

## APÉNDICE D

### ANÁLISIS

Response: ANGULO DE CONTACTO					
Factor	Name	Units	Type	-1 Level	+1 Level
A	DEA	%	Numeric	16.4645	23.5355
B	MDEA	%	Numeric	18.0806	26.9194
C	EG	%	Numeric	8.23223	11.7678
D	TEMPERATURA	°C	Numeric	41.3327	64.6673
E	FLUJO	SCFH	Numeric	22.9289	37.0711
F	COMPOSICIÓN	%	Numeric	22.9289	37.0711

Sequential Model Sum of Squares					
Source	Sum of Squares	DF	Mean Square	F Value	Prob > F
Mean	200238	1	200238		
Linear	329.268	4	54.878	5.75516	< 0.0001
Quadratic	139.13	6	6.62521	0.625661	0.8824
Cubic	365.946	8	14.0749	1.81447	0.0549
Residual	248.224	11	7.757		
Total	201321	30	2340.94		

"Sequential Model Sum of Squares": Select the highest order polynomial where the additional terms are significant.

Lack of Fit Tests					
Source	Sum of Squares	DF	Mean Square	F Value	Prob > F
Linear	657.368	70	9.39097	0.881029	0.6496
Quadratic	518.238	49	10.5763	0.992232	0.5532
Cubic	152.292	23	6.6214	0.621197	0.8289
Pure Error	95.9319	9	10.6591		

"Lack of Fit Tests": Want the selected model to have insignificant lack-of-fit.

Model Summary Statistics					
Source	Root MSE	R-Squared	Adjusted R-Squared	Predicted R-Squared	PRESS
Linear	3.08795	0.304155	0.251306	0.165807	903.071
Quadratic	3.2541	0.432673	0.168572	-0.716285	1858
Cubic	2.78514	0.770708	0.390944	-1.64759	2866.2

"Model Summary Statistics": Focus on the model minimizing the "PRESS", or equivalently maximizing the "PRED R-SQR".

**ANOVA**

Response: ANGULO DE CONTACTO					
Factor	Name	Units	Type	-1 Level	+1 Level
A	DEA	%	Numeric	16.4645	23.5355
B	MDEA	%	Numeric	18.0806	26.9194
C	EG	%	Numeric	8.23223	11.7678
D	TEMPERATURA	°C	Numeric	41.3327	64.6673
E	FLUJO	SCFH	Numeric	22.9289	37.0711
F	COMPOSICIÓN	%	Numeric	22.9289	37.0711

ANOVA for Response Surface Reduced Linear Model

Source	Sum of Squares	DF	Mean Square	F Value	Prob > F
Model	679.657	10	37.7587	6.27889	< 0.0001
Residual	402.911	6	6.0136		
Lack of Fit	306.979	5	5.29275	0.496547	0.9462
Pure Error	95.9319	9	10.6591		
Cor Total	1082.57	30			

Root MSE	2.45226	R-Squared	0.627819	
Dep Mean	48.253	Adj R-Squared	0.52783	
C.V.	5.08209	Pred R-Squared	-0.872426	
PRESS	2027.03	Adeq Precision	18.8176	Desire > 4

Factores que intervienen principalmente en el ángulo de contacto						
	Coefficient		Standard	t for H0		
Factor	Estimate	DF	Error	Coeff=0	Prob >  t	VIF
Intercept	47.3279	1	0.739385			
A-DEA	1.63237	1	0.361105	4.52049	< 0.0001	1.73469
B-MDEA	0.0513282	1	0.361105	0.142142	0.02493	1.73469
C-EG	-0.419622	1	0.361105	-1.16205	< 0.0001	1.73469
TEMPERATURA	0.460197	1	0.361105	1.27441	< 0.0001	1.73469

Final Equation in Terms of Coded Factors:

$$\begin{aligned} \text{ANGULO DE } &= \\ &47.3279 \\ &+ 1.63237 * A \\ &+ 0.0513282 * B \\ &- 0.419622 * C \\ &+ 0.460197 * D \end{aligned}$$

Final Equation in Terms of Actual Factors:

$$\begin{aligned} \text{ANGULC} = & \\ & 135.3 \\ & -6.6525 * \text{DEA} \\ & -2.6166 * \text{MDEA} \\ & 6.1996 * \text{EG} \\ & -0.8349 * \text{TEMPERATURA} \end{aligned}$$

Diagnostics Case Statistics								
Standard Order	Actual Value	Predicted Value	Residual	Leverage	Student Residual	Cook's Distance	Outlier t	Run Order
1	50.28	48.8555	1.424	0.105824	0.61429	0.0023505	0.611413	6
2	53	51.6596	1.340	0.105824	0.578039	0.0020812	0.575145	26
3	50	48.739	1.261	0.105824	0.543809	0.001842	0.540931	86
4	52.34	51.543	0.797	0.105824	0.343686	0.0007358	0.341413	15
5	48.56	48.3227	0.237	0.105824	0.102325	6.522E-05	0.101567	76
6	51.43	51.1268	0.303	0.105824	0.13076	0.0001065	0.129797	20
7	48.16	48.2062	-0.046	0.105824	-0.019905	2.468E-06	-0.0197561	58
8	42.76	51.0102	-8.250	0.105824	-3.55784	0.0788462	-3.921 *	4
9	52	49.5146	2.485	0.105824	1.07181	0.0071556	1.07302	32
10	52.12	52.3187	-0.199	0.105824	-0.08567	4.572E-05	-0.0850325	9
11	50.23	49.398	0.832	0.105824	0.358779	0.0008018	0.356434	39
12	53	52.2021	0.798	0.105824	0.34409	0.0007375	0.341815	75
13	49.67	48.9818	0.688	0.105824	0.296788	0.0005487	0.294759	5
14	52.45	51.7858	0.664	0.105824	0.286412	0.000511	0.28444	38
15	49	48.8652	0.135	0.105824	0.058123	2.104E-05	0.0576888	84
16	52.16	51.6693	0.491	0.105824	0.211618	0.0002789	0.210103	83
17	49.43	48.6546	0.775	0.105824	0.334387	0.0006965	0.33216	77
18	49.65	51.4587	-1.809	0.105824	-0.779969	0.0037893	-0.777666	29
19	47.28	48.538	-1.258	0.105824	-0.542517	0.0018333	-0.53964	74
20	50.16	51.3421	-1.182	0.105824	-0.509769	0.0016187	-0.506935	31
21	47.12	48.1218	-1.002	0.105824	-0.432011	0.0011625	-0.429373	34
22	50.14	50.9258	-0.786	0.105824	-0.33889	0.0007154	-0.33664	59
23	51.67	48.0052	3.665	0.105824	1.58041	0.0155577	1.59865	11
24	60.31	50.8093	9.501	0.105824	4.09711	0.104559	4.697 *	60
25	50.45	49.3137	1.136	0.105824	0.490039	0.0014958	0.487242	57
26	53.4	52.1177	1.282	0.105824	0.552973	0.0019047	0.550088	43
27	50	49.1971	0.803	0.105824	0.346246	0.0007468	0.343961	47
28	50.49	52.0012	-1.511	0.105824	-0.651675	0.0026453	-0.648853	55
29	46.89	48.7808	-1.891	0.105824	-0.815412	0.0041415	-0.81335	14
30	51.54	51.5849	-0.045	0.105824	-0.019366	2.336E-06	-0.0192211	85
31	45.98	48.6643	-2.684	0.105824	-1.15758	0.0083465	-1.16057	16
32	48.65	51.4683	-2.818	0.105824	-1.21539	0.0092011	-1.21981	82
33	45.14	45.1765	-0.036	0.105824	-0.015728	1.541E-06	-0.0156097	73
34	48.65	47.9805	0.669	0.105824	0.288703	0.0005192	0.286718	28
35	40.56	45.0599	-4.500	0.105824	-1.94055	0.0234561	-1.98253	22
36	48.32	47.864	0.456	0.105824	0.196659	0.0002409	0.195243	1
37	44.1	44.6437	-0.544	0.105824	-0.234448	0.0003424	-0.232787	67

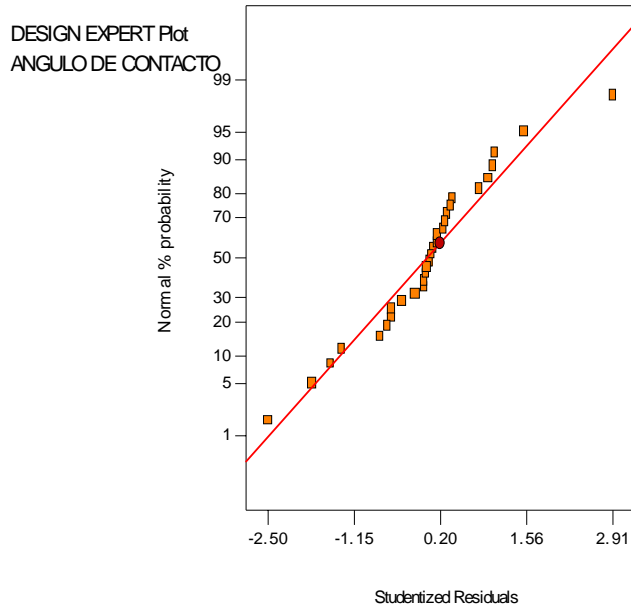
38	46.17	47.4477	-1.278	0.105824	-0.551007	0.0018911	-0.548123	18
39	47.78	44.5271	3.253	0.105824	1.40279	0.0122572	1.41319	71
40	50.31	47.3312	2.979	0.105824	1.2846	0.0102788	1.29098	61
41	47.77	45.8355	1.934	0.105824	0.834224	0.0043348	0.832309	24
42	50.12	48.6396	1.480	0.105824	0.638413	0.0025387	0.635567	56
43	46.14	45.719	0.421	0.105824	0.181566	0.0002053	0.18025	53
44	48	48.523	-0.523	0.105824	-0.225554	0.0003169	-0.223949	79
45	44.56	45.3027	-0.743	0.105824	-0.320292	0.000639	-0.318137	48
46	48.8	48.1068	0.693	0.105824	0.298945	0.0005567	0.296903	63
47	44.34	45.1862	-0.846	0.105824	-0.364899	0.0008294	-0.362526	66
48	46.75	47.9902	-1.240	0.105824	-0.534835	0.0017818	-0.531966	21
49	45.23	44.9755	0.254	0.105824	0.109737	7.501E-05	0.108925	52
50	48.34	47.7796	0.560	0.105824	0.24167	0.0003638	0.239965	46
51	43.67	44.859	-1.189	0.105824	-0.512734	0.0016375	-0.509895	3
52	46.21	47.663	-1.453	0.105824	-0.626609	0.0024457	-0.623746	81
53	43.67	44.4427	-0.773	0.105824	-0.33323	0.0006917	-0.331008	17
54	46	47.2468	-1.247	0.105824	-0.537665	0.0018007	-0.534793	37
55	45.15	44.3262	0.824	0.105824	0.355276	0.0007862	0.352947	10
56	49.32	47.1302	2.190	0.105824	0.944325	0.0055546	0.943552	62
57	46.18	45.6346	0.545	0.105824	0.235202	0.0003446	0.233536	36
58	48.18	48.4387	-0.259	0.105824	-0.111544	7.75E-05	-0.110719	70
59	45.1	45.518	-0.418	0.105824	-0.180273	0.0002024	-0.178966	65
60	48.54	48.3221	0.218	0.105824	0.09397	5.5E-05	0.093272	33
61	45.16	45.1018	0.058	0.105824	0.025106	3.926E-06	0.0249178	12
62	47.12	47.9058	-0.786	0.105824	-0.33889	0.0007154	-0.33664	40
63	45.32	44.9852	0.335	0.105824	0.144371	0.0001298	0.143312	78
64	51.89	47.7893	4.101	0.105824	1.7684	0.0194791	1.79761	44
65	49.43	50.0722	-0.642	0.943 #	-1.09873	1.05471	-1.10045	25
66	48.24	48.8822	-0.642	0.943 #	-1.09873	1.05471	-1.10045	42
67	51.45	52.0922	-0.642	0.943 #	-1.09873	1.05471	-1.10045	72
68	46.78	47.4222	-0.642	0.943 #	-1.09873	1.05471	-1.10045	19
69	46.76	47.4022	-0.642	0.943 #	-1.09873	1.05471	-1.10045	49
70	51.32	51.9622	-0.642	0.943 #	-1.09873	1.05471	-1.10045	51
71	50.2	50.8422	-0.642	0.943 #	-1.09873	1.05471	-1.10045	68
72	46.89	47.5322	-0.642	0.943 #	-1.09873	1.05471	-1.10045	27
73	54.25	54.8922	-0.642	0.943 #	-1.09873	1.05471	-1.10045	7
74	32.56	33.2022	-0.642	0.943 #	-1.09873	1.05471	-1.10045	35
75	49.12	49.7622	-0.642	0.943 #	-1.09873	1.05471	-1.10045	50
76	49.14	49.7822	-0.642	0.943 #	-1.09873	1.05471	-1.10045	69
77	48.24	47.3279	0.912	0.0909091	0.390097	0.0008009	0.387615	41
78	47.96	47.3279	0.632	0.0909091	0.270344	0.0003847	0.268465	23
79	46.99	47.3279	-0.338	0.0909091	-0.144515	0.0001099	-0.143455	80
80	37.92	47.3279	-9.408	0.0909091	-4.02366	0.0852099	-4.586 *	2
81	48.32	47.3279	0.992	0.0909091	0.424312	0.0009476	0.421701	45
82	47.87	47.3279	0.542	0.0909091	0.231852	0.0002829	0.230207	54
83	47.99	47.3279	0.662	0.0909091	0.283175	0.000422	0.281222	64
84	48.12	47.3279	0.792	0.0909091	0.338774	0.000604	0.336525	30
85	47.98	47.3279	0.652	0.0909091	0.278898	0.0004094	0.276969	13
86	49.32	47.3279	1.992	0.0909091	0.852002	0.0038206	0.850239	8

\* Case(s) with |Outlier T| > 3.50

# Obs with Leverage > 2.00 \*(average leverage)

# DIAGNÓSTICO ESTADÍSTICO ÁNGULO DE CONTACTO

Normal plot of residuals



ABS(Residuals) vs. Predicted

