Australian tractor test report no. 49 : McCormick International 624

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THE McCormick International 624, imported fully assembled from Germany, is a general purpose farm tractor of 47 drawbar horsepower. With 53 h.p. at the P.T.O. at rated engine speed it comes within Class 5, of the Australian Standard Classification of Wheeled Tractors for Agricultural Purposes, A.S. D:10:1967. It may be equipped with either 16.9 or 18.4 x 30 pneumatic tyres. It has a four-speed syncromesh gear box with ratio change gears giving 12 selections forward and four reverse speeds. However because some ratios are identical or very close to others there are effectively seven forward speeds. The transmission features the 'I.H. Agriomatic-S' power shift as described below.

The tractor is designed for working primarily with mounted implements directly through the three-point linkage, though a swinging drawbar is supplied as standard equipment.

The tractor has an International 4-cylinder, 4-stroke, direct injection diesel engine of 206 cubic inches capacity rated speed 2,100 rpm. The recommended fuel is distillate. The manufacturer's advertised value for power output is 58 shaft h.p. at rated speed for a fully equipped engine.

Further details, including an abstract of the manufacturer's specifications, are contained in the full Technical Report from which this abridgment has been made.

The test tractor

The test tractor was chosen at random from stock at International Harvester Co.'s depot at Brooklyn, Vic. It was run-in at the Testing Station for 12 hours. Full power was measured in a 2 hour test after running in; a check test after a further 41 hours of test running showed no significant change of output. As will be seen from the Performance Summary the test value of full power output is consistent with the manufacturer's rating.

Fuel pump calibration was within specified limits; governor setting was as recommended by the manufacturer, 2,310 rpm high idle. Fuel used was "Mobil" distillate weighing 8.25 lb. per gallon.

Tractor identification numbers were:

Serial No. NT 805577. Engine No. 31N 1843.

No water was added during the tests. On removing the engine for test it was found that a grease line to the clutch throw-out bearing had been worn through by contact with the fly-wheel; this was replaced. Oil consumption for the 41 hours of test running was approximately 2½ pints. The engine and the transmission were partly dismantled after the test, and found to be in satisfactory condition.

Drawbar tests were done with the tractor ballasted to the maximum recommended by the Company for normal agricultural drawbar work. Total weight including the driver was 7,780 lb. (front axle, 1,720 lb., rear axle 6,060 lb.). This weight included 75 per cent. water ballast in the rear (18.4 x 30) tyres. Solid ballast was 540 lb. comprising two weights per rear wheel. Some loss of steering was noticed at high drawbar loads; a front ballast carrier and weights are optionally available.

Drawbar height was 17 in. The tests were done on a level tarmac road.

Further information on the effect on performance of varying drawbar height, weight, wheel equipment, road surface and other questions of the interpretation of tractor test data may be obtained from the Tractor Testing Officers at the University of Melbourne.

'I.H. Agriomatic—S' Transmission

The "Agriomatic-S" transmission consists essentially of a four-speed constant mesh gear box with syncromesh on each gear together with ratio change gears which give four High (Road Range), four Low (Field Range) and four reverse gears.

A further set of gears provides a range of speeds intermediate between the High and Low gears. The shift into an Inter-
mediate gear from either of the corresponding High or Low gears may be made on-the-move, without operating the clutch, by means of the power-shift lever to the right of the dashboard. This shift is effected by a double-acting, multiple-disc, hydraulic clutch in the transmission housing; an auxiliary gear pump, also in the transmission housing, provides power for this operation.

It will be seen from the table that although twelve separate selections are possible, because the ratios of some gears are identical with, or very close to, others, the arrangement provides an effective choice of only six speeds in the working range plus a road gear at about 14 m.p.h.

The shift from High to Intermediate has the same effect as coming down two gears in the standard range; the shift from Low to Intermediate amounts to moving up to the next gear in the standard range.

With the range selector lever in Reverse the operation of the power-shift lever provides an on-the-move shift from reverse to forward motion. The forward speeds thus provided are those of the Low range, the reverse speeds are about 30 per cent. faster.

It should be noted that there is no engine braking in the Low forward range of gears.

Inspection Report

Power Take-Off

The pto gives 545 r.p.m. at the engine rated speed of 2,100 r.p.m.

The pto is a standard 6 spline 1 3/4 in. diam., "live" drive with guard and cover according to B.S. 1495 : 1964, located 2 1/2 in. right of centre, rear, 23 1/2 in. above the ground when on 18.4 x 30 tyres. Control is by hand-operated independent clutch at left of dashboard and hand lever at right below seat.

Speed, height above ground, and clearances to drawbar and other fixed parts conform to B.S. 1945 : 1964.

Belt Pulley

The belt pulley unit mounts on the pto for rearward working, clockwise rotation as viewed from pulley face at 1,080 r.p.m. at 2,100 r.p.m. engine rated speed. At this speed, speed of belt is 3,050 r.p.m. in accordance with B.S. 1495 : 1964.

Performance Summary

<table>
<thead>
<tr>
<th>Gear</th>
<th>Engine Crankshaft (rpm)</th>
<th>PTO (rpm)</th>
<th>Belt Pulley (4th Low Gear)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low 1</td>
<td>2290</td>
<td>6000</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>2290</td>
<td>6000</td>
<td>1.2</td>
</tr>
<tr>
<td>3</td>
<td>2290</td>
<td>6000</td>
<td>2.3</td>
</tr>
<tr>
<td>4</td>
<td>2100</td>
<td>4800</td>
<td>3.7</td>
</tr>
<tr>
<td>Int. 1</td>
<td>2290</td>
<td>6000</td>
<td>1.2</td>
</tr>
<tr>
<td>2</td>
<td>2260</td>
<td>6000</td>
<td>2.1</td>
</tr>
<tr>
<td>3</td>
<td>2100</td>
<td>4800</td>
<td>3.7</td>
</tr>
<tr>
<td>4</td>
<td>2100</td>
<td>3100</td>
<td>5.7</td>
</tr>
<tr>
<td>High 1</td>
<td>2100</td>
<td>3250</td>
<td>3.3</td>
</tr>
<tr>
<td>2</td>
<td>2100</td>
<td>3400</td>
<td>5.3</td>
</tr>
<tr>
<td>3</td>
<td>2100</td>
<td>1900</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Fuel Consumption

<table>
<thead>
<tr>
<th>Engine speed = r.p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2200</td>
</tr>
<tr>
<td>2900</td>
</tr>
<tr>
<td>3600</td>
</tr>
<tr>
<td>4200</td>
</tr>
</tbody>
</table>

Hydraulics, Three-Point Linkage

A gear pump located on the front right of the engine gives 5.1 g.p.m. at 2,300 p.s.i. at 2,100 engine r.p.m. supplies for the three-point linkage and external circuits.

The three-point linkage conforms to B.S. 1841 Categories 1 and 2. Both “position"
and “draft” control are provided by the “IH Exact” system; provision is also made to regulate the speed at which the implement drops into work. Jack tappings and valves for external circuits are provided.

**Drawbar**

A fixed drawbar 15\(\frac{1}{2}\) in. above ground is provided. A swinging drawbar mounts on this; five positions are available 3\(\frac{1}{2}\) in. and 8 in. either side of centre. Height is not adjustable.

A linkage mounted drawbar is also available as an optional extra.

**Driver’s Accommodation**

Access to the seat is from the L.H. side forward of the rear wheels; access from the right side is impeded by pedals and control levers. Footplates are provided either side of the transmission housing.

The seat is a “Grammar” Type DS 20 upholstered bucket seat; it is mounted on a parallel motion linkage with damper and springs adjustable to the driver’s weight. Fore and aft adjustment is 3\(\frac{1}{2}\) in.

Though all controls are readily accessible and easily operated the spatial layout of the whole driver’s area is restrictive. Also many controls do not conform to B.S. 1495 : 1964; thus, handthrottle is in R.H. side of dashboard not below steering wheel and moves forward to increase speed not towards the operator; there is no parking latch on the footbrake; the handbrake is on the R.H. side not the preferred L.H. side; similarly the p.t.o. lever is on the R.H. side and its operating positions are not marked. The engine may be started with the tractor in gear. The “stop” control is incorporated in a “start” and “run” control and is spring loaded to return to the “run” position.

**Operating Features**

Turning circles (minimum outside diameters on a consolidated gravel surface) with track widths front 57 in. and rear 62\(\frac{1}{2}\) in. were: no brakes, 26 ft. with brakes, 20 ft. Ground clearance is 13\(\frac{1}{2}\) in. under the drawbar fitting.

Centre of gravity is 4 in. above and 19 in. ahead of the rear axle for the tractor as tested in the maximum weight condition.

**Standard and Optional Features**

Standard equipment includes tachometer, incorporating an hour meter and road speed indications in road gear; water temperature gauge (°C); fuel gauge; generator charging warning light and oil pressure warning light. “Live” p.t.o.; three-point linkage; differential lock; full lighting equipment; fixed and swinging drawbar; one set of wheel weights; foot throttle.

Optional features fitted on the test tractor included the belt pulley unit and extra wheel weights.

**Users’ Service**

The usual minimum kit of hand tools is supplied and were delivered with the test tractor; a reasonably satisfactory illustrated Instruction Book is supplied. Service is available throughout Australia from International dealers and agencies.

G. H. Vasey, Officer-in-Charge,
Tractor Testing.
W. F. Baillie, Testing Officer.
University of Melbourne,
September, 1967.
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