RAW-J/WY.

2nd February, 1961.

To:- Major F. W. Smith,
Major V. T. Mountford.
Mr. V. L. Young.
Mr. G. H. Baker,
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Cylinder Head Gaskets.

The following is a summary of the results of test of various head gaskets carried out in the past year.

1. Individual solid copper gaskets with pressed in ridge round push rod holes.

These have never overcome the tendency to oil leaks from the push rod tunnels which they share with the standard copper gaskets. They are also liable, when the engine is driven very hard, to blow and burst out between the two inside cylinder studs, unless restrained by ridges in one or other of the joint faces which introduce machining difficulties.

2. Combined solid copper gaskets with pressed in ridge round push rod holes.

These consist of two individual gaskets joined together to form a joint across both heads. This effectively prevents blow out between the inside cylinder studs but the tendency to oil leaks from the push rod tunnels is not affected.

3. Combined Gasket in "Klingerit 1000" material.

This, as reported in September, was unsatisfactory the material not having sufficient strength to resist blowing out between the two cylinders.

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Cylinder Head Gaskets.

4. Cross Gasket.

This consists of a split metal ring of triangular section in either a 'V' shaped groove in top cylinder face or in a chamfer at the top of the bore. It is very successful in holding the compression and firing pressures but needs supplementary seals for the push rod tunnels. These take the form of a rubber 'O' ring on the Crusader and square section rubber rings on the Constellation. Both are effective when in good condition but deteriorate fairly quickly especially if the head is removed and replaced, an operation which is carried out with more than normal frequency on experimental machines.

On the Crusader the split metal ring can be fitted outside the cylinder spigot and can be made of steel. On the Constellation there is no spigot and the width between the cylinder wall and the push rod tunnels is so small that the split metal ring has to seat on a chamfer at the top end of the cylinder bore. This brings its sharp edge into contact with the burning gasses and causes a tendency to detonation unless bronze is used instead of steel.

Both types of engine on which these have been used have been very good as regards holding compression and firing pressures with only 17 ft. lbs torque on the cylinder head nuts. The machining of the groove or chamfer is, however, obviously critical and might present problems in production.

5. Gasket in Coopers G.130 Material (Reinforced).

These were referred to in my report headed "Report of Extended Test on Constellation Machine with Various Experimental Features" sent out under cover of my memo dated 2nd September 1960. They were very satisfactory over a period of 669 miles of road work but had to be removed, when the engine was dismantled to change the pistons because they had stuck to the heads and barrels. Some more similar gaskets have now been obtained and are being fitted to the Constellation to be tested at M.I.R.A. with the extended sump cover plates.

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Cylinder Head Gaskets.

6. Effect of Dividing Twin Carburettor Manifold.

Westwood claim that dividing the twin carburettor manifold into two separate pipes considerably reduces the amount of oil leakage from the push rod tunnels where they cross the joint face. This is supported by a test here where the one piece manifold was sawn in two on the engine with the Cross gaskets which at the time was leaking some oil at the joint. An immediate improvement was noted. Subsequently the heads were removed, the split steel rings changed for bronze ones and new rubbers fitted. Since then one cylinder and head have been completely dry externally, the other leaks slightly apparently due to slight porosity of the aluminium cylinder barrel.

R.A. Mabbs-Jones