

COMPLETE CAM SPECIFICATIONS

Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	See pg. 294 LIFTERS	Degrees	Advertised	Degrees	Open/Close	Lash	Gross
					Duration @ .050"	Degrees Duration	Lobe Separation	@ .050" Cam Lift	Hot Int.	Lift Int.
Hydraulic Roller Camshafts — Retrofit										
Brute low end torque, smooth idle, daily usage, fuel economy, 1200-2000 cruise RPM, 8.0 to 9.25 compression ratio advised.	HR-204/286-2-12 IG	800-4600	139601 ^a	13532-16 ^b	204	260	112	(5) 29	.000	.486
					214	270	44 (10)	.000	.512	
Excellent low end torque & HP, good idle, daily usage, off road, towing, performance & fuel efficiency, 2600-3000 cruise RPM, marine applications: primarily used in 454 cu.in. near-stock engines for mild performance applications w/ free-flowing above water exhaust systems. 8.75 to 10.5 compression ratio advised.	ZHR-276-2S-10 IG	1200-5000	139001 ^a	13532-16 ^b	214	276	110	2 32	.000	.553
					222	284	46 (4)	.000	.576	
Good low end torque & HP, good idle, daily usage, w/ plate nitrous system, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Good w/centrifugal or Roots supercharger, 8 lbs. max. boost w/8.5 max. compression ratio advised.	HR-214/325-2S-12 IG	1200-5200	139351 ^a	13532-16 ^b	214	276	112	0 34	.000	.553
					222	284	48 (6)	.000	.576	
Good low end torque and HP, good idle, daily usage, 2600-3000 cruise RPM, 8.75 to 10.5 compression ratio advised. Crate motor upgrade. Good w/small centrifugal or Roots supercharger, 8 lbs. maximum boost w/8.5 maximum compression ratio advised.	HR-218/3001-2S-14 IG	1400-5200	139611 ^a	13532-16 ^b	218	278	114	(1) 39	.000	.510
					224	284	50 (6)	.000	.510	
Good low end and mid range torque and HP, fair idle, daily usage, off road, 2600-3000 cruise RPM, 9.0 to 10.5 compression ratio advised.	HR-222/339-2S-10 IG	1600-5400	139761 ^a	13532-16 ^b	222	284	110	6 36	.000	.576
					230	292	50 0	.000	.598	
Excellent mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, good w/plate or manifold nitrous system, marine applications: for 454-502 cu.in. modified engines in performance applications with aftermarket high flow above water exhaust systems. 3000-3400 cruise RPM, 9.5 to 11.0 compression ratio advised. Good w/centrifugal or Roots supercharger, 10 lbs. maximum boost w/8.5 compression ratio advised.	ZHR-288-2S-12 IG	1800-5600	139011 ^a	13532-16 ^b	226	288	112	6 40	.000	.587
					234	296	54 0	.000	.610	
Good mid range torque and HP, fair idle, moderate performance usage, mild bracket racing, auto trans w/2500+ converter, marine applications: for 502+ cu.in. modified engines in performance applications with aftermarket high flow above water exhaust systems. 3200-3600 cruise RPM, 9.75 to 11.25 compression ratio advised.	HR-230/352-2S1-14 IG	2000-5800	139771 ^a	13532-16 ^b	230	292	114	6 44	.000	.598
					236	298	57 (1)	.000	.610	
Good mid range torque & HP, fair idle, performance usage, mild bracket racing, good w/manifold nitrous system, auto trans w/3000+ converter, marine applications: for 454-502+ cu.in. modified engines in performance applications w/ aftermarket dry pipe exhaust systems. 3400-3800 cruise RPM, 10.0 to 11.5 compression ratio advised. Good w/Roots supercharger, 15 lbs. max. boost w/8.0 max. compression ratio advised.	ZHR-296-2S-12 IG	2200-6000	139021 ^a	13532-16 ^b	234	296	112	10 44	.000	.610
					242	304	58 4	.000	.632	

CAMSHAFTS

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: The 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by installing 99152-16 rocker arm studs (no machining required) and appropriate rocker arms. Custom length pushrods can also be made to achieve correct lifter preload if

standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our 99459-8 Spring Seat Spacers or 4 of 99948-2 valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later

engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our 99459-8 Spring Seat Spacers or our 99948-16 valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

NOTE: Left Hand rotation camshafts are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

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Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALVE TRAIN COMPONENTS

See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM ROCKERS — CRANE CLASSIC/ ENERGIZER	GOLD RACE
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j	13801-16 ^{k,l}	13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j	13801-16 ^{k,l}	13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p
	99896-16 99832-16 ^a	99955-16 99976-16 ^f	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^{f,g}	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{l,m} 13744-16 ^{l,n}	13750-16 ^{l,o} 13763TR-16 ^p

Section Continued

- a Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod **11985-1** is highly recommended to prevent fuel pump lobe wear.
- b Vertical locking bar hydraulic roller lifters, no machining required.
- c Must machine cylinder heads.
- d Machined steel, heat treated.
- e Heavy wall, heat treated, for standard deck height blocks.
- f Pro Series, one piece.
- g Heavy wall, heat treated, for +.400" deck height "Tall Blocks".
- h Performance steel billet gears and roller chain set.
- i Pro Series steel billet gears and roller chain set.
- j Pro Series steel billet gears and roller chain set with thrust bearing.
- k 1.7 ratio, extra long slot for 1.560" maximum O.D. valve springs.
- l 1991-95 engines require the installation of **99152-16** 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.
- m Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- n Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- o 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- p 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.
- q Ovate wire beehive spring, requires **99976-16** retainers.
- r Steel, for **99832-16** beehive springs.

COMPLETE CAM SPECIFICATIONS

See pg. 294

Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	LIFTERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int.	Gross Lift Int.
Hydraulic Roller Camshafts — Retrofit										
Good mid range torque and HP, fair idle, performance usage, bracket racing, good with manifold nitrous system, auto trans w/3000+ converter, 3400-3800 cruise RPM, best in 502+ cu.in. engines. 10.0 to 11.5 compression ratio advised. Good w/supercharger, 16 lbs. max. boost w/8.0 max. compression ratio advised.	HR-236/359-2S-14 IG	2200-6000	139671^a	13532-16^b	236 244	298 306	114	9 47 61 3	.000 .000	.610 .632
Excellent mid range to upper RPM torque & HP, rough idle, performance usage, bracket racing, auto trans w/3000+ converter, 3600-4000 cruise RPM, marine usage: for 500+ modified engines w/dry aftermarket exhaust. 10.5 to 12.0 compression ratio advised.	HR-240/365-2S-12 IG	2600-6200	139681^a	13532-16^b	240 248	302 310	112	13 47 61 7	.000 .000	.621 .632
Good mid range to upper RPM torque, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, marine performance for 480+ cu.in. modified engines in performance applications with aftermarket dry pipe exhaust systems, or tube headers, 3600-4000 cruise RPM, for 500+ cu.in. engines. 10.5 to 12.0 compression ratio advised.	HR-244/372-2S-10 IG	2800-6200	139781^a	13532-16^b	244 256	306 318	110	17 47 63 13	.000 .000	.632 .632
Good mid range to upper RPM torque & HP, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, marine performance for 500+ cu.in. modified engines in performance applications w/aftermarket dry pipe exhaust systems, or tube headers, good w/manifold nitrous system, 3800-4200 cruise RPM, for 500+ cu.in. engines. 10.5 to 12.5 compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	HR-306-2S-14 IG	3000-6400	139651^a	13532-16^b	244 256	306 318	114	13 51 67 9	.000 .000	.632 .632
Good mid range to upper RPM torque and HP, rough idle, performance usage, Pro Street, bracket racing, auto trans w/3500+ converter, 3800-4200 cruise RPM, for 500+ cu.in. engines. 11.0 to 12.5 compression ratio advised. Good w/Roots supercharger, 18 lbs. max. boost w/8.0 max. compression ratio advised.	HR-246/400-2S-14 IG	3200-6400	139791^a	13532-16^b	246 254	316 324	114	13.5 52.5 65.5 8.5	.000 .000	.680 .680
Good mid range to upper RPM torque, rough idle, performance usage, bracket racing, auto trans w/3500+ converter, 3600-4000 cruise RPM, for 500+ cu.in. engines. 11.0 to 12.5 compression ratio advised.	HR-248/372-2S-10 IG	3000-6400	139801^a	13532-16^b	248 256	310 318	110	19 49 63 13	.000 .000	.632 .632
Excellent upper RPM torque and HP, performance usage, bracket racing, good w/manifold nitrous system, auto trans w/3500+ converter, best in 540+ cu. in. engines. 11.0 to 12.5 compression ratio advised. Good w/supercharger, 20 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-248/372-2S-14 IG	3200-6400	139691^a	13532-16^b	248 256	310 318	114	15 53 67 9	.000 .000	.632 .632
Performance usage, bracket racing, good w/manifold nitrous system, auto trans w/race converter, best in 540+ cu.in. engines. 11.5 to 13.0 compression ratio advised. Good w/supercharger, 20 lbs. maximum boost, w/8.0 maximum compression ratio advised.	HR-250/400-2S1-14 IG	3200-6400	139811^a	13532-16^b	250 258	320 328	114	15.5 54.5 68 10	.000 .000	.680 .680

CAMSHAFTS

RPM range shown is for average usage. These cam profiles will RPM higher, depending upon application.

IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

NOTE: In order to use these cams in 65-66 engines, you must groove the center of the rear cam bearing journal, 3/16" wide and 7/64" deep.

NOTE: The 1991-95 Gen V engines can use these camshafts and components if they are converted to adjustable rocker arms by installing **99152-16** rocker arm studs (no machining required) and appropriate rocker arms. Custom length pushrods can also be made to achieve correct lifter preload if

standard non-adjustable rocker arms are retained. See page 305 for special pushrod ordering instructions and page 374 for checking your hydraulic lifter preload.

NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our **99459-8** Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later

engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or our **99948-16** valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

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CRANE VALVE TRAIN COMPONENTS

See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM ROCKERS — CRANE CLASSIC/ ENERGIZER	GOLD RACE
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}

Section Continued

- a Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod **11985-1** is highly recommended to prevent fuel pump lobe wear.
- b Vertical locking bar hydraulic roller lifters, no machining required.
- c Must machine cylinder heads.
- d Machined steel, heat treated.
- e Heavy wall, heat treated, for standard deck height blocks.
- f Pro Series, one piece.
- g Heavy wall, heat treated, for +.400" deck height "Tall Blocks".
- h Performance steel billet gears and roller chain set.
- i Pro Series steel billet gears and roller chain set.
- j Pro Series steel billet gears and roller chain set with thrust bearing.
- k 1991-95 engines require the installation of **99152-16** 7/16" rocker arm studs (no machining required) and factory pushrod guideplates.
- l Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- m Energizer, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- n 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- o 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.
- p Ovate wire beehive spring, requires **99976-16** retainers.
- q Steel, for **99832-16** beehive springs.

COMPLETE CAM SPECIFICATIONS

See pg. 294

Application	Camshaft Series/ Grind Number	RPM POWER RANGE	Camshaft PART NUMBER/ Emissions Code	LIFTERS	Degrees Duration @ .050" Int/Exh.	Advertised Degrees Duration Int/Exh.	Degrees Lobe Separation	Open/Close @ .050" Cam Lift Int/Exh	Lash Hot Int.	Gross Lift Int. Exh.
Performance usage, good upper RPM torque & HP, bracket racing, good w/large manifold nitrous system, auto trans w/3500+ converter, best in 540+ cu.in. engines w/prepared cylinder heads. 12.0 min. compression ratio advised. Good w/large supercharger, 22 lbs. max. boost w/8.5 max. compression ratio advised.	HR-254/400-2S-14 IG	3400-6600	139701^a	13532-16^b	254	324	114	17.5 56.5	.000	.680
					262	332		69.5 12.5	.000	.680
Good upper RPM torque and HP, bracket racing, auto trans w/3500+ converter, best in 540+ cu.in. engines w/prepared cylinder heads. 12.0 minimum compression ratio advised.	HR-256/372-2S-10 IG	3400-6600	139821^a	13532-16^b	256	318	110	23 53	.000	.632
					264	326		67 17	.000	.632
Performance usage, good upper RPM HP, bracket racing, good w/large manifold nitrous system, auto trans w/3500+ converter, marine performance, 4000-4400 cruise RPM, for 540+ cu.in. engines. 11.0 minimum compression ratio advised. Good w/large Roots supercharger, good upper RPM HP, 480+ cu.in., 22 lbs. max. boost w/8.0 max. compression ratio advised.	HR-318-2S-14 IG	3600-6600	139661^a	13532-16^b	256	318	114	19 57	.000	.632
					264	326		71 13	.000	.632
Competition only, bracket racing, good w/large manifold nitrous system, auto trans w/race converter, 4000-4400 cruise RPM, for 540+ cu.in. engines. 12.0 min. compression ratio advised. Good w/large Roots supercharger, good upper RPM HP, 480+ cu.in., 22 lbs. max. boost w/8.0 max. compression ratio advised.	HR-258/4001-2S-14 IG	3600-6600	139831^a	13532-16^b	258	328	114	19.5 58.5	.000	.680
					266	336		71.5 14.5	.000	.680
Competition only, bracket, Super Gas, Super Comp racing, auto trans w/race converter, best in 540+ cu.in. engines w/prepared cylinder heads, 12.5 minimum compression ratio advised.	HR-262/400-2S2-14 IG	3800-6600	139841^a	13532-16^b	262	332	114	21.5 60.5	.000	.680
					266	336		71.5 14.5	.000	.680
Competition only, bracket, Super Gas, Super Comp racing, auto trans w/race converter, best in 572+ cu.in. engines w/prepared cylinder heads, good w/large manifold nitrous system, 12.5 minimum compression ratio advised. Good w/large supercharger, 26 lbs. max. boost w/8.5 max. compression ratio advised.	HR-262/400-2S1-14 IG	3800-6600	139711^a	13532-16^b	262	332	114	21.5 60.5	.000	.680
					270	340		73.5 16.5	.000	.680
Competition only, best in 572+ cu.in. high torque applications: drag, marine, radical Pro Street, 13.0 minimum compression ratio advised.	HR-264/420-2S-15 IG	4000-6800	139861^a	13532-16^b	264	328	115	21 63	.000	.714
					272	336		75 17	.000	.714
Competition only, best in 572+ cu.in., high torque and RPM applications: drag, radical Pro Street, good w/large manifold nitrous system, 13.0 minimum compression ratio advised. Good w/large supercharger, 28 lbs. maximum boost w/9.0 maximum compression ratio advised.	HR-270/400-2S-14 IG	4400-6800	139851^a	13532-16^b	270	340	114	25.5 64.5	.000	.680
					282	347		79 23	.000	.680

CAMSHAFTS

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IMPORTANT: Adjustable Vacuum Advance Kits available. See page 333 for details.

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NOTE: Camshafts with SFO firing order (1-8-7-3-6-5-4-2, or 4/7 swap), are available on special order. Contact Crane's Performance Consultants for details.

IMPORTANT NOTE: Some 1973 thru 1981 454 cu.in. engines were equipped with exhaust valve rotators. In these instances when using dual valve springs, use either our **99459-8** Spring Seat Spacers or 4 of **99948-2** valve spring retainers (on the exhaust valves only) to prevent excessive valve spring shimming when eliminating the rotators. Some later

engines were equipped with rotators on both the intake and exhaust valves. For these applications when using dual valve springs, use either 2 of our **99459-8** Spring Seat Spacers or our **99948-16** valve spring retainers to prevent excessive valve spring shimming when eliminating the rotators.

NOTE: Left Hand rotation camshafts are available on special order. Contact Crane's Performance Consultants for details.

Since 1975, General Motors divisions have exchanged engines throughout different models. Be certain of exactly which engine you have before ordering.

*This product is applicable only to pre-1966 California and pre-1968 federally certified passenger cars. It is also applicable to non-emission controlled trucks and similar vehicles. It is not applicable or intended for use on any emission controlled vehicles operated on highways or roads.



Custom Grind Cams Also Available – Call 866-388-5120 or go to cranecams.com for ordering information

CRANE VALVE TRAIN COMPONENTS

See pg. 358	See pg. 337	See pg. 350	See pg. 362	See pg. 360	See pg. 306	See pg. 328	See pg. 312	See pg. 315	See pg. 317
VALVE SPRING AND RETAINER KITS	VALVE SPRINGS	RETAINERS	VALVE STEM SEALS	VALVE STEM LOCKS	PUSHRODS	TIMING CHAIN AND GEAR ASSEMBLY	STEEL ROCKER ARMS	— ALUMINUM CRANE CLASSIC/ ENERGIZER	ROCKERS — GOLD RACE
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16 99832-16 ^p	99955-16 99976-16 ^q	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l} 13744-16 ^{k,m}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}
	99896-16	99955-16	99822-16 ^c	99098-1 ^d	13628-16 ^e 13642-16 ^{e,f} 13629-16 ^g 13643-16 ^g	13975-1 ^h 13984-1 ⁱ 13977-1 ^j		13774-16 ^{k,l}	13750-16 ^{k,n} 13763TR-16 ^{k,o}

- a** Requires cam button spacer, camshaft incorporates an integral cast iron distributor drive gear, aluminum-bronze distributor drive gear not required. For engines equipped with mechanical fuel pumps, fuel pump pushrod **11985-1** is highly recommended to prevent fuel pump lobe wear.
- b** Vertical locking bar hydraulic roller lifters, no machining required.
- c** Must machine cylinder heads.
- d** Machined steel, heat treated.
- e** Heavy wall, heat treated, for standard deck height blocks.
- f** Pro Series, one piece.
- g** Heavy wall, heat treated, for +.400" deck height "Tall Blocks".
- h** Performance steel billet gears and roller chain set.
- i** Pro Series steel billet gears and roller chain set.
- j** Pro Series steel billet gears and roller chain set with thrust bearing.
- k** 1991-95 engines require the installation of **99152-16 7/16"** rocker arm studs (no machining required) and factory pushrod guideplates.
- l** Crane Classic extruded, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- m** EnergiZER, 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- n** 1.7 ratio, 7/16" stud. Valve Train Stabilizer available, see page 363.
- o** 1.7 ratio, 7/16" stud, Wide Body. Valve Train Stabilizer available, see page 363.
- p** Ovate wire beehive spring, requires **99976-16** retainers.
- q** Steel, for **99832-16** beehive springs.