Análisis de la Corriente, 706B (Experimento final B&B)
Box_Benken_706B_ortogonal_09.04.2006.sgp (B&B_design_for_all_cases_09042006.sfx)
27/08/2006  8:48 a.m.

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

Estimated effects for Ol y Ona 706B

| | | |
|---|---|---|
| average | = 284,408 | +/- 0,332216 |
| A:Carga | = 4,255 | +/- 0,406879 |
| B:Vapor_E530 | = 0,66875 | +/- 0,406879 |
| C:Presión_C525 | = 7,15125 | +/- 0,406879 |
| D:Nivel_V540 | = -5,205 | +/- 0,406879 |
| E:Vapor_E532 | = -2,9825 | +/- 0,406879 |
| AA | = -0,277917 | +/- 0,550917 |
| AB | = 1,02 | +/- 0,813759 |
| AC | = -0,76 | +/- 0,813759 |
| AD | = 0,04 | +/- 0,813759 |
| AE | = 0,81 | +/- 0,813759 |
| BB | = 0,30375 | +/- 0,550917 |
| BC | = -0,385 | +/- 0,813759 |
| BD | = -1,07 | +/- 0,813759 |
| BE | = 0,52 | +/- 0,813759 |
| CC | = 0,59375 | +/- 0,550917 |
| CD | = -0,31 | +/- 0,813759 |
| CE | = 0,58 | +/- 0,813759 |
| DD | = -0,904583 | +/- 0,550917 |
| DE | = 0,93 | +/- 0,813759 |
| EE | = 0,132083 | +/- 0,550917 |

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 706B

| Source | Sum of Squares | Df | Mean Square | F-Ratio | P-Value |
|---|---|---|---|---|---|
| A:Carga | 72,4201 | 1 | 72,4201 | 109,36 | 0,0000 |
| B:Vapor E530 | 1,78891 | 1 | 1,78891 | 2,70 | 0,1128 |
| C:Presión C525 | 204,562 | 1 | 204,562 | 308,91 | 0,0000 |
| D:Nivel V540 | 108,368 | 1 | 108,368 | 163,65 | 0,0000 |
| E:Vapor_E532 | 35,5812 | 1 | 35,5812 | 53,73 | 0,0000 |
| AA | 0,168519 | 1 | 0,168519 | 0,25 | 0,6184 |
| AB | 1,0404 | 1 | 1,0404 | 1,57 | 0,2216 |
| AC | 0,5776 | 1 | 0,5776 | 0,87 | 0,3593 |
| AD | 0,0016 | 1 | 0,0016 | 0,00 | 0,9612 |
| AE | 0,6561 | 1 | 0,6561 | 0,99 | 0,3291 |
| BB | 0,201303 | 1 | 0,201303 | 0,30 | 0,5863 |
| BC | 0,148225 | 1 | 0,148225 | 0,22 | 0,6402 |
| BD | 1,1449 | 1 | 1,1449 | 1,73 | 0,2005 |
| BE | 0,2704 | 1 | 0,2704 | 0,41 | 0,5286 |
| CC | 0,769176 | 1 | 0,769176 | 1,16 | 0,2914 |
| CD | 0,0961 | 1 | 0,0961 | 0,15 | 0,7065 |
| CE | 0,3364 | 1 | 0,3364 | 0,51 | 0,4826 |
| DD | 1,78532 | 1 | 1,78532 | 2,70 | 0,1131 |
| DE | 0,8649 | 1 | 0,8649 | 1,31 | 0,2639 |
| EE | 0,038064 | 1 | 0,038064 | 0,06 | 0,8125 |
| Total error | 16,5551 | 25 | 0,662203 | | |
| Total (corr.) | 448,476 | 45 | | | |

R-squared = 96,3086 percent
R-squared (adjusted for d.f.) = 93,3555 percent
Standard Error of Est. = 0,813759
Mean absolute error = 0,45846
Durbin-Watson statistic = 2,45445 (P=0,1569)
Lag 1 residual autocorrelation = -0,248318

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The ANOVA table partitions the variability in Ol y Ona 706B 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, 4 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 96,3086% of the variability in Ol_y_Ona_706B. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 93,3555%. The standard error of the estimate shows the standard deviation of the residuals to be 0,813759. The mean absolute error (MAE) of 0,45846 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 706B

| | |
|---|---|
| constant | = 284,408 |
| A:Carga | = 2,1275 |
| B:Vapor E530 | = 0,334375 |
| C:Presión C525 | = 3,57563 |
| D:Nivel V540 | = -2,6025 |
| E:Vapor E532 | = -1,49125 |
| AA | = -0,138958 |
| AB | = 0,51 |
| AC | = -0,38 |
| AD | = 0,02 |
| AE | = 0,405 |
| BB | = 0,151875 |
| BC | = -0,1925 |
| BD | = -0,535 |
| BE | = 0,26 |
| CC | = 0,296875 |
| CD | = -0,155 |
| CE | = 0,29 |
| DD | = -0,452292 |
| DE | = 0,465 |
| EE | = 0,0660417 |

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

Ol y Ona 706B = 284,408 + 2,1275*Carga + 0,334375*Vapor E530 + 3,57563*Presión C525 - 2,6025*Nivel V540 - 1,49125*Vapor E532 - 0,138958*Carga^2 + 0,51*Carga*Vapor_E530 - 0,38*Carga*Presión_C525 + 0,02*Carga*Nivel_V540 + 0,405*Carga*Vapor_E532 + 0,151875*Vapor_E530^2 - 0,1925*Vapor_E530*Presión_C525 - 0,535*Vapor_E530*Nivel_V540 + 0,26*Vapor_E530*Vapor_E532 + 0,296875*Presión_C525^2 - 0,155*Presión C525*Nivel V540 + 0,29*Presión C525*Vapor_E532 - 0,452292*Nivel V540^2 + 0,465*Nivel_V540*Vapor_E532 + 0,0660417*Vapor_E532^2

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 706B

| Row | Observed Value | Fitted Value | Lower 95,0% CL for Mean | Upper 95,0% CL for Mean |
|---|---|---|---|---|
| 1 | 283,74 | 284,408 | 283,724 | 285,093 |
| 2 | 282,34 | 282,469 | 281,284 | 283,654 |
| 3 | 286,65 | 285,704 | 284,519 | 286,889 |
| 4 | 281,7 | 282,118 | 280,933 | 283,303 |
| 5 | 288,05 | 287,393 | 286,208 | 288,578 |
| 6 | 283,93 | 283,125 | 281,94 | 284,31 |
| 7 | 290,94 | 290,586 | 289,401 | 291,771 |
| 8 | 277,66 | 278,23 | 277,045 | 279,415 |
| 9 | 284,05 | 285,071 | 283,886 | 286,256 |
| 10 | 285,49 | 284,408 | 283,724 | 285,093 |
| 11 | 285,44 | 286,043 | 284,858 | 287,228 |
| 12 | 286,28 | 286,192 | 285,007 | 287,377 |
| 13 | 282,16 | 282,541 | 281,356 | 283,726 |
| 14 | 284,04 | 283,729 | 282,544 | 284,914 |
| 15 | 278,08 | 278,483 | 277,298 | 279,668 |
| 16 | 283,44 | 283,498 | 282,313 | 284,683 |
| 17 | 286,65 | 286,394 | 285,209 | 287,579 |
| 18 | 290,49 | 289,889 | 288,704 | 291,074 |
| 19 | 282,65 | 284,408 | 283,724 | 285,093 |
| 20 | 289,11 | 288,581 | 287,396 | 289,766 |
| 21 | 282,6 | 282,446 | 281,261 | 283,631 |
| 22 | 285,44 | 284,668 | 283,483 | 285,853 |
| 23 | 280,79 | 280,393 | 279,208 | 281,578 |
| 24 | 281,09 | 280,755 | 279,569 | 281,94 |
| 25 | 281,76 | 281,808 | 280,623 | 282,993 |
| 26 | 288,54 | 288,291 | 287,106 | 289,476 |
| 27 | 288,44 | 288,575 | 287,389 | 289,76 |
| 28 | 284,22 | 284,408 | 283,724 | 285,093 |
| 29 | 284,38 | 284,312 | 283,127 | 285,497 |
| 30 | 287,16 | 288,527 | 287,342 | 289,712 |
| 31 | 280,16 | 279,067 | 277,882 | 280,252 |
| 32 | 283,02 | 283,362 | 282,177 | 284,547 |
| 33 | 282,94 | 282,977 | 281,792 | 284,162 |
| 34 | 289,39 | 289,548 | 288,363 | 290,733 |
| 35 | 279,39 | 279,414 | 278,229 | 280,599 |
| 36 | 287,0 | 287,146 | 285,961 | 288,331 |
| 37 | 285,44 | 284,408 | 283,724 | 285,093 |
| 38 | 284,11 | 284,104 | 282,919 | 285,289 |
| 39 | 287,57 | 287,549 | 286,364 | 288,734 |
| 40 | 279,84 | 280,312 | 279,127 | 281,497 |
| 41 | 284,92 | 285,377 | 284,192 | 286,562 |
| 42 | 285,27 | 285,841 | 284,656 | 287,026 |
| 43 | 286,99 | 287,58 | 286,395 | 288,765 |
| 44 | 281,86 | 281,706 | 280,521 | 282,891 |
| 45 | 281,44 | 281,305 | 280,12 | 282,49 |
| 46 | 284,91 | 284,408 | 283,724 | 285,093 |

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This table contains information about values of Ol y_Ona_706B generated using the fitted model. The table includes:
(1) the observed value of Ol_y_Ona_706B (if any)
(2) the predicted value of Ol_y_Ona_706B 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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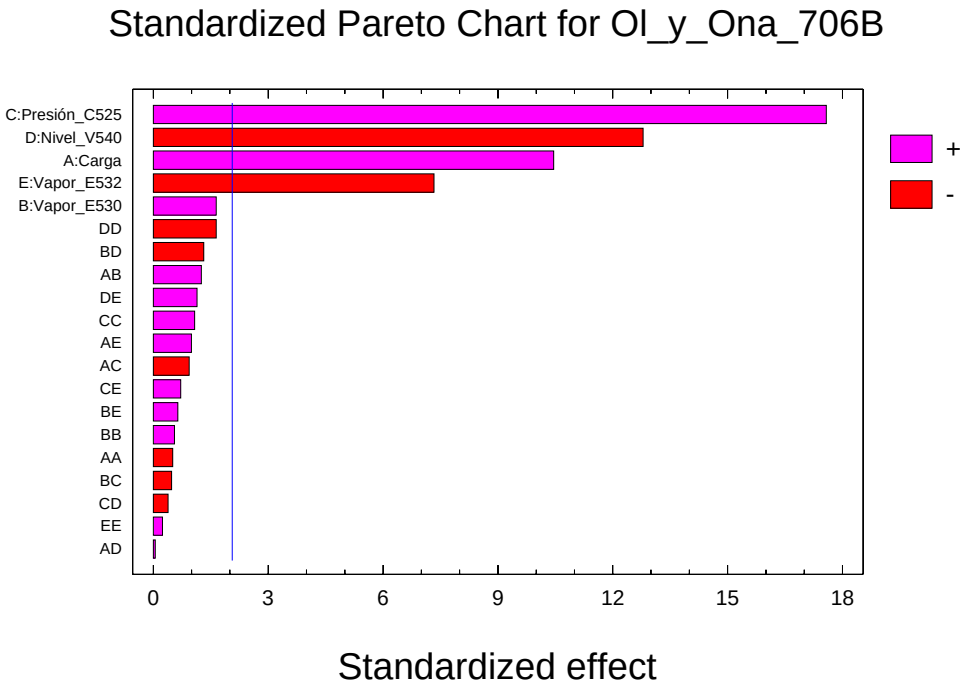

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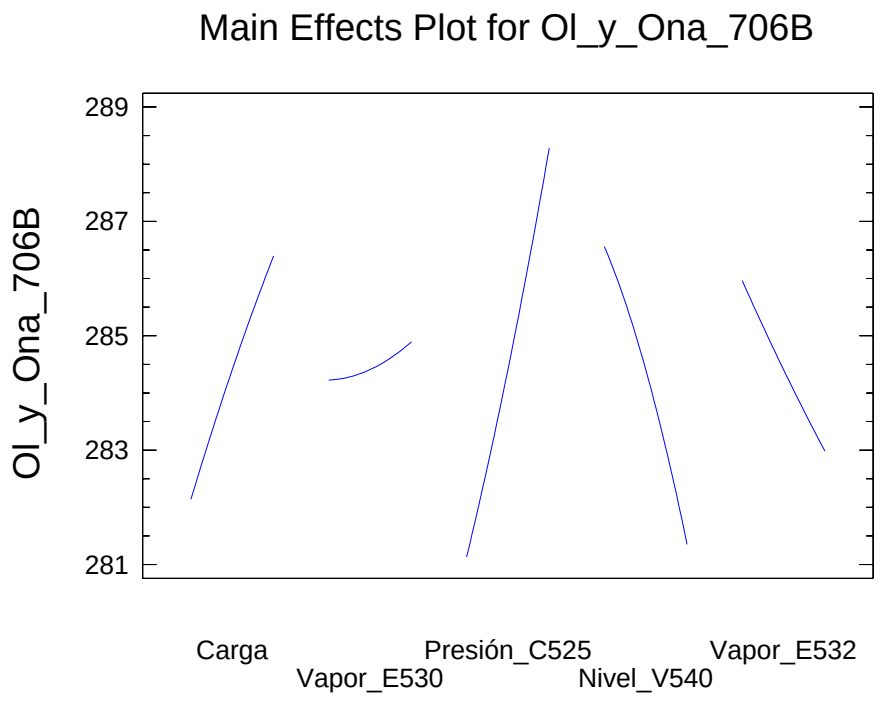

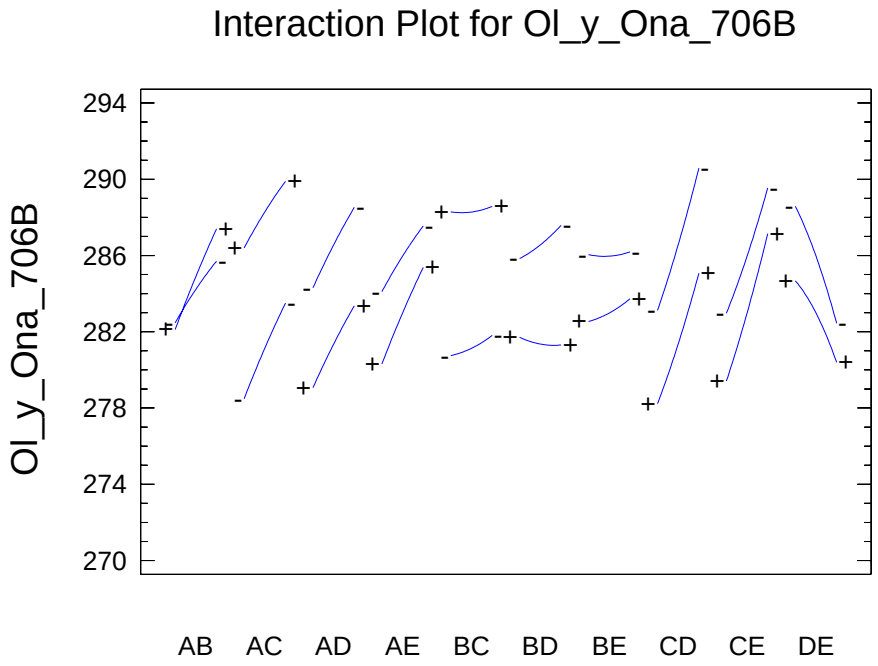
Interaction Plot for Ol_y_Ona_706B
Ol_y_Ona_706B
294
290
286
282
278
274
270
AB
AC
AD
AE
BC
BD
BE
CD
CE
DE

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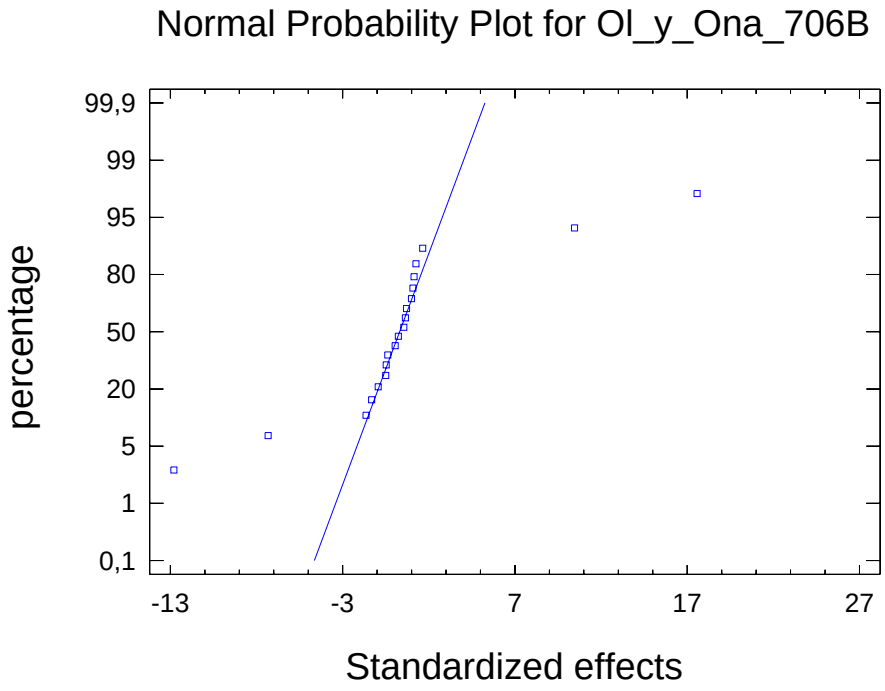

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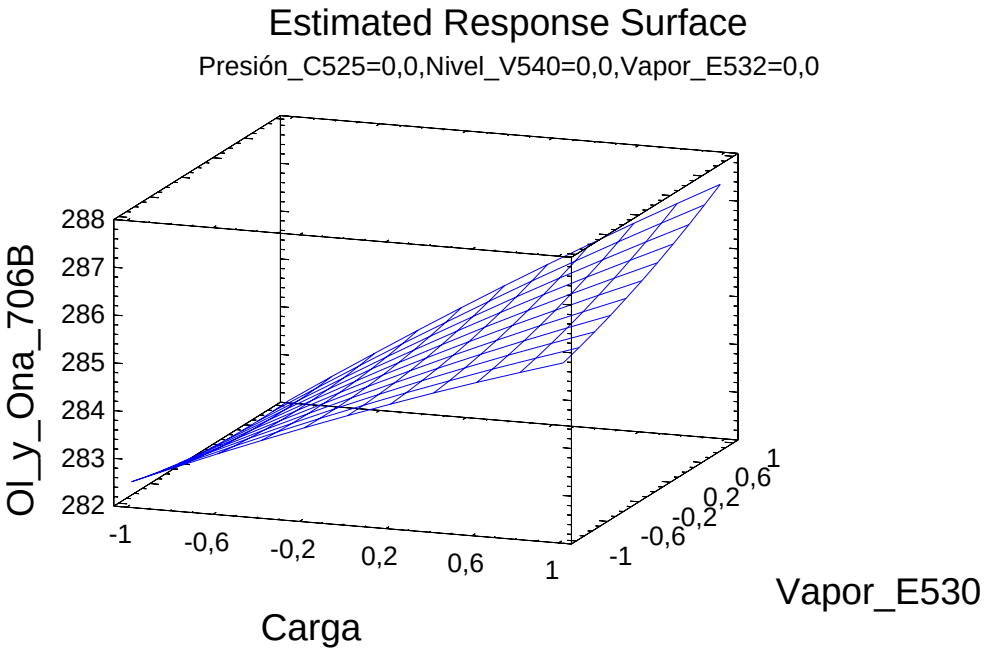

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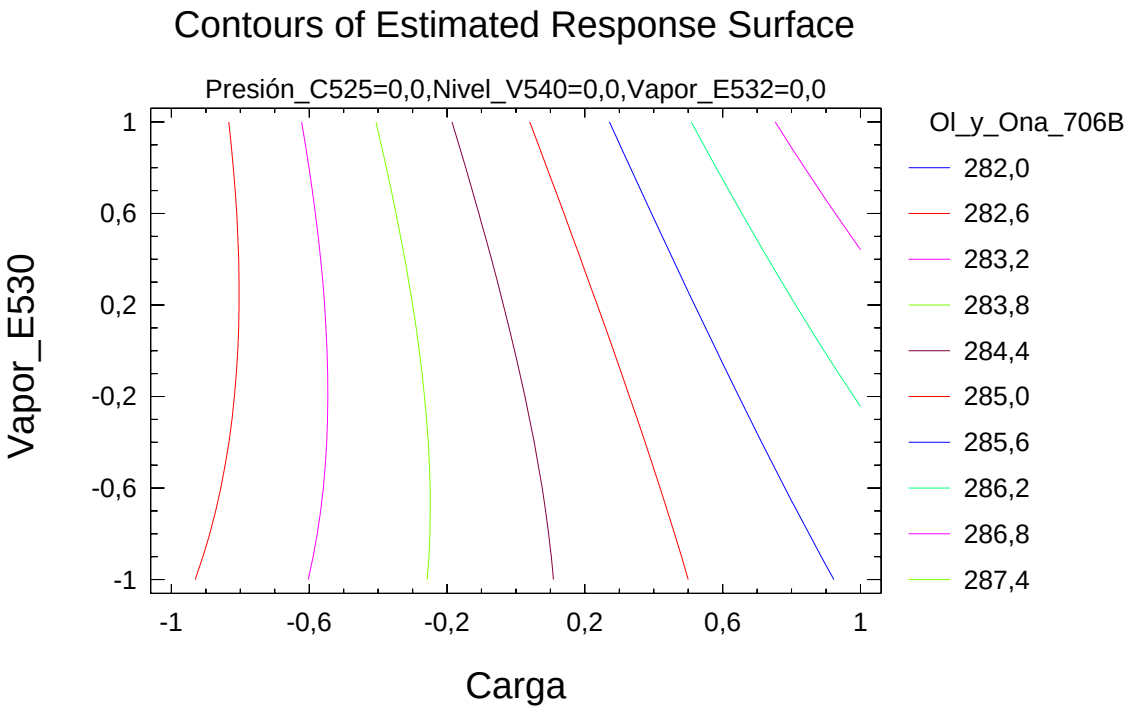

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