

DOE Full Factorial Design

This guide provides instructions on designing a full factorial experiment. A full factorial experiment in where every possible treatment combination will be studied. For analysis of full factorial experiments, see the **DOE Full Factorial Analysis** guide.

Create the Design (Full Factorial Design)

- 1. Open the platform under **DOE > Classical > Full Factorial Design**.
- 2. Specify the **Response(s)**:
 - Double-click on **Y**, under **Response Name**, to name the response.
 - If needed, change the response **Goal** and **Upper** and **Lower Limits**.
 - Click Add Response to add additional responses.
- 3. Specify the **Factors**:
 - Click **Continuous** or **Categorical**, then the number of levels to add a factor. Click **Remove** to remove a factor.
 - Double-click to change the factor name.
 - Tab to change the values for the factor.
 - Repeat for all factors.
- 4. Click Continue.
- 5. Specify the **Run Order** (default is Randomize), the **Number of Center Points** and the **Number of Replicates** (the number of additional sets of runs for each design point).

Here, we have specified an unreplicated fully randomized 2^3 full factorial design with 3 center points, totaling 8 + 3 = 11 runs.

- 6. Select **Make Table** to generate the design (or **Back** to make changes). In the design table:
 - The **Pattern** column provides a key to the factor levels for each trial.
 - The factor settings are indicated in the columns for each factor.
 - The response for each trial will be recorded in the last column (here, **Percent Reacted**).

File Edit Tables Row						Window Help
i 🖶 🛅 🔀 🖿 🖄 🏓	🖉 🚽 🔛	💕 🛃	3 🗈 🚨	58	÷	
2x2x2 Factorial	∢					
Design 2x2x2 Factorial		Pattern	Feed Rate	Catalyst	Stir Rate	Percent Reacted
Model Evaluate Design	1	-+-	10	2	100	•
 DOE Dialog 	2	+	15	1	100	•
	3	000	12.5	1.5	110	•
	4	+++	15	2	120	•
	5		10	1	100	•
 Columns (5/0) 	6	++-	15	2	100	•
2	7	+-+	15	1	120	•
🖡 Pattern 🔁	8	000	12.5	1.5	110	•
🚄 Feed Rate ≭	9	+	10	1	120	•
🖌 Catalyst 🗱	10	-++	10	2	120	•
🚄 Stir Rate ≭ 🚄 Percent Reacted 苯	11	000	12.5	1.5	110	•

2x2x2 Factorial - JMF

• The **Model** script will be saved to the data table and the design specification window stays open to change or regenerate the design.

Notes:

- Select Evaluate Design to view properties of the design.
- The **Easy DOE** platform (under DOE menu) provides a guided workflow to step through the process of creating and analyzing experiments and is an alternative to the steps above for creating a design.
- Full factorial designs can also be generated from the **Custom Design** platform.

Visit Design of Experiments Guide in JMP Help to learn more.

To create a 2³ full factorial design with one run at each of the 8 corner points and 3 runs at the center point.

# C	DOE - Fi	ull Facto	rial Desi	gn - JN	1P						-		×
File	Edit	Tables	Rows	Cols	DOE	Analyze	Graph	Tools	Add-Ins	View	Window	Help	
4 💌	Full F	actoria	al Desi	gn									
⊿∎	Respo	nses											
/	Add Response 👻 Remove Number of Responses												
	Response Name			Goa	Goal		Lower Limit		er Limit	: Imp	ortance		
F	Percent	Reacted			Ma	ximize	90		99				
4	Factor	'S											
	Continu	Jous 🔻	Categor	rical 🔻	Remo	ove Add	N Factors	1					
	Name Role						Values						
1	Feed Rate Continue Catalyst Continue Stir Rate Continue					10		15	5		_		
1						1					-		
1	Juli	ate		contin	uous		100		12				
2x2:	x2 Facto	orial											
	utput C												
Ru	in Orde	erc		Rand	omize	~							
		of Runs:				8							
		of Cente											
-		of Replic	ates:	0									
N	lake Ta	ble											