PPS (nPOWER)

Polyphenylsulfone

Print Settings	
Extruder Temperature	330°C
Bed Temperature	N/A – Slicer automatically sets temperature based on support material.
Bed Preparation	N/A
Cooling Fan	Yes
Heated Chamber	Yes
Closed Chamber	Yes
Chamber Temperature	85°C
Notes	• Due to nPOWER's material properties, it has some special machine setup requirements and cautions that go with printing it, as well as some manual (not automated via the LCD screen menu) procedures for loading and unloading materials. • Also, nPOWER requires a dedicated nozzle and heat bridge that, once used for nPOWER, cannot be used with other materials, including cleaning nylon.
G-Code Files	• See G-Code files - https://trak.app.box.com/s/00i84reqay3w74go7chlyqvi4ltrqxwc ○ nPower_Purge1.gcode ○ nPower_Purge2.gcode ○ nPower_Purge3.gcode

Material Management	
Drying	**Temperature** • 70°C - 110°C **Dry Time** • Heat only →12 hours • Heat +Vacuum → 3 hours
Recommended Support Material	• SSU05
Storage	• Moisture-free, dry environment.
Compatible Materials	• None

Slicer Settings	KISSlicer (0.4mm)	KISSlicer (0.6mm)	SSI (0.4mm)	SSI (0.6mm)
Material Profile Name	nPower new		nPower	
Layer Height	0.25 - 0.3 mm	Not Available	0.25-0.3	Not Available
Loops	4.5		4.5	
Skin	1.5		1.5	
Infill	Recommended 20 % (Always <50%)		Recommended 20 % (Always <50%)	

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Machine Setup & Procedure

1. Thoroughly clean the nozzle on the heater/extruder you are going to change (we recommend using nozzle #2 or #3 to enable abbreviated calibration), but it could be any nozzle, then unload the cleaning material.
2. The nozzle then must be changed to the HIGH TEMP configuration (PTFE tube inside heat bridge "up") before it will safely heat to the required print temperature of 330°C. Changing the configuration requires that the heater/extruder assembly to be reconfigured must be removed from the print head and the heat bridge "flipped" upside down to the HIGH TEMP config. Please see the owner's manual for detailed instructions on making this change. Failure to do this will ruin heat bridge.
3. After remounting the assembly in the print head an abbreviated calibration must be done to reset all nozzles to precisely the same Z height (+/- .2mm). See the guide for doing an abbreviated calibration. Alternatively, a full calibration can be done per the owner's manual, and should be done if nozzle #1 was changed.
4. Repetier Server must also be reconfigured for the nozzle to be used to allow the temperature to be set to 330°C. Go to Printer | Printer Settings | Extruder tab and increase the maximum allowed temperature on the required nozzle(s) and save.
5. The printer configuration must be changed to put the appropriate nozzle into HI TEMP configuration. See step by step on how to do this if needed, and confirm the display shows HI TEMP (two thermometers) on the correct nozzle(s) and save the new configuration.
6. Load the supplied "330_nPOWER_purge_pause_Nzl_X" GCode to Repetier Server, or to the SD Card, or both for maximum convenience.
7. Load nPOWER manually fully into the system and run 330_nPOWER_purge_pause_Nzl_X. The nozzle will heat to 330°C, purge and wait for user intervention (don't let it sit "cooking" more than a minute or so). Once the nozzle has stopped flowing push the black button and the system will retract the material and cool the nozzle. nPOWER is now ready to print.
8. Load nPOWER support material normally into desired nozzle.
9. Modify the build plate temperature on nPOWER support material (SSU05) in KISSlicer to 130°C for v2 & v3 machines, or 115°C for v4's. (if this hasn't already been done in the material profile).
10. Create an nPOWER style (copy style) in KISSlicer for the desired Z height (.25 or .3mm recommended, typically no more than 50% infill) to accommodate any additional changes to the Style tab you might make.
11. Slice and print normally using the SSU05 Object nPOWER Support strategy with the materials mapped to the correct nozzles.

PDL Rating Guide

Weighted Value	Weight Change*	Diameter; Length Change (%)	Thickness Change (%)	Volume Change (%)	Mechanical Property Retained (%)
9	0-0.25 >0.25-0.5	0-0.1 >0.1- 0.2	0-0.25 >0.25-0.5	0-02.5 >02.5-5.0	>97 94 -<97
8	>0.5-0.75	>0.2-0.3	>0.5-0.75	>5.0-10.0	90 -<94
7	>0.75-1.0	>0.3-0.4	>0.75-1.0	>10.0-20.0	85 -<90
6	>1.0-1.5	>0.4-0.5	>1.0-1.5	>20.0-30.0	80 -<85
5	>1.5-2.0	>0.5-.75	>1.5-2.0	>30.0-40.0	75 -<80
4	>2.0-3.0	>.75-1.0	>2.0-3.0	>40.0-50.0	70 -<75
3	>3.0-4.0	>1.0-1.5	>3.0-4.0	>50.0-70.0	60 -<70
2	>4.0-6.0	>1.0-1.5	>4.0-6.0	>60.9-90.0	50 -<90
0-1	>6.0	>.0	>6.0	>90.0	0 -<50 0

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Chemical Resistance Table

The chemical resistance of PPS compounds is well known to be outstanding, even at elevated temperatures. However, being an organic polymer, PPS can be affected by some chemicals under certain conditions. The following list is disclosed as indication of performances for customer convenience: the indications are given at our best knowledge and must be taken as information while printing material selection.
It is up to the customer to validate the fitness and the final chemical resistance at selected reagents, especially for public transport and dangerous area (ATEX) applications.
In no case TRAK Machine Tools will be liable for any responsibility from use of nPOWER 3d printing filament.

Reagent Name	Note	Concentration (%)	Temperature	Time (days)	PDL Rating
1,2 Dichloroethane			90°	1	9
1,2 Dichloroethane			90°	90	8
1,2 Dichloroethane			90°	365	8
Aniline			90°	1	9
Aniline			90°	90	7
Aniline			90°	365	4
Benzaldehyde			90°	1	8
Benzaldehyde			90°	90	5
Benzaldehyde			90°	365	3
Benzonitrile			90°	1	9
Benzonitrile			90°	90	6
Benzonitrile			90°	365	3
Chloroform			90°	1	7
Chloroform			90°	90	6
Chloroform			90°	365	3
Ferric Chloride			90°	1	8
Fluoboric Acid			90°		7
Formaldehyde			90°	1	7
Formic Acid			90°	1	4
Freon			90°		7
Fuel oils			90°		7
Gasoline	15% Ethanol		23°	14	8
Gasoline	Unleaded 15% Ethanol		23°	42	8
Gasoline	15% Methanol		23°	14	8
Gasoline	Unleaded 15% Methanol		23°	42	8
Glycolic Acid			90°		7
Heptane			90°		7
Hexane			90°		7
Hydraulic fluid, aircraft			90°	1	8
Hydraulic fluid, aircraft			90°	90	7
Hydraulic fluid, aircraft			90°	365	7
Hydrobromic Acid		10	23°	7	8
Hydrocloric Acid		10	90°	1	8
Hydrocloric Acid		10	150°	1	4
Hydrocloric Acid		5	90°		7
Hydrocloric Acid		50	60°		7
Hydrocloric Acid		75	90°		7
Hydrogen Peroxide		30	90°		7
Hydrogen sulfide			90°		7
Isooctane		85	23°	60	6

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Reagent Name	Note	Concentration (%)	Temperature	Time (days)	PDL Rating
Jet JP4			90°		7
Kerosene			90°		7
Ketones			90°		7
Lactic Acid			90°		7
Lead Acetate			90°		7
Lubricating oils			90°		7-8
Magnesium Chloride		10	90°		8
Magnesium Hydroxide			90°		7
Magnesium Sulphate			90°		7
Methulene Chloride			21°		7
Methulene Chloride			90°		7
Methyilpyrrolidone	n-methylpyrrolidone		90°	1	8
Methyilpyrrolidone	n-methylpyrrolidone		90°	90	7
Methyl Alcohol		15	23°	60	8
Methyl Chloride			21°		7
Methyl Ethyl Ketone (MEK)			21°		7
Methyl Ethyl Ketone (MEK)			90°		7
Methyl Isobutyl Ketone			21°		7
Methyl Isobutyl Ketone			90°		7
Mineral Oils	5W30		23°	60	8
Mineral Oils	5W30		80°	30	8
Mineral Oils	SAE30		180°	3	8
Mineral Oils	SAE30		180°	28	8
N-Butyl Alcohol			90°	1	9
N-Butyl Alcohol			90°	90	8
N-Butyl Alcohol			90°	365	7
Naphtha			90°		7
Naphthalene			90°		7
Nickel Chloride			90°	7	7
Nitric Acid			23°	90	7
Nitric Acid			90°	1	0
Nitrobenzene			90°	90	7-8
Nitrobenzene			90°		2
Nitromethane			90°		7
Oleic Acid / Oxalic Acid			90°		7
Oleic Acid / Oxalic Acid			90°	1	7
Perchloroethylene			90°		7
Phenol			90°	1	8
Phenol			90°	90	7
Phenol			90°	365	2
Phosphoric Acid		85	90°		8
Phosphoric Acid		85	90°		8
Phosphoric Acid		85	90°		6
Phosphorous Trichloride			90°		7
Potassium Chloride		50	90°		7
Potassium Cyanide			90°		7
Potassium Hydroxide		50	90°		7
Potassium permanganate		10	90°	1	8
Propyl Alcohol	1-propanol		90°		7

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Reagent Name	Note	Concentration (%)	Temperature	Time (days)	PDL Rating
Propylene Chlorohydrin			90°		6
Pyridine			90°	1	7
Refrigerant R-22			90°	1	9
Refrigerant R-22			90°	90	8
Refrigerant R-22			90°	365	7
Sea Water			90°		7
Silver Nitrate			90°		7
Sodium Hydroxide		30	90°	1	9
Sodium Hydroxide		30	90°	90	7
Sodium Hydroxide		30	90°	365	4
Sodium Hypochloride			90°	1	8
Sodium Hypochloride			90°	90	6
Sodium Hypochloride			90°	365	4
Sulphuric Acid		30	90°	1	8
Sulphuric Acid		30	90°	90	7
Sulphuric Acid		30	90°	365	5
Sulphuric Acid		50	90°	1	7
Sulphuric Acid		50	90°	120	6
Sulphuric Acid		50	90°	365	4
Toluene			90°	1	8
Toluene			90°	90	6
Toluene			90°	365	3