



NEXT GENERATION XA VALVES

RE: #20900-42 & 20930-42

Meet the Guru...

For those of you that don't know Milan, he escaped communist Czech Republic in 1983. He arrived in Canada unable to speak English but came as a Journeyman Electrician and an experienced machinist. Because of the differences in content he was required to complete his Journeyman Electrician certification in Canada, later becoming Red Seal Certified as well. After opening the Harley-Shop in 1986 Milan became a Journeyman Motorcycle Mechanic. In 1989 he was awarded the Harley-Davidson Franchise and attended H-D factory training in Milwaukee. Milan owned and operated this business until 1999. Now he has redesigned the original H-D XA valve for one that fits both intake and exhaust.



Q: Are these new valves made of the same material as H-D XA valves in 1942?

A: No...they are not. Decades went by since Harley supplied these valves in WWII. Materials and manufacturing processes have changed significantly.

Q: What material are these valves made out of?

A: Valves are manufactured from austenitic stainless steel alloy, also called "Austenitic Valve Steel" or 1.4871 or X53CrMnNiN21-9

Q: Why stainless alloy?

A: - Resistance to high temperatures and mechanical load strength.

- Long term maintenance of tightness.
- Resistance to corrosion and erosion.
- High degree of thermal coefficient.
- Low degree of abrasion.
- High hardness value of valve faces and stem at high operating temperatures.
- Stability of material structure at high temperatures.
- Low weight.
- Lack of self hardening properties
- The additional benefit of this stainless alloy is that this material is not magnetic.

Meaning it will not be magnetized by manufacturing, shipping, installation or actual operation. This will prevent the occurrence of magnetized valve stems attracting loose microscopic metal particles that are floating in the XA engine oil, causing premature wear of the valve guides. The XA motorcycle was not equipped with an oil filter so it is a critical concern.





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Q: What is the manufacturing process?

A: Preparation of forgings by means of electrospinning and forging, full thermal treatment, grinding using center-less, automatic grinders and hardening of stem end through induction hardening - stelliting, followed by individual inspection.

Q: Why is one valve replacing the original two, intake and exhaust valves?

A: As mentioned the quality of the new valve is supreme compared to materials used in the 1940's. Intake valves are now made out of modern exhaust valve materials.

Q: Was the head of the original exhaust valve lower profile from the factory then the head profile of the intake valve?

A: Yes it was. But as years went by, mainly exhaust seats have become lower or worn out more then intake seats. This is due to higher temperatures, exhaust fumes and acidity. This adjustment of thickness of exhaust valve head will partially compensate for this condition.

Q: Intake and exhaust valves are now the exact same and interchangeable?

A: Yes, the material and physical size (all dimensions) are the exact same.

Q: Is caution required when installing these new, thicker head, exhaust valves?

A: Yes! It is important to always make sure that proper clearance of minimum .040" - 1MM is between fully open valve and combustion chamber surface above the valve if it is exhaust or intake valve. NOTE: this check must be done with valves fully open. FYI - stock XA camshaft lift is .2365" = 6.00MM

Q: Are all other valve dimensions the same as stock original valves?

A: Overall length stayed the same but the following upgrades were done. Due to to build up of carbon on valves stems above the valve guide, size of the valve stem diameter was made smaller for better flow. Raw forging of valve head bottom surface is now precisely machined so the smooth surface will provide additional flow. Valve keeper grooves are now wider by .005" - 0.127MM as the factory grooves were too tight and not machined correctly. Valve keepers are now easy to install and remove. Valve stem diameter has also been changed from .3543" - 9MM to .3555" - 9.03MM to a slightly larger size stem for tighter valve guide clearance.



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Q: Do we use stock valve springs, collars and valve keeps with these new valves?

A: Yes, all of these will fit the new valves.

Q: Is it true the valves from the Chinese CJ750, Russian M72, K750, MB750 and German R12, R71 valves the same as XA?

A: This information is not correct. Overall length of valves is different. Chinese, Russian and German valves are on average 5.380" = 136.66MM as Harley XA valves are 5.4880 = 139.40MM long. That is .108" = 2.743MM shorter than XA valve length. Style of valve keepers are completely different. Materials and manufacturing processes are also completely outdated. Stock XA valve stem is .35340" = 9.00MM diameter. Chinese CJ750 is .35185" = 8.937MM, which is way too small for XA valve guides by .0025" = .063MM. Also, note that of these old, original valves are not made from stainless.

VALVE LIFT - CYLINDER HEAD CLEARANCE TEST

Calculation of valve travel with additional minimum clearance requirement.

Standard XA cam lift	0.2365" = 6.00MM
Additional clearance	0.040" = 1.02MM
Total:	0.2765" = 7.02MM

Items required (Fig 1):

- 1 - Cylinder head - carbon removed out of combustion chamber
- 2 - Copper cylinder head gasket
- 3 - Head bolts with washers
- 4 - Socket 9/16" with ratchet
- 5 - Measuring device - caliper
- 6 - Cylinder, guides installed and fitted, valve seats resurfaced with lapping done.
- 7 - Two XA valves



Fig. #1



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Steps to test:

- 1 - Slide valves in to the valve guides
- 2 - Install copper gasket and cylinder head
- 3 - Install washers, head bolts and tighten
- 4 - Set cylinder, head facing down, on to the work bench
- 5 - Pull/slide valve stems "up", one at a time, to close valve position, hold it in place and take the measurement above the guide and record it.
- 6 - Use caliper to measure length of valve stems about guides (Fig 2.) and record it
- 7 - Push both valve stems "down" to make sure that valves are fully open

Sample measurement with calculations

Intake Valve

- Closed (up) 1.2345" = 31.36MM
 - Open (down) 0.8165" = 20.74MM
- Actual max valve travel 0.418" = 10.62MM

Exhaust Valve

- Closed (up) 1.2305" = 31.25MM
 - Open (down) 0.8760" = 22.25MM
- Actual max valve travel 0.3545" = 9.00MM



Fig. #2

NOTE: In our example both intake and exhaust valves have over the minimum of 0.2765" = 7.02MM that is required. (valve cam travel + clearance) Also, note that every valve cylinder has to be checked individually. Special precaution needs to be taken if valve seat inserts or high lift cam, are being installed, as the valve lift height may change significantly!

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