

# [The case of the variable laminates](https://assignbuster.com/the-case-of-the-variable-laminates/)

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The Case of Variable Laminates In the current scenario, there are three major experimental variables that need to be investigated simultaneously for their effect on process outcome. These variables are soak time, soak temperature and knife pressure. Knife setting is being left out since it has no discernible impact on process output. The typical operating ranges for these parameters are outlined in the table shown below.   
Soak Time (minutes)   
Soak Temperature (oC)   
Knife Pressure (psi)   
30   
150   
250   
60   
200   
300   
Operating Range   
30   
50   
50   
A rational approach for enhanced process control would be to investigate these parameters such that for each experiment each variable’s operating range is divided by 5 to reveal a sizable increment. This would indicate that soaking time is incremented by 6 minutes, soaking temperature by 10oC and knife pressure by 10 psi. The resulting Taguchi experimental design orthogonal array would assume the form shown in the Appendix. The total number of experiments required would be 36.   
The thickness measurements are previously being made at every 15 minutes but a greater frequency for soaking time has been defined in order to ensure that process control experimentation resolution is enhanced. The contention in running these experimental runs is to measure the resulting laminate thickness. Once laminate thickness has been tabulated against each experimental run, statistical methods can be used to determine the optimal running conditions. Multiple combinations of operating parameters may produce the desired thickness so other factors such as power consumption may be used to decipher the final operating conditions.   
Appendix   
Experiment Number   
Soak Time (minutes)   
Soak Temperature (oC)   
Knife Pressure (psi)   
1   
30   
150   
250   
2   
30   
160   
260   
3   
30   
170   
270   
4   
30   
180   
280   
5   
30   
190   
290   
6   
30   
200   
300   
7   
36   
150   
250   
8   
36   
160   
260   
9   
36   
170   
270   
10   
36   
180   
280   
11   
36   
190   
290   
12   
36   
200   
300   
13   
42   
150   
250   
14   
42   
160   
260   
15   
42   
170   
270   
16   
42   
180   
280   
17   
42   
190   
290   
18   
42   
200   
300   
19   
48   
150   
250   
20   
48   
160   
260   
21   
48   
170   
270   
22   
48   
180   
280   
23   
48   
190   
290   
24   
48   
200   
300   
25   
54   
150   
250   
26   
54   
160   
260   
27   
54   
170   
270   
28   
54   
180   
280   
29   
54   
190   
290   
30   
54   
200   
300   
31   
60   
150   
250   
32   
60   
160   
260   
33   
60   
170   
270   
34   
60   
180   
280   
35   
60   
190   
290   
36   
60   
200   
300