COMITATO DI COORDINAMENTO PER L'OMOLOGAZIONE
DELLE MACCHINE AGRICOLE IN ITALIA

**REPORT No. 366/O.E.C.D.**
**APPROVED: 29-9-1971**

REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST CODE
FOR AGRICULTURAL TRACTORS

# FIAT MODEL 300 DIESEL TRACTOR

*Manufactured by:* FIAT S. p. A.
Torino, Italy




*Date of Tests:* October 1970 - March 1971

*This report has been approved by the O. E. C. D. Coordinating Centre (C.N.E.E.M.A., France) as being in accordance with the O. E. C. D. Tractor Test Code*

CONSIGLIO NAZIONALE DELLE RICERCHE
**LABORATORIO PER LA MECCANIZZAZIONE AGRICOLA**
TORINO - ITALY

This Bulletin is based on engineering tests in accordance with the O.E.C.D. Tractor Code. It does not contain an evaluation of the performance of the tractor on practical farm work

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| **Optional tests** | |
| None | |


## PERFORMANCE CURVES


| | FIG. NO. |
|---|---|
| **Power take-off test** | |
| Curves of power take-off horsepower, equivalent crankshaft torque and specific fuel consumption/engine speed | 1 |
| Curves of specific fuel consumption/power take-off horsepower | 2 |
| **Drawbar test with ballast** | |
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| **Drawbar test without ballast** | |
| Curves of drawbar horsepower and wheelslip/drawbar pull | 5 |
| Curves of travel speed and specific fuel consumption/drawbar pull | 6 |

| | |
|---|---|
| Manufacturer: | FIAT S.p.A. - TORINO (Italy). |
| Submitted for test by: | the manufacturer |
| Selected by: | the manufacturer with the agreement of the testing station |
| Place of running-in: | FIAT - Servizio Esperienze Trattori - TORINO (Italy) |
| Duration of running-in: | engine 50 hours; p.t.o. 20 hours; transmission 30 hours. |

**SPECIFICATION OF TRACTOR**

| | |
|---|---|
| Make: | FIAT |
| Model: | 300 |
| Type: | Four wheel, rear wheel driven, unit construction |
| Serial No.: | 023669 |

**Engine:**

| | |
|---|---|
| Make: | FIAT |
| Model: | 8025 |
| Type: | 4-stroke, direct injection diesel |
| Serial No.: | 161276 |
| Cylinders: | 2, vertical, in-line, 100 mm bore x 110 mm stroke, capacity 1727 $cm^3$, compression ratio 17 : 1, overhead valves, replaceable dry cylinder liners. |
| Fuel system: | Forced feed; own make, model EP/KS 22 A: LA/10 plunger type fuel pump; replaceable cartridge model CAV paper filter with water separater; capacity of fuel tank 29 litres.<br>BOSCH injection pump model PES 2A 80 B 410/L 4/106, serial No. 9535; manufacturer's production setting: $\leqslant$ 51.3 $mm^3$ stroke at 1125 rev/min pump speed and 15° C fuel temperature.<br>Own make injector, model KB 70 S1 F 10; injector setting 230 $\pm$ 5 $kg/cm^2$. |
| Governor: | BOSCH Mechanical, incorporated in fuel injection pump. Governed range of engine speed: 600 to 2430 rev/min. Rated engine speed 2250 rev/min. |
| Air cleaner: | Own make, oil bath air cleaner; oil capacity 0.280 litres. |
| Lubrication system: | Forced feed from gear-type pump. One screen type filter installed on pump suction and one replaceable cartridge type filter installed on the pressure line to the engine. Engine sump oil capacity: 4.2 litres.<br>Recommended oil change period: 200 hours; cartridge change period: 400 hours. |
| Cooling system: | Water cooled from centrifugal pump (0.5 $kg/cm^2$); thermostat for temperature control; 4-blade belt driven 320 mm dia fan; cooling water capacity: 7 litres; visual temperature control with thermometer. |
| Starting system: | Electrical, own make starter motor type M 125 - 3/12 S Var. 1; 4.5 metric hp. |

**Electrical system:**

Voltage: 12 V, negative earth.

Alternator: FIAT A 12 M - 124/12/42 X.

Battery: TITANO 6 AT M 15, lead acid, capacity 77 Ah.

**Transmission:**

Clutch: Own make, single dry plate, pedal operated; plate diameter: 216 mm.

Gearbox: Own make, mechanical sliding gear type, 6 forward and 2 reverse speeds. It consists of two units: a 3 forward and 1 reverse speed gearbox and a 2 speed gearbox.

Rear axle and final drive: Own make, crown wheel and pinion with bevel gear type differential; pedal operated differential lock; bull gear final drives.

Oil capacity: Gearbox and differential: 6.1 litres; final drives: 1.9 litres each. Recommended oil change period: 1600 hours.

| *Gear* | *Number of engine revolutions for one revolution of driving wheel* | *Travelling speed for 2250 rev/min rated engine speed km/h* |
|---|---|---|
| Forward | | |
| 1 | 185.226 | 2.36 |
| 2 | 108.818 | 4.02 |
| 3 | 66.892 | 6.54 |
| 4 | 48.525 | 9.01 |
| 5 | 28.507 | 15.34 |
| 6 | 17.523 | 24.96 |
| Reverse | | |
| 1 | 121.996 | 3.59 |
| 2 | 31.947 | 13.69 |

**Power take off:**

Main: At rear of tractor in vertical centre plane, independent of gearbox, manually engaged and clutch driven; 34.9 mm ($1\,^3/_8$ in) dia, according to ISO standard, 6 splines; height above ground 670 mm.
Proportional engine speeds: 574 rev/min at 2250 rev/min engine speed; 540 rev/min at 2117 rev/min engine speed. Direction of rotation: clockwise viewed from tractor rear in forward gear.
Optional: power take-off synchronised with gearbox.
Proportional ground speed: 1 revolution of p.t.o. for approximately 271 mm of travel.
Number of p.t.o. revolutions for one revolution of driving wheels: 11.95.
Direction of rotation: Clockwise viewed from tractor rear in forward gear.

Secondary: Placed under tractor transmission housing, independent of gearbox, manually engaged.
Diameter 29.5 mm ($1\,^1/_8$ in); 10 splines. Height above ground 570 mm.
Proportional engine speed: 994 rev/min at 2250 rev/min engine speed.
Direction of rotation: anticlockwise viewed from tractor rear.

**Belt pulley:**

Location: Attachable to rear of tractor, in two alternative positions: on right or on left side of p.t.o.
Driven from p.t.o. clutch through bevel gears.

Diameter/width of face: 210 mm/120 mm.

Speed: 1432 rev/min giving 945 m/min linear speed at 2250 rev/min rated engine speed.

Direction of rotation: Clockwise with pulley on right side of p.t.o., anticlockwise with pulley on left side of p.t.o., viewed from tractor right side.

**Power lift:** Own make, gear-type oil pump operated.
Category 1 implement linkage, draught and position controls. Oil capacity of power lift reservoir: 2.9 litres. Oil change every 800 working hours.

**Drawbar:** Swinging drawbar, with clevis end sliding on drilled guide.
Vertical height to centre of clevis 510 mm.
Drawbar hole 29 mm dia; distance behind rear axle 565 mm; position relative to p.t.o.: 110 mm below, and 235 mm to rear.
Lateral adjustment: 4 positions from 0 mm to 240 mm each side.

**Steering:** Own make; mechanical type with pinion and bevel gear; steering wheel operated.

**Brakes:** Own make, band type with drums fixed to differential half-shafts; independent or combined pedal operated. Parking brake hand-lever operated with ratchet and pawl.

**Wheels:**

Steering wheels: Two at front, PIRELLI «Tractor» 5.00-15 tyres, 4 ply rating. Maximum permissible weight on each tyre 340 kg at 2.50 kg/cm² pressure. Track width 1050 mm by 7 steps to 1650 mm obtained by extending front axle and reversing wheel discs.

Driving wheels: Two at rear, PIRELLI «Tractor cinturato» 11.2/10-24 tyres, 4 ply rating, mounted on W 10-24" rims. Maximum permissible weight on each tyre 860 kg at 1.10 kg/cm² pressure. Track width 1000 mm by 8 steps to 1700 mm changed by reversing wheel centres and offset lugs on rims.

Wheel base: 1700 mm.

**Tractor weights:** (without driver but with tank full).

| | *Front kg* | *Rear kg* | *Total kg* |
|---|---|---|---|
| Without ballast | 460 | 620 | 1080 |
| With ballast | 610 | 1250 | 1860 |

**Ballast**

| | *Number of weights* | *Total weight kg* | *Water kg* |
|---|---|---|---|
| Front | 2 (1 per wheel) | 50 | — |
| Rear | 12 (6 per wheel) | 470 | 160 |
| Additional | 1 (front axle weight) | 100 | — |

**Seat:** Own make, flat spring suspension with rubber lined coil spring.

**Number of grease points:**

Whole tractor: 16.

**Overall Dimensions:**

| | *Length* *m* | *Width* *m* | *Height* *m* |
|---|---|---|---|
| *With ballast:* | | | |
| — with power lift linkage | 2.95 | 1.54 to 2.20 | 1.57 |
| — without power lift linkage | 2.74 | | |
| *Without ballast:* | | | |
| — with power lift linkage | 2.95 | 1.29 to 1.99 | 1.57 |
| — without power lift linkage | 2.74 | | |

**Lighting:** (Tractor without ballast, 1.29 m rear track).

| | *Height above ground of centre* *cm* | *Size* *cm* | *Distance from outside edge of tractor to centre* *cm* |
|---|---|---|---|
| Head lights | 97 | 13 dia | 46 |
| Side lights | 97 | 13 dia | 46 |
| Rear lights | 105 | 7 × 5 | 39 |
| Reflectors | 93 | 5.5 dia | 39 |

## FUELS AND LUBRICANTS USED IN TESTS

**Laboratory and track tests:**

| | |
|---|---|
| Fuel: | Diesel oil, density 0.831 kg/l at 15 °C, Cetane number not recorded. |
| Engine oil: | FIAT AMBRA, viscosity SAE 20 W-40 |
| Transmission oil: | FIAT AMBRA, viscosity SAE 20 W-40 |
| Hydraulic oil: | FIAT AMBRA, viscosity SAE 20 W-40. |

## COMPULSORY TESTS

### 1. Main power take-off performance:

Date and location of tests: 16th October 1970 - L.M.A. - TORINO (Italy)

Type of dynamometer: electrical, swinging frame

| *Horsepower* | *Speeds* | | *Fuel consumption* | | |
|---|---|---|---|---|---|
| | *Engine* | *P.t.o.* | *Per hour* | *Specific* | *metric hph/unit of volume* |
| *metric hp* | *rev/min* | *rev/min* | *l/h* | *g/metric hp h* | *metric hp h/l* |
| A. Maximum power: 2 - hour test | | | | | |
| 25.05 | 2300 | 587 | 6.57 | 218 | 3.81 |
| B. Standard p.t.o. speed (540 rev/min) | | | | | |
| 23.67 | 2117 | 540 | 6.07 | 213 | 3.90 |
| C. Speed recommended by manufacturer for drawbar work | | | | | |
| 24.64 | 2250 | 574 | 6.43 | 217 | 3.83 |
| D. Part loads | | | | | |
| 21.65 | 2345 | 598 | 5.72 | 219 | 3.79 |
| — | 2430 | — | 1.73 | — | — |
| 10.99 | 2380 | 607 | 3.61 | 273 | 3.04 |
| 25.05 | 2300 | 587 | 6.57 | 218 | 3.81 |
| 5.56 | 2406 | 614 | 2.45 | 367 | 2.27 |
| 16.35 | 2360 | 602 | 4.62 | 235 | 3.54 |

No load, maximum engine speed: 2430 rev/min

Equivalent crankshaft torque at max. power: 7.80 mkg

Maximum equivalent crankshaft torque: 9.82 mkg at 1200 rev/min engine speed

Mean atmospheric conditions:
- temperature 18.5 °C
- pressure 749.0 mm/Hg
- relative humidity 54%

Maximum temperature:
- coolant 80 °C
- engine oil 102 °C
- fuel 31 °C

## 2. Drawbar performance:

Date of tests: 21st - 23rd and 27th October 1970
Type of track: concrete
Height of drawbar above ground: 510 mm

| Gear No. | Horse-power, metric hp | Drawbar pull, kg | Travelling speed, km/h | Engine speed, rev/min | Wheelslip, % | Fuel consumption | | Temperature | | | Atmospheric conditions | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | metric hp h/l | Specific g/metric hph | Coolant °C | Fuel °C | Engine oil °C | Temperature, °C | Relative humidity, % | Pressure, mmHg |
| 1 - Maximum power (ballasted) | | | | | | | | | | | | | |
| (*) 1 | 12.80 | 1578 | 2.19 | 2358 | 11.5 | 2.97 | 280 | 80 | 28 | 114 | 7.5 | 75 | 741.6 |
| (*) 2 | 21.15 | 1560 | 3.66 | 2310 | 11.3 | 3.27 | 254 | 80 | 28 | 114 | 11.0 | 60 | 741.8 |
| 3 | 23.01 | 980 | 6.34 | 2285 | 4.6 | 3.44 | 241 | 80 | 28 | 114 | 16.0 | 30 | 740.3 |
| 4 | 23.59 | 719 | 8.86 | 2280 | 3.2 | 4.30 | 233 | 80 | 28 | 114 | 16.0 | 33 | 740.0 |
| 5 | 22.92 | 405 | 15.98 | 2279 | 1.8 | 3.44 | 242 | 80 | 28 | 114 | 14.5 | 38 | 740.0 |
| 2 - Five-hour test at 75% of pull at maximum power | | | | | | | | | | | | | |
| 4 | 18.69 | 555 | 9.09 | 2340 | 3.0 | 3.30 | 251 | 80 | 30 | 116 | 7.5 | 75 | 744.0 |
| (°) 3 - Five-hour test at pull corresponding to 15% wheelslip in test (1) | | | | | | | | | | | | | |
| 1 | 13.20 | 1591 | 2.25 | 2355 | 9.1 | 2.98 | 279 | 80 | 30 | 116 | 17.5 | 30 | 742.5 |
| 4 - Maximum power (unballasted) | | | | | | | | | | | | | |
| (●) 2 | 14.89 | 1075 | 3.74 | 2366 | 11.6 | 3.22 | 259 | 80 | 29 | 110 | 16.2 | 55 | 749.0 |
| 3 | 22.12 | 976 | 6.12 | 2301 | 8.4 | 3.38 | 246 | 80 | 29 | 110 | 16.2 | 55 | 749.0 |
| 4 | 23.50 | 730 | 8.69 | 2288 | 5.3 | 3.52 | 236 | 80 | 29 | 112 | 17.0 | 57 | 748.0 |
| 5 | 23.91 | 431 | 14.98 | 2276 | 3.5 | 3.57 | 233 | 80 | 29 | 114 | 17.0 | 57 | 748.0 |

Oil consumption during ten hours duration of tests (2) and (3): 8 g/h.
(*) Maximum pull available at 15% wheelslip: 1640 kg
(°) Tractor with additional ballast
(●) Maximum pull available at 15% wheelslip: 1110 kg

3. **Turning space and turning circle:**

Details of wheel equipment: As in specification, without ballast

Track of wheels: Front 1250 mm
Rear 1300 mm

| | With brakes | | Without brakes | |
|---|---|---|---|---|
| | *Right-hand* | *Left-hand* | *Right-hand* | *Left-hand* |
| Radius of turning space m | 2.89 | 2.82 | 3.34 | 3.20 |
| Radius of turning circle m | 2.77 | 2.70 | 3.22 | 3.08 |

4. **Location of centre of gravity:**

| | *mm* |
|---|---|
| Height above ground | 780 |
| Distance forward from the vertical plane containing the axis of the rear wheels | 691 |
| Distance from the median plane of the tractor | 0 |

5. **Braking:**

| | |
|---|---|
| Date of tests | 26th November 1970 |
| Type of track | concrete |
| Type of decelerometer | SIEMENS BREMSMESSER B1S |
| Weight of ballasted tractor | 1860 kg |

*Cold brakes:*

| | | *Tractor ballasted* | *Tractor without ballast* |
|---|---|---|---|
| Travelling speed of tractor | km/h | 25 | 25 |
| i - Maximum deceleration | m/s² | 4.60 | 4.40 |
| ii - Stopping distance | m | 7.50 | 8.20 |
| iii - Force on brake pedal | kg | 52 | 52 |
| iv - Force on brake pedal to a deceleration of 2.5 m/s² | kg | 35 | 35 |

*Brake fade characteristics* (hot tests):

Maximum deceleration hot/maximum deceleration cold × 100 = 96%.

Stopping distance cold/stopping distance hot × 100 = 96%.

Force on pedal cold/force on pedal hot × 100 = 93%.

**Parking brake:**

Efficiency of handbrake on a slope of 16 per cent: with a 32 kg pull on handbrake no wheel rotation occurs with tractor facing first up and then down the slope.

**6. Measurement of ambient noise emitted by the tractor:**

Date of test: 27th November 1970
Type of sound level meter: ELIT type 905
Type of track: concrete
Results of test: — gear 6th
— travelling speed 24.5 km/h
— sound level 84 dBA

**7. Noise measurement at the driver's ear level:**

Date of test: 27th November 1970
Type of sound level meter and octave filter: ELIT type 905 and 955
Type of track: concrete
Type of frequency analyzer: octave type, with 10 bands from 31.5 to 16,000 Hz

**Results of test**

| *Gear* | *Travelling speed km/h* | *Loudness sones* |
|---|---|---|
| 4th | 8.45 | 86 |

**8. Power lift and hydraulic pump performance:**

Date and location of tests: 30th March 1971 - L.M.A. - TORINO (Italy)
Hydraulic fluid: FIAT AMBRA, viscosisty SAE 20 W-40.
Type of linkage lock for transport: hydraulic
Opening pressure of the relief valve: 150 kg/cm²

*Pump characteristics*:

i) Opening pressure of the relief valve: 150 kg/cm²
Sustained pressure by the open relief valve: 170 kg/cm²
ii) Pump delivery rate at minimum pressure and rated engine speed: 9.8 l/min
iii) Pump delivery rate: 9.4 l/min
Delivery pressure: 170 kg/cm²
Power: 3.6 metric hp

| | *Height above ground in down position* | | *Vertical movement mm* | *Maximum force exerted through full range kg* | *Pressure kg/cm²* | *Lifting force when front of tractor lifts kg* |
|---|---|---|---|---|---|---|
| | *Hitch point mm* | *Frame mm* | | | | |
| Linkage giving maximum mechanical advantage | | | | | | |
| At hitch points | 330 | — | 420 | 800 | 170 | — |
| On the frame | — | 300 | 490 | 550 | 170 | 500 |
| Linkage giving minimum mechanical advantage | | | | | | |

Only one position is possible at the hitch points.

Officer in charge: Ing. R. Gioia
Head of L.M.A.: Dr. L. Lisa
Date: 10th April 1971

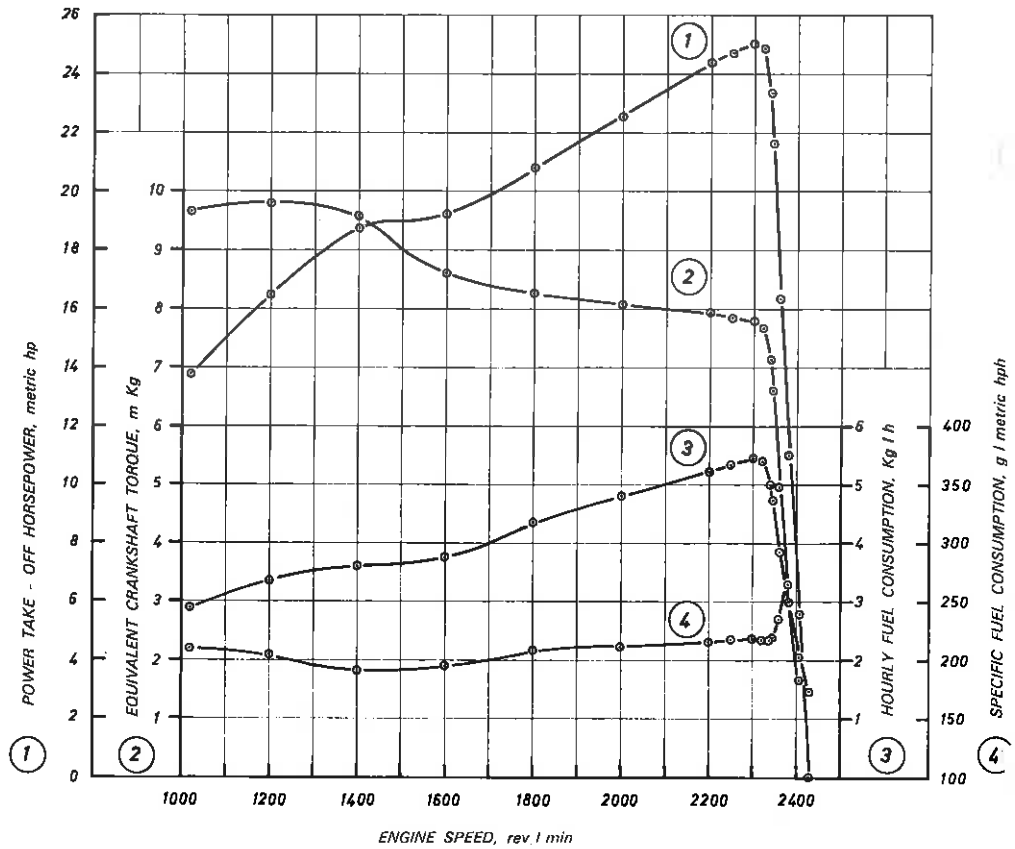



Fig. 1. Power take-off test

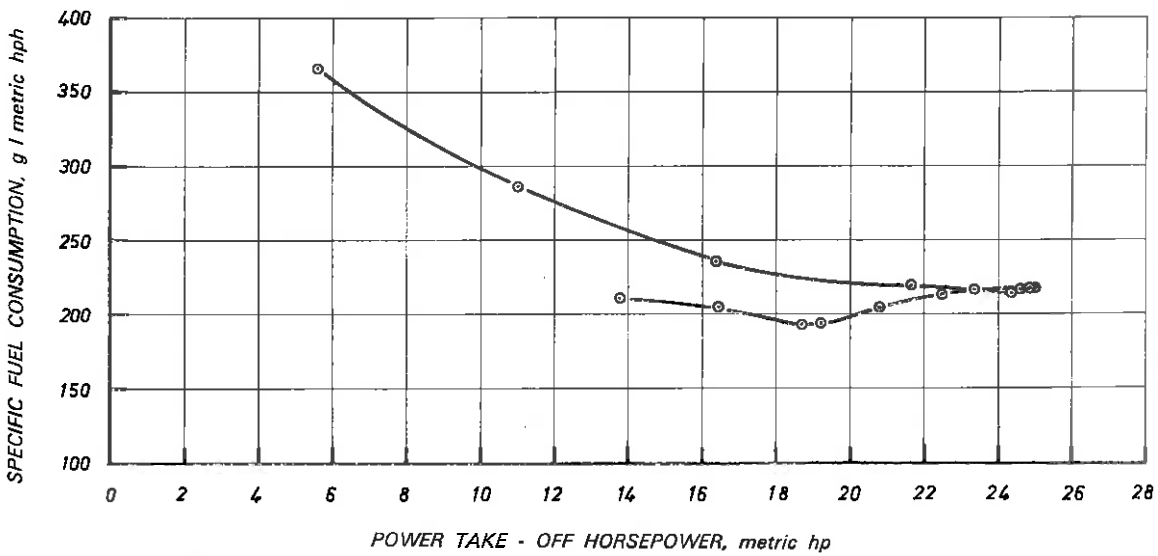



Fig. 2. Power take-off test

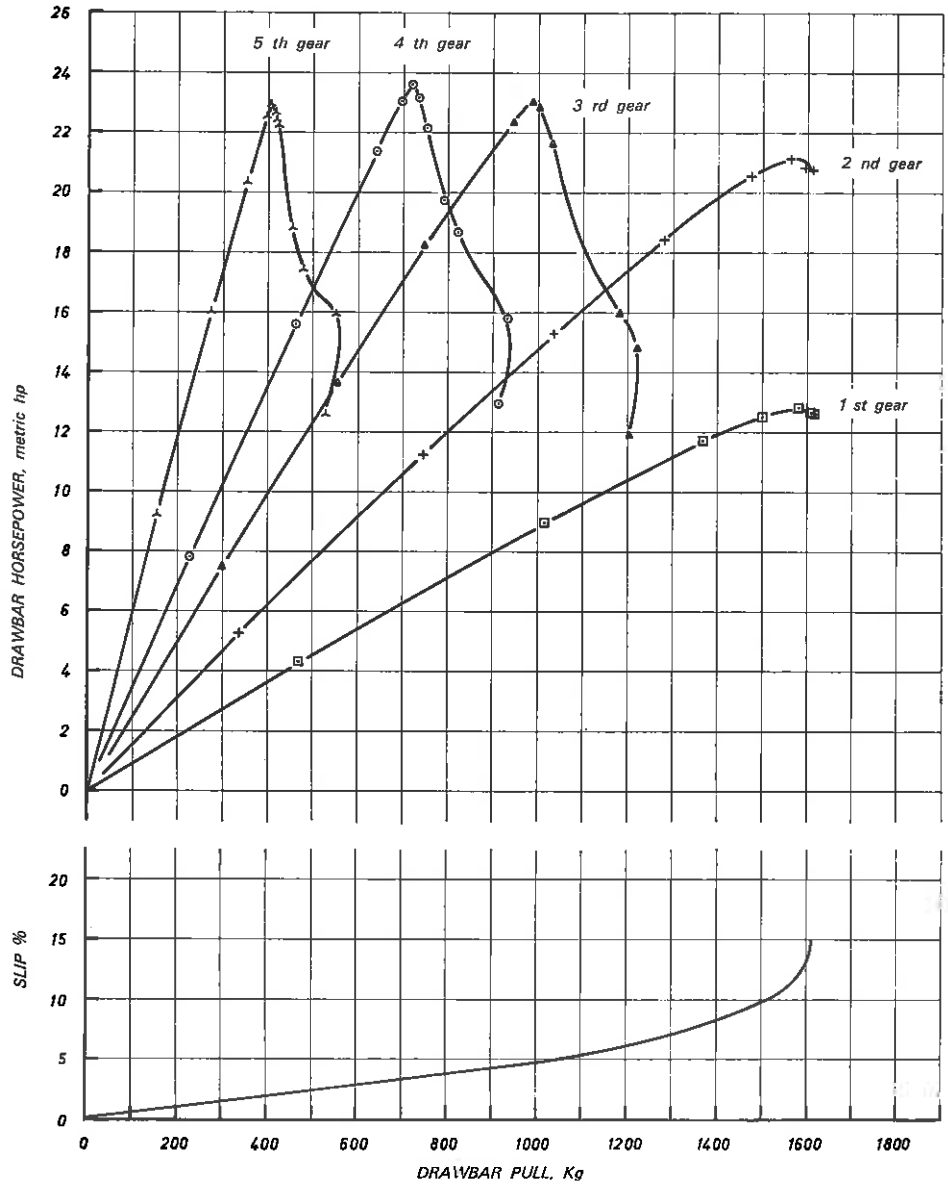



FIG. 3. Drawbar test on concrete, with ballast

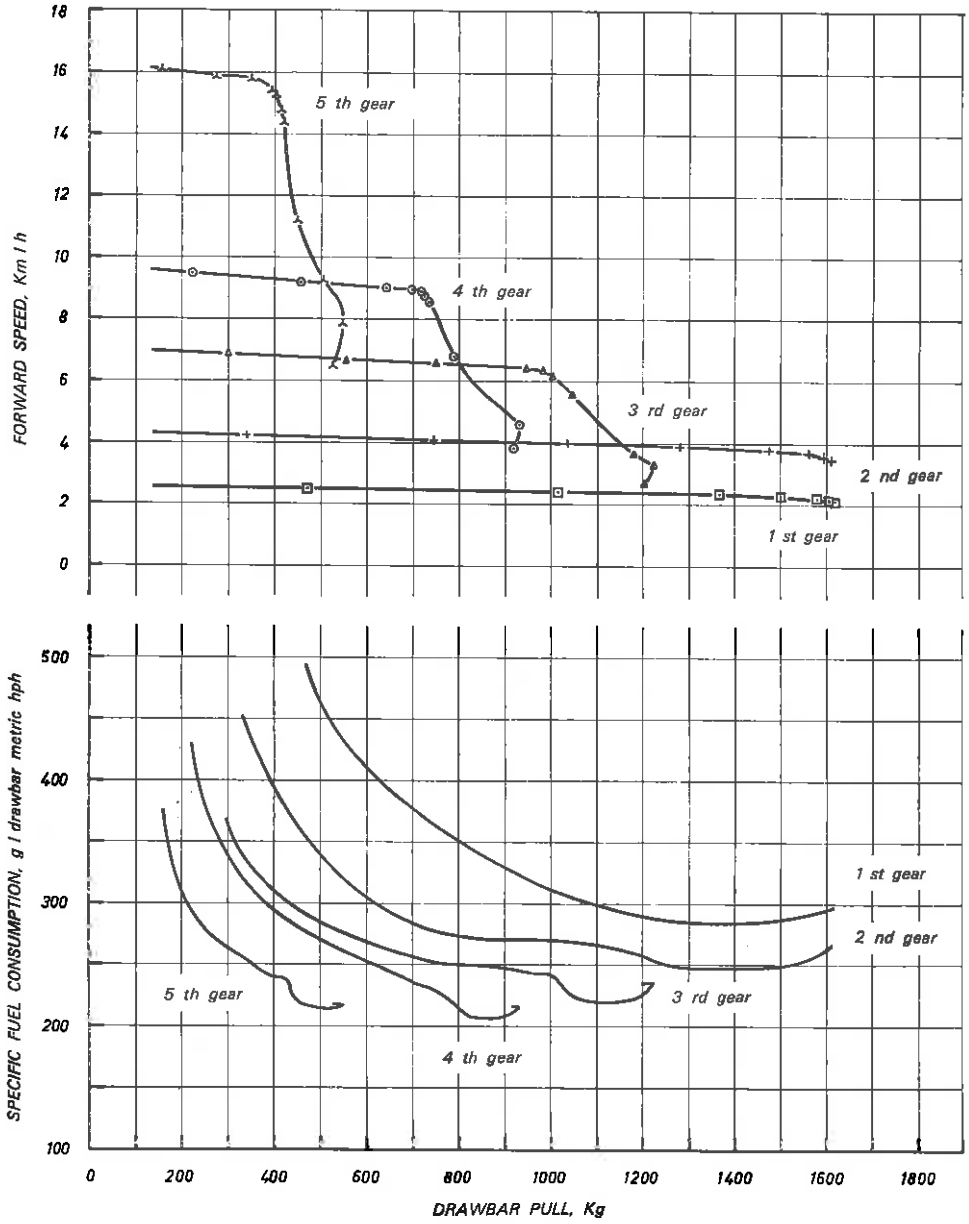



FIG. 4. Drawbar test on concrete, with ballast

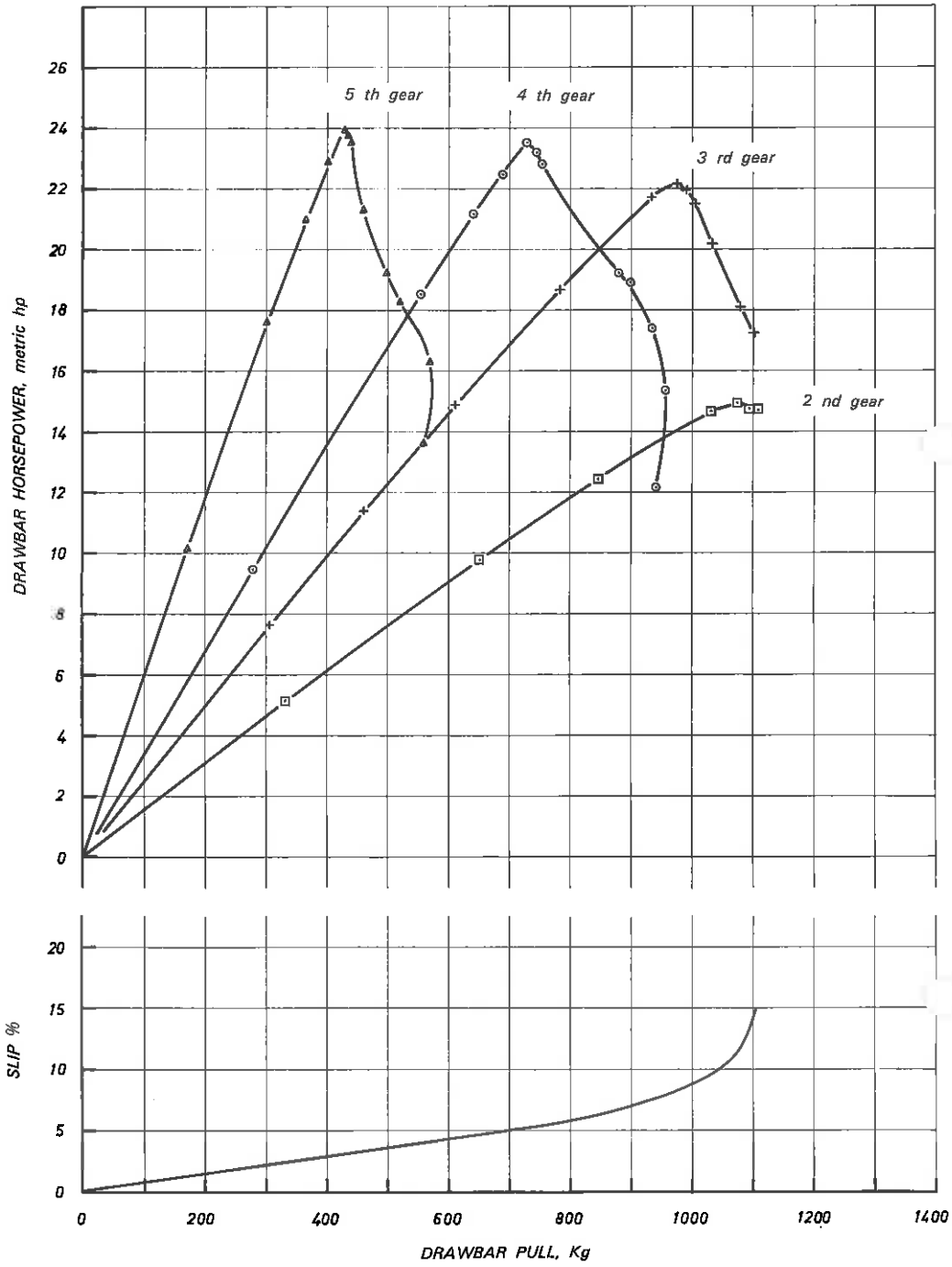



FIG. 5. Drawbar test on concrete, without ballast

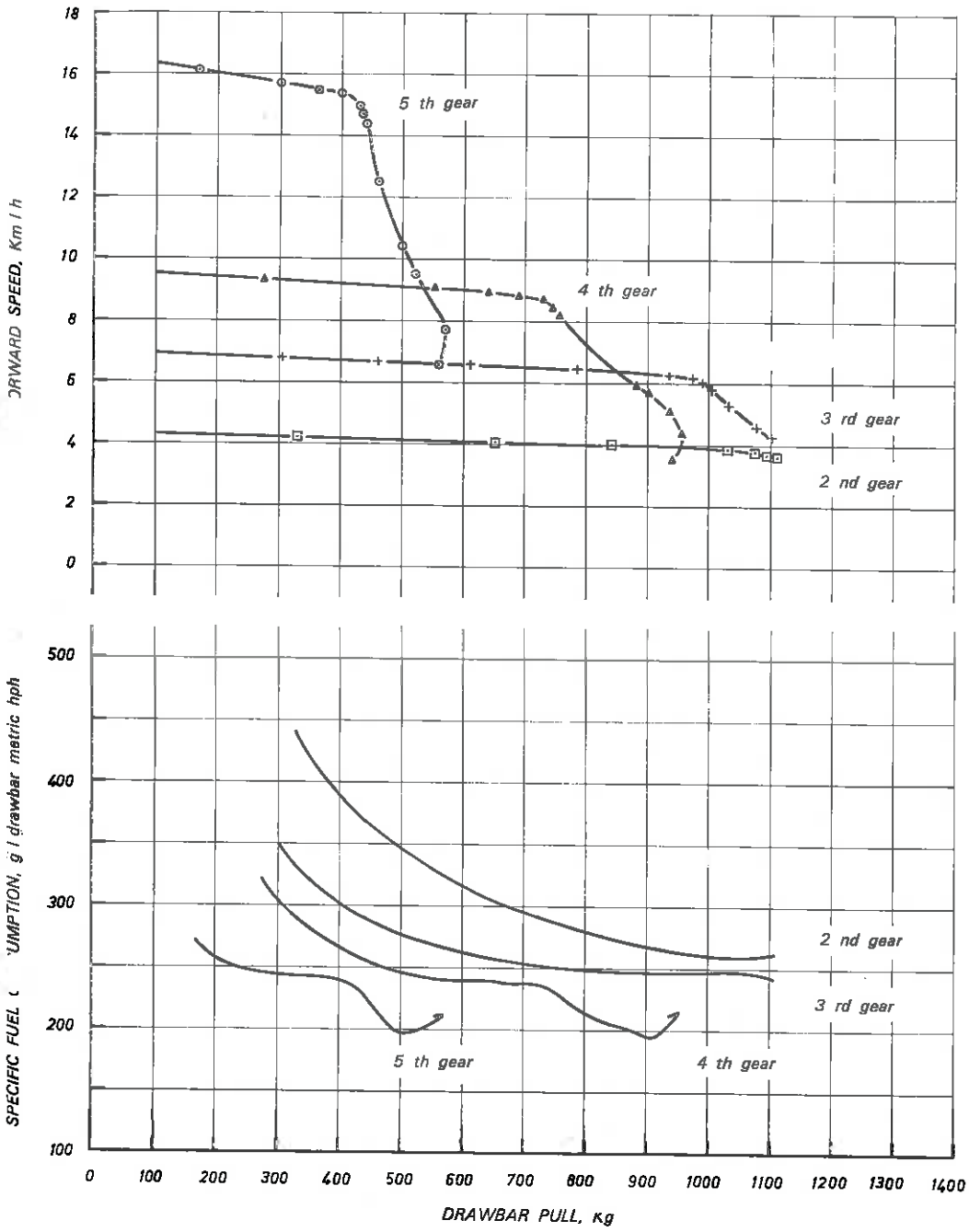



FIG. 6. Drawbar test on concrete, without ballast

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