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Tuner Report #6 Nitrous Injected SR20DE

The Premise

In this week's tuner report we're going to look at using the nitrous calculator to choose the right parts for a bolt-on nitrous buildup. The reason I'm showing this kind of build-up is that for many cars out there it's very difficult to find an off the shelf turbo or supercharger kit. For some cars (and motorcycles) the choice of the correct combination of bolt ons, with a healthy shot of nitrous, can produce a safe and power efficient set-up without the complication of a DIY turbo or supercharger kit.

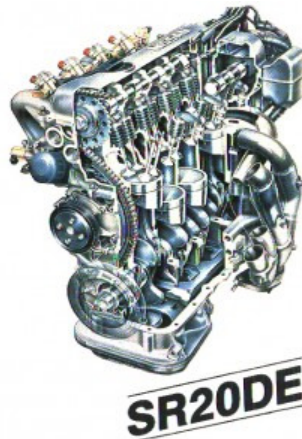
This is also somewhat of a follow up on last week's tuner report where we did an all-motor to supercharged conversion... when in fact if you live in the US (which is where our readers are located) or in a similar country where nitrous oxide is easy to purchase and racing only going to happen at a regulated track, then it makes sense to build on your all-motor set-up with a healthy shot of nitrous that you use on the weekends, while keeping your car fairly stock and simple during the weekdays... making it a Dr. Jekyll and Mr. Hyde set-up ...

[More Details](#) (Wikipedia) | [Example](#) (170whp All-Motor SR20DE) | [Specs](#) (Camshaft Compilation)

The Victim

Nissan SR20DE

- 2.0L 169 hp I4
- 7200 rpm redline
- 169 hp @ 6400 RPM
- 132 ft-lbs @ 4800 RPM
- 32 valve /DOHC
- 2x 34mm intake valves
- 2x 30mm exhaust valves
- Bore: 86 mm
- Stroke: 86 mm
- Compression ratio: 9.5:1
- Naturally Aspirated



The Scheme

289hp @ 100 shot @ 7200 rpms
Design time: 3 minutes and 15 seconds

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Tuner Report #6 Nitrous Injected SR20DE

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Should be good though because it directly answers t fuel without a spark...

Year	Make	Model	Engine	Supercharger	Power (HP)	Torque (ft-lb)
2000	Nissan	SR20DE	2.0L I4	None	169	132
2000	Nissan	SR20DE	2.0L I4	Procharger	289	200

Supercharger Calc

Saturday at 2:57pm

Supercharger Performance Getting there... pro

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The Specifications

Blogroll

Supercharger Performance – Where it all started

The results

Basic Information:

- Displacement = 1998 cc
- Stock Engine Volumetric Efficiency = 121 %
- Maximum Safe RPM = 8506 rpm
- Expected Bolt On Power is 189 crank hp

To reach your power goals you need:

- Required N2O Shot = 100 horse power - **Buy Now**
- Released above 2778 RPM

Single Fogger Jetting:

- N2O Jet: 0.048 in.
- Fuel Jet: 0.03 in.

Direct Port Jetting:

- N2O Jets: 0.024 in.
- Fuel Jets: 0.015 in.

Typical 10 lb. bottle duration:

- 100 seconds
- 7 runs

Spark plugs: - **Buy Now**

- Spark plugs should be = 1 step(s) colder

Piston compression ratio: - **Buy Now**

- Recommended Static Compression Ratio: 10.5 (@this boost/nitrous level @92 octane gasoline)

To increase your compression ratio by one point, Head Mill= 0.0338 inches

To reduce your compression ratio by one point, A head gasket thicker by 0.0338 inches is required

Valves:

- Intake Valve Size = 2 x 31 mm
- Exhaust Valve Size = 2 x 26 mm

Cams: - **Buy Now**

- Intake Cam Duration = 246 degrees
- Intake Cam Lift = 7.75 – 10.2 mm
- Exhaust Cam Duration = 260 degrees
- Exhaust Cam Lift = 6.5 – 8.5 mm

Ideal Head Flow (total per cylinder):

- Intake = 216 CFM @ 28 " H2O
- Exhaust = 183 CFM @ 28 " H2O

Intake dimensions: - **Buy Now**

- Intake Pipe diameter = 3.66 inches
- Resonant Chamber volume = 526 cc
- Throttle Bodies = 1 x 77.37 mm

Intake Manifold:

- Plenum Volume = 1740 cc
- Runner Length = 11.7 inches
- Runner Diameter = 39 mm

Header and Exhaust:

For Shorty Headers: - **Buy Now**

- Header primary diameter = 1.811 inches
- Header primary length = 20.4 inches

- Cutout & midpipe & collector diameter = 1 x 2.65 inches - **Buy Now**

- Cat-Back diameter = 1 x 2 inches - **Buy Now**

Fuel and supplemental injection:

Fuel Lines: - **Buy Now**

- Feed Line: -7AN 0.41in 10mm
- Return Line – fuel injected ~40psi: -5AN 0.31in 7mm
- Return Line – carbureted ~15psi: -9AN 0.56in 14mm

- Fuel pump capacity is 140 Liters Per Hour - **Buy Now**

You need 4 injectors delivering 433 cc/min each - **Buy Now**

Summary of changes:

Item	Stock	Bolt Ons	100-shot
Horsepower	169 @ 6400	189 @ 7200	289 @ 7200

Intake	n/a	2.75"	3.6"
Header Primary	n/a	1.462"	1.81"
Collector &	1.875"	2.14"	2.65"
Exhaust			
Valves (in/ex)	34mm - 30mm	31mm - 25mm	31mm - 26mm
Fuel Pump	n/a	68 lph	140 lph
Intake Cam	248*/10mm	260*/10.2mm	246*/10.2mm
Exhaust Cam	248*/10mm	260*/8.2mm	260*/8.5mm
Spark Plugs	Stock	Stock	1- Step Colder
Throttle Body	60 mm	64mm	77mm

Conclusion & Parts:

- Stock cylinder head is large enough to support our target power goal with 34mm intake and 30mm exhaust valves.
- For our bolt-ons setup (189hp) the hotshot header with it's smaller 1.5" primary pipes and 2.25" collector is a good choice, however the oversized pacesetter or AEBS headers that have a 1.75" primary and a 2.5" collector are a better match for the nitrous setup.
- The stock or a slightly ported stock throttle body is good for bolt on power levels as it's a generously sized 60mm unit but a Tomei 70mm N-1 throttle body is a better match for our nitrous setup
- For our nitrous setup, we don't need to upgrade our intake cam (due to the increased charge density from the nitrous flow requiring less duration) so we can save money by only upgrading our exhaust camshaft... Jun, HKS, JWT, Zex, Comp, Tomei, Apexi, and Piper all offer a 260 to 264 degree camshaft with at least 10mm of lift which is adequate for our buildup.
- A GSS278 Walbro 190 lph fuel pump is more than capable at holding prime fuel pressure at our target power level.
- Our stock Compression ratio of 9.5:1 to 10.1:1 (depending on the exact model SR20DE) is low enough for a safe spray level of a 100 shot.
- NGK BKR7ES (copper) or BKR7EIX (Iridium) are 1 step colder than stock with a smaller standard 0.8mm gap (compared to the stock 1.1mm gap) and would be a good match for this combo.



The Getaway



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