STAHL HEADERS/CAMS
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York, PA 17403

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STAHL HEADERS/CAMS NEWSLETTER

ISSUE #6

CAMSHAFTS

When you receive a new cam from any source we suggest you visually inspect it after cleaning. Check the cam for straightness on the center journal using (1) V-block on each end. Accept no more than .0015 run out. Use a micrometer to measure all 16 lobes from the toe to heel (base circle to nose) while the cam is still sitting in V blocks. The intakes should not vary more than .005 to each other (our specs are .003) and the same for the exhausts. Whenever you rebuild the engine, check the cam for straightness. We think you'll find Stahl cams stay straighter due to our computer controlled cam rinding machines. Incidentally, as Bar as we know our cam grinding machines are the only ones in the racing cam industry that are computer controlled. For those of you who have not tried a Stahl camshaft, we can very comfortably say you are missing out for most oval track or road race situations.

STAHL CAMS (717) 846-3123

DYNO MUFFLERS

Dyno exhaust systems should never go "down" in elevation from the engine to the muffler or atmosphere. Meaning, from the time the exhaust leaves the engine it should always go up in elevation, even if the incline is very slight. Methanol and mufflers that go down and/or are tied to a sealed exhaust system are a bomb waiting for a chance to go off. We have heard some real horror stories of people who's dyno facilities have experienced muffler explosions great enough to break apart concrete block walls and toss the blocks some 200 feet. If by any chance you are using such a facility, RIGHT NOW go get some sort of fan you can position to pull exhaust out of this "downward" facing thing. Open up the exhaust pipes to permit cell air to enter the exhaust system and run the fan at all times before and after you run the engine so the fumes can be purged before you start the engine next time.

STAHL HEADERS (717) 846-1632

STAHL INTAKE LOBES

Dur @.050	Designed Base Circle	Cam Lift	Gross Valve Lift 1.50	1.55	1.60	1.65	1.70
255-A	1.020	.415	.623	.643	.664	.685	.706
259-A	1.000	.420	.630	.651	.672	.693	.714
259-BS	.940	.419	.629	.649	.670	.691	.712
261-BF	.980	.4265	.640	.661	.682	.704	.725
261-CS	.920	.4265	.640	.661	.682	.704	-725
263-A	1.020	.413	.619	.640	.661	.681	.702
264-BF	1.000	.430	.645	.667	.688	.709	.731
264-BS	.940	.431	.647	.668	.690	.711	.733
267-A	1.000	.435	.653	.674	.696	.718	.740
268-A	1.020	.418	.627	.648	.669	.690	.711
277-A	.980	.442	.663	.685	.707	.729	.751

STAHL EXHAUST LOBES

Dur @.050	Designed Base Circle	Cam Lift	Gross Valve Lift 1.50	1.55	1.60	1.65	1.70
261-A	1.020	.401	.602	.622	.642	.662	.682
264-C	1.020	.409	.613	.634	.654	.675	.695
264-DS	.940	.410	.615	.636	.656	.677	.697
267-BF	.980	.4195	.629	.650	.671	.692	.713
267-BS	.920	.419	.629	.649	.670	.691	.712
270-A	1.000	.422	.633	.654	.675	.696	.717
270-BS	.940	.422	.633	.654	.675	.696	.717
274-A	1 .ooo	.424	.636	.657	.678	.700	.721
283-A	1.000	.429	.644	.665	.686	.708	.729

Stahl Steel Roller Cams

If you have not tried a Stahl Cam, keep in mind that Stahl lobe shapes are different. Over and over again we get compliments about smoothness to drive, valve train life and power.

DYNO EXHAUST SYSTEMS

We still are getting phone calls from people who have done an incredible amount of dyno testing with exhaust system components like 3-l/2" or 4" flex pipe and similar size mufflers on engines over 500 HP that get raced with open exhaust. The most confusing thing is that some people continue to do it after they've been told it invalidates all previous testing. Do some people enjoy beating their head against the wall?? Is what counts to go through the motions rather than results?

CAM SELECTION

How much cam will an engine accept? For several years it has appeared that exhaust port flow characteristics determines how much cam the engine will accept and be still be happy. The better the exhaust port works, the more cam the engine will accept without raping the torque curve. There is a window that we perceive as functioning like a vertical opening house window. This window is made up of the combination of intake port size and intake lobe size/shape. How much intake lobe the window will accept depends upon the rpm range, cyl size and how good the exhaust port is. The poorer the exhaust port is, the more sensitive the intake port is to shape. As the intake port tends to become lazy then the more crlt-ical the exhaust port. If you have a poor exhaust port and combine it with a lazy intake port, the engine will never make decent power, but to get the best out of those cylinder heads you will have to back off on the amount of cam. It appears that small cam changes have very little effect on where torque peak occurs in the small block Chev. Until the area of the intake /exhaust lobe relationship becomes unbalanced or overlap area gets totally screwed up, the power output will tend to pivot around the torque peak. Yes, we have software that lets us look at these values.

DYNO REPEATABILITY

Unfortunately too many dyno operators do not understand how oil temperature affects power output. I have tested both piston and rotary engines for oil temperature sensitivity and found them to behave in a similar fashion. There is typically l-1/2% power increase in a INLET oil temp increase from 160°F to 205°F. To date no one has disputed these observations. Be my guest... Solution... pick a value to test at and always pull the handle at the same temperature. Since there are seldom more than l-1/2 to 2-l/2% power gains in individual items like headers, cams, intake manifolds and carburetors it becomes **absolutely necessary** to follow good test procedures to ensure valid data. Why spend the time and money to change parts if you can't draw valid conclusions from your data?

B.S.F.C.

Brake Specific Fuel Consumption. Are you one of those NASCAR people who wish you'd never heard the words? BSFC has been perceived by many people as an indicator of air-fuel ratio. Many times people look at a BSFC value and say the engine is rich or lean. BSFC is an indicator of fuel efficiency. It tells us how much fuel the engine is consuming to make one (1) horsepower. For example, if we have a BSFC of .5 it means the engine is consuming l/2 pound of fuel per hour for every one (1) horsepower being produced. If the compression ratio is raised and the BSFC goes from .460 to .445 it means the engine is more fuel efficient. If exhaust port shape changes result in the BSFC going from .445 to .420 it means the engine is more fuel efficient. In both of the above cases it is normal to make more power with the change and not use any more fuel. If we have oil pan (A) that produces 15 less horsepower at 7500 rpm than oil pan (B) we find the engine will consume the same amount of fuel @7500 but the power has gone up with pan (B). If we run a water pump so fast it cavitates and the drive belt accidently breaks (not due to cavitation) and 25 HP or more is picked up . . . and so we go back and drive the pump with an electric motor so we can identify the power loss, then what we're really talking about is pumping losses. If a 390 CFM carburetor has an optimum BSFC of .525 at 7500 and it was .465 with a 750 CFM carb, the change in optimum BSFC has occurred because of the pumping losses created by the smaller carb. Anytime manifold vacuum rises above 1" Hg pumping loses are being created. A 6" increase can cost 100 hp and a 10" loss can cost 200 hp. The higher the manifold vacuum the greater the pumping losses. Diesel engines are more fuel efficient because they run significantly higher compression ratios than gasoline and have little or no air inlet pumping losses as compared to a carbureted engine running under part throttle conditions. A Winston cup engine with a restrictor plate that takes away 200 hp and has a manifold vacuum of 10" is now spending l/3 of its power in trying to pull air into the engine. Just like a vacuum cleaner motor, it does not do very well if you try to make it suck and blow at the same time. I can think of another illustration but ???. Too many people think of BSFC as a mixture indicator and/or tend to create preconceived thoughts about what BSFC value an engine should have. In reality, the optimum BSFC for an engine needs to be re-evaluated every time the combination is changed. Normally piston domes, and cylinder heads dictate the larger changes. However, exhaust system, cam and intake manifolds can create a situation requiring a different optimum BSFC. Be open minded. The more pre-conceived thoughts we have, the more closed minded we are. The more close minded, the sooner we are going to get beat.

POWER VALVE FLOAT

What is power valve float? Power valve float occurs when the valve starts to bounce off the seat as it is closing. It is primary caused by the camshaft lobe shape. Contributing factors are: (1) valve weight, (2) valve spring condition, spring load and frequency, (3) push rod stiffness, (4) rocker arm stiffness, (5) cylinder head rigidity where the valve train mechanism is attached.

Why be concerned with it? If the engine goes into power valve float while under normal racing conditions it: (a) causes the engine to lose power, (b) rapidly fatigues and/or breaks valves and valve springs, (c) pounds valve seats and faces which disturbs air flow which causes the engine to lose more power under all RPM situations, (d) shortens roller follower life, (e) increases wear to lifter bores, (f) shortens roller rocker arm/component life. In other words, it's not advantageous to anyone except the manufacturers of the parts.

It can be recognized on the dyno by studying power in 100 rpm increments starting as low as 7000 if steel valves are used and 7500 if titanium valves are used. Poor cams will start around 7200 and good oval track cams can run to 8100-8200 with steel valves. A sudden power loss will be observed when the valves start to bounce. You cannot detect it by engine exhaust note change or by the human ear as relates to mechanical noise changes.

STAHL HEADERS/CAMS NEWSLETTER QUESTIONNAIRE

Your Name: _____

Company _____

Address: _____

_____

Phone: _____

Flow Bench: _____
Brand Model

Dyno: _____
Brand Model

Computer:

Specialty:
Drag Race: _____
Oval Track: _____
Road Race: _____
Other: _____

Cams Used Most:
Flat Tappet : _____
Roller : _____

Please complete & return to:
STAHL HEADERS/CAMS
1515 Mt. Rose Ave.
York, PA *17403*
(717) 846-1632 *or 846-3123*

ATTENTION!
DO YOU WANT TO CONTINUE TO RECEIVE THIS NEWSLETTER?
Check you mailing label!

Some of you receiving this issue had XXX's on your last issue label and a red stamp "LAST ISSUE UNLESS YOU RESPOND". Because you were added to the list after September 1, 1987, we will send you issues 5 and 6 with out a response but then we will drop you from the list unless you fill out and return the above questionnaire. We require a response to indicate your interest. If you care enough to respond we feel you are reading the newsletter. Those that didn't respond are either not reading it or don't care and, in any event, we don't need to waste. This is your last chance! *We've dropped several hundred to date.*

STAHL

#1 QUALITY HEADERS FOR OVER 2.5 YEARS
#1 QUALITY CAMS FOR 3 YEARS

ROCKER ARM RATIO VARIATION

We hear stories that some rocker arms have significant variation in ratio. We suggest checking the net valve lift of each valve. To properly check rocker arm ratios against each other, check them all on the same valve and set lash at exactly the same crankshaft angle for each rocker.

LOW LIFT FLOW

We define low lift flow to be the intake flow at valve lift points when the piston is BTDC. Exhaust low lift flow takes place at valve lift points when the piston is more than 30" BBDC. Thus the definition varies with camshaft size. However, 90% of the SB Chevs in oval track racing have exhaust lobes within 10" duration of each other @.050 cam lift so there is not a significant difference in the low lift flow point.

OIL HEATING

Immersion Oil Heaters DO NOT EVER IMMERSE AN UNCOVERED ELECTRIC HEATING ELEMENT IN MOTOR OIL. Heating elements must be used with a steel or stainless steel sheath. Non sheathed elements will carburize the oil (whatever that means, it is undesirable). Heaters are available from several companies. Call or write for list.