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11-14-1979

## Test 1333: Belarus 1500 Diesel (T-150K) 12-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA TRACTOR TEST 1333 — BELARUS 1500 DIESEL (T-150K) 12 SPEED

## POWER TAKE-OFF PERFORMANCE

| Power<br>Hp<br>(kW) | Crank<br>shaft<br>speed<br>rpm | Fuel Consumption |                       |                       | Temperature °F (°C) |                    |                    | Barometer<br>inch Hg<br>(kPa) |
|---------------------|--------------------------------|------------------|-----------------------|-----------------------|---------------------|--------------------|--------------------|-------------------------------|
|                     |                                | gal/hr<br>(l/h)  | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Cooling<br>medium   | Air<br>wet<br>bulb | Air<br>dry<br>bulb |                               |

### MAXIMUM POWER AND FUEL CONSUMPTION

| Rated Engine Speed—Two Hours (PTO Speed—1024 rpm) |      |                    |                  |                  |               |  |              |              |                    |
|---|------|--------------------|------------------|------------------|---------------|--|--------------|--------------|--------------------|
| 168.76<br>(125.84)                                | 2100 | 10.386<br>(39.314) | 0.436<br>(0.265) | 16.25<br>(3.201) | 200<br>(93.2) |  | 54<br>(12.3) | 75<br>(23.9) | 29.020<br>(97.996) |

| Standard Power Take-off Speed (1000 rpm)—One Hour |      |                    |                  |                  |               |  |              |              |                    |
|---|------|--------------------|------------------|------------------|---------------|--|--------------|--------------|--------------------|
| 169.63<br>(126.49)                                | 2050 | 10.291<br>(38.956) | 0.429<br>(0.261) | 16.48<br>(3.247) | 199<br>(92.8) |  | 54<br>(12.2) | 75<br>(23.7) | 28.975<br>(97.844) |

### VARYING POWER AND FUEL CONSUMPTION—Two Hours

|                                      |             |                                 |                                |                                |                             |  |                            |                            |                                  |
|--------------------------------------|-------------|---------------------------------|--------------------------------|--------------------------------|-----------------------------|--|----------------------------|----------------------------|----------------------------------|
| 147.00<br>(109.62)                   | 2153        | 9.202<br>(34.832)               | 0.443<br>(0.270)               | 15.98<br>(3.147)               | 192<br>(88.6)               |  | 54<br>(12.2)               | 75<br>(23.9)               | .....                            |
| 0.00<br>(0.00)                       | 2255        | 2.590<br>(9.803)                | .....                          | .....                          | 175<br>(79.4)               |  | 53<br>(11.7)               | 74<br>(23.6)               | .....                            |
| 75.36<br>(56.19)                     | 2207        | 5.811<br>(21.997)               | 0.546<br>(0.332)               | 12.97<br>(2.555)               | 183<br>(83.9)               |  | 54<br>(12.2)               | 75<br>(23.9)               | .....                            |
| 169.57<br>(126.45)                   | 2100        | 10.372<br>(39.261)              | 0.433<br>(0.263)               | 16.35<br>(3.221)               | 198<br>(92.2)               |  | 54<br>(12.2)               | 76<br>(24.2)               | .....                            |
| 38.13<br>(28.44)                     | 2233        | 4.090<br>(15.483)               | 0.759<br>(0.462)               | 9.32<br>(1.837)                | 178<br>(81.4)               |  | 54<br>(11.9)               | 75<br>(23.9)               | .....                            |
| 111.77<br>(83.35)                    | 2182        | 7.511<br>(28.431)               | 0.476<br>(0.289)               | 14.88<br>(2.932)               | 184<br>(84.7)               |  | 53<br>(11.7)               | 75<br>(23.9)               | .....                            |
| <b>Av 90.30</b><br><b>Au (67.34)</b> | <b>2188</b> | <b>6.596</b><br><b>(24.968)</b> | <b>0.517</b><br><b>(0.314)</b> | <b>13.69</b><br><b>(2.697)</b> | <b>185</b><br><b>(85.0)</b> |  | <b>54</b><br><b>(12.0)</b> | <b>75</b><br><b>(23.9)</b> | <b>28.953</b><br><b>(97.771)</b> |

## DRAWBAR PERFORMANCE

| Power<br>Hp<br>(kW) | Drawbar<br>pull<br>lbs<br>(kN) | Speed<br>mph<br>(km/h) | Crank-<br>shaft<br>speed<br>rpm | Slip<br>% | Fuel Consumption |                       | Temp. °F (°C)         |                     | Barom.<br>inch Hg<br>(kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|------------------|-----------------------|-----------------------|---------------------|----------------------------|
|                     |                                |                        |                                 |           | gal/hr<br>(l/h)  | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Cool-<br>ing<br>med |                            |

| Maximum Available Power—Two Hours 6th (2-2) Gear |                  |                |      |      |                    |                  |                  |               |             |
|--|------------------|----------------|------|------|--------------------|------------------|------------------|---------------|-------------|
| 147.03<br>(109.64)                               | 10381<br>(46.18) | 5.31<br>(8.55) | 2100 | 3.61 | 10.119<br>(38.306) | 0.487<br>(0.296) | 14.53<br>(2.862) | 191<br>(88.3) | 50<br>(9.7) |

| 75% of Pull at Maximum Power—Ten Hours 6th (2-2) Gear |                 |                |      |      |                   |                  |                  |               |             |
|---|-----------------|----------------|------|------|-------------------|------------------|------------------|---------------|-------------|
| 118.73<br>(88.53)                                     | 8048<br>(35.80) | 5.53<br>(8.90) | 2170 | 2.77 | 8.491<br>(32.142) | 0.506<br>(0.308) | 13.98<br>(2.754) | 184<br>(84.4) | 44<br>(6.9) |

| 50% of Pull at Maximum Power—Two Hours 6th (2-2) Gear |                 |                |      |      |                   |                  |                  |               |             |
|---|-----------------|----------------|------|------|-------------------|------------------|------------------|---------------|-------------|
| 80.89<br>(60.32)                                      | 5358<br>(23.83) | 5.66<br>(9.11) | 2207 | 2.19 | 6.605<br>(25.003) | 0.578<br>(0.352) | 12.25<br>(2.412) | 181<br>(82.8) | 39<br>(3.6) |

| 50% of Pull at Reduced Engine Speed—Two Hours 8th (2-4) Gear |                 |                |      |      |                   |                  |                  |               |             |
|--|-----------------|----------------|------|------|-------------------|------------------|------------------|---------------|-------------|
| 80.99<br>(60.39)   | 5361<br>(23.85) | 5.66<br>(9.12) | 1409 | 2.25 | 5.651<br>(21.393) | 0.494<br>(0.300) | 14.33<br>(2.823) | 176<br>(80.0) | 42<br>(4.7) |

### MAXIMUM POWER IN SELECTED GEARS

|                    |                  |                 |      |       |  |  |                |               |              |              |                    |
|--------------------|------------------|-----------------|------|-------|--|--|----------------|---------------|--------------|--------------|--------------------|
| 131.63<br>(98.16)  | 19311<br>(85.90) | 2.56<br>(4.11)  | 2118 | 13.82 |  |  | 3rd (1-3) Gear | 187<br>(85.8) | 34<br>(1.1)  | 37<br>(2.8)  | 28.700<br>(96.916) |
| 145.41<br>(108.43) | 14799<br>(65.83) | 3.68<br>(5.93)  | 2101 | 5.51  |  |  | 4th (1-4) Gear | 195<br>(90.3) | 51<br>(10.6) | 70<br>(21.1) | 28.690<br>(96.882) |
| 151.93<br>(113.30) | 12358<br>(54.97) | 4.61<br>(7.42)  | 2100 | 4.15  |  |  | 5th (2-1) Gear | 195<br>(90.3) | 51<br>(10.6) | 69<br>(20.6) | 28.700<br>(96.916) |
| 151.96<br>(113.31) | 10728<br>(47.72) | 5.31<br>(8.55)  | 2100 | 3.51  |  |  | 6th (2-2) Gear | 195<br>(90.6) | 51<br>(10.6) | 70<br>(21.1) | 28.710<br>(96.949) |
| 150.88<br>(112.51) | 8951<br>(39.81)  | 6.32<br>(10.17) | 2100 | 2.94  |  |  | 7th (2-3) Gear | 195<br>(90.6) | 51<br>(10.6) | 70<br>(21.1) | 28.690<br>(96.882) |
| 149.24<br>(111.29) | 6628<br>(29.48)  | 8.44<br>(13.59) | 2100 | 2.22  |  |  | 8th (2-4) Gear | 192<br>(88.9) | 51<br>(10.6) | 70<br>(21.1) | 28.680<br>(96.848) |

Department of Agricultural Engineering

Dates of Test: November 14-27, 1979

Manufacturer: KHARKOV TRACTOR PLANT,  
Kharkov - 7 USSR

**FUEL, OIL AND TIME:** Fuel No. 2 Diesel Cetane No. 49.0 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°60° (15°/15°)** 0.8500 **Fuel weight** 7.078 lbs/gal (0.848 kg/l) **Oil SAE 30 API service classification** SB-SE/CA-CD **To motor** 4.849 gal (18.353 l) **Drained from motor** 3.941 gal (14.917 l) **Transmission and hydraulic lubricant** SAE 30 **Final drive lubricant** SAE 90 **Total time engine was operated** 41.0 hours.

**ENGINE:** Make USSR Diesel **Type** six cylinder vee with turbocharger **Model** SMD-62 **Serial No.** 79255514 **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 5.118" x 4.528" (130 mm x 115 mm) **Compression ratio** 15.0 to 1 **Displacement** 558 cu in (9150 ml) **Starting system** single cylinder, 2 cycle gasoline engine started by 12 volt motor or hand rope **Lubrication** pressure **Air cleaner** steel wool element with aspirator **Air compressor** direct engine drive **Oil filter** full flow centrifugal, separate washable element for turbocharger **Oil cooler** separate radiators for crankcase and transmission oil **Fuel filter** three paper elements in parallel, sediment bowl and strainer **Muffler** vertical **Cooling medium temperature control** two thermostats.

**CHASSIS:** **Type** Four-wheel drive **Serial No.** 128543 **Tread width** rear 73.2" (1860 mm) front 73.2" (1860 mm) **Wheel base** 112.6" (2860 mm) **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 72.4" (1839 mm) Vertical distance above roadway 37.2" (945 mm) Horizontal distance from center of rear wheel tread 0.4" (10 mm) to the left **Hydraulic control system** direct engine drive with throw out lever (engaged during test) **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Advertised speeds mph (km/h)** first 2.1 (3.4) second 2.4 (3.8) third 2.8 (4.6) fourth 3.8 (6.0) fifth 4.6 (7.4) sixth 5.3 (8.5) seventh 6.3 (10.1) eighth 8.3 (13.4) ninth 10.1 (16.2) tenth 11.6 (18.6) eleventh 13.7 (22.0) twelfth 18.7 (30.0) reverse 3.8 (6.1), 4.4 (7.0), 5.2 (8.3), 6.9 (11.1) **Clutch** double dry disc, air power assisted, operated by foot pedal **Brakes** expanding shoe pneumatically operated by foot pedal **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 263.7" (6.70 m) left 263.7" (6.70 m) **Turning space diameter** (on concrete surface without brake) right 562" (14.27 m) left 562" (14.27 m) **Power take-off** 1000 rpm at 2050 engine rpm.

# **LUGGING ABILITY IN 6th (2-2) GEAR**

|                      |                    |                    |                    |                   |                   |                  |
|----------------------|--------------------|--------------------|--------------------|-------------------|-------------------|------------------|
| Crankshaft Speed rpm | 2100               | 1893               | 1676               | 1464              | 1256              | 1052             |
| Pull—lbs<br>(kN)     | 10728<br>(47.72)   | 11531<br>(51.29)   | 12686<br>(56.43)   | 13511<br>(60.10)  | 12416<br>(55.23)  | 10950<br>(48.71) |
| Increase in Pull %   | 0                  | 7                  | 18                 | 26                | 16                | 2                |
| Power—Hp<br>(kW)     | 151.96<br>(113.31) | 146.71<br>(109.40) | 142.31<br>(106.12) | 131.80<br>(98.28) | 104.49<br>(77.91) | 77.57<br>(57.84) |
| Speed—Mph<br>(km/h)  | 5.31<br>(8.55)     | 4.77<br>(7.68)     | 4.21<br>(6.77)     | 3.66<br>(5.89)    | 3.16<br>(5.08)    | 2.66<br>(4.28)   |
| Slip %               | 3.51               | 3.89               | 4.40               | 4.65              | 4.40              | 3.64             |

## **TRACTOR SOUND LEVEL WITH CAB**

|   | dB(A) |
|---|-------|
| Maximum Available Power—Two Hours             | 87.0  |
| 75% of Pull at Maximum Power—Ten Hours        | 86.5  |
| 50% of Pull at Maximum Power—Two Hours        | 86.5  |
| 50% of Pull at Reduced Engine Speed—Two Hours | 83.5  |
| Bystander in 12th (3-4) gear                  | 94.5  |

## **TIRES, BALLAST AND WEIGHT**

|   |                                     | With Ballast                          | Without Ballast                       |
|---|-------------------------------------|---------------------------------------|---------------------------------------|
| <b>Rear Tires</b>                       | —No., size, ply & psi (kPa)         | Two 530-610/21.3-24P,<br>10, 18 (125) | Two 530-610/21.3-24P,<br>10, 18 (125) |
| Ballast                                 | —Liquid (each)<br>—Cast Iron (each) | 560 lb (254 kg)<br>None               | None<br>None                          |
| <b>Front Tires</b>                      | —No., size, ply & psi (kPa)         | Two 530-610/21.3-24P,<br>10, 26 (180) | Two 530-610/21.3-24P,<br>10, 26 (180) |
| Ballast                                 | —Liquid (each)<br>—Cast Iron (each) | None<br>None                          | None<br>None                          |
| <b>Height of Drawbar</b>                |                                     | 15.5 in (395 mm)                      | 15.5 in (395 mm)                      |
| <b>Static Weight with Operator—Rear</b> |                                     | 7955 lb (3608 kg)                     | 6835 lb (3100 kg)                     |
| —Front                                  |                                     | 11930 lb (5411 kg)                    | 11930 lb (5411 kg)                    |
| —Total                                  |                                     | 19885 lb (9019 kg)                    | 18765 lb (8511 kg)                    |

**REPAIRS and ADJUSTMENTS:** Previous to the Ten Hour Drawbar Test, cab insulation had to be removed from under the throttle linkage.

**REMARKS:** All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump was 151°F (66.2°C). Six gears were chosen between 15% slip and 10 mph (16.1 km/h). The pull in 3rd (1-3) was limited to avoid tractor bouncing.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1333**.

L. I. LEVITICUS  
Engineer-in-Charge

G. W. STEINBRUEGGE  
W. E. SPLINTER  
K. VON BARGEN  
Board of Tractor Test Engineers



**Belarus 1500 Diesel**