2020 Arctic Cat Ctec-2 800 exhaust comparison Jim Czekala

Tom Ferry of Arctic Adventures in Rosendale NY needs a condo in Batavia NY since he comes here so often in the quest for knowledge and horsepower. He came to DTR with a 2000 mile bone stock 2020 Ctec2 800 to use for a pipe comparison. He also brought his personal trail sled—ported (by him) 2020 Ctec-2 800 with his own custom Precision EFI reflash to see which of our exhausts best matched his modified cylinders. One of his good customers Randy Latona (lives west of Buffalo some 300 miles from Rosendale) came by to help Tom swap exhaust components and provide moral support.

We would do all of the testing on the stock sled with stock muffler, stock ECU and 93.3 R+M/2 octane 0% ethanol fuel (tested on our Zeltex meter, ethanol reading verified with Rev X water based tester). Each exhaust was run twice, back to back to show what RPM peak HP would occur at initially after 8-9 seconds at WOT and then how the HP might be gained or lost as pipe temperature would climb after 15-16 seconds at WOT (and how peak HP RPM might shift with rising average exhaust temp in the pipe). Coolant temperature was consistent—beginning each first test at 80F (thermostat opening temp) and concluding each second test at @110-115F. The stock ECU delivers A/F ratio in the high 12/1 range at peak HP RPM, indicating there was plenty of fuel even for those pipes that had higher than stock airflow. Those pipes with lower than stock airflow might benefit from building heat and HP faster, and in some cases create more optimal backpressure quickly providing better cylinder filling initially. But that better initial performance after 8-9 seconds sometimes was followed by reduced performance after 15-16 seconds since airflow CFM would drop as the higher average exhaust temperature climbs enrichening A/F ratio. It appears that the ECU runs a leaner mixture when pipe temperature is even slightly lower than optimal to hasten temperature rise. Then the ECU appears to be *enrichening fuel flow* after pipe EGT becomes optimal (as airflow CFM is dropping—a double whammy). In some cases that can contribute to the dreaded HP "fade" due to gradually enrichening A/F ratio and declining HP. In situations like that, a reflash of the ECU that could change the fuel compensation to *reduce fuel flow as pipe temp climbs*—maintaining more constant A/F ratio as airflow inevitably drops—might provide even more consistent performance.

After we completed testing of the various exhausts on the stocker, we dyno tested Tom's trail sled with his own $600 Arctic Adventures cylinder porting. He also has his ECU reflashed with his own tune for the ported cylinders and new for 2020 lower RPM Jaws or D&D exhaust. Tom also tried the SpeedWerx pipe and Y pipe that made the most HP on the stock engine, and made slightly less HP than the new Jaws setup. Note that the Precision EFI Arctic Adventures custom flash runs lean on the first test then enrichens optimally then stays like that to allow long WOT runs with no fade. Tom says his clutching shifts initially at just below 8000 then slides up gradually, pulling more RPM as time at WOT continues.

We have included detailed SF data of each pipe's first test, and graphic comparisons of each pipe's back to back dyno tests and airflow CFM.

STOCK EXHAUST

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	Air_1c CFM
6950	125.2	94.6	0.635	76.6	15.40	459	57.7	235.3
7000	126.0	94.5	0.634	76.9	15.36	460	57.7	237.2
7050	126.9	94.5	0.635	77.5	15.32	460	57.7	238.8
7100	127.8	94.6	0.638	78.4	15.27	462	57.6	241.1
7150	129.4	95.1	0.637	79.4	15.19	463	57.6	244.0
7200	130.8	95.4	0.638	80.3	15.16	463	57.6	245.8
7250	132.2	95.7	0.638	81.1	15.12	464	57.5	247.4
7300	133.6	96.1	0.640	82.2	15.06	465	57.5	249.6
7350	135.6	96.9	0.640	83.4	14.91	468	57.5	252.7
7400	138.5	98.3	0.633	84.3	14.73	469	57.5	256.2
7450	140.6	99.1	0.627	84.7	14.69	469	57.4	257.9
7500	142.5	99.8	0.622	85.3	14.66	469	57.4	259.7
7550	144.6	100.6	0.620	86.2	14.59	469	57.4	262.0
7600	146.6	101.3	0.617	87.0	14.44	470	57.3	264.6
7650	148.3	101.8	0.615	87.7	14.30	471	57.3	266.3
7700	149.9	102.3	0.615	88.7	14.16	472	57.3	268.2
7750	151.3	102.5	0.619	90.0	14.00	474	57.3	270.0
7800	152.4	102.6	0.623	91.3	13.84	476	57.2	271.6
7850	153.2	102.5	0.629	92.7	13.70	477	57.2	272.9
7900	153.6	102.1	0.636	94.0	13.56	479	57.1	273.9
7950	153.6	101.5	0.644	95.1	13.38	480	57.1	274.7
8000	152.9	100.4	0.655	96.2	13.16	482	57.1	275.5
8050	151.9	99.1	0.666	97.2	12.99	484	57.1	276.1
8100	150.3	97.4	0.676	97.6	12.87	485	57.0	276.6
8150	148.1	95.5	0.687	97.7	12.80	487	56.9	277.0
8200	145.3	93.1	0.702	98.0	12.75	490	56.9	277.4
8250	142.6	90.7	0.717	98.2	12.70	492	56.9	277.4
8300	138.3	87.5	0.739	98.1	12.69	495	56.9	277.1

SSI PIPE MOD STOCK Y PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	Air_1c CFM
6900	125.2	95.3	0.643	77.4	14.91	577	57.7	230.3
6950	126.1	95.3	0.646	78.2	14.91	576	57.7	230.9
7000	126.7	95.0	0.655	79.7	14.92	575	57.6	232.4
7050	127.8	95.2	0.664	81.5	14.75	575	57.6	235.3
7100	129.6	95.9	0.661	82.3	14.59	575	57.5	237.2
7150	131.5	96.6	0.659	83.2	14.46	574	57.5	239.4
7200	133.4	97.3	0.656	84.0	14.38	574	57.5	241.4
7250	135.7	98.3	0.651	84.9	14.29	573	57.4	244.1
7300	138.4	99.6	0.645	85.8	14.21	573	57.4	246.7
7350	140.9	100.7	0.640	86.6	14.13	573	57.4	249.0

7400	143.2	101.7	0.635	87.4	14.06	573	57.3	251.3
7450	145.1	102.3	0.632	88.0	14.01	574	57.4	253.2
7500	147.0	102.9	0.629	88.7	13.96	574	57.4	255.5
7550	149.2	103.8	0.623	89.4	13.91	574	57.3	258.6
7600	151.2	104.5	0.619	89.9	13.87	574	57.3	260.6
7650	153.3	105.2	0.619	91.1	13.83	572	57.3	263.2
7700	154.9	105.7	0.619	92.1	13.79	573	57.2	265.1
7750	156.1	105.8	0.624	93.5	13.70	573	57.2	267.1
7800	156.5	105.4	0.636	95.6	13.54	572	57.1	268.9
7850	156.2	104.5	0.649	97.4	13.32	573	57.0	270.1
7900	155.1	103.1	0.664	98.9	13.09	574	56.9	271.1
7950	153.0	101.1	0.685	100.6	12.89	577	56.9	271.7
8000	148.5	97.5	0.718	102.3	12.68	579	56.9	272.1

SPEEDWERX PIPE AND Y PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	Air_1c CFM
6950	131.4	99.3	0.621	78.4	14.44	618	57.8	230.0
7000	132.2	99.2	0.632	80.2	14.41	617	57.7	233.1
7050	133.5	99.5	0.637	81.6	14.34	615	57.7	236.0
7100	135.2	100.0	0.638	82.8	14.26	613	57.6	238.8
7150	137.1	100.7	0.636	83.7	14.20	612	57.6	241.6
7200	139.3	101.6	0.632	84.6	14.17	610	57.6	244.8
7250	141.3	102.4	0.628	85.2	14.15	608	57.6	247.4
7300	143.2	103.0	0.623	85.6	14.13	607	57.5	249.6
7350	144.9	103.5	0.619	86.1	14.10	606	57.5	251.8
7400	146.6	104.1	0.614	86.5	14.04	605	57.5	254.1
7450	148.3	104.6	0.609	86.8	13.98	604	57.6	256.2
7500	150.2	105.2	0.603	87.0	13.92	603	57.6	258.6
7550	151.9	105.7	0.599	87.3	13.89	603	57.5	260.7
7600	153.6	106.1	0.598	88.1	13.87	602	57.5	262.6
7650	155.5	106.8	0.601	89.7	13.83	601	57.4	265.0
7700	157.5	107.5	0.603	91.3	13.72	600	57.3	267.3
7750	159.4	108.0	0.605	92.6	13.59	599	57.3	269.0
7800	161.1	108.5	0.608	94.0	13.44	599	57.2	270.6
7850	162.3	108.6	0.613	95.4	13.26	600	57.2	272.2
7900	163.2	108.5	0.619	96.9	13.07	601	57.2	273.6
7950	163.4	108.0	0.626	98.2	12.92	602	57.1	274.7
8000	163.2	107.1	0.634	99.3	12.78	603	57.1	275.6
8050	161.8	105.5	0.647	100.5	12.63	604	57.1	276.7
8100	158.4	102.7	0.668	101.5	12.53	606	57.1	277.8

D&D PIPE AND Y PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	Air_1c CFM

6950	126.6	95.7	0.639	77.7	14.59	621	57.7	229.9
7000	127.1	95.4	0.651	79.4	14.58	618	57.6	233.4
7050	128.7	95.9	0.648	80.1	14.45	617	57.5	235.8
7100	131.1	97.0	0.644	81.1	14.27	616	57.5	238.8
7150	134.0	98.4	0.638	82.1	14.16	615	57.5	241.6
7200	136.3	99.4	0.632	82.7	14.13	615	57.4	243.6
7250	138.4	100.2	0.627	83.3	14.11	614	57.4	245.8
7300	140.7	101.2	0.620	83.7	14.08	614	57.4	248.4
7350	142.6	101.9	0.613	83.9	14.04	613	57.4	250.3
7400	144.8	102.8	0.606	84.3	13.98	613	57.4	252.7
7450	146.9	103.6	0.603	85.0	13.94	612	57.4	254.9
7500	148.7	104.1	0.603	86.0	13.92	612	57.3	256.6
7550	150.3	104.5	0.604	87.1	13.89	611	57.3	258.4
7600	152.0	105.1	0.605	88.3	13.81	611	57.3	260.8
7650	153.9	105.6	0.605	89.4	13.69	610	57.2	262.8
7700	155.9	106.3	0.606	90.7	13.53	608	57.2	265.0
7750	157.9	107.0	0.607	92.0	13.37	607	57.2	267.0
7800	159.3	107.2	0.611	93.4	13.24	606	57.1	268.5
7850	160.2	107.2	0.617	94.8	13.12	607	57.1	269.9
7900	160.4	106.6	0.625	96.3	12.98	607	57.0	271.2
7950	160.2	105.9	0.634	97.4	12.86	607	57.0	272.1
8000	158.3	103.9	0.653	99.2	12.68	608	56.9	273.1
8050	155.0	101.1	0.677	100.6	12.55	608	56.9	273.8
8100	148.8	96.5	0.715	102.1	12.44	610	56.9	274.4

BIKEMAN PIPE AND Y PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	Air_1c CFM
6950	121.9	92.2	0.652	76.3	14.73	655	57.7	229.0
7000	122.7	92.1	0.658	77.5	14.69	654	57.6	230.8
7050	124.5	92.7	0.662	79.0	14.47	653	57.6	234.4
7100	126.4	93.5	0.660	80.0	14.35	653	57.6	236.4
7150	127.9	93.9	0.657	80.6	14.29	653	57.5	237.9
7200	129.4	94.4	0.655	81.2	14.24	653	57.5	239.8
7250	132.9	96.3	0.649	82.6	14.09	653	57.5	245.3
7300	135.3	97.3	0.642	83.3	14.07	653	57.5	247.3
7350	137.2	98.0	0.636	83.7	14.06	653	57.5	248.9
7400	139.1	98.7	0.631	84.1	14.05	653	57.5	251.2
7450	142.1	100.2	0.621	84.7	14.02	653	57.4	255.6
7500	144.2	101.0	0.616	85.1	14.03	653	57.4	257.7
7550	146.1	101.6	0.612	85.8	14.05	652	57.4	259.7
7600	148.1	102.4	0.612	86.9	14.08	651	57.4	262.6
7650	150.8	103.5	0.613	88.7	14.02	649	57.3	266.5
7700	153.7	104.8	0.611	90.0	13.90	649	57.2	269.4
7750	156.0	105.7	0.609	91.1	13.80	649	57.2	271.5
7800	158.1	106.4	0.609	92.3	13.70	649	57.2	273.3

7850	159.6	106.8	0.612	93.6	13.58	649	57.1	275.0
7900	160.4	106.7	0.618	95.1	13.40	650	57.1	276.8
7950	160.6	106.1	0.624	96.1	13.25	651	57.0	278.2
8000	160.1	105.1	0.632	97.0	13.15	652	57.0	279.3
8050	158.5	103.4	0.645	98.1	13.09	653	57.0	280.3
8100	155.5	100.8	0.663	98.9	13.09	656	57.0	281.2
8150	149.2	96.1	0.695	99.3	13.16	659	57.0	281.9

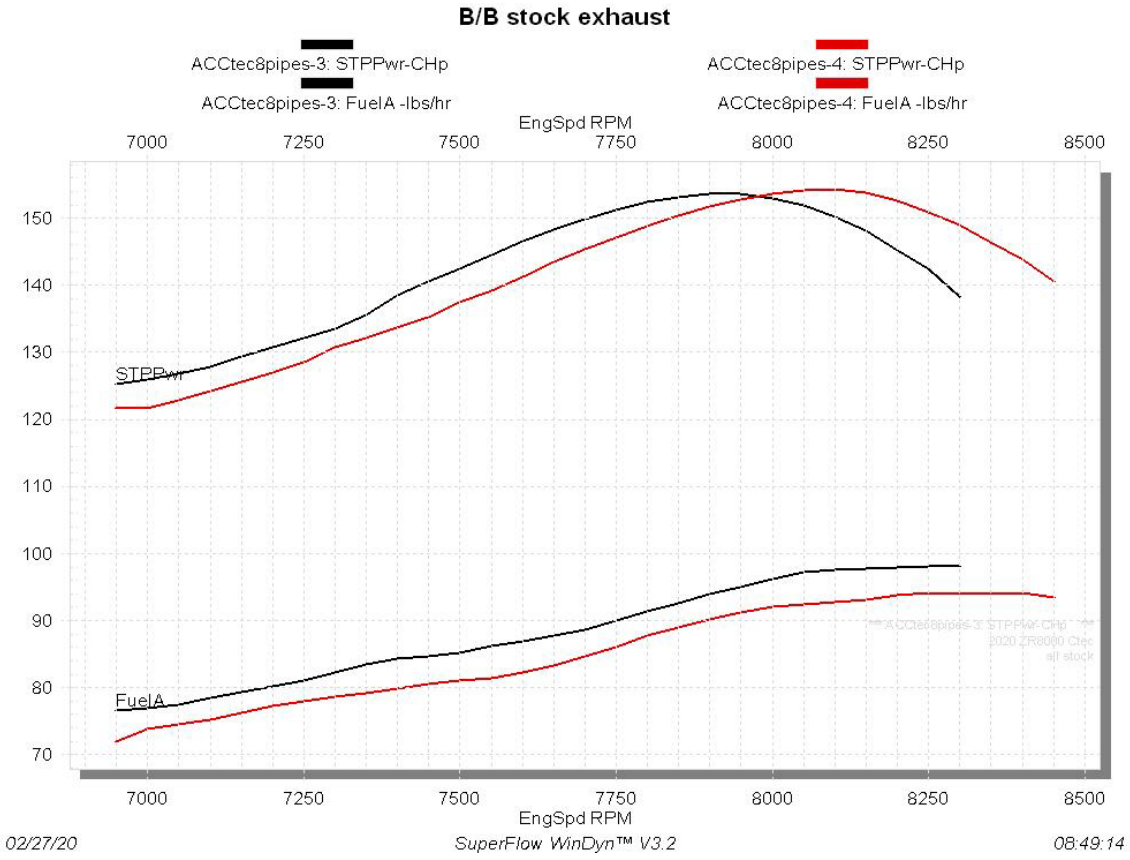
JAWS 2020 PIPE AND Y PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	Air_1c CFM
6900	134.3	102.2	0.588	75.8	14.78	645	57.7	230.6
6950	134.9	102.0	0.591	76.5	14.68	643	57.7	232.8
7000	135.6	101.8	0.604	78.6	14.63	640	57.6	236.3
7050	136.7	101.9	0.607	79.6	14.60	639	57.6	238.4
7100	137.9	102.0	0.608	80.4	14.58	638	57.5	240.6
7150	139.2	102.3	0.608	81.3	14.55	637	57.5	243.2
7200	141.0	102.9	0.607	82.1	14.51	636	57.5	246.5
7250	143.5	104.0	0.602	82.9	14.47	635	57.4	249.7
7300	145.6	104.8	0.598	83.5	14.46	635	57.4	251.8
7350	147.9	105.7	0.594	84.3	14.43	635	57.4	254.4
7400	150.1	106.5	0.591	85.2	14.35	634	57.4	257.1
7450	152.2	107.3	0.587	85.8	14.29	632	57.4	259.8
7500	153.9	107.7	0.582	86.0	14.27	632	57.4	261.7
7550	155.3	108.0	0.579	86.2	14.27	632	57.4	263.5
7600	156.4	108.1	0.578	86.8	14.27	632	57.4	265.3
7650	157.5	108.1	0.579	87.4	14.24	631	57.3	267.3
7700	158.3	108.0	0.581	88.3	14.14	631	57.3	269.6
7750	159.1	107.8	0.585	89.3	14.01	631	57.3	271.4
7800	159.6	107.5	0.591	90.5	13.90	631	57.2	272.8
7850	159.5	106.7	0.604	92.4	13.76	631	57.2	274.2
7900	157.7	104.9	0.625	94.5	13.52	631	57.1	275.4

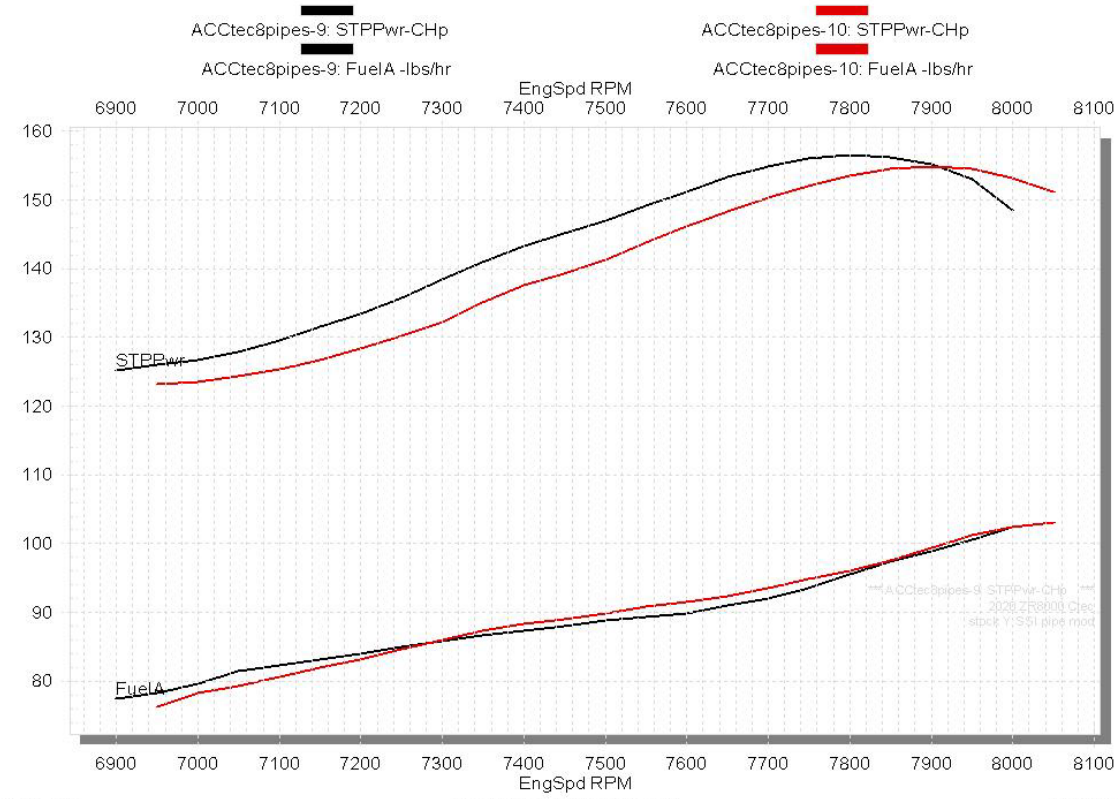
ARCTIC ADVENTURES PORTING/ REFLASH 2020 JAWS PIPE AND Y PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA lb/hph	FuelA lbs/hr	LamAF1 Ratio	DenAlt Feet	FulPrA psig	LM1Air SCFM
7350	148.2	105.9	0.544	77.1	14.28	806	57.8	244.7
7400	147.3	104.5	0.575	81.0	14.46	808	57.8	260.2
7450	147.2	103.8	0.602	84.8	14.28	812	57.7	269.0
7500	149.1	104.4	0.603	86.0	14.12	813	57.7	269.7
7550	151.1	105.1	0.602	87.0	14.03	814	57.7	271.2
7600	155.0	107.1	0.605	89.7	13.83	817	57.6	275.8
7650	158.3	108.7	0.599	90.6	13.72	818	57.6	276.4
7700	161.1	109.9	0.592	91.3	13.65	818	57.6	276.9

7750	164.1	111.2	0.585	91.8	13.60	820	57.6	277.5
7800	166.1	111.8	0.578	91.8	13.61	821	57.6	277.6
7850	167.8	112.3	0.573	91.9	13.61	822	57.5	278.1
7900	169.2	112.5	0.572	92.5	13.59	823	57.5	279.6
7950	170.5	112.7	0.573	93.5	13.53	824	57.5	281.2
8000	171.7	112.7	0.574	94.2	13.48	825	57.5	282.3
8050	172.7	112.7	0.576	95.0	13.43	826	57.4	283.6
8100	173.3	112.4	0.578	95.7	13.36	828	57.4	284.3
8150	173.3	111.7	0.580	96.1	13.28	830	57.4	283.6
8200	173.0	110.8	0.583	96.4	13.21	831	57.4	283.0
8250	171.4	109.1	0.591	96.8	13.11	832	57.4	282.3
8300	169.1	107.0	0.600	97.0	13.01	833	57.4	280.5
8350	165.6	104.1	0.612	96.8	12.92	834	57.5	278.0
8400	156.2	97.6	0.644	96.0	12.91	837	57.5	275.4

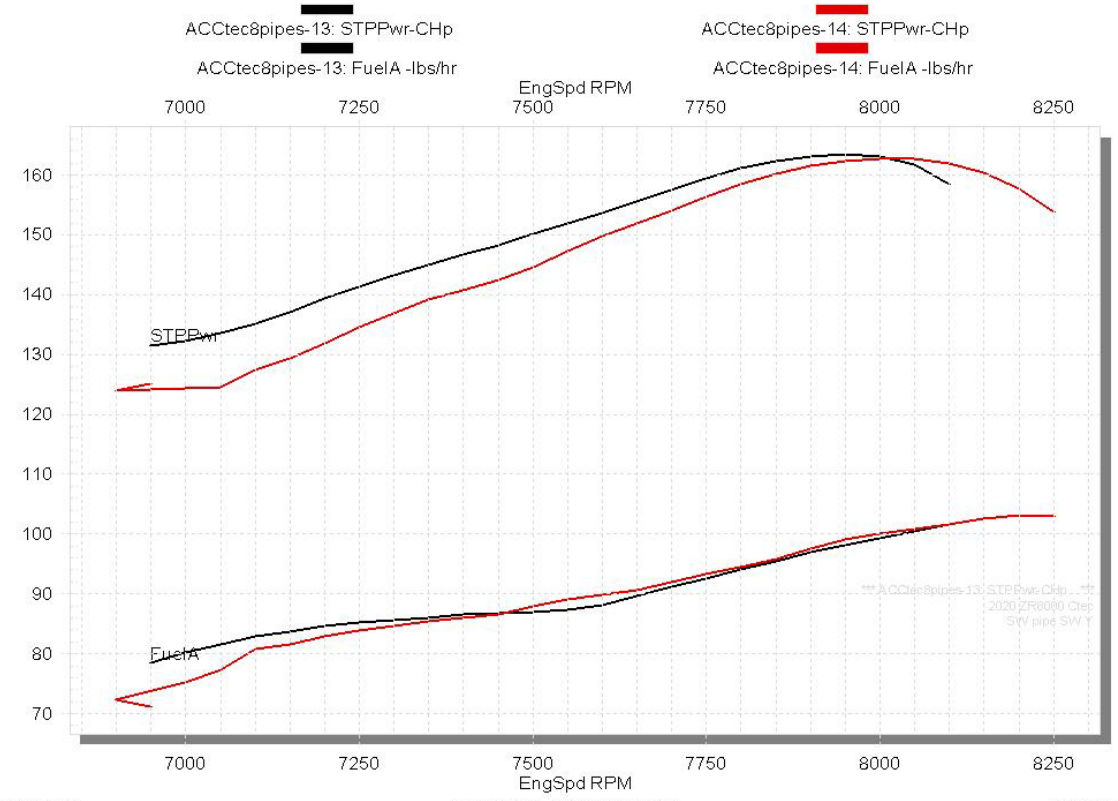


B/B SSI pipe mod



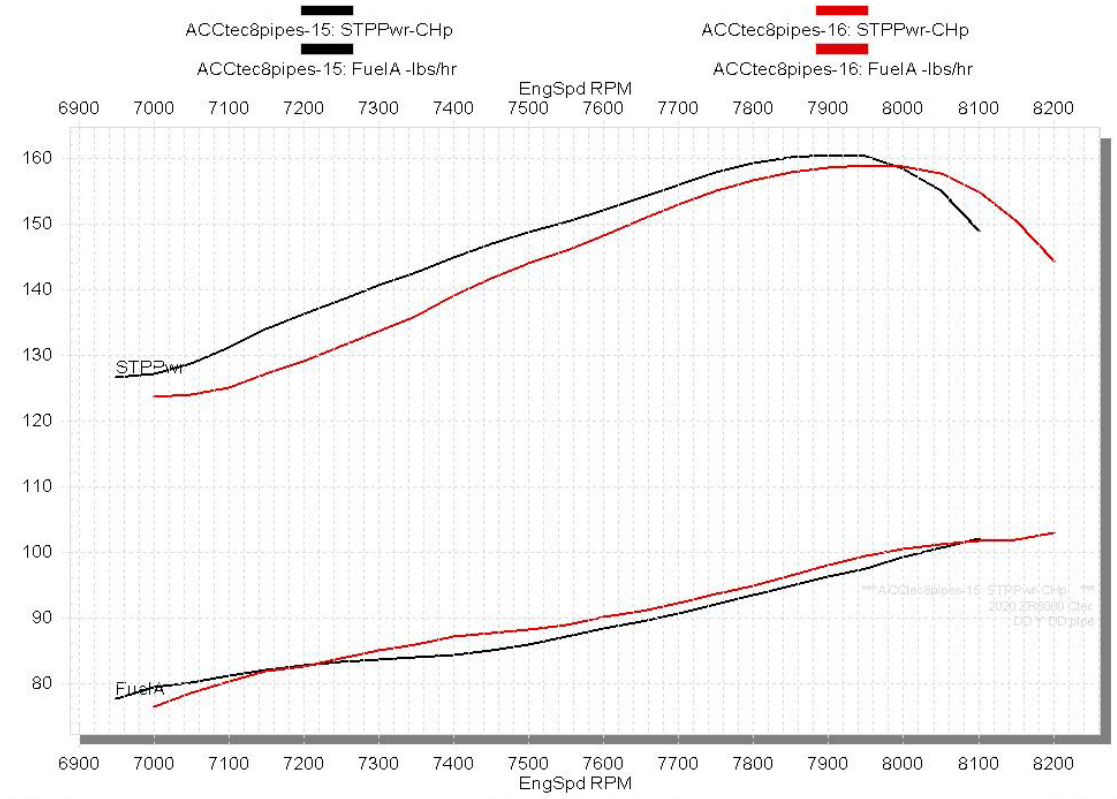
02/27/20 *SuperFlow WinDyn™ V3.2* *09:34:11*

B/B SpeedWerx pipe and Y pipe



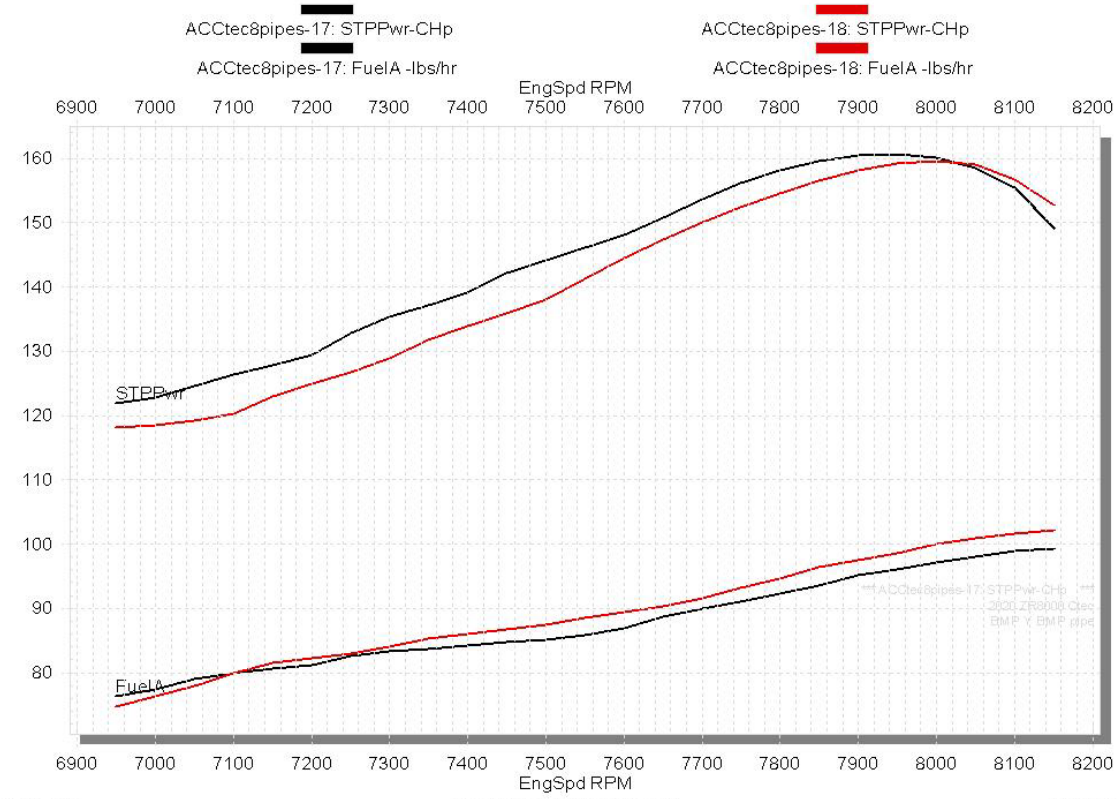
02/27/20 *SuperFlow WinDyn™ V3.2* *09:36:34*

B/B D&D pipe and Y pipe



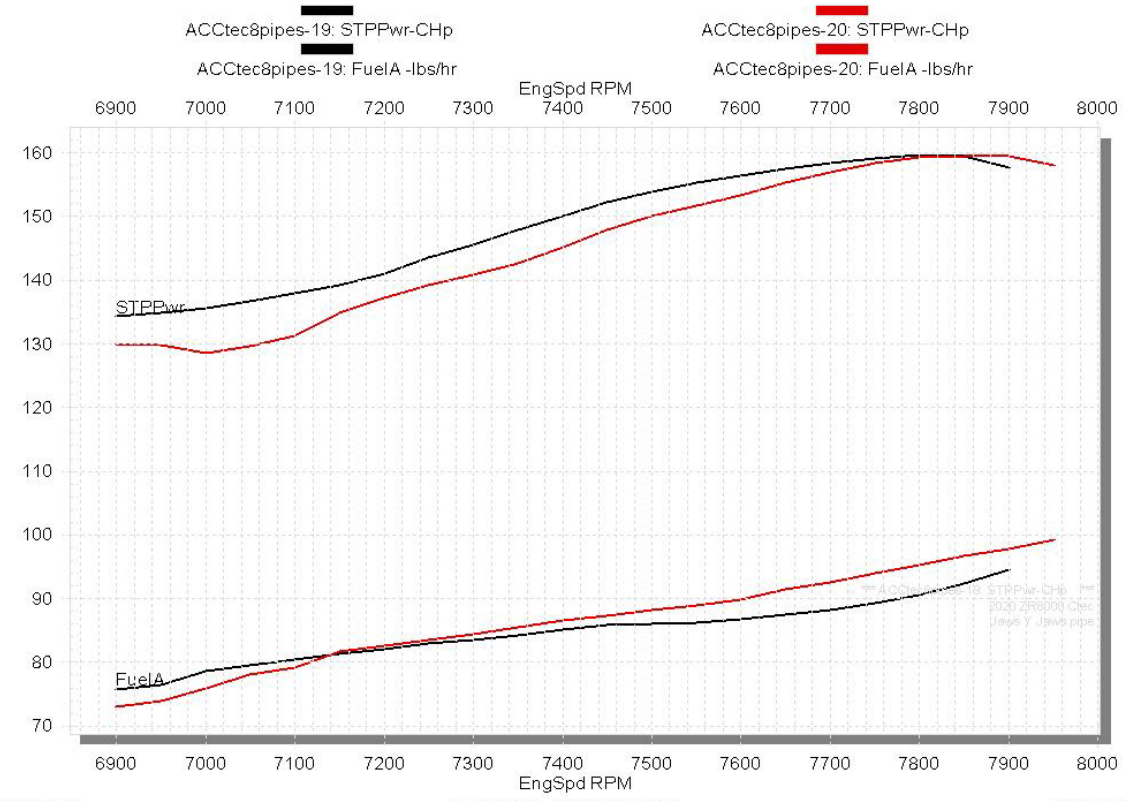
02/27/20 *SuperFlow WinDyn™ V3.2* *09:39:37*

B/B BMP pipe and Y pipe



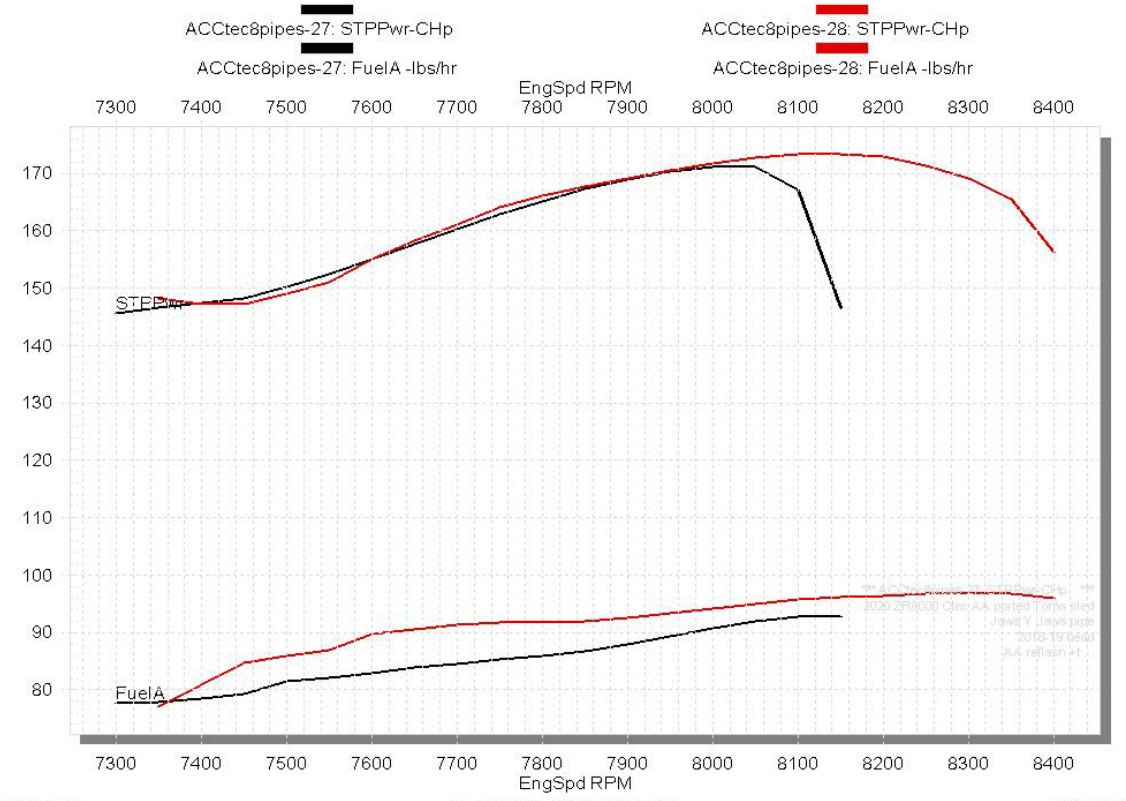
02/27/20 *SuperFlow WinDyn™ V3.2* *09:42:16*

B/B Jaws pipe and Ypipe



02/27/20 *SuperFlow WinDyn™ V3.2* *09:18:39*

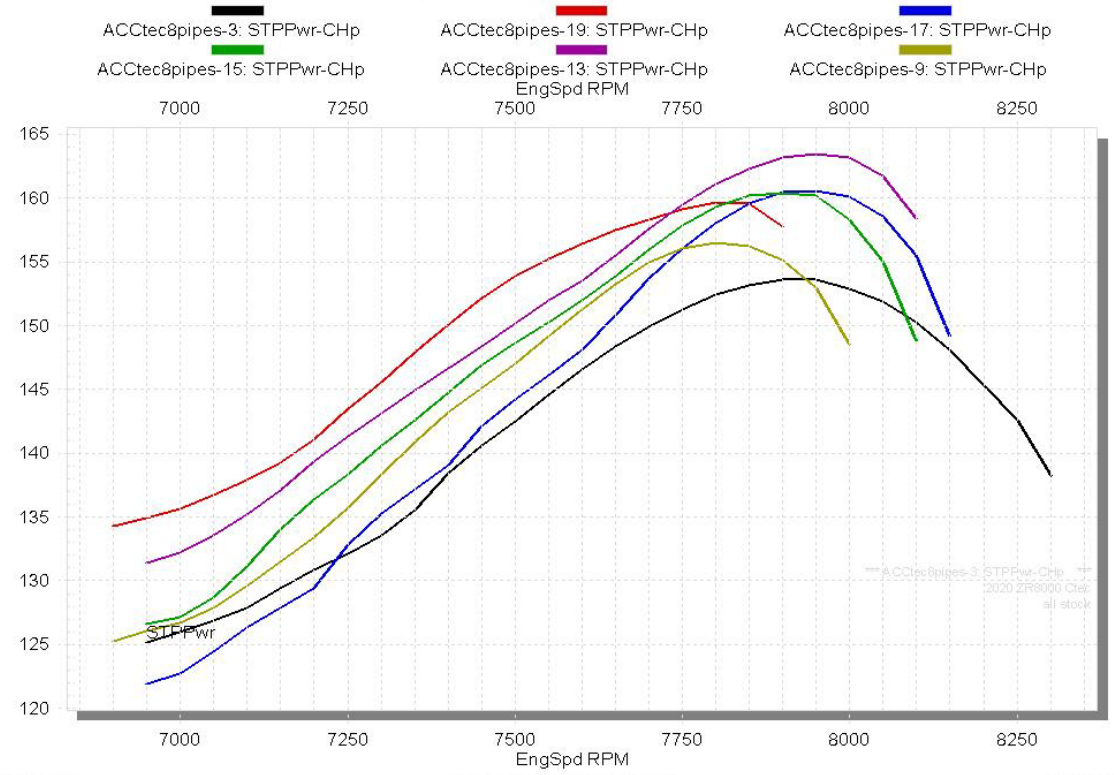
B/B Jaws exh, Arctic Adventures porting and reflash



02/27/20 *SuperFlow WinDyn™ V3.2* *09:48:32*

Compare pipes, B/B test one

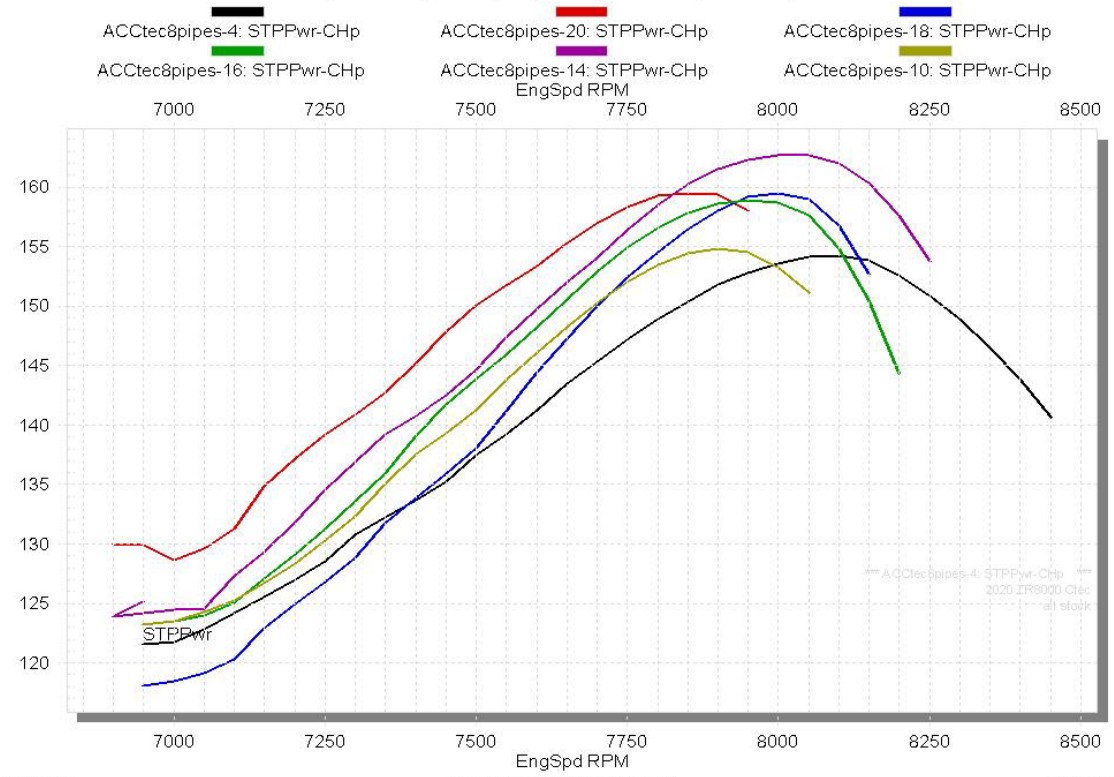
Black stock, Gold SSI pipe mod, Purple SW, Green D&D, Blue BMP, Red Jaws



02/25/20 *SuperFlow WinDyn™ V3.2* *14:55:30*

Compare pipes, B/B test two

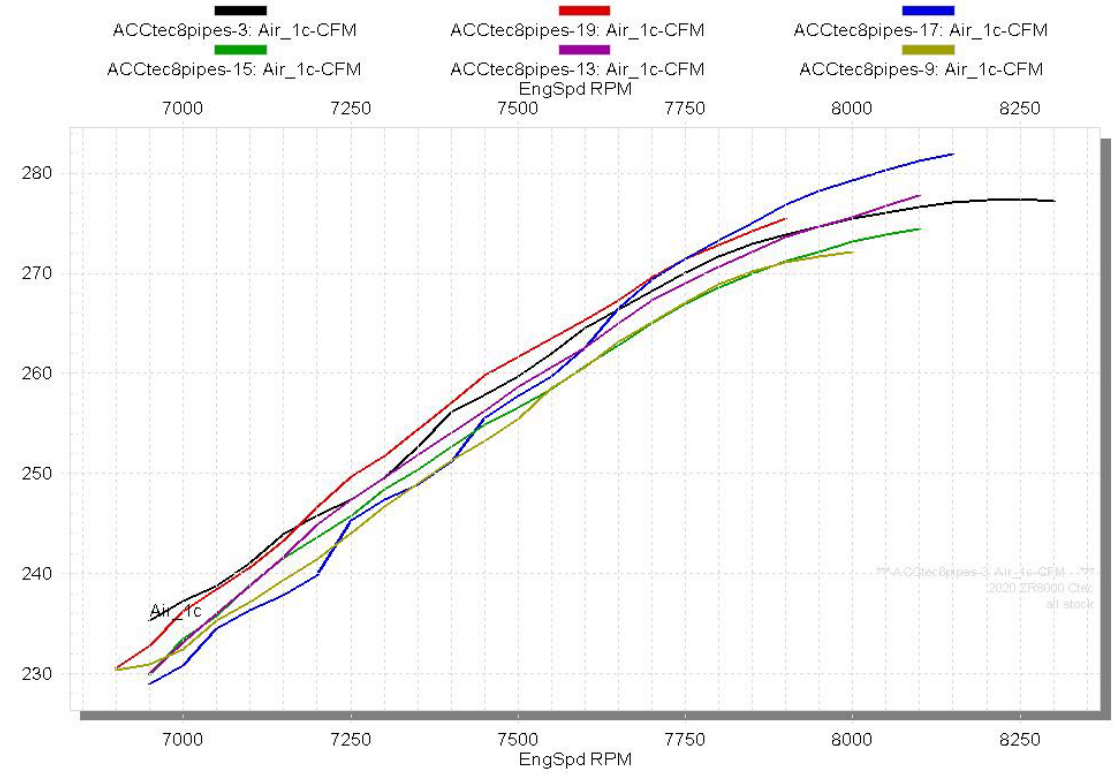
Black stock, Gold SSI pipe mod, Purple SW, Green D&D, Blue BMP, Red Jaws



02/25/20 *SuperFlow WinDyn™ V3.2* *14:40:50*

Compare airflow CFM test one of each pipe

Black stock, Gold SSI pipe mod, Purple SW, Green D&D, Blue BMP, Red Jaws



02/25/20 *SuperFlow WinDyn™ V3.2* *16:44:23*