

# TEST REPORT



## Grapple Skidder

### WERNER Type „WF-trac 1700“ with grapple and front winch

**OWNER OF THE TEST CERTIFICATE:**

Applicant/distributor:

WERNER GmbH Forst- und Industrietechnik  
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**Manufacturer:**

WERNER GmbH Forst- und Industrietechnik



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# Grapple skidder WERNER Type “WF-trac 1700“ with crane and front winch



## Evaluation– Review

Test item	Test results	Evaluation
<b>Skidder class 3</b>	<b>Engine power &gt; 80 kW</b>	
Chief application field	Hauling, skidding, sorting and piling of medium sized to thick stems over short distances, also in difficult terrain; for continuous use loads should not exceed 6-7 cubic meters of timber.	
<b>Skidding</b>		<b>good</b>
Winch	Max. line pull 80 kN, max. average line speed 1.40 m/s	+
Front axle lift tendency when pulling	Critical pulling power = 284 kN	++
Skidder power	Max. pulling power 115 kN at 2.0 km/h – (91% of net weight)	++
Load distribution	FA : RA = 50 : 50	o
Front axle lift tendency when driving	Critical pulling power = 172 kN, Measured at 126 kN while skidding	++
Max. speed	Vmax = 50 km/h	++
Off-road capability	Off-road capability coefficient = 0.88	+
Decking blade	Rear anchor blade, max. lifting power 66 kN, lifting of rear axle is possible	+
<b>Piling</b>		<b>very good</b>
Stacking blade	Not mounted, not evaluated	
Crane construction	Gross lifting torque 90 kNm, max. reach 7.0 m; measured lifting power at 4 m reach 21 kN, at max reach 10 kN	++
Stability during crane work	Lateral stability is provided when loaded at maximum reach, Standing torque = 1,36 x max. lifting torque	++
<b>Ergonomics</b>		<b>good</b>
Noise	L <sub>eq</sub> = 73 dB(A)	+
Vibration	K = 11.8	o
Cab design	ROPS/FOPS tested, cab can be hydraulically rotated through 270° and positioned as desired, all control elements are well arranged, storage areas provided	+
Attenuating forces	Generally low, front winch rope uncoiling force normal	+
Visibility	Rotating cab, very good all-round visibility narrow cab stays	++
<b>Work safety</b>	DPLF work safety test	
<b>Ecology</b>		<b>good</b>
Ground impact	118 ground impact points	o
Operational fluids	Approved for bio-degradable hydraulic fluids, optionally RME-capability, e.g. Panolin HLP Synth 46	++
Fuel consumption	Av. 7.0 – 8.0 l/operating hour (specific consumption 202 g/kWh)	+
Emissions	Comply with Euro-Ri 97/68EC, Euromot 2 and Euro 3	++
<b>Economy</b>		
Cost (without wages)	According to calculation scheme 60 EUR/ operating hour (based on 1500 operating hours/year)	
Maintenance (incl. refuelling)	Approx. ¼ hour daily; approx. 1 hour weekly	
Power	Near upper limit for this skidder class	
Distinctive features	Hydraulically operated rotating cab (through 270°) and power derived continuous auxiliary transmission	

++ = very good; + = good; o = satisfactory; - = adequate; -- = inadequate

## Short description

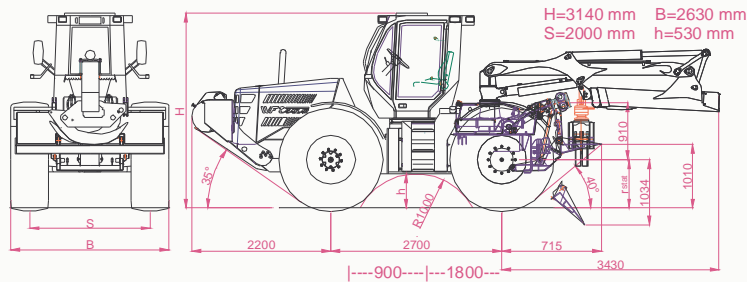


Figure: Machine sketch

- Hydraulically operated rotating cab (270°) – unrestricted positioning
- Frame-built front and rear bogie with lockable joint
- Front axle with Ackerman steering controlled by Orbitrol or joystick (turn circle diameter 14.9 m)
- Rigid front axle with hydro-pneumatic suspension and level control system, rigid rear axle
- hydrostatic–mechanical “power derived” transmission, 2 groups continuous, max. speed 50 km/h
- Rear wheel drive, front wheel drive and differential lock can be switched on independently
- Anchor blade can be lowered hydraulically. Provided with cable guide pulleys and toothed edge
- Front mounted, hydro-mechanical double drum winch, electro-pneumatically operated via remote control
- Test tires: front/rear: Trelleborg twin 422 LS2 600/65-34
- Net weight: 12 650 kg Axle load distribution: (FA : RA): 50.3 : 49.7 %
- Engine power: 129 kW Transport height: 3140 mm
- Width (600 tires): 2630 mm Ground clearance: 530 mm
- Winch: Werner Double Drum winch Type F82.2 with maximum pulling power of 2 x 80 kN
- Crane: Epsilon/Werner Type C 81.1 TL with maximum reach of 7.0 m
- Field of application: When fully utilizing the potential of the crane, the machine is suitable for skidding, sorting and piling medium thick to thick stems, as well as removing skidded long timber from the forest followed by short distance hauling and sorting, even in difficult terrain. When operated continuously, the winched load should not exceed 6 to 7 cubic metres long timber.

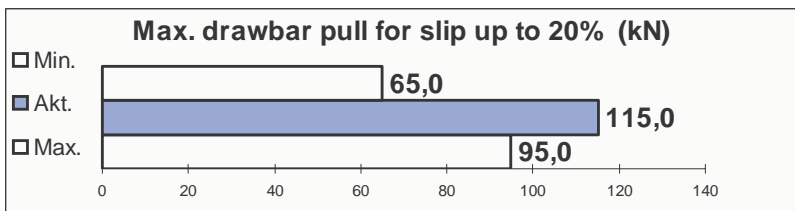
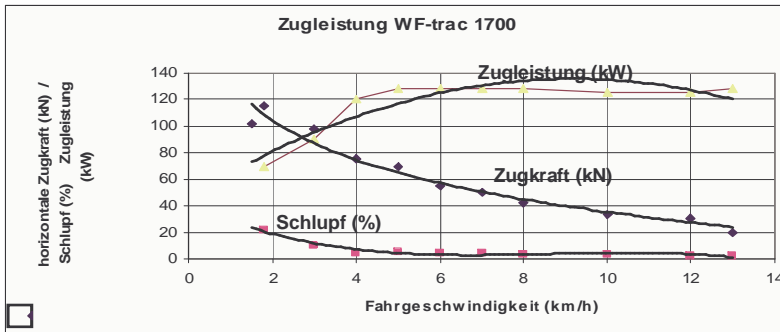


Fig 1: Comparison between the data of the tested machine and the minimum and maximum values of the 4 machines tested so far in the respective performance class of the machine group.

### Axle loads and payload

	According to KWF-measurements*	Permitted according to German traffic legislation	Permitted according to manufacturer's declaration static/dynamic
Gross weight (kg)	12650	13000	
Front axle load (kg)	6360	6300	14000 / 7000 at 40 km/h
Rear axle load (kg)	6290	7700	20000 / 14000 at 8 km/h
Weight distribution (%)	(FA) 50 : (RA) 50		

\* measured weight of the fully refuelled machine without operator and payload

### Engine

Daimler Chrysler, Type OM 904 LA, water cooled, 4-cylinder 4-stroke diesel engine with direct priming, turbocharger and intercooling; constant torque characteristics from 1200 to 1700 1/min

Power	at engine speed	2200 1/min	129	kW
max. torque	at engine speed	1200-1700 1/min	675	Nm
Torque increase			21	%
specific fuel consumption	Nominal engine speed	2200 1/min	214	g/kWh
	working engine speed	1400 1/min	202	g/kWh
Average fuel consumption under working conditions			7.0– 8.0	l/Operating hour
Fuel tank volume			140	l

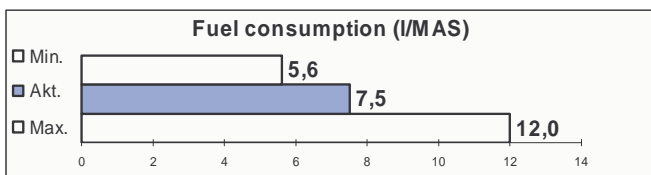
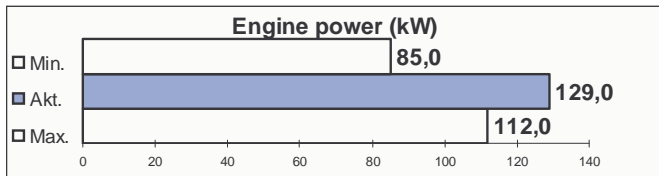


Fig. 2: Comparison between the data of the tested machine and the minimum and maximum values of the 4 machines tested so far in the respective performance class of the machine group.

### Transmission

Continuous hydrostatic–mechanical “power derived” transmission		
Electronic engine-transmission management; electronic transmission control with group preselection and reversing gearbox forwards/reverse for the preselected group; programmable drive speed forwards/reverse; machine can be driven by remote control (max. speed 6 km/h)		
Permitted maximum speed	50	km/h
Number of gears (forwards/reverse)	2/2	
Number of groups	2	

<b>Hydraulics work circuit</b>		
Single circuit hydraulic system, work hydraulics with priority switch for steering; optional additional hydraulic connections for equipment and trailer with hydraulic brakes; open Load-Sensing System.		
Hydraulic pump	Tractor hydraulic system: axial piston pump with adjustable supply flow, 2 Rexroth Type A10VO 45	
Capacity	at nominal engine speed (2200 U/min)	215 l/min
Hydraulic pressure	Tractor hydraulic system maximal unloaded	25 MPa
	Anchor blade	3.0 MPa
	Crane	25 MPa
	Steering	25 MPa
	Winch drive	18.5 Mpa
Fuel tank capacity	Joint tank for steering and work hydraulics	25 MPa
		220 l
The machine is constructed to be operated with specific biodegradable hydraulic liquids (Panolin HLP Synth 46) (Filled upon request)		

<b>Winch</b>		
Front mounted double-Drum winch: Werner Type F82.2; hydro-mechanical drive (2 gear driven constant engine Sauer/Danfoss Type OMTS 200); electro-pneumatic control; hydraulic rope pay-out device with adjustable speed		
Maximum line pull		
Step 1: lower/upper rope position	80 / 53	kN
Step 2: lower/upper rope position	75 / 50	kN
Both Drums together	134	kN
Control pressure	7.2	bar
Drum inner diameter	229	mm
Drum outer diameter	418	mm
Drum width	225	mm
Rope diameter	13	mm
Maximum rope length	2 x 90	m
Rope type	13 mm compounded	
Height of the rope entry	1250 - 1660	mm
Rope uncoiling force** with/without pay out device	0 / 120	N
average line speeds (m/s)		
Engine speed drive - winch	From work speed 1400 1/min *	To nominal speed 2200 1/min
Step 1	0.45	to 0.70
Step 2	0.90	to 1.40
Rope dependant deviation of maximum and minimum line speed from the average speed		+/- 20 %

\*the work engine speed can be continuously adjusted by remote control

\*\* manual adjustment

<b>Stacking blade (not available)</b>		
<b>Decking blade</b>		
Anchor blade, hydraulic lifting and lowering of rear blade with 600 mm wide toothed edge on the left and right side of the decking blade; the cable entry unit is attached to decking blade; the rope entry height is proportional to the movements of the decking blade; prepared for attaching trailers.		
Height / width	980 / 2350	mm
Reach	600	mm
Maximum lift / blade dig (below surface) *	980 / 280	mm
Maximum/minimum lifting power	67/60	kN

\*measured at the rear edge of the decking blade. It is possible to lift the rear axle with the decking blade.

Crane		
Comprises slewing gear, pillar, boom and jib and a 2-step telescope; mounted separately above the rear axle; non-tilting, digital electro-hydraulic precontrol (5 programmable settings)		
Type	Epsilon/Werner C 81.1 TL	
maximum reach	7.0	m
Gross lifting torque *	90	kNm
Slewing torque	35	kNm
Telescope traction force	24	kN
Turning area(left/right)	93/93	°
Maximum working pressure	25	MPa
Boom weight (without rotator and grapple) *	1300	kg

\* Manufacturer's declaration

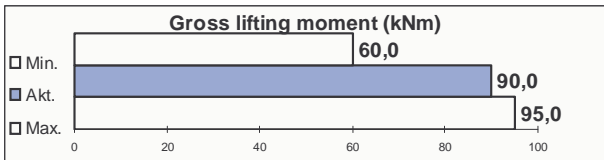
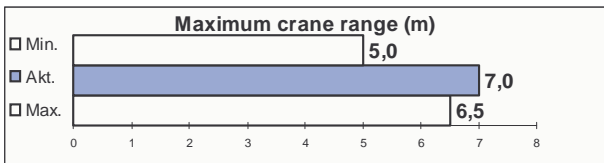


Fig. 5: Comparison between the data of the tested machine and the minimum and maximum values of the 4 machines tested so far in the respective performance class of the machine group.

Fig. 3: Outreach scheme-

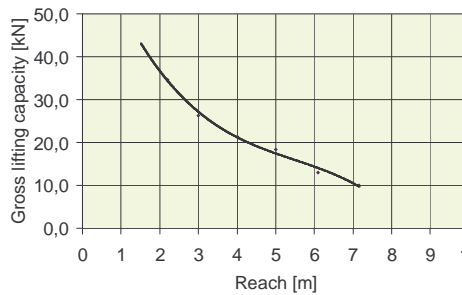
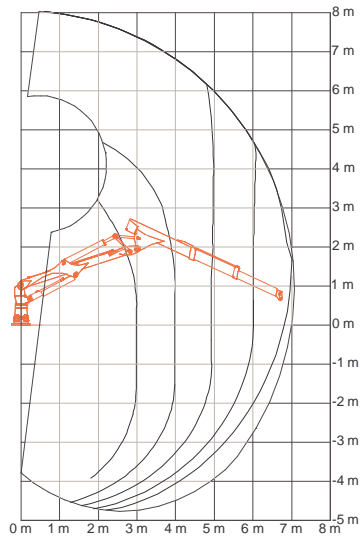


Fig. 4: Lifting capacity (gross values)

Grapple and rotator		
Manufacturer	Epsilon FG 41 S	
Attached to the boom with rotator and swing brake		
Endless rotator Indexator GV 12		
Weight (with/without rotator) *	320/260	kg
Enclosure area	0.40	m <sup>2</sup>
Maximum grapple opening	1880	mm
Length of tongs	520	mm

\*Manufacturer's declaration

Kommentar [m1]: Hier bin ich mir nicht sicher ob da auch die länge gemeint ist

<b>Cab</b>		
4-way vibration dampened own-make safety cab; tested according to ISO 8082 (ROPS) and ISO 8083 (FOPS)		
Operator seat	Isringhausen Type 6500 mounted separately; horizontal and vertical adjustment; load dependant air suspension with dampening, pneumatic adjustment of lumbar support; heated seat	
	Comments / Evaluation	Complies with standards
Cab size and design	270 °hydraulic swivelling cab lockable in any position; all important control elements are within reach and view; adequate storage space; the cab is partially enclosed.	yes
Cab climate	Efficient ventilation and heating; air conditioning is a standard feature	
Control elements	Easy to use, useful arrangement and labelling; Low actuating force; central multifunctional system display with analogue drive and engine speed metre; Information monitor for displaying operational conditions and control lamps.	yes
Work field illumination	The work lights are satisfactory for crane work (2 Halogen-double headlights on each side of the cab roof)	yes
Visibility	Visibility is very good. Features such as the 270°swivelling cab and narrow A and B pillars afford very good all round visibility; potential obstruction of visibility in the direction of the crane can be avoided by turning the cab. The wheels are clearly visible from the operator seat. High windscreens and a glass skylight provide very good upward visibility.	yes
Noise	Low in closed cab	Noise level 73 dB(A)
Vibration	K <sub>eq</sub> = 10.8	
Storage space on the machine	XXX I; good, for standard tools, oil binding substances and choker chains where required, as well as for personal belongings (storage box with power supply for cool box)	yes
Storage space in the cab	satisfactory, for operators manual and small items; little space for personal belongings	
Special features	270 °hydraulic swivelling cab, lockable in any position	

<b>Spare parts supply, handbooks and service</b>	
Spare parts supply and service is very good, handbooks are satisfactory	
Time required for daily maintenance	approx. ¼ hour
Time required for weekly maintenance	approx. 1 hour
Maintainability	Good, access to maintenance points very good
Maintenance scope	According to schedule and necessity
Operator's manual	Comprehensive and clear
Spare parts list	Spare parts list incomplete and no description of freely available spare parts; hose descriptions are available
Training	1-2 days on-site according to demand; additional training at the manufacturer's

Machine cost and calculation basis				
Price for tested version			227.000	€
Workload operating hours/year	1500	2000		Total service life [operating hours] 12000
Recovery period (years)	8	6		Repair cost factor 0.9
	€/operating hour	€/operating hour		Operating material (fuel + lubricants) in €/operating hour 8.80
Recovery	18.90	18.90		interest rate [%] 8.0
Repair and maintenance	17.00	17.00		Transport costs [€/operating hour] 4.50
Fuel and lubricants	8.80	8.80		Additional costs [€/year] 7500
Interest rate	6.10	4.50		
Transport, driving	4.50	4.50		Technical work productivity
Others	5.00	3.80		9.5 cubic meters/operating hour
Machine costs	60.30	57.50		Within the range for skidder class 3

## Additional equipment (tested)

Stem grapple, pneumatic trailer brake, engine and path dependant power take-off shaft (1000 1/min), cable pay-out device, crane Epsilon/Werner Type C 81.1TL73 with 7.3 m reach

## Additional equipment (not tested)

Alternative tires, alternative cranes, alternative winches, removable skid blade, front stacking blade/push blade, xenon working lights, front loading shovel, short timber trailer, height adjustable cable inlet, tire pressure control system

## Test

### Remaining requirements:

none

### Recommendations:

Windscreen wipers for the side windows of the cab

### Test institute

Kuratorium für Waldarbeit und Forsttechnik e. V., Groß-Umstadt

### Author

Ekkehard Debnar, KWF, Groß-Umstadt

### KWF-utility test

Test-No. 4295, valid until 31. 07.2011

According to the test regulations, the applicant is entitled to display the test mark on machines of this type and to use the certification for advertising purposes