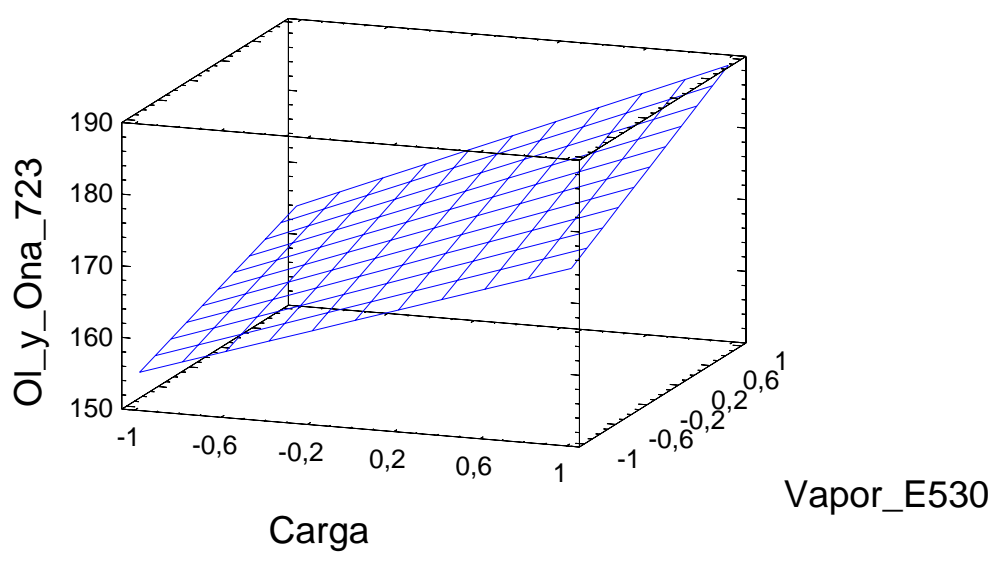
Interaction Plot for Ol_y_Ona_723



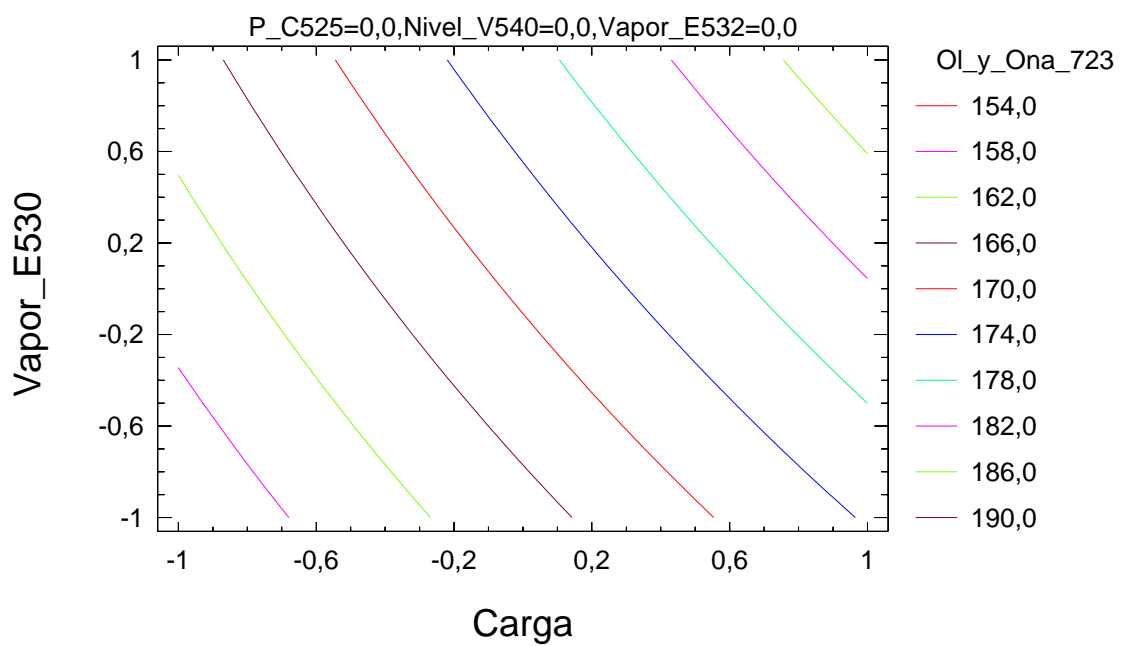
Normal Probability Plot for OI_y_Ona_723



Estimated Response Surface
P_C525=0,0,Nivel_V540=0,0,Vapor_E532=0,0



Contours of Estimated Response Surface



Residual Plot for Ol_y_Ona_723

