

Análisis de la Corriente, 723 (Experimento final B&B)
Box Benken_706B_ortogonal_09.04.2006.sgp (B&B_design_for_all_cases_09042006.sfx)
27/08/2006 8:56 a.m.

Analysis Summary

File name: C:\Documents and Settings\Edward A. Moscoso\Mis documentos\Statgraphics\B&B_design_f

Estimated effects for Ol y Ona 723

average	= 156,488	+/- 0,680648
A:Carga	= 2,9075	+/- 0,83362
B:Vapor_E530	= 2,13	+/- 0,83362
C:Presión_C525	= 6,99625	+/- 0,83362
D:Nivel_V540	= 3,92875	+/- 0,83362
E:Vapor_E532	= 3,2175	+/- 0,83362
AA	= 1,13875	+/- 1,12873
AB	= 2,105	+/- 1,66724
AC	= -1,88	+/- 1,66724
AD	= 0,09	+/- 1,66724
AE	= 0,495	+/- 1,66724
BB	= 0,91875	+/- 1,12873
BC	= -1,64	+/- 1,66724
BD	= -0,915	+/- 1,66724
BE	= 2,03	+/- 1,66724
CC	= 1,11042	+/- 1,12873
CD	= 0,145	+/- 1,66724
CE	= 0,75	+/- 1,66724
DD	= 0,0604167	+/- 1,12873
DE	= 2,865	+/- 1,66724
EE	= -0,67125	+/- 1,12873

Standard errors are based on total error with 25 d.f.

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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	33,8142	1	33,8142	12,16	0,0018
B:Vapor_E530	18,1476	1	18,1476	6,53	0,0171
C:Presión_C525	195,79	1	195,79	70,44	0,0000
D:Nivel_V540	61,7403	1	61,7403	22,21	0,0001
E:Vapor_E532	41,4092	1	41,4092	14,90	0,0007
AA	2,82928	1	2,82928	1,02	0,3227
AB	4,43103	1	4,43103	1,59	0,2184
AC	3,5344	1	3,5344	1,27	0,2702
AD	0,0081	1	0,0081	0,00	0,9574
AE	0,245025	1	0,245025	0,09	0,7690
BB	1,84168	1	1,84168	0,66	0,4233
BC	2,6896	1	2,6896	0,97	0,3347
BD	0,837225	1	0,837225	0,30	0,5880
BE	4,1209	1	4,1209	1,48	0,2348
CC	2,69024	1	2,69024	0,97	0,3347
CD	0,021025	1	0,021025	0,01	0,9314
CE	0,5625	1	0,5625	0,20	0,6567
DD	0,00796402	1	0,00796402	0,00	0,9577
DE	8,20822	1	8,20822	2,95	0,0981
EE	0,983076	1	0,983076	0,35	0,5574
Total error	69,4922	25	2,77969		
Total (corr.)	453,977	45			

R-squared = 84,6926 percent
 R-squared (adjusted for d.f.) = 72,4466 percent
 Standard Error of Est. = 1,66724
 Mean absolute error = 0,930236
 Durbin-Watson statistic = 1,48035 (P=0,1170)
 Lag 1 residual autocorrelation = 0,243369

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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, 5 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 84,6926% 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 72,4466%. The standard error of the estimate shows the standard deviation of the residuals to be 1,66724. The mean absolute error (MAE) of 0,930236 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 greater than 0.05, there is no indication of serial autocorrelation in the residuals.

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Regression coeffs. for Ol y Ona 723

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constant          = 156,488  
A:Carga           = 1,45375  
B:Vapor E530     = 1,065  
C:Presión C525   = 3,49812  
D:Nivel V540     = 1,96437  
E:Vapor E532     = 1,60875  
AA              = 0,569375  
AB              = 1,0525  
AC              = -0,94  
AD              = 0,045  
AE              = 0,2475  
BB              = 0,459375  
BC              = -0,82  
BD              = -0,4575  
BE              = 1,015  
CC              = 0,555208  
CD              = 0,0725  
CE              = 0,375  
DD              = 0,0302083  
DE              = 1,4325  
EE              = -0,335625  
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This pane displays the regression equation which has been fitted to the data. The equation of the fitted model is

$$\begin{aligned} \text{Ol y Ona 723} = & 156,488 + 1,45375 \cdot \text{Carga} + 1,065 \cdot \text{Vapor E530} + \\ & 3,49812 \cdot \text{Presión C525} + 1,96437 \cdot \text{Nivel V540} + 1,60875 \cdot \text{Vapor E532} + \\ & 0,569375 \cdot \text{Carga}^2 + 1,0525 \cdot \text{Carga} \cdot \text{Vapor E530} - 0,94 \cdot \text{Carga} \cdot \text{Presión C525} + \\ & 0,045 \cdot \text{Carga} \cdot \text{Nivel V540} + 0,2475 \cdot \text{Carga} \cdot \text{Vapor E532} + \\ & 0,459375 \cdot \text{Vapor E530}^2 - 0,82 \cdot \text{Vapor E530} \cdot \text{Presión C525} - \\ & 0,4575 \cdot \text{Vapor E530} \cdot \text{Nivel V540} + 1,015 \cdot \text{Vapor E530} \cdot \text{Vapor E532} + \\ & 0,555208 \cdot \text{Presión C525}^2 + 0,0725 \cdot \text{Presión C525} \cdot \text{Nivel V540} + \\ & 0,375 \cdot \text{Presión C525} \cdot \text{Vapor E532} + 0,0302083 \cdot \text{Nivel V540}^2 + \\ & 1,4325 \cdot \text{Nivel V540} \cdot \text{Vapor E532} - 0,335625 \cdot \text{Vapor E532}^2 \end{aligned}$$

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	156,1	156,488	155,087	157,89
2	155,28	156,051	153,623	158,479
3	157,22	156,853	154,425	159,281
4	155,63	156,076	153,648	158,504
5	161,78	161,088	158,66	163,516
6	151,55	151,684	149,256	154,112
7	156,77	158,535	156,107	160,963
8	155,83	155,468	153,039	157,896
9	161,34	162,609	160,181	165,037
10	157,07	156,488	155,087	157,89
11	155,61	154,953	152,525	157,381
12	156,18	155,053	152,625	157,481
13	156,4	156,141	153,713	158,569
14	161,03	160,301	157,873	162,729
15	150,41	151,721	149,293	154,149
16	156,22	156,509	154,081	158,937
17	160,33	160,597	158,169	163,025
18	162,38	161,625	159,197	164,053
19	155,0	156,488	155,087	157,89
20	153,33	154,042	151,614	156,47
21	155,3	155,106	152,678	157,534
22	153,97	154,395	151,967	156,823
23	161,67	161,189	158,761	163,617
24	152,2	152,12	149,692	154,548
25	156,1	155,89	153,462	158,318
26	160,95	160,756	158,328	163,184
27	161,57	161,246	158,818	163,674
28	154,64	156,488	155,087	157,89
29	157,83	153,715	151,287	156,143
30	159,24	156,532	154,104	158,96
31	158,19	157,554	155,126	159,982
32	159,78	160,551	158,123	162,979
33	151,95	151,976	149,548	154,404
34	158,67	158,222	155,794	160,65
35	155,55	154,444	152,016	156,872
36	163,77	162,19	159,762	164,618
37	158,17	156,488	155,087	157,89
38	153,44	153,907	151,479	156,335
39	155,1	156,32	153,892	158,748
40	155,14	156,63	154,202	159,058
41	157,79	160,032	157,604	162,46
42	152,06	153,491	151,063	155,919
43	154,18	156,536	154,108	158,964
44	158,98	158,335	155,907	160,763
45	159,27	159,55	157,122	161,978
46	157,95	156,488	155,087	157,89

The StatAdvisor

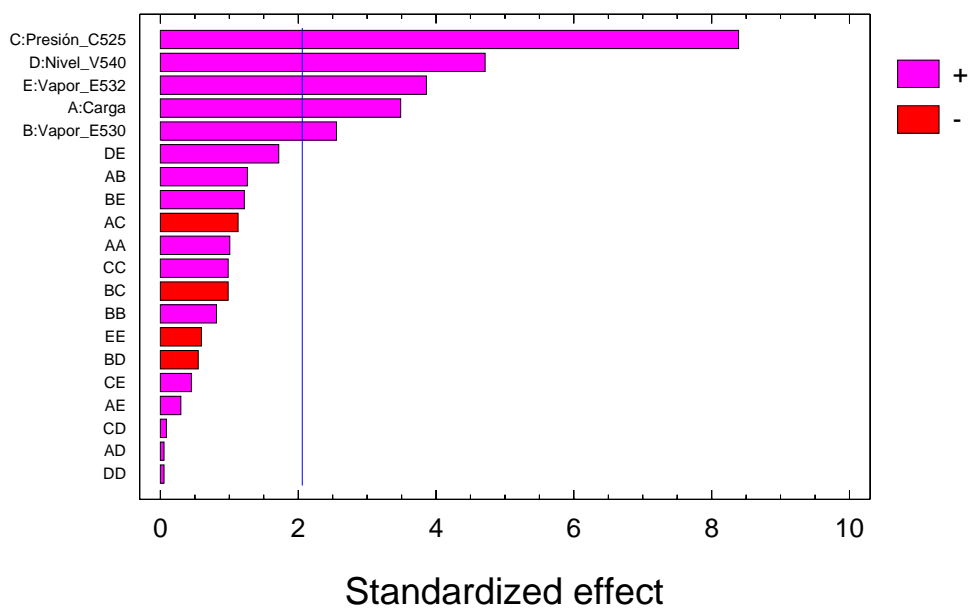
This table contains information about values of Ol y Ona_723 generated using the fitted model. The table includes:

- (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

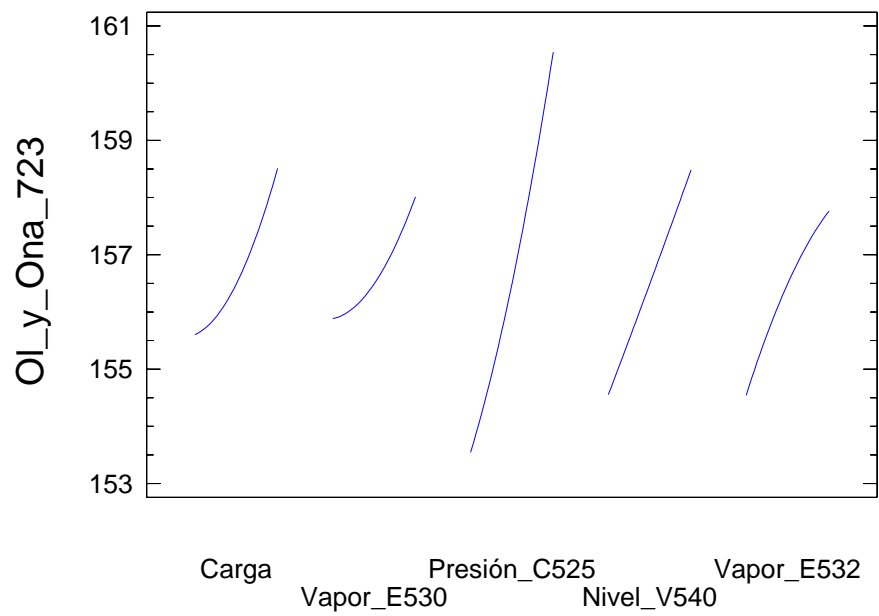
Each item corresponds to the values of the experimental factors in a specific row of your data file. To generate forecasts for additional combinations of the factors, add additional rows to the bottom of your data file. In each new row, enter values for the experimental factors but leave the cell for 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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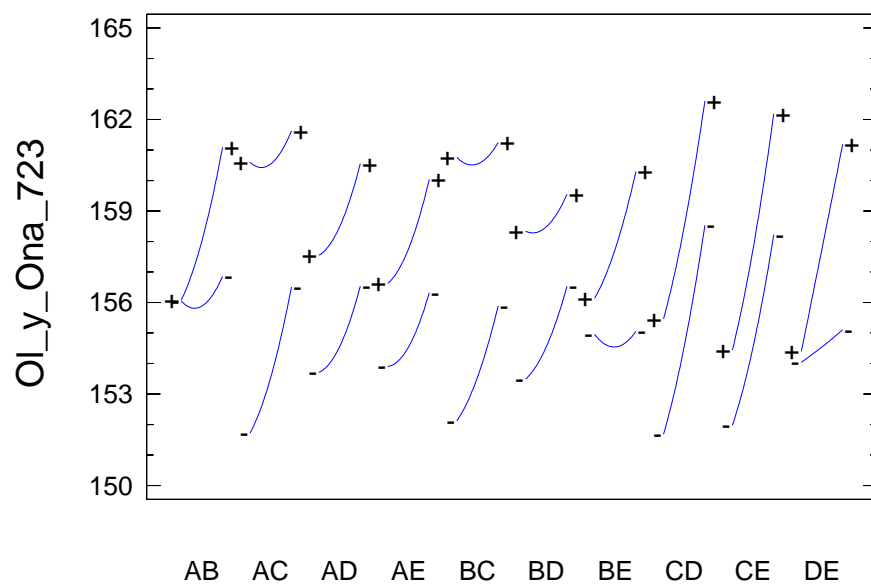
Standardized Pareto Chart for Ol_y_Ona_723



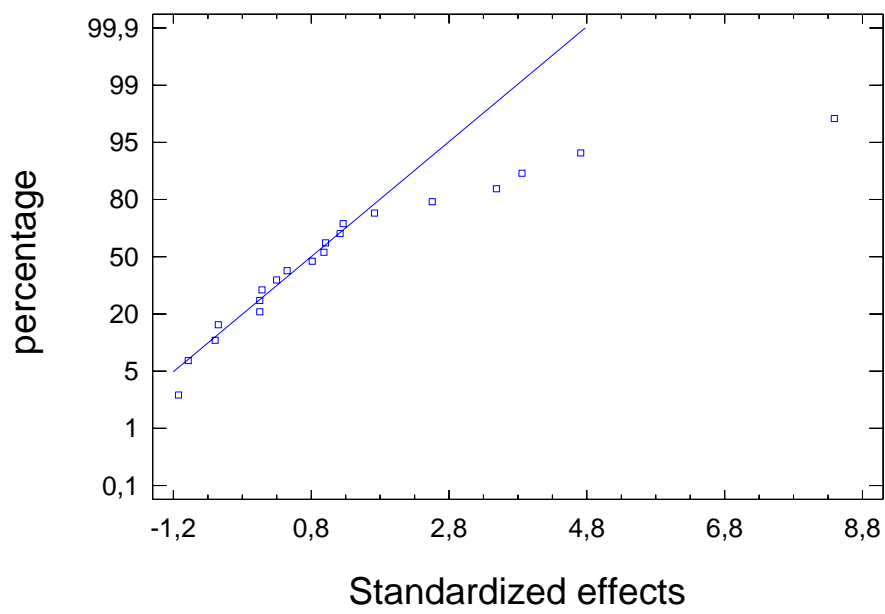
Main Effects Plot for Ol_y_Ona_723



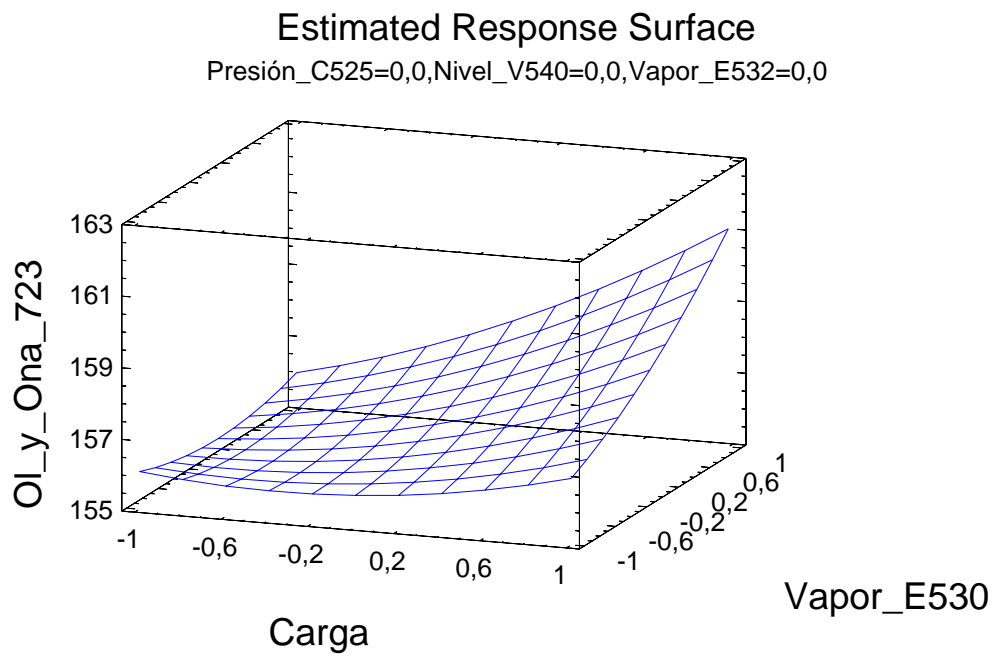
Interaction Plot for Ol_y_Ona_723

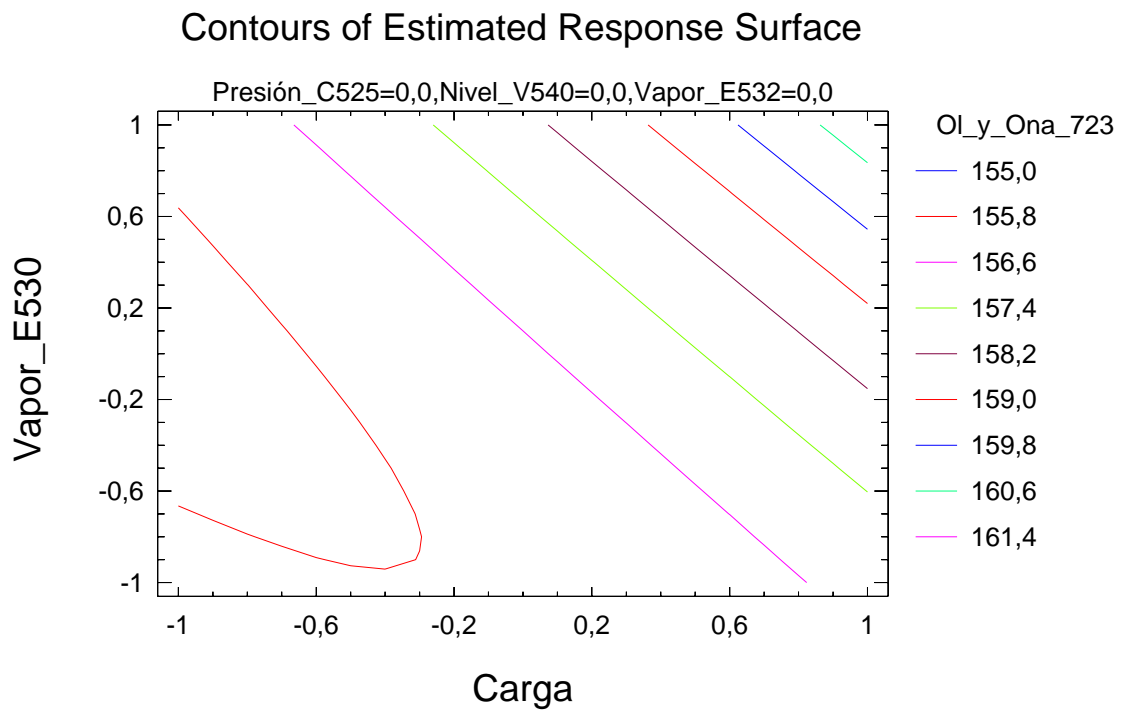


Normal Probability Plot for Ol_y_Ona_723



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Residual Plot for Ol_y_Ona_723

