

## **AWSR NOTICE OF MOTION FOR SPECIAL RESOLUTION – AWSR SPECIFICATIONS**

### **SUBMITTED BY: NATIONAL TECH TEAM**

Original drafted by Matt Clark with input from head machinists, engine builders and AWSR tech reps. Final copy edited by AWSR National Tech Team.

**To replace AWSR supplementary rule 11.3 in SCCA Racing Rules, Regulations and Specifications August 2014 in its entirety.**

### **11.3 CYLINDER HEADS**

- (a) Must be genuine, as per GMH factory original equipment manufactured (OEM) for series 2 VN, through to VR.
- (b) Cylinder head Machining and Checked Specifications.

This document Terminology is stated with the cylinder head up-side down on the work bench. Eg:, when referring to the top edge of the valve seat, it is the widest side of the seat, on the combustion chamber side of the seat, not the throat side of the seat.

#### **(1) Mating Surfaces**

The mating surfaces of the cylinder head may be resurfaced by parallel machining only. Angle grinding or angle milling of cylinder heads is not permitted.

#### **(2) Inlet Seats**

The maximum inlet seat diameter, measured at the top edge of the valve seat, must not be more than 1.705" ( 43.307mm ), and must have a minimum seat width of no less than 1mm. There is a Maximum inlet valve size of 1.709" ( 43.409mm)

#### **(3) Exhaust Seats**

The maximum exhaust seat diameter, measured at the top edge of the valve seat, must not be more than 1.488" ( 37.795mm ), and must have a minimum seat width of no less than 1mm. There is a maximum exhaust valve size of 1.490" (37.846mm)

#### **(4) Valve Heads and Stems**

The minimum valve stem diameter is 0.340" (8.636mm) at the "un-worn portion" of the stem. Narrowing stems and undercutting stems is prohibited, and stems must remain parallel and not reduce in diameter at any point along its length. Oversize stems for reconditioning purposes is allowed, save that inlet and exhaust valve guide centres must remain within 0.010" of OEM dimension of 1.655" ( 42.037mm ), and remain parallel to each other and remain at 90 degrees to the horizontal plane. Inlet and exhaust valve heads must remain flat on the combustion chamber side. No Anti reversion cuts or dishes are allowed to be machined or manufactured into the valves.

(5) Valve Type Specifics

One back cut angle can be used to narrow the valve face. Thus, the valve must have no more than 2 angles, being the 45 degree valve seat, and one lesser angle joining the radius to the seat.

Recommended valves are Genuine Holden replacement from a Holden dealer, or EVL or identically similar, available from Precision International.

EVL Inlet Valve	part # IN3010 ( 1.709" x 4.717" x 0.341" )
EVL Exhaust Valve	part # EX3011 ( 1.488" x 4.717" x 0.341" )

Custom made valves are prohibited. Swirl polishing is prohibited.

(6) Inlet Chamber Wall

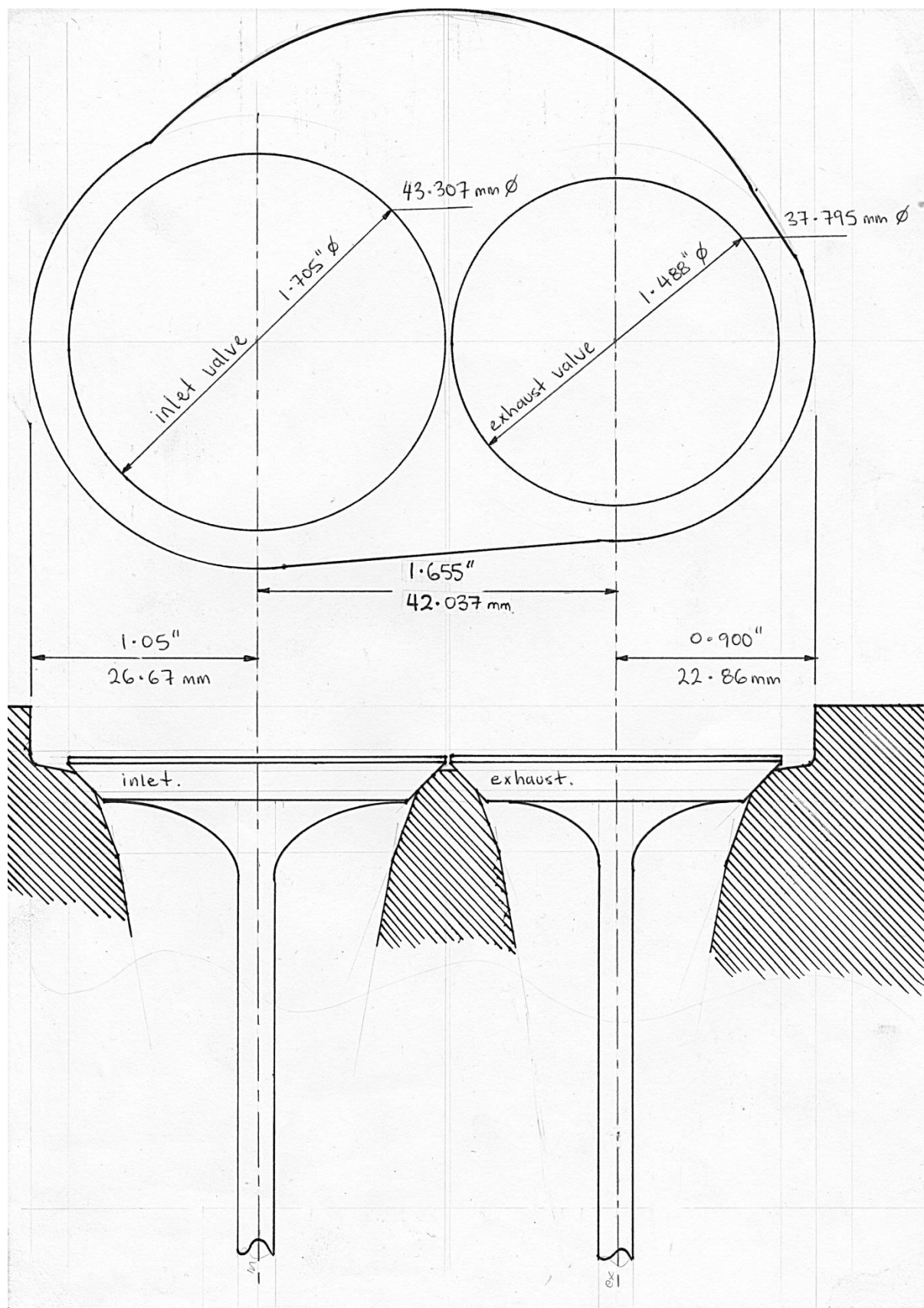
The recommended radius from inlet valve centre to combustion chamber wall must be no greater than 1.05" ( 26.67mm ). This may be checked with a 2.10" valve with 11/32 stem, and have zero clearance to chamber wall. The AWSR has a special tool which checks this dimension. Clearance in this area with the AWSR tool, of more than 0.015" ( 0.3mm ) is not permitted.

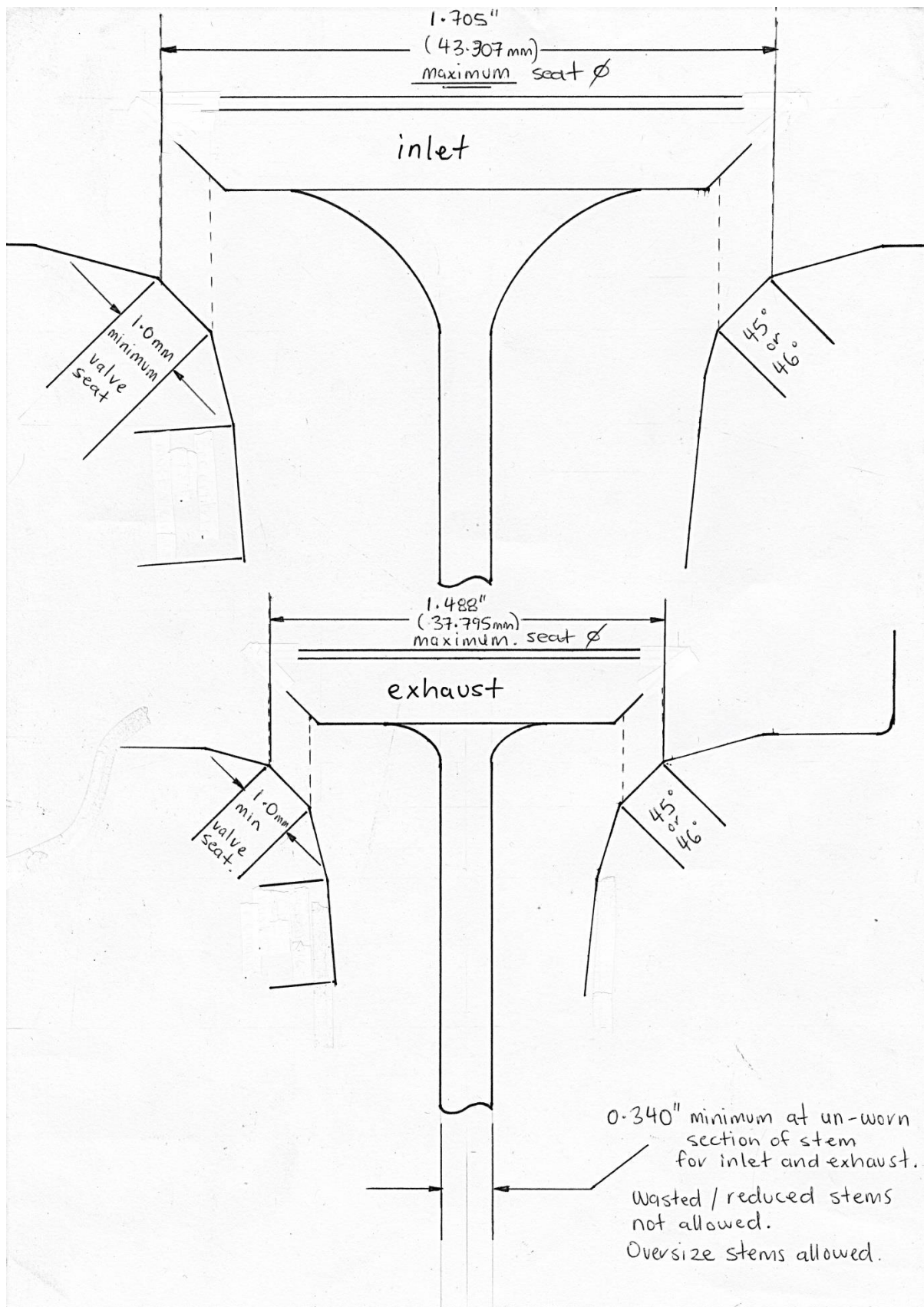
(7) Exhaust Chamber Wall

The recommended radius from exhaust valve centre to combustion chamber wall must be no greater than 0.900" ( 22.86mm ). This may be checked with a 1.80" valve with 11/32 stem, and have zero clearance to chamber wall. The AWSR has a special tool which checks this dimension. Clearance in this area with the AWSR tool, of more than 0.015" ( 0.3mm ) is not permitted.

(8) Throats

The widest section of the valve throat in the valve job machining process must be at the bottom edge of the valve seat, with the steepest allowable angle below the seat to be no greater than 80 degrees in the inlet throat, and 78 degrees in the exhaust throat. Thus, vertical throating and venturi profiles are prohibited. A venturi profile would be one which creates a throat which gets narrower, then wider again. The machined section of the throat must not get wider at any point. It must continue to get narrower until the cast or OEM section of the throat widens from the factory. The 78 and 80 degree angles will be judged by the AWSR sectioned angle tools. The 78 and 80 degree OEM angles can generally also be easily identified by eye, with the common factory "chatter marks" visible. The AWSR tool may sit at various heights depending on each individual cylinder head and valve seat diameter, but the angles of 78 degrees in the exhaust throat, and 80 degrees in the inlet throat must not be exceeded. The valve throat begins at the bottom edge of the valve seat, and ends at the surface of the valve guide boss. If in doubt It is recommended to take the heads to a machine shop who have the tooling to determine the throat angles before the heads are used







(9) Maximum Valve Seat Height

Maximum valve seat height is measured from the throat side of the valve guide boss using an accurate depth gauge. The height is measured from the guide boss to the bottom edge of the valve seat ( with the bottom edge being the valve face and bottom cut junction ), and must not exceed 34.5 mm on the inlet seat, and 33.5 on the exhaust seat. Maximum seat height is the same for inserted and non-inserted heads. There is no minimum valve seat height

(10) Checking Dimensions

The valve guide boss height on the throat side will be 53.5mm, + - 1mm, measured from the rocker cover gasket surface, which is the factory datum reference point for all OEM valve seat machining, and all measurements can be referenced to this datum height accurately.

The simplest way to measure this dimension is with a depth gauge or vernier calliper down through the valve guide, with the cylinder head upside down on an accurate flat surface, such as a lathe bed, Mill, granite surface table, or a cast iron cylinder block deck surface. Any true, clean, flat surface can be used with a good degree of accuracy. If in doubt, check the surface with a straight edge before placing the cylinder head on it for measurement of the valve guide boss heights.





#### (11) Valve Guide Spacing

Valve guide centres will be checked by measuring each pair of valve stems ( inlet and exhaust of each cylinder ) from the outside edge to the outside edge in two places along their length above the valve guide on the spring side of the cylinder head, with the valves on their seats. You will need a dimension of 1.995" + - 0.005" for standard stem diameters.

The valve guides must be parallel.

## Summary

In all cases, it is highly recommended to keep the 45 valve seat contacting the valve face in the centre of the face, with slight margin of non-contact on each side of the contact area. The maximum seat diameter is there to cater for badly worn or pocketed “ wrecker heads”, which may have a seat diameter close to the maximum diameter, caused from excessive wear. The suggested method for worn heads with excessively wide seats is to take a very light cut on the 45 degree valve seat, then narrow the seat if required using a 30 or 35 degree top cut, and a 60 or 70 degree bottom cut, without exceeding any of the following dimensions.

- the valve seats must not be narrower than 1mm.
  - there is no maximum seat width, but recommended to stay narrower than valve face.
  - maximum intake seat diameter 1.705” (43.307mm)
  - maximum exhaust seat diameter 1.488” (37.795mm)
  - maximum intake valve diameter 1.709” (43.409mm)
  - maximum exhaust valve diameter 1.490” (37.846mm)
  - exhaust valve seat inserts may be fitted, as long as seat heights, seat diameters and seat job profiles are consistent and conform with the dimensions for non-inserted heads
  - inlet valve seat inserts are prohibited.
  - fitting smaller than oem valves is prohibited.
  - venturi cutting is strictly prohibited. ( eg, by use of newen cnc machine or single point variable diameter cutter )
  - the throats, guides, and ports must remain “untouched” from the bottom edge of the valve job profile to the manifold faces.
  - the steepest valve seat profile angle must be no greater than 80 degrees on the inlet, and 78 degrees on the exhaust.
  - de-shrouding is prohibited.
  - valve guides must remain parallel, and 90 degrees to the valve cover gasket surface in both left and right, and forward and aft planes, and have a centre distance of 1.655” +/- 0.005” ( 42.037mm +/- 0.127mm)
  - valve stems must not be smaller than 0.340” diameter.
  - the current awsr cylinder head checking tools will be used for checking de-shrouding, and angle-milling of heads.
- (c) No VN series I, Ecotec or aftermarket heads permitted.
- (d) Exhaust Valve seat inserts may be fitted, as long as seat heights, seat diameters and seat job profiles are consistent and conform with the dimensions for non-inserted heads. Inlet valve seat inserts are prohibited.
- (e) Valve springs may be replaced with aftermarket springs that comply to the same physical appearance and outside diameter as the OEM springs, as per the approved engine part listing
- (f) No double valve springs or dampeners allowed.
- (g) Shims may be used under the valve springs to obtain uniform seat pressure. No

machining of spring seat or guide boss to allow fitment of shims.

- (h) VR rocker assemblies may be used on VN/VP cylinder heads. The following methods may be used to affect this interchange.
- (i) Down-sizing of the threads of the early model heads from 3/8" to 5/16" using a helicoil type thread repair method or similar. Resizing must remain in the original OEM position.
- (j) Opening the late model rocker pivot from the original 5/16" to 3/8" to accept the early model size mounting bolts.
- (k) K Line Valve Guide Inserts only can be used to bring valve stems in cylinder heads back to within standard specifications.
- (l) Push rods must be OEM standard length 202.3 mm x diameter 8.7 mm. Pushrods may be aftermarket as long as they are the same physical dimensions and material as the OEM pushrod.
- (m) Valve lash adjustment is not permitted in any part of the valvetrain.