POLY WO-DOODLE 500 HORSEPOWER POLY BUILD

"Remembering that the POLY torque curve is +430ftlbs from 1900 to 5900rpm!!! No other engine can match that!" ***Burnt Black/2015***

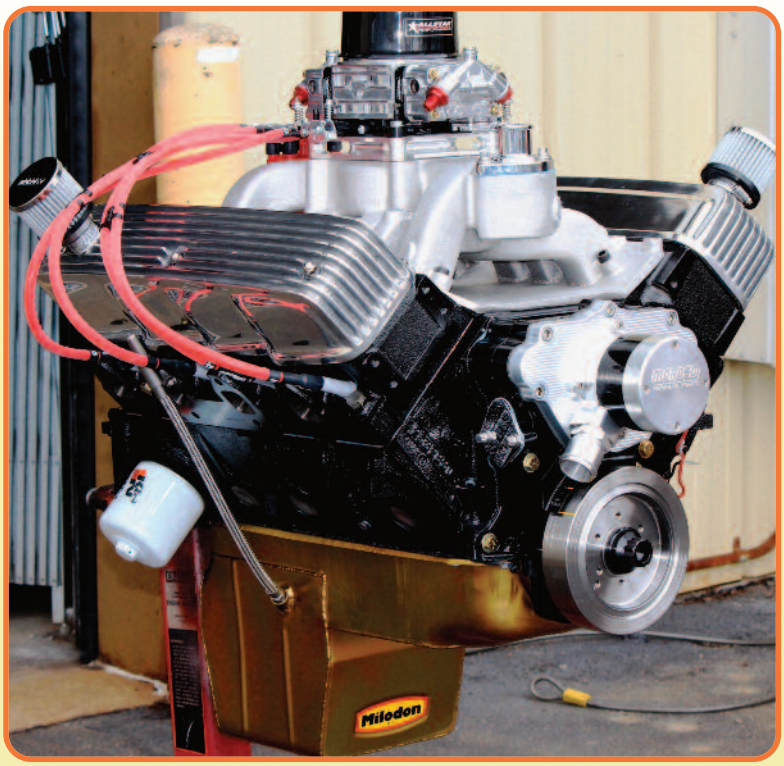
"Polly Wolly Doodle" is a song first published in a Harvard student songbook in 1880. Alvin and the Chipmunks recorded the song on their album *The Chipmunk Songbook* in 1962 and VeggieTales recorded it on their 2002 album on CD, *Bob and Larry's* ***Backyard Party***.

While that has nothing to do with this story, it makes for an interesting intro for a *Backyard Party* POLY!!! Check this out. It's a stroked 318 Chrysler Poly on the dyno **pumping out nearly 500hp**!!!

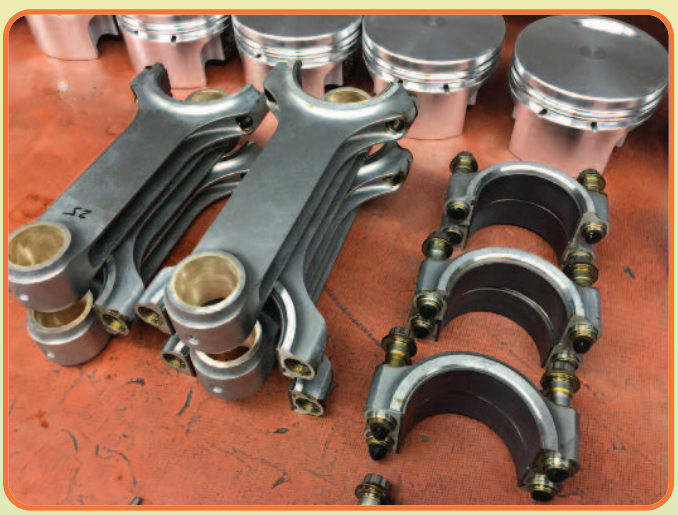
This particular POLY engine design was by Daryl Whitmer with support by Gary Pavlovich and assembly and dyno by Borowski Race Engines in Rockford IL. The POLY has enjoyed a whole new lease on life in the last two years, being Chrysler's 1955 extremely successful shot at building an economical single rocker shaft HEMI.

This version is a four-inch stroke with .060 over pistons yielding 396CI. The RaceTech forged pistons yield a 10.47:1 compression that runs on hi-test leaded pump gas, has reworked stock heads, and ported and larger valves installed, all done by Bruce Toth.

Roller rockers, roller lifters and gear drive supplied by Pavlovich and a secret-for-now custom roller cam ground specifically for this application. The carburetor is by Williams Carburetors, has TTI 1 ¾ headers... and WindTunnel intake and valve covers by Roland Osborne at Chrysler Power.



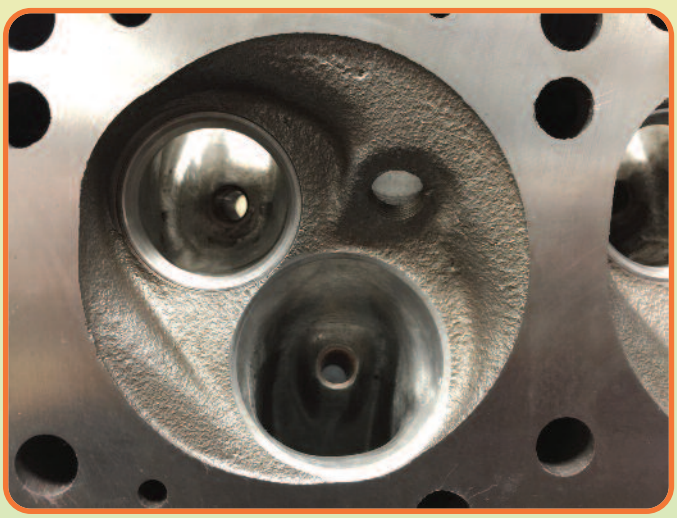
The POLY has found a new lease on life due to a hardy hand of enthusiasts that kept interest alive long enough for Chrysler Power to come along and 'bird dog' a new and extremely effective intake manifold… This is a unit built for Daryl Whitmer at Borowski Race Engines in Rockdale IL. While this is a very high end build, and the POLY like the HEMI lends itself well to the investment, this build can be approximated on a reasonable budget…



The pistons are RaceTech and rods and crank are SCAT.

This small block POLY produced the 'expected' 481HP @ 5700rpm with 487ft/lb. of torque @ 4600rpm. The Electronic ignition was set originally at 34 degrees total advance, turning back to 32 with final best numbers at 25 degrees.

Dyno testing started with an 800cfm carb, went to 750 — and Whitmer & Borowski believe that 500hp can be easily attained with a 650-700 carb!



The heads were done by Bruce Toth, Toth Performance, Chrysler Power POLY Head R&D Specialist using 1.94/1.60 11/32 stem valves, hardened seats on the exhaust and full bronze guides. Bruce did his MAX porting job followed by 3 angle seats. Note the slight extra relief in the head deck around the exhaust to facilitate unshrouding…

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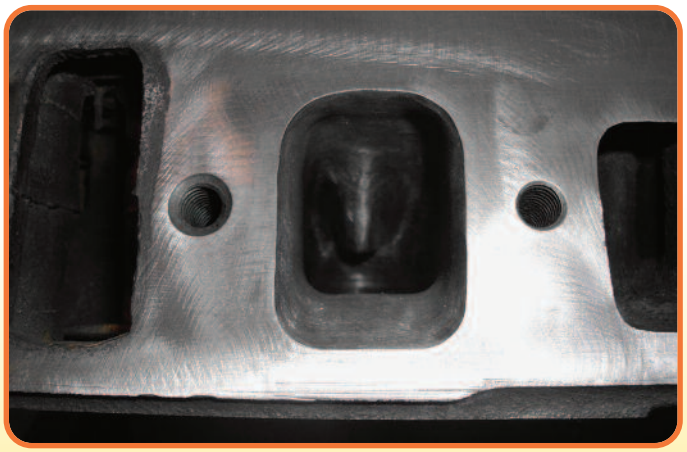
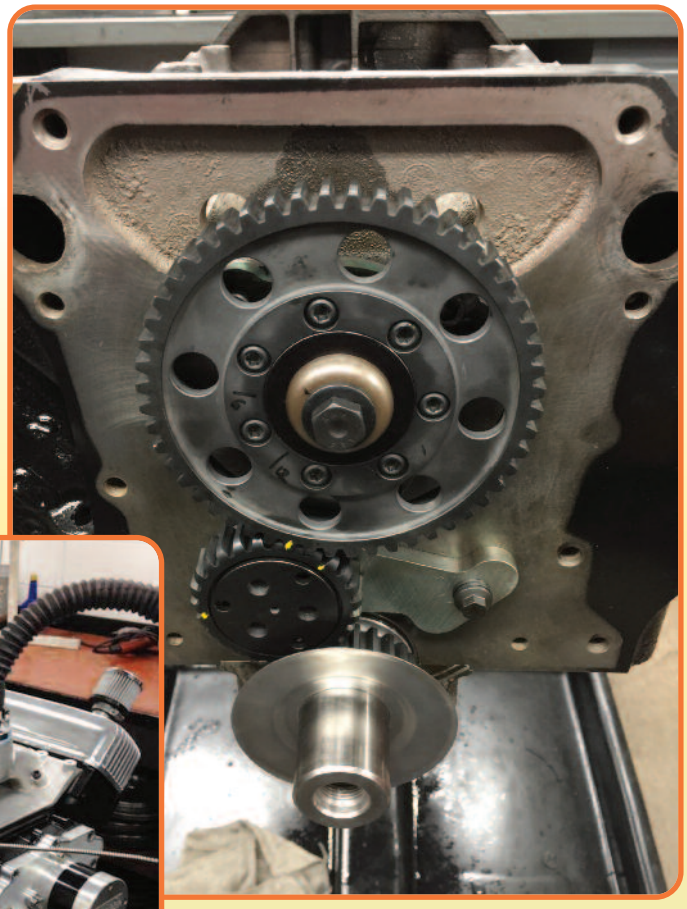


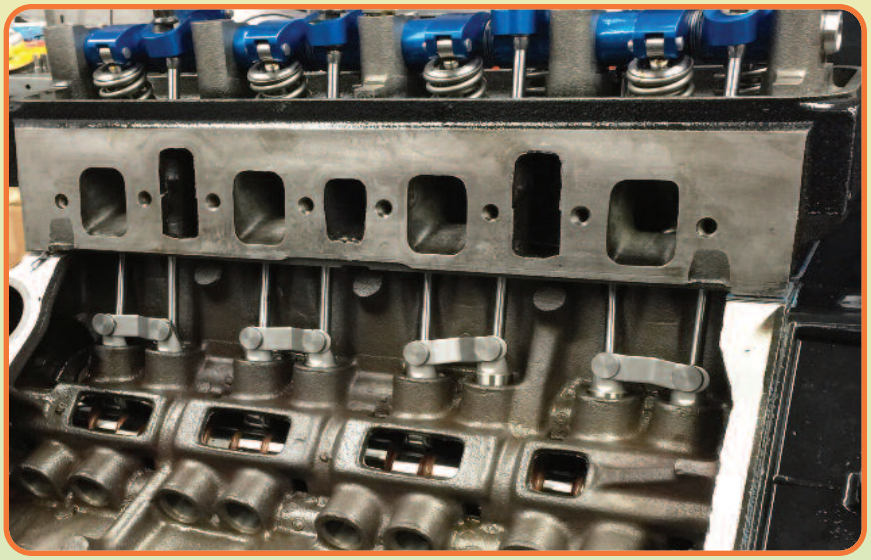
With the new POLY SS-X WindTunnel manifold in ANY application, the intake runner in the head needs to be port matched at least 1-2 inches in…



Of course the gear drive adds much increased stability to the cam efficiency.

The 10.5 compression ratio was achieved with the .060" over RaceTech piston about .015" out of the hole. This is a normal number as the stock pistons were close to that too.

◄ Initial timing started of around 32 with an 800 carb… Timing backed off all the way to 25 and with a 750 carb final numbers were 481hp/487ftlb torque. The consensus was that a 650 carb could have gotten them to right near 500hp!!!



The POLY came with mostly solid lifter cams from the factory with a few aberrations having hydraulics. They also came with a decent set of adjustable rockers… but in this case, Whitmer used a secret fgrind roller cam and pushrods with hi tech roller rockers. While these pieces will increase the potential of the package, a similar lift/duration solid cam and stock rockers (optimized at 1.6 ratio) can come reasonably close in performance for an econo build…

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Date 01-01-2003 Time 02:36:13

T02:35 D01-01 Engine Type:POLY 395 CARB:QF 750
Timming :25° Jets :74P84S CUSTOMER D.WHITMER HEADS:IRON
LSM ROLLER LASH .012-.012
10.5 COMP. DUAL PLANE INTAKE
1" OPEN SPACER

FileName : WHITMER.D54
Mode : A-Sweep

Speed rpm	CPower C_HP	C_TQ lbft	Oil psi	Fuel psi	Water °F	Vacumn	Oil °F	C.A.T. °F
3500	286.4	429.7	75.3	6.9	155	.3	68	64
3600	296.6	432.8	75.9	6.9	155	.3	68	64
3700	306.9	435.7	76.5	6.9	155	.38	68	64
3800	320.6	443	77.3	6.9	155	.4	68	64
3900	336.1	452.6	78.1	6.9	155	.4	68	64
4000	350.2	459.8	79.1	6.9	156	.4	68	64
4100	366.1	468.9	80.3	6.9	156	.49	68	64
4200	379.4	474.4	81.2	6.9	156	.5	68	64
4300	392.3	479.1	82.1	6.9	156	.59	68	64
4400	404.5	482.9	83	6.9	156	.6	68	64
4500	415.7	485.2	83.8	6.9	156	.6	68	64
4600	425.7	486	84.6	6.9	156	.6	68	64
4700	435	486.1	85.7	6.8	156	.69	68	64
4800	443.8	485.6	86.8	6.8	156	.7	68	64
4900	449.9	482.2	87.6	6.8	156	.7	68	64
5000	456.3	479.3	88.1	6.8	157	.78	68	64
5100	460.9	474.6	88.5	6.8	158	.8	68	64
5200	465.8	470.5	88.9	6.8	158	.8	68	64
5300	470.6	466.3	89.5	6.8	158	.8	68	64
5400	473.2	460.2	90.1	6.8	158	.8	68	64
5500	476.2	454.7	90.7	6.8	158	.8	68	64
5600	479.5	449.7	91.3	6.8	158	.89	68	64
5700	481.3	443.5	92.1	6.8	158	.9	69	64
5800	480.9	435.5	93.1	6.7	158	.9	69	64
5900	480	427.3	94	6.7	159	.9	69	64
6000	478.4	418.8	94.8	6.7	160	.9	69	64
[Average data]								
4750	415.9	460.2	85.3	6.83	156.7	.651	68.2	64

[Inertia factor] 1.08 [Time] 6.3 Secs

While this dyno run sheet only shows figures from 3500 to 6000, note that the torque curve on similar displays demonstrate approximately 430ftlb from 1900 to 5900rpm-no other engine but the Poly can do that…

PISTONS

In CPPA's continuing efforts to 'bring good things to life,' there have been hundreds upon hundreds of hours of R&D expended on this POLY project. Many thanks to Machine Works in Greenville, TX, Summit Racing for pistons and cranks, SCAT Enterprises for cranks and rods, Toth Performance for head R&D, AutoTech for Pistons and CP/Ross for pistons.

CPPA's position was to ascertain a reliable-yet-economical series of 'kits' to bring to the table, to take advantage of the extremely effective POLY combustion chamber and heads, adding cubic inches by utilizing overbore and extended crankshaft arms to build more cubic inches into that motor. There are still OER sandcast replacement pistons on the market 40 years later by Silvolite, but CPPA opted for a performance version as minimal entry requirements to the playing field.

The efforts have been extremely successful developing a 333CI package utilizing stock crank and four-inch bore pistons, a 354CI package utilizing 360 stroke (3.58) crank (stock 360 crank mains are bigger, they need to be cut down to 318/340 size or use SCAT version), and a 396/402 package using the SCAT four-inch crank and .060 or .090 over (four-inch bore) pistons hypereutectic or forged depending on severity of use and budget.

Machine Works did all the custom work on the super-econo (less than $200/set) Speed Pro coated hypereutectic pistons, cutting off the tops and adding intake valve eyebrows for clearance. This worked very well for the 333 and 354 kits… However, when they got to the four-inch cranks, the economical Speed Pro pistons could not be reworked efficiently and without jeopardizing so much in extra efforts that the AutoTech forged units came about to be more economical.

The CP/Ross units are VERY nice and about $300/set more than the AutoTech. You can see from the photos that the Ross have just a real nice little dome creating a bit of extra squish to 'swirl' the mixture at a high rate of speed enhancing the combustion 'burn' on the power stroke yielding a bit more power for the buck?

While the pricing for the SpeedPro starter pistons is around $200, they take another $250 of machining at Machine Works (or your local speed emporium if they can handle that with about .080" to .130" needing to come off the top and intake eyebrows put in…) The AutoTech pistons are about $650 and RaceTech version about $800 with Ross tipping the scales at $900.

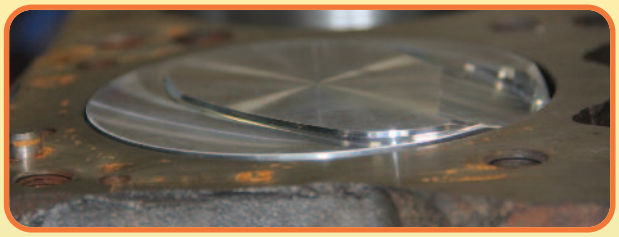
If you're on a budget and just want a good clean rebuild, get the four-inch SpeedPro sets from CPPA reworked at Machine Works or sets from Summit reworked at your own local shop. You'll be able to pick up an extra point or so in compression translating to as much as 50hp if you add the cam, headers, ignition and manifold. The 354 kit just needs the SCAT lightweight ProComp crank for about $450 and at least 75-100hp with aforementioned accessories…

Finally, the 396/402 is a bit more serious with crank and pistons mentioned above totaling about $1000 more-(around $2000 for the kit)-and a die grinder to clear the nuts on the rod bolts in the block (very minor work…) or add the SCAT rods for $450 with no problems usually. However, sans the roller cam and rockers in this story above at ~500hp, your motor should be very righteous at around 425 pump gas, tire frying, ground pounding, street dominating performance!

We've done a tremendous labor of trying to identify and produce a high quality piston package at economical price… That in and of itself is an oxymoron as there is no real competition in the marketplace… On the low end you have the Silvolite sand cast around $200. The next step is AutoTech around $650, RaceTech about $800 and CP/Ross around $1000.

This shot here is the SpeedPro hypereutectic .060" and .090" over-out board on both sides… They can work very well to be an econo 333 or 354- around $450 machined for application. They also require a press pin rod. CPPA has fresh MagnumCPSS-X forged rods for $250/set. The center left is the 396/402 AutoTech 4" (.090"over) piston about $650complete set 9.1CR and center right is the Ross version-(about $1000 complete) 9.5CR both versions here full floating pins…

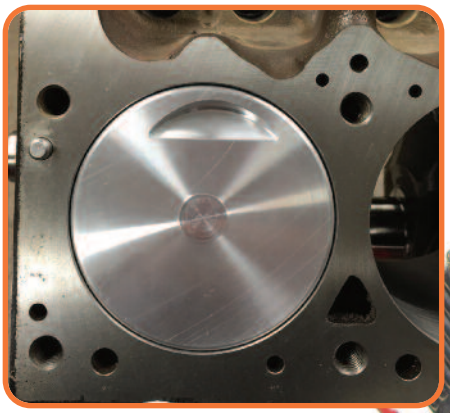
This is the side view of the 'prepared' by MachineWorks SpeedPro hypereutectic 354 piston in the hole… Note the .015" out for a good 9.1CR $450 set-requires press pin rod…



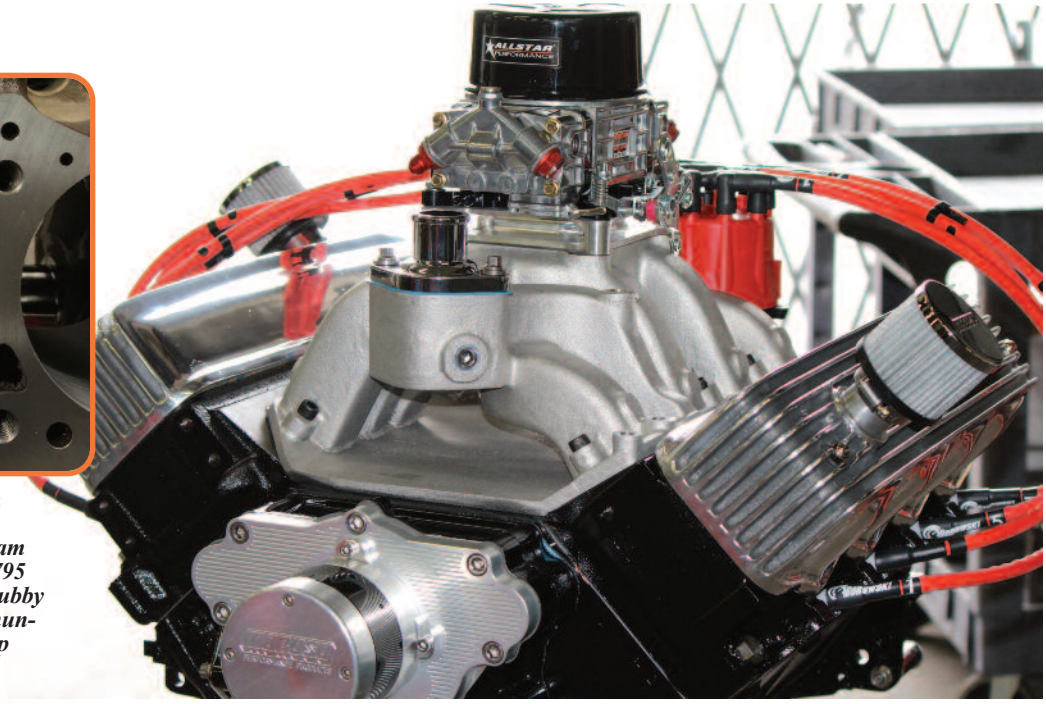
Same shot of Ross 354/396/402 with dome and significant valve relief for serious cam lift… 9.5CR about $1000 but floating pin!

The piston weight is also a pretty important factor. The Ross on the left weighs in at 664, the SpeedPro econo 621and the stock is a huge 784! Start adding rod weights; stock POLY Full Floating/621, SCAT Full Floating/593 and CPSS-X Magnum 740. The SCAT is a lightweight forging- about $375/set; CPSS Magnum very strong $250/set; and POLY is a reasonably good piece but not severe duty rated like the others…

This is the CPPA 354 econo kit with SCAT lightweight crank, CPSS Magnum press pin rods and SpeedPro hypereutectic pistons… 9.1CR $1495 balanced… The 396-402 kit must upgrade to the AutoTech forged pistons-$1895… And that's not bad for the foundational short block parts to expect ~425hp!



In closing, this is your solid meat & potatoes performance package- RaceTech 10.5 pistons, SCAT H beam rods and SCAT forged crank… $2795 for ~500 bullet proof tire frying Chubby smoking horsepower… For a few hundred more you can step up to the top rung with Ross.



This is what started it all… The CPSS-X WindTunnel manifold from CPPA… Where will it all end??? (Can anyone say XC-8 CrossRam and Aluminum heads???

Sources

Toth – *tothperformance@zoominternet.net* Eau Claire PA 724.290.2497
Borowski Race Engines – *borowskirace.com* Rockdale IL 815-725-2727.
Machine Works – 3167 State Highway 34 S, Greenville, TX 75402 903-455-7223
CPPA/POLY SuperPAC – *polysuperpac.com* Quinlan TX 888-548-2282
Ross – Gregg Suyenaga – *greggs@rosspistons.com* El Segundo CA 310-536-0100
SCAT – *www.scatenterprises.com* Redondo Bch, CA (310) 370-5501
AutoTec – *racetecpistons.com* Huntington Bch, CA Phone: 714.903.4362 CP