JMP Output for Process Development Study Data

Response Conversion% -
Full Factorial (Charge, Temperature, Pressure, Concentration)

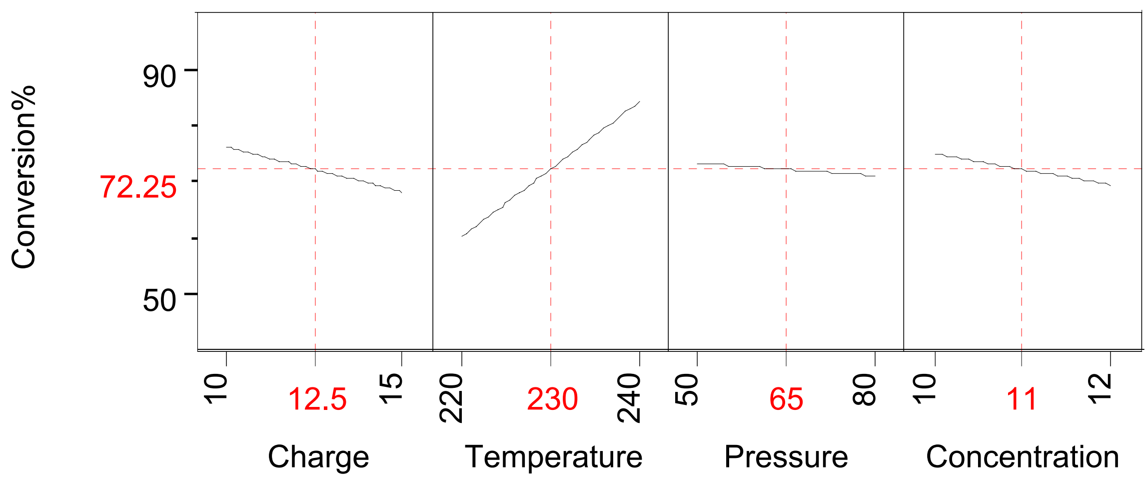
Summary of Fit

RSquare	1
RSquare Adj	.
Root Mean Square Error	.
Mean of Response	72.25
Observations (or Sum Wgts)	16

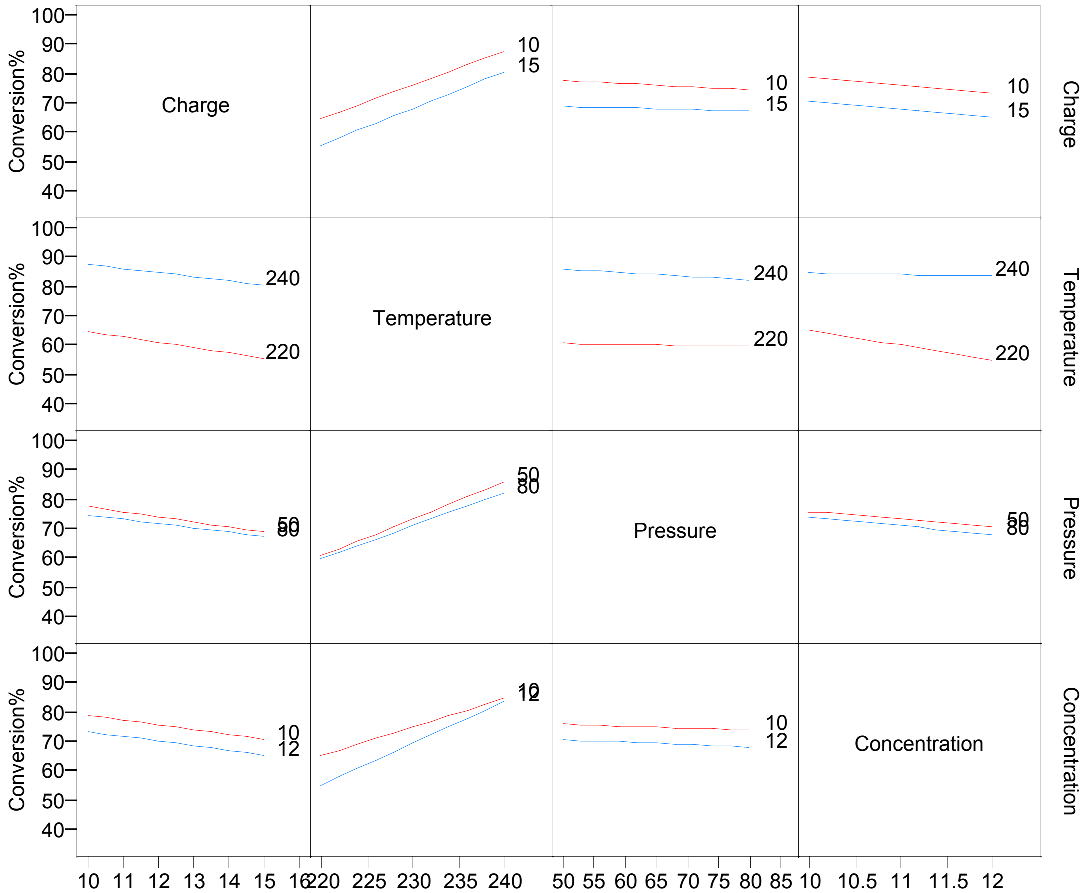
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	15	2801.0000	186.733	.
Error	0	0.0000	.	Prob > F
C. Total	15	2801.0000		.

Prediction Profiler



Interaction Profiles



Response Conversion%

Full Factorial (XA, XB, XC, XD
Summary of Fit

RSquare	1
RSquare Adj	.
Root Mean Square Error	.
Mean of Response	72.25
Observations (or Sum Wgts)	16

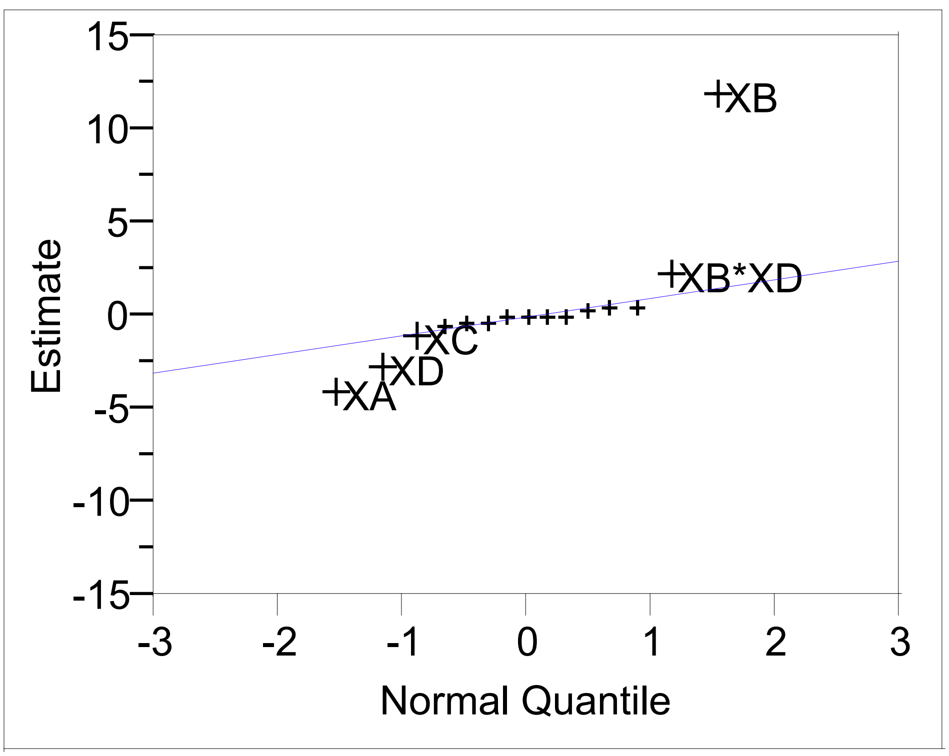
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	15	2801.0000	186.733	.
Error	0	0.0000	.	Prob > F
C. Total	15	2801.0000		.

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	72.25	.	.	.
XA	-4	.	.	.
XB	12	.	.	.
XA*XB	0.5	.	.	.
XC	-1.125	.	.	.
XA*XC	0.375	.	.	.
XB*XC	-0.625	.	.	.
XA*XB*XC	-0.375	.	.	.
XD	-2.75	.	.	.
XA*XD	0	.	.	.
XB*XD	2.25	.	.	.
XA*XB*XD	0.25	.	.	.
XC*XD	-0.125	.	.	.
XA*XC*XD	-0.125	.	.	.
XB*XC*XD	-0.375	.	.	.
XA*XB*XC*XD	-0.125	.	.	.

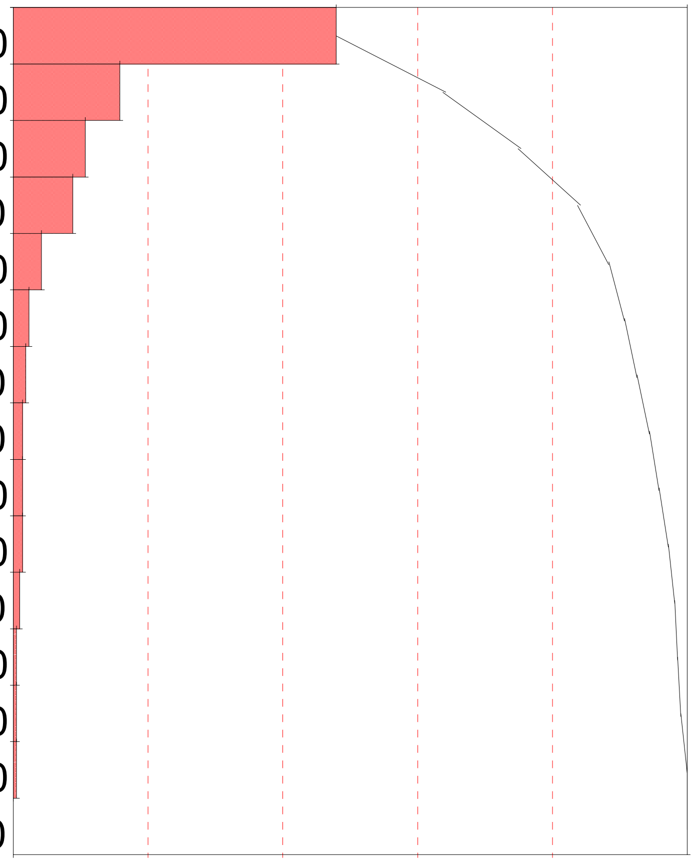
Normal Plot



Blue line is Lenth's PSE, from the estimates population.

Pareto Plot of Estimates

Term	Estimate
XB	12.00000
XA	-4.00000
XD	-2.75000
XB*XD	2.25000
XC	-1.12500
XB*XC	-0.62500
XA*XB	0.50000
XA*XC	0.37500
XA*XB*XC	-0.37500
XB*XC*XD	-0.37500
XA*XB*XD	0.25000
XC*XD	-0.12500
XA*XB*XC*XD	-0.12500
XA*XC*XD	-0.12500
XA*XD	0.00000



Response Conversion%
Full Factorial (XA, XB, XD) with pseudo-replication

Summary of Fit

RSquare	0.987861
RSquare Adj	0.97724
Root Mean Square Error	2.061553
Mean of Response	72.25
Observations (or Sum Wgts)	16

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	2767.0000	395.286	93.0084
Error	8	34.0000	4.250	Prob > F
C. Total	15	2801.0000		<.0001

Parameter Estimates

<table>
<tr><th>Term</th><th>Estimate</th><th>Std Error</th><th>t Ratio</th><th>Prob>|t|</th></tr>
<tr><td>Intercept</td><td>72.25</td><td>0.515388</td><td>140.19</td><td><.0001</td></tr>
<tr><td>XA</td><td>-4</td><td>0.515388</td><td>-7.76</td><td><.0001</td></tr>
<tr><td>XB</td><td>12</td><td>0.515388</td><td>23.28</td><td><.0001</td></tr>
<tr><td>XA*XB</td><td>0.5</td><td>0.515388</td><td>0.97</td><td>0.3604</td></tr>
<tr><td>XD</td><td>-2.75</td><td>0.515388</td><td>-5.34</td><td>0.0007</td></tr>
<tr><td>XA*XD</td><td>0</td><td>0.515388</td><td>0.00</td><td>1.0000</td></tr>
<tr><td>XB*XD</td><td>2.25</td><td>0.515388</td><td>4.37</td><td>0.0024</td></tr>
<tr><td>XA*XB*XD</td><td>0.25</td><td>0.515388</td><td>0.49</td><td>0.6406</td></tr>
</table>

Response Conversion%
Reduced Model (XA, XB, XD, XBXD)

Summary of Fit

RSquare	0.986076
RSquare Adj	0.981013
Root Mean Square Error	1.882938
Mean of Response	72.25
Observations (or Sum Wgts)	16

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	4	2762.0000	690.500	194.7564
Error	11	39.0000	3.545	Prob > F
C. Total	15	2801.0000		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	3	5.000000	1.66667	0.3922
Pure Error	8	34.000000	4.25000	Prob > F
Total Error	11	39.000000		0.7621
				Max RSq
				0.9879

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	72.25	0.470734	153.48	<.0001
XA	-4	0.470734	-8.50	<.0001
XB	12	0.470734	25.49	<.0001
XD	-2.75	0.470734	-5.84	0.0001
XB*XD	2.25	0.470734	4.78	0.0006