

# Steyr Plus Trucks

## Model Series 91



# Steyr Plus T

The heavy-duty Steyr Plus Trucks of the Model Series 91 point the way towards the next decade and, indeed, reflect the shape of things to come. The ever more urgent question of energy supplies as well as the problems of environmental pollution control and problems in connection with the worldwide traffic situation face both the haulage industry and automotive engineering enterprises with a set of altogether new facts. In the next decade only those means of transport will stand any chance of winning through on the market which do not conform to futuristic ideas as regards their external styling features but, much rather, are new in regard to their internal structure and their technical overall concept. Such as the Steyr Plus Trucks of the Model Series 91.



They are equipped with engines which even now meet the environmental pollution control requirements of the eighties and, with their improved combustion process, guarantee a more efficient utilization of the fuel. The new design concept of the chassis units ensures the careful transport of the goods to be carried and, at the same time, guarantees minimum wear of vehicle and road surface alike. Improvements have been introduced wherever possible. Even the driver's cab has undergone certain changes: not outwardly evident – since, according to the technical findings and the experience gained so far, the aerodynamically ideal wedge shape cannot be improved upon – are the noise reduction, temperature insulation, the safety features for the driver and the tilting cab design.

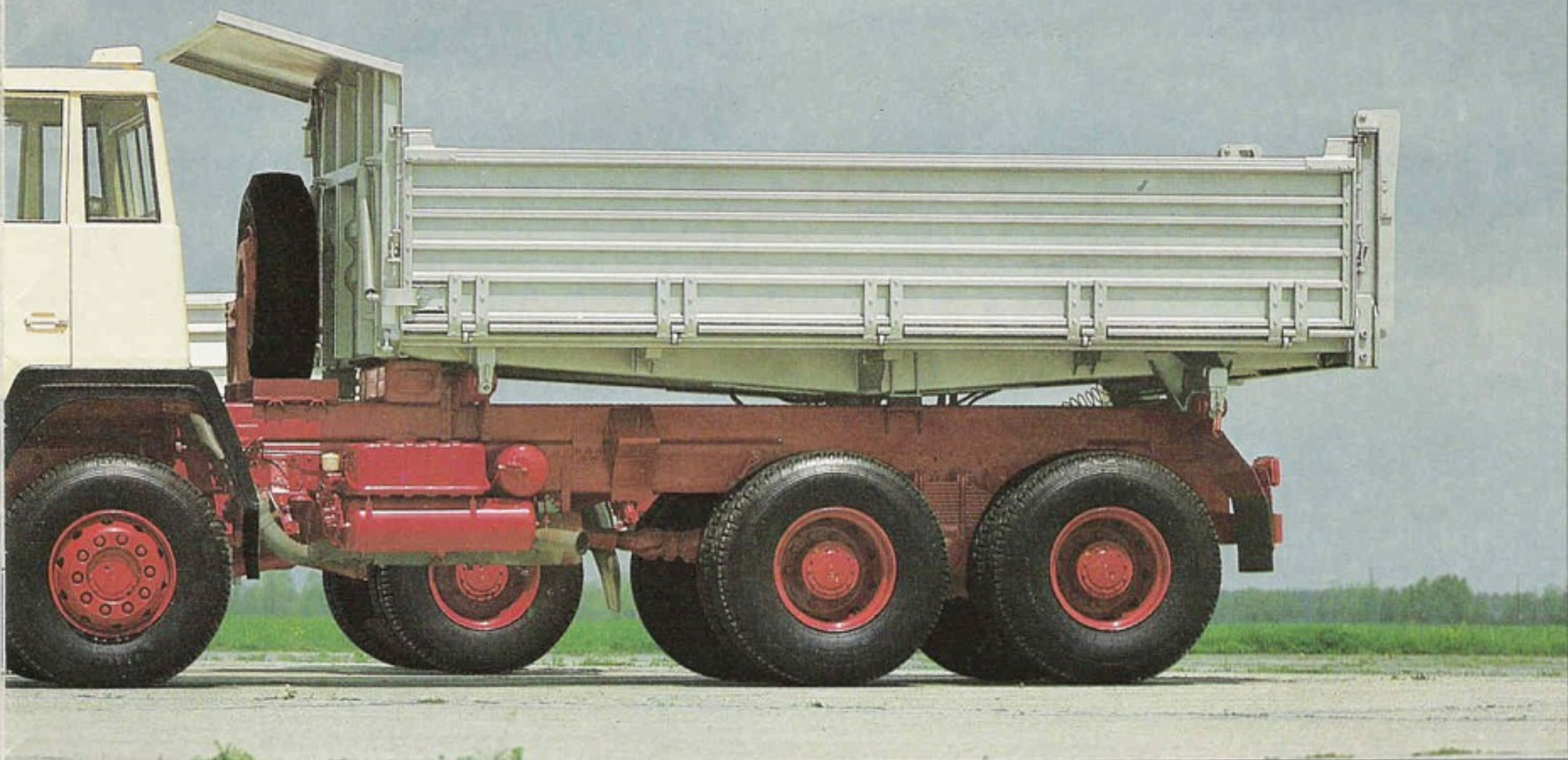


In evolving the design concept of the Model Series 91, the well-tried Plus-driver's cab, which is absolutely tops as regards its comfort and safety features, has been retained. Whatever additional refinements were feasible in regard to the shape and design of this cab have been implemented: all driver's cabs of this model series have been made tiltable by 70 degrees; they can be tilted with ease and locked in place securely (triple security) regardless of the gradient or tilt of the vehicle.



# Trucks

# 91



The tilting-cab design has been chosen so as to be able – quite apart from the advantages offered by the easier accessibility of the power plant – to close off the top of the engine compartment completely in order to achieve highly effective sound insulation.

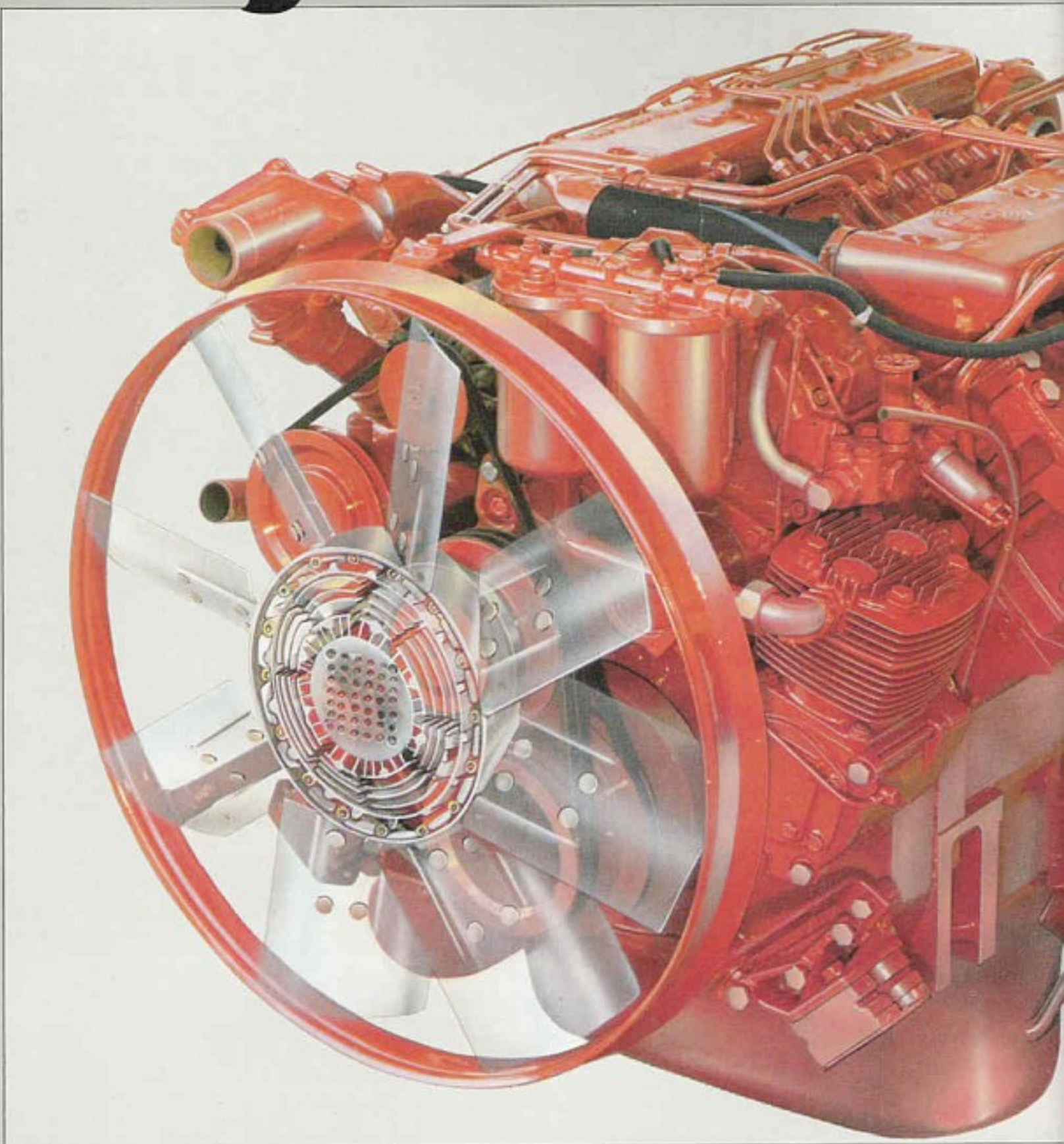
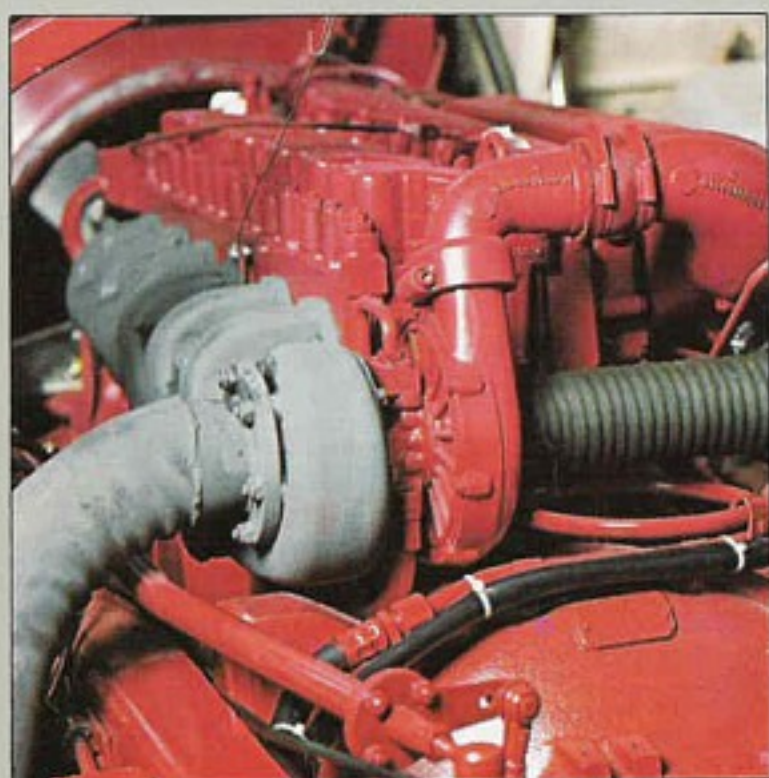
## The Austrian Challenge

# Engine

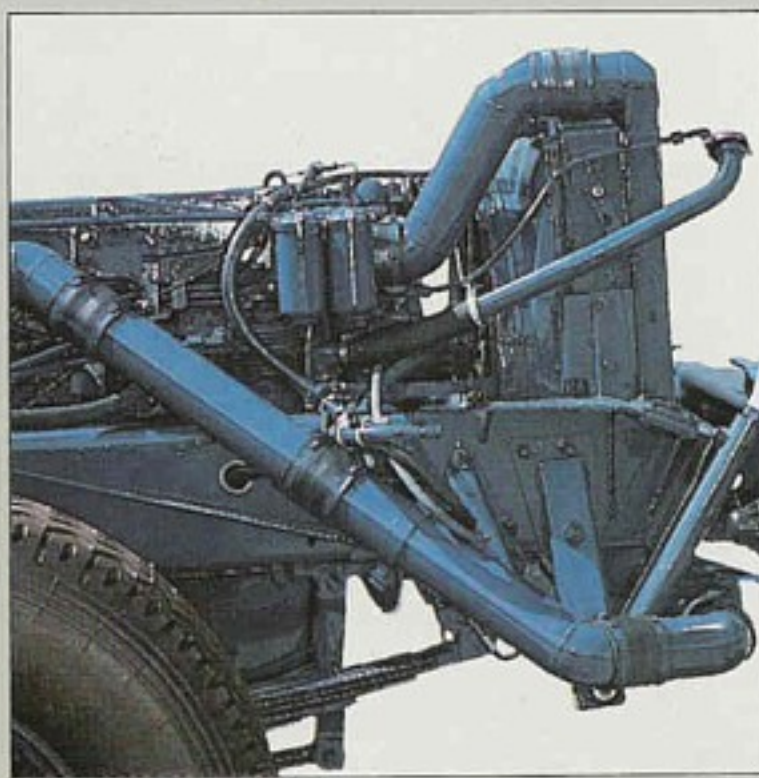
In order to make allowance for the continuously mounting trend towards greater horsepower combined with substantially reduced fuel consumption as well as lowest possible exhaust gas emission and noise generation, an altogether new generation of 6-cylinder in-line engines with an increased swept volume has been designed. The use of new technologies and the application of the very latest scientific findings in the field of physics (improved control of the combustion process thanks to comprehensive research work) has resulted in higher performance capacities and, above all, in greatly improved economy.

For the Steyr Plus trucks of the Model Series 91, new 6-cylinder diesel engines have been developed. Thanks to these engines it is possible to cover several output ranges with units of identical overall dimensions.

The greater horsepower output of these Steyr-engines has been achieved by increasing the cylinder capacity without changing the low piston speed. Already with the naturally aspirated version of the engine WD 615, the torque increase has been raised to 15%, with the torque as such raised by a significant 22% at a reduced overall speed. With the aid of the



supercharger turbine, the development of the torque is improved once again at an increased output to 18% as compared with the aspirated version, with the further improvement being attained, finally, by the application of boost intercooling.



The Steyr-central-turbulence combustion process and the charge-air pressure-dependent fuel quantity injected are only two of several measures contributing to improved combustion efficiency and leading to an optimal specific fuel consumption of 204 g/kWh (150 g/hph) with charge cooling.

Over and above this, however, these measures not only result in an improved utilization of the fuel, but also in improved noise damping and exhaust gas values, i.e. the ecologically safe Steyr-engines remain below the exhaust gas emission values according to ECE No. 24 and the California Test. All of these details merely serve as examples for the superior characteristics of the Steyr-engines: top quality, highest efficiency and optimum environmental safety.

The nitrided camshafts (i.e. camshafts that have been subjected to a hardening process which results in greater elasticity and longer service life) run in even more generously dimensioned



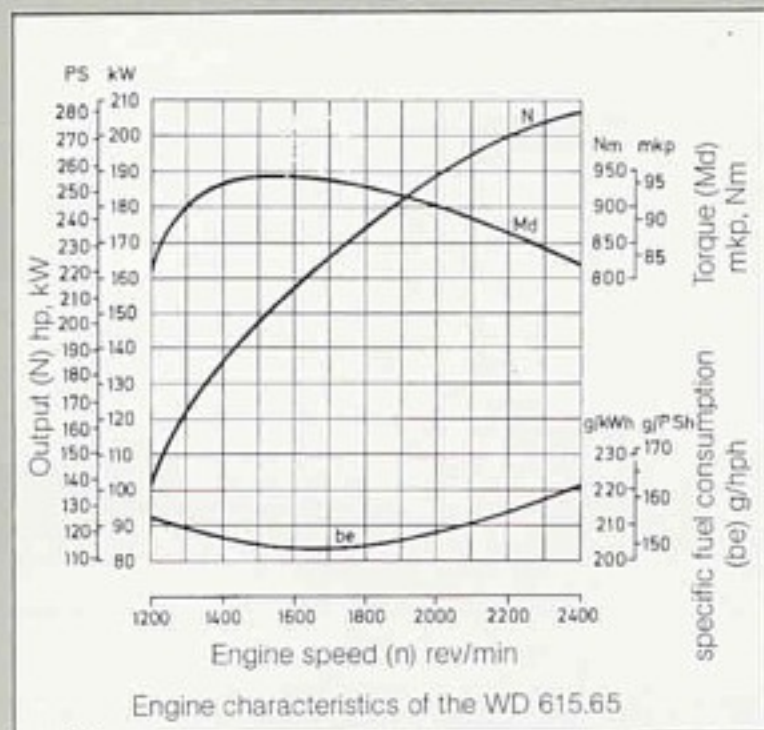
WD 612.00 in naturally aspirated version delivering 107 kW (145 hp) at 2800 rev/min, torque 415 Nm (42 mkp) at 1600 rev/min.

WD 612.60 in supercharged version delivering 125 kW (170 hp) at 2800 rev/min, torque 480 Nm (49 mkp) at 1700 rev/min.

WD 615.00 in naturally aspirated version delivering 148 kW (201 hp) at 2600 rev/min, torque 623 Nm (63.5 mkp) at 1400 rev/min.

WD 615.61 in supercharged version delivering 191 kW (260 hp) at 2600 rev/min, torque 829 Nm (84.5 mkp) at 1600 rev/min.

WD 615.65 in supercharged version with boost intercooling delivering 206 kW (280 hp) at 2400 rev/min, torque 942 Nm (96 mkp) at 1500 rev/min.



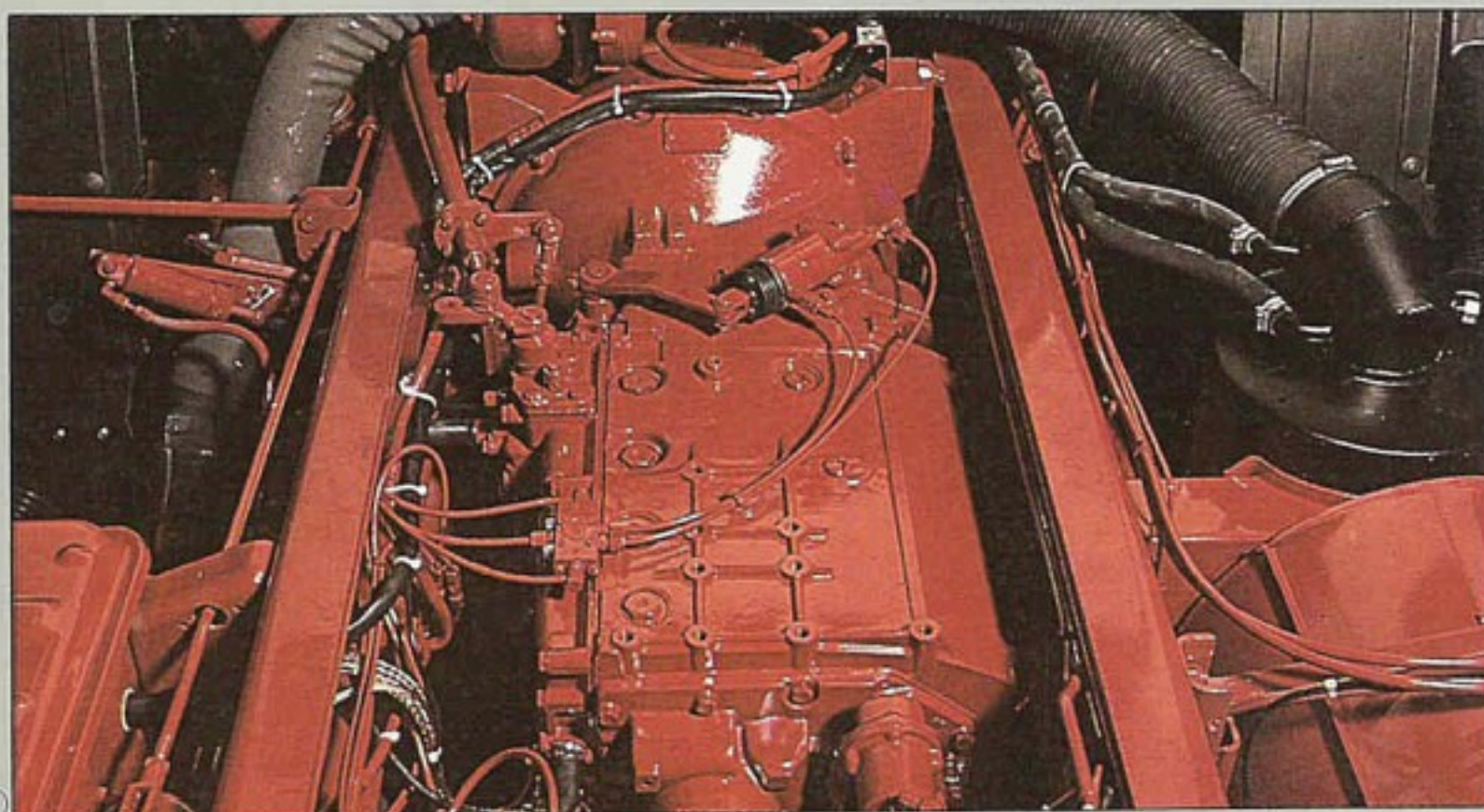
three-component bearings, for example with the engine WD 615, of 100 mm diameter. The dry cylinder sleeves have been pre-honed to 6–10  $\mu\text{m}$  and then superfinished to 2–3  $\mu\text{m}$ , – a method which is reflected in excellent emergency running properties and shortens the running-in time. The individually detachable cylinder heads with the R-6-engines are held down by a total of 45 cylinder head bolts, and the water pump has been generally uprated. The capacity of the cooling system of the V-8-engines has been improved to such an extent that it has become highly efficacious also for retarder operation. Control is effected by way of a thermostat with 4 control units; the number of Vee-belts has been reduced to 4 and a new fan

system results in a reduction of the fan speed and of the noise level. The ambient air is aspirated from the zone of low dust content above the driver's cab; thanks to the low overall height of the Steyr-engines – the modest overall dimensions could be maintained in spite of the larger swept volume – the top of the engine cover in the cab protrudes only 270 mm above the floor of the cab; by way of an oil separator, the gases emerging from the crankcase breather are returned to the combustion space rather than being discharged to the atmosphere, – a fact which represents a further contribution towards effective environmental pollution control; the main-flow oil filter is equipped with a safety bypass valve.

WD 815.61 in supercharged version delivering 236 kW (320 hp) at 2600 rev/min, torque 981 Nm (100 mkp) at 1600 rev/min.

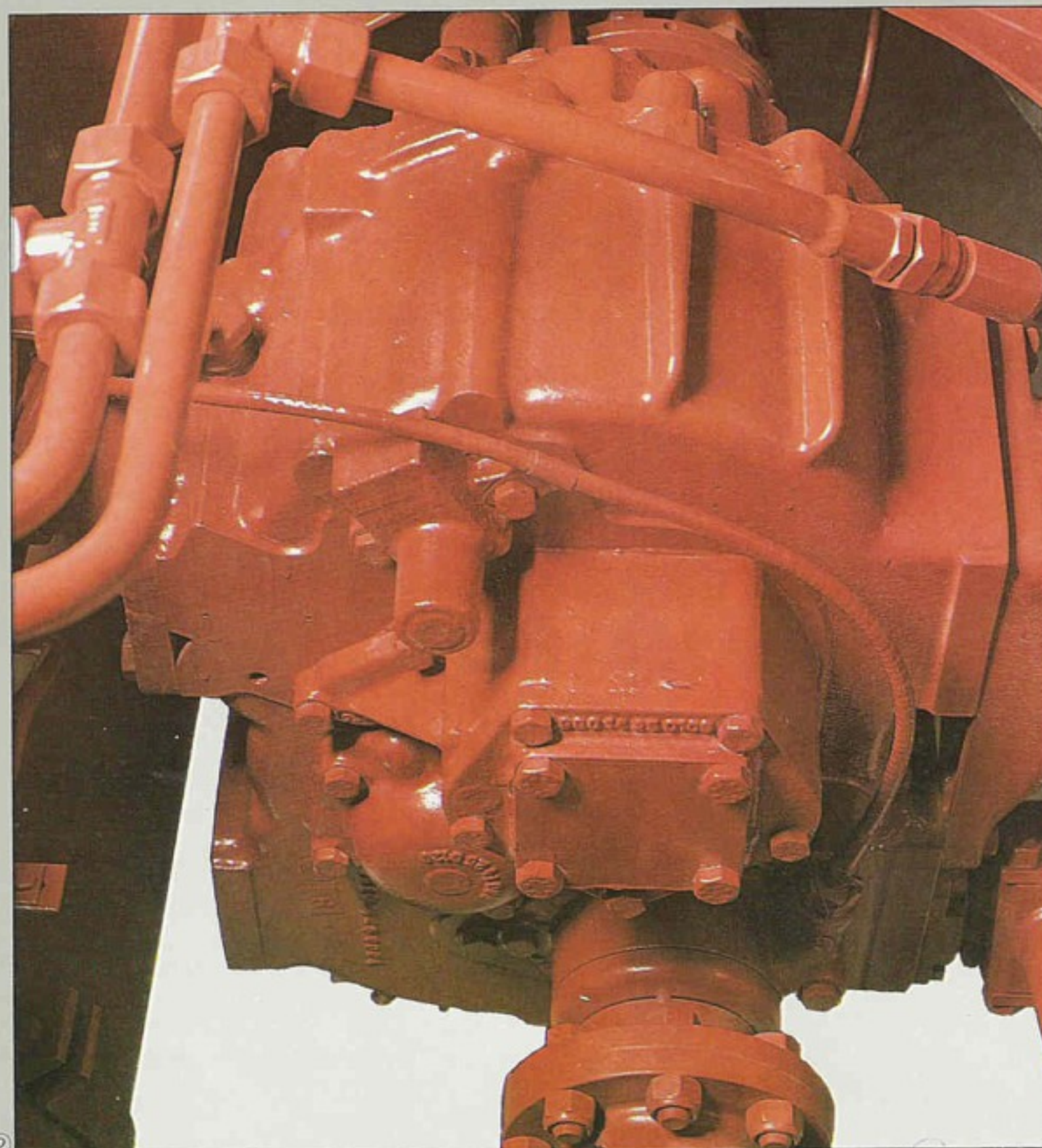
**Full Power  
at Your Finger Tips**

# Power Train



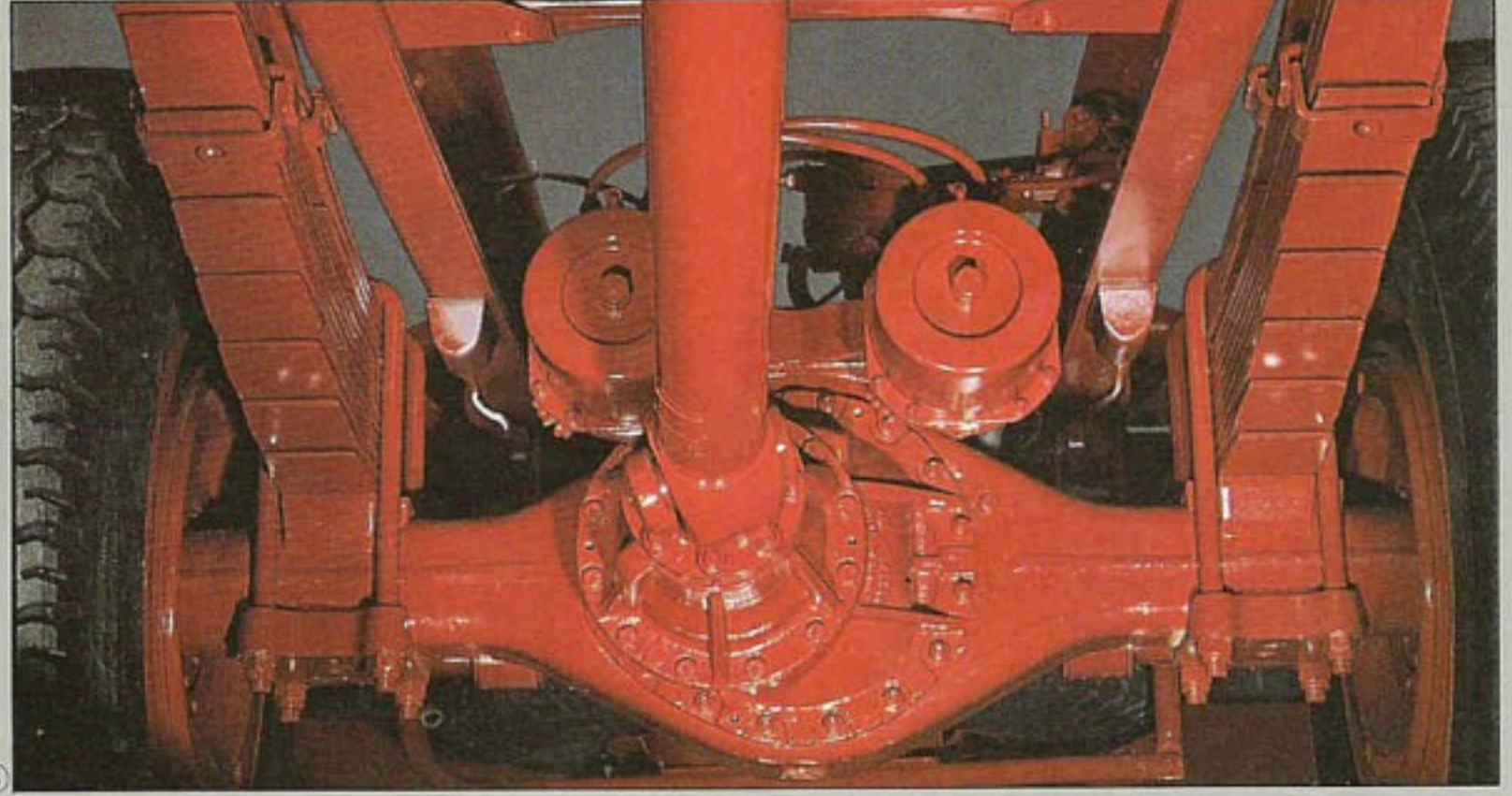
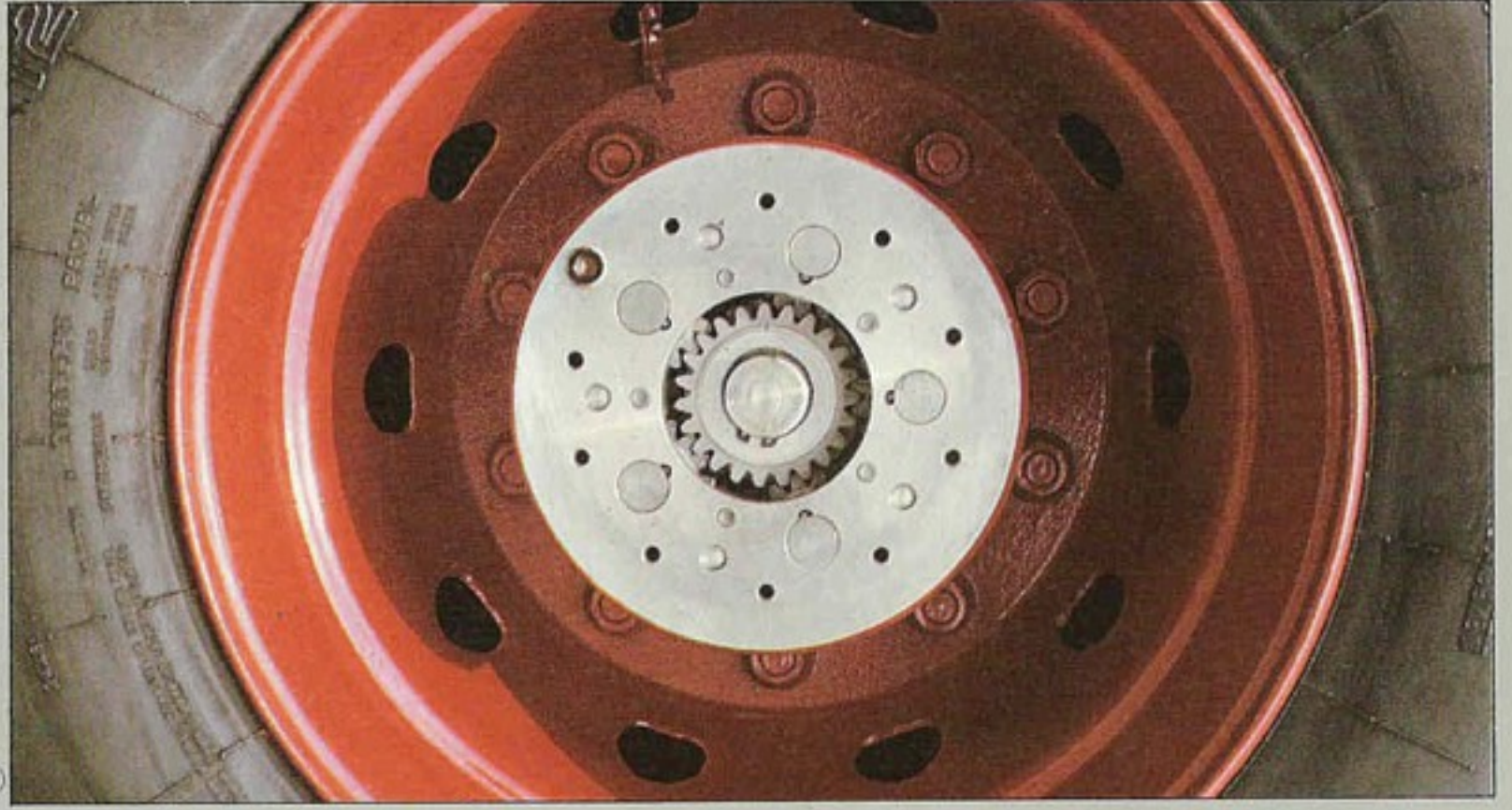
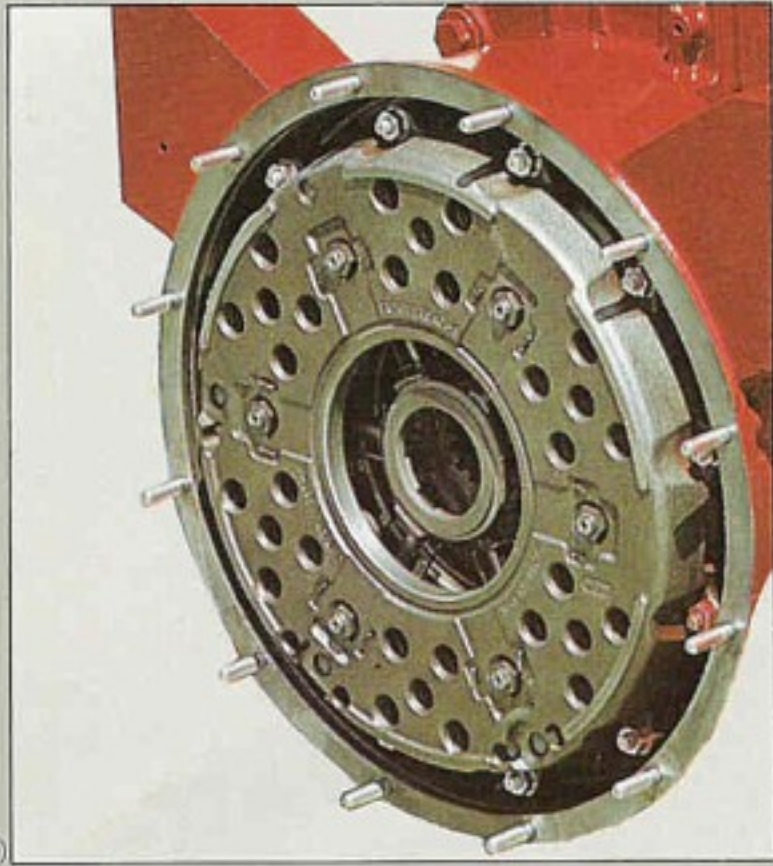
The higher horsepower ratings of the new Steyr-engines are transferred by uprated transmissions to the driving wheels. The transmissions used for this purpose are: the STEYR AK or S 50-5 with GV 50 in the case of the medium-heavy range of trucks; the ZF AK or S 6-65 with GV 80, AK or S 6-90 with GV 90 or Fuller RTO 9513, respectively, with the heavy range of 6-cylinder models as well as ZF 5 K 110 GP or 5 S 110 GP or Fuller RT 9513, respectively, with the V-8-range of models. These full constant mesh- or synchromesh transmissions are well-proven units of layshaft design. High-quality materials, generously dimensioned antifriction bearings, helically-toothed gears and scraped or ground gear flanks guarantee long service life and extremely quiet running. ①

The Steyr-transfer case VG 1200 ② with an input torque of 11,770 Nm (1200 mkp) is one of the most powerful transfer cases on the domestic market to be manufactured in series for use in trucks; for medium-heavy trucks the Steyr VG 450 is used. Provision has been made for optional equipment with automatic transmissions, torque converter clutches, starting aids etc., i.e. the design of the

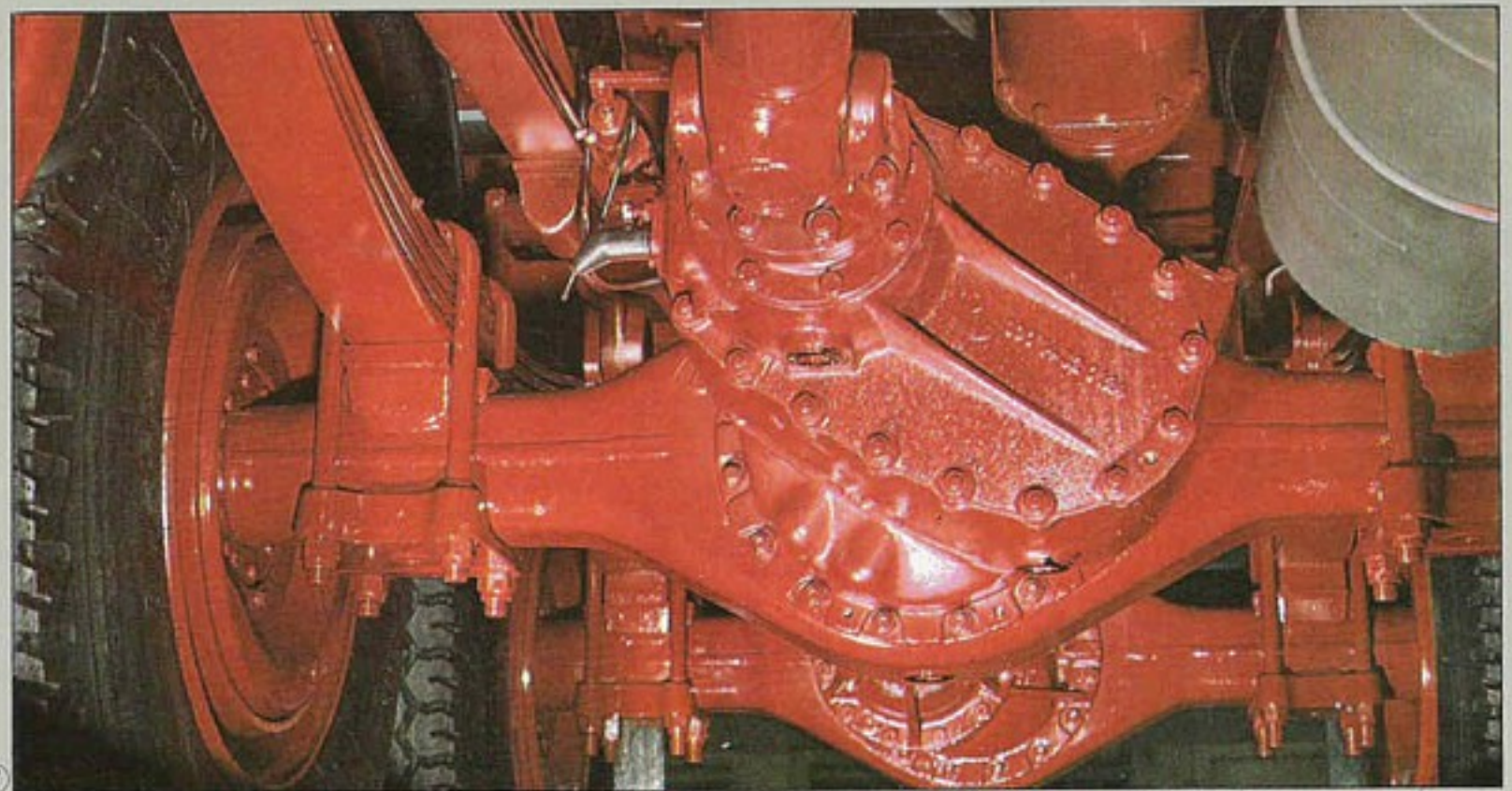


engine connection flanges has already been adapted to this purpose and conforms to the international standard specification; the clutches with the Models 791 and 891 have a diameter of 350 mm, those of the Model 991 of 380 mm and those of the Models 1291 and 1491 a diameter of 420 mm. ③

In the models having a longer wheel-base, the cardan shafts are supported by a central bearing. ④ The planetary drive axles with 6 different gear ratios produce the full power only in the wheel hubs and thus go easy on the entire power train. ⑤⑥



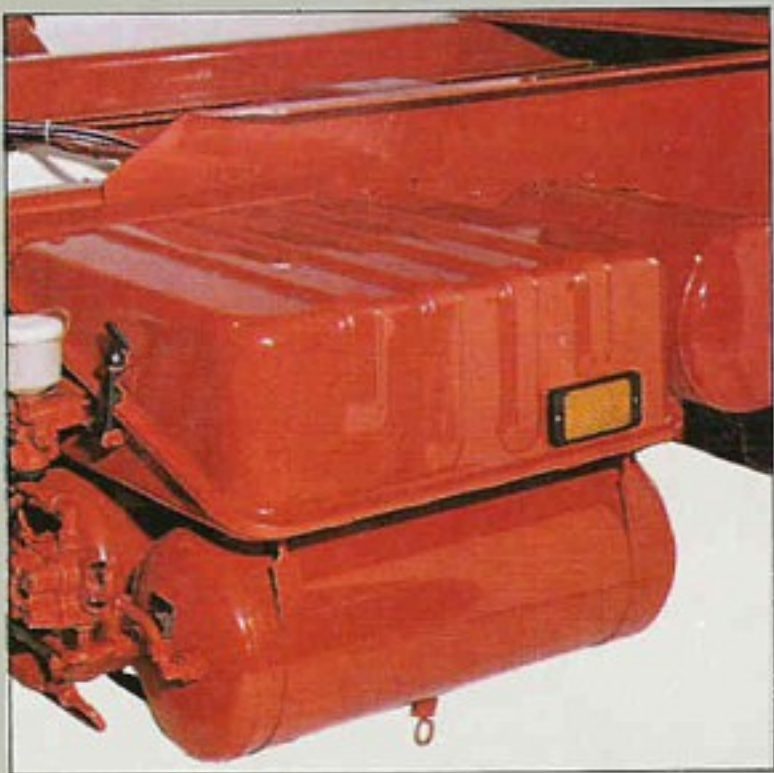
The compact design of the driven front axles enables a wheel lock of 45° and, therefore, improves manoeuvrability. Differential locks and the lockable inter-axle compensation with the tandem axle units are – in the versions with swing-axle suspension or compensating-linkage suspension – standard fitments. ⑦ Auxiliary drives of many transmission ratios and output ratings are available and, with the tipper chassis, have been installed as standard. The Steyr-auxiliary drives N 50 and N 200, respectively, can be readily fitted to all transmissions. The gearshift cylinders of these auxiliary drives have been integrated into the assemblies and thus are protected from any mechanical damage. The differential casing and the bevel gears of the Steyr-axles have been standardized and, with the Models 791, 891, 1391 or 991, 1291 and 1491, respectively, are in all cases of identical dimensions. Lifiable leading- and trailing axles can be supplied if desired.



## Superiority Becomes Tangible

# Chassis Units

The chassis units of the Steyr Plus trucks of the Model Series 91 may serve as the best example of the new Steyr modular construction system. Standardization of components such as the invariably identical front- and rear sections for variable wheelbases;



grouping of such assemblies as braking system, battery case and exhaust so as to form a single modular unit. The chassis units are available in variants of all types and descriptions, i.e. as 2- or 3-axle models in normal and all-wheel-drive versions, with various wheelbases, design variations and wheel combinations 4x2, 4x4, 6x2, 6x4 and 6x6. The elastic parallel-ladder-type frame, which is of double strength throughout the supporting sections, features top chords that are



flush and level as regards height and width. The advantages entailed by this design feature become apparent at the latest when the body is to be mounted on the frame. The central frame cross-member has been moved back and leaves room for the ready installation of various implements, such as retarders or auxiliary drives at the gearbox. Newly conceived thick-leaf springs with a length of up to 1.8 m or parabolic springs (optionally also available with pneumatic springs) guarantee outstanding running characteristics and preserve both the goods carried and the road surface.

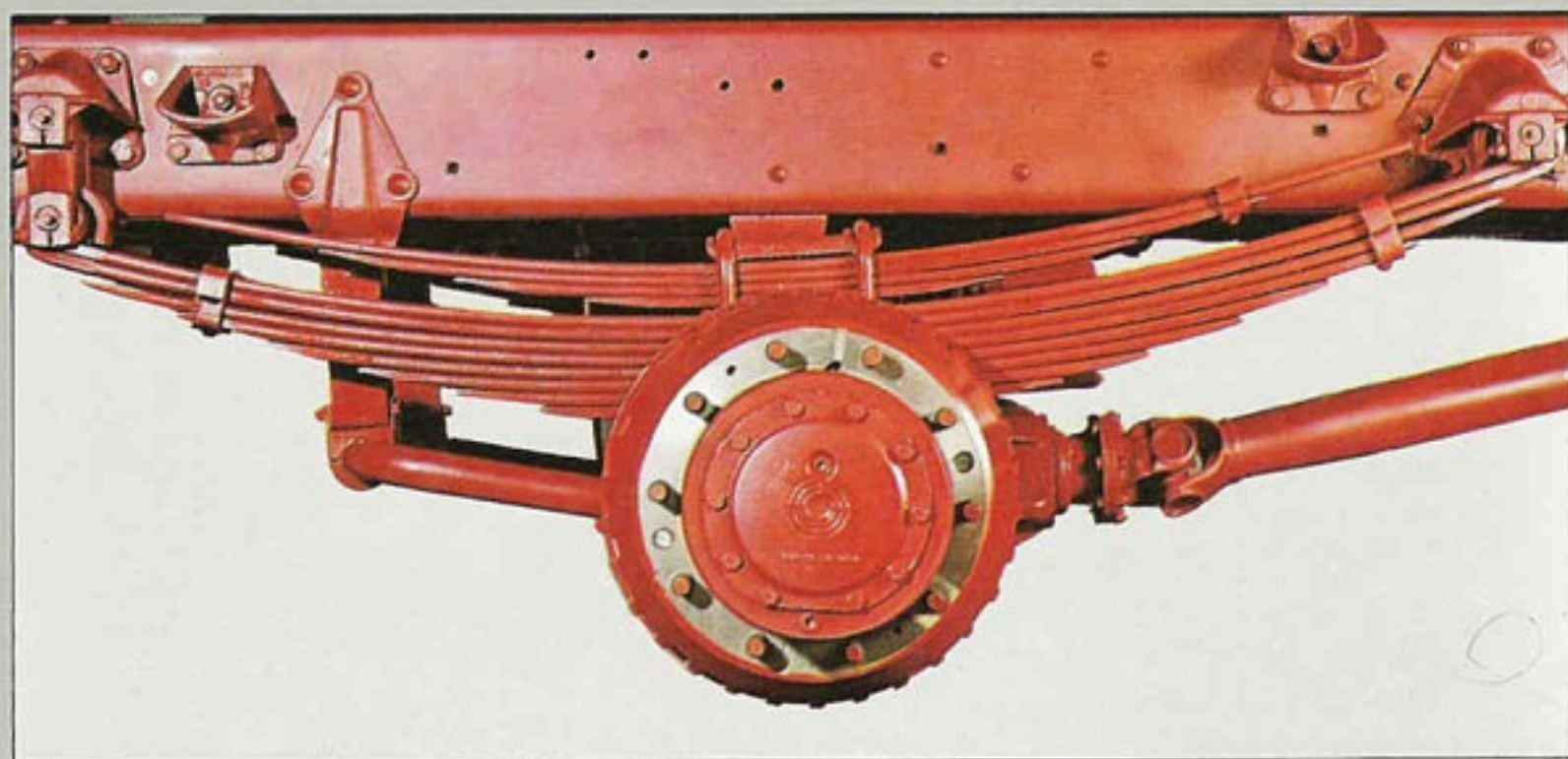




pendent braking force regulator) in the case of the medium-heavy range of trucks or else dual-circuit compressed-air brake system with ALB in the case of the range of heavy trucks; spring-type parking brake, larger brake air supply owing to an increase of the service pressure to 8.1 bar; exhaust brake with electrical connection for the trailer brake system, 4-circuit safety valve and, as an additional safety precaution, control position of the hand brake valve. It goes without saying that all models are equipped with an anti-freeze pump, pressure testing connections, dual-circuit brake system, external filling connection etc. While, to avoid corrosion damage, all wheelbase-dependent brake lines are made of synthetic plastic, the unprotected sections consist of steel. The electrical standard equipment comprises halogen headlamps with lens apertures that are larger by 75%, three turn-signal lamps with day/night circuitry of the turn-signal indicator lamp on the instrument panel, sidelamps on the roof of the driver's cab, wiring and switch for reversing lamps and cables for fog

warning lamps, individually lit individual instruments, control lamps for all important functions and a three-phase a.c.-generator, high-capacity batteries with specially resistant battery housing which is, however, of transparent material in order to facilitate the checking of the acid level.

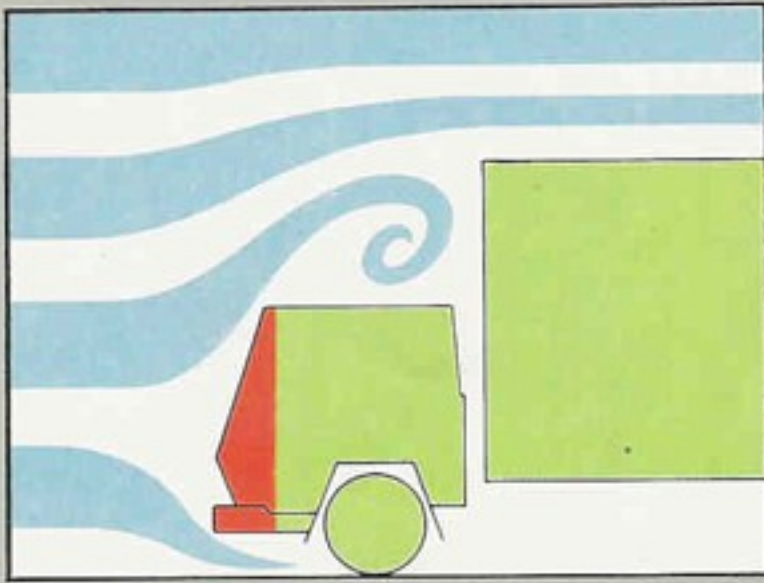
This comfortable road behaviour is also enhanced, moreover, by the steering geometry and the small unsprung masses of the chassis units as well as by the self-centering feature of the wheel hub and the consequent absolutely true running of the wheels. 15-degree taper-base rims result in a weight saving of up to 30 kg per wheel. All chassis units of the Steyr Puch Trucks of the Model Series 91 are equipped with braking systems that conform to EC-directives: hydraulic dual-circuit brake with dual-circuit air-operated brake servo unit and hydraulic ALB (automatic load-de-



## A Chassis for Every Kind of Duty

# Driver's Cab

The wedge-shaped design of the Steyr-Plus driver's cab has been tested in the wind tunnel and results in excellent aerodynamic properties. The angular leading edge of the roof has the effect of a spoiler since, at higher speeds, the air stream breaks away and is led over the – usually higher – body of the truck.



The wedge shape and the bumper, which is connected to the longitudinal frame members, form a generously dimensioned deformable zone, which, in conjunction with the fact that the seat has been moved back towards the rear, offers maximum protection. Type-approved anchor points for seat belts have been provided as standard. While Steyr has quite intentionally refrained from making any "stylish" improvements, these driver's cabs are



nevertheless based on a truly exemplary design concept.

- The driver's cab can be tilted through 70° and affords ready access to the engine.
- The driver's cab can be locked in position at any angle of tilt, even with the truck standing on a gradient.
- The driver's cab can be tilted even when a gear has been engaged.
- The hydraulic tipping mechanism is operated from the off-side where there is no traffic and, finally
- The engine can be started for test runs from the outside even with



the driver's cab tilted and with the gears disengaged (optional equipment). The "short driver's cab" is characterized by improved space utilization:

- the roof has been raised so as to



attain greater freedom of movement above the bunks and in the area of the standing spaces

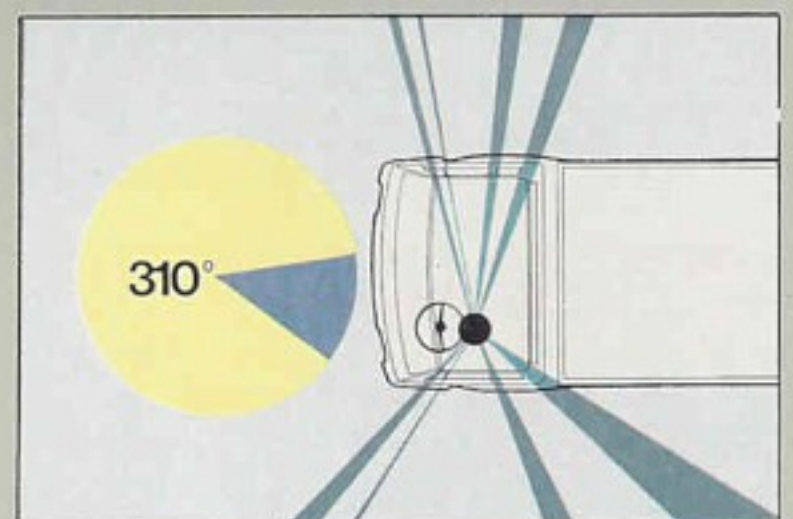
- more stowage space in spite of the provision of two bunks in the shorter driver's cab and, therefore,



- \* the manual force required in order to move the steering wheel amounts to only 8 kp
- \* the steering wheel rim has been amply covered with foamed plastic
- \* the bunks in the long-distance driver's cab are not only of anatomically correct shape but also padded and upholstered with material that is permeable to air and thus able to "breathe"
- \* fitted with sun visors or roller blinds as preferred.

7-function lever: horn, headlamp flasher, high-beam- and low-beam headlamps, turn-signal indicators, windscreen wiping and washing. The matt-finished, glare-free instrument panel is divided into 3 modules, viz. an indicator-, an electric- and a switch module. The plug relays and instruments are therefore readily exchangeable and need not be dismantled as a complete unit. The instrument panel is equipped with all instruments that are essential for the perfect functioning of the vehicle, with all indicator lamps grouped together on a strip that is clearly within the driver's field of vision.

The driver is provided with the latest information concerning road- and traffic conditions as well as with



- improved economy thanks to the larger cargo platform.

The constructional elements of the driver's cab are manufactured of 2-mm-gauge steel sections, – a fact that guarantees enormous strength, ruggedness and safety.

The temperature- and noise insulation consists throughout of 30-mm Moltopren foam panels; the engine bonnet is made of glass fibre-reinforced plastic and is equipped with an effective heat shield.

Private car-style comfort for the driver:

- \* the entrance has been made as convenient as possible
- \* the grab handles have been placed way down
- \* the step-up has been arranged in a very low position
- \* the hydraulically damped comfort-type suspension seats can be individually adjusted to any body size and weight
- \* all operating controls



- \* the pedals and the (optionally adjustable) steering wheel are very free-moving

music for relaxation via a high-quality radio receiver complete with cassette recorder; in Austria this is standard equipment while for export the mounting receptacle only is provided. Needless to say the safety concept of the Steyr Plus driver's cabs also includes panoramic visibility, which means a field of vision of 310°, i.e. almost a full circle.

According to all current scientific findings and considering the possibilities of modern engineering science with special consideration given to the comfort of the driver, no better driver's cab can be built at the present time. Novel kinds of weld sealing and hollow-space preservation measures enhance the corrosion resistance of these vehicles very materially.

## A Safe Place of Work

# 91



# in action

The Steyr-Plus trucks of the Model Series 91 are characterized in urban traffic by excellent manoeuvrability and rapid "getaway power". Convenient access to and passage through the driver's cab as well as the low-down mounting of the handles prove to be attractive features especially for delivery duty with its frequent loading work. A clearly noticeable reduction of the noise and, above all, of the exhaust gas emission preclude unnecessary pollution of the environment. The ideal truck for delivery runs, with top marks for economy and . . .

## Manoeuvrability Ruggedness

in service off the road and on construction site duty. In developing the Steyr-Plus trucks of the Model Series 91 the heavily stressed parts of the power train have, therefore, been strengthened. The crankshaft, clutch, the entire running gear and the supporting elements have been improved. At the same time it has been possible to increase the payload by using, for example, taper-base rims or conically forged spring leaves etc.



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The test in the trade journal "lastauto omnibus" 12/78 and 1/79 demonstrated most convincingly one of the most outstanding and, today, most important properties of all fuel consumers, viz. thriftiness. The tested Steyr-Plus 1291 tractor-trailer unit with three-axle semi-trailer and a payload of 16 tons has won out against international competition and, with its average fuel consumption of 34 litres, has been described as one of the most economical vehicles. Steyr-Plus trucks are second to none in long-distance haulage service as regards

## ...economy versatility...

in the performance of council duties is another strong point of the Steyr-Plus trucks: as road cleansing- and maintenance vehicles, fire brigade-, crane- or special-duty vehicles with the appropriate optional- and supplementary equipment. Bodies of all kinds can be readily mounted on the frames of proven ruggedness without any laborious and cost-intensive alterations.





4	1291.280/4x2	1291.320/4x2	1291.320/4x4	1491.260/6x2	1491.260/6x4	1491.260/6x6	1491.280/6x2	1491.280/6x4	1491.320/6x2	1491.320/6x4	1491.320/6x6
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WD 615.65	WD 815.61	WD 815.71	WD 615.61	WD 615.61	WD 615.71	WD 615.65	WD 615.65	WD 815.61	WD 815.61	WD 815.71
206 (280) at 2400	235 (320) at 2600	235 (320) at 2600	191 (260) at 2600	191 (260) at 2600	191 (260) at 2600	206 (280) at 2400	206 (280) at 2400	235 (320) at 2600	235 (320) at 2600	235 (320) at 2600
942 (96) at 1500	981 (100) at 1600	981 (100) at 1600	829 (84,5) at 1600	829 (84,5) at 1600	829 (84,5) at 1600	942 (96) at 1500	942 (96) at 1500	981 (100) at 1600	961 (100) at 1600	981 (100) at 1600
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126/130 9,726	126/120 11,970	126/120 11,970	126/130 9,726	126/130 9,726	126/130 9,726	126/130 9,726	126/130 9,726	126/120 11,970	126/120 11,970	126/120 11,970
10.4	10.4	10.4	11.2	11.2	11.2	10.4	10.4	10.4	10.4	10.4

420 FULLER RTO 9513	420 ZF 5 K 110 GP <sup>1</sup> ZF 5 S 110 GP	420 ZF 5 K 110 GP	420	420 ZF AK 6-90	420 ZF AK 6-90	420 FULLER RTO 9513	420 FULLER RTO 9513	420 ZF 5 S 110 GP ZF 5 K 110 GP	420 ZF 5 S 110 GP ZF 5 K 110 GP	420 ZF 5 K 110 GP <sup>1</sup> ZF 5 S 110 GP
-	FULLER RT 9513	FULLER RT 9513	ZF S 6-90	ZF S 6-90	ZF S 6-90	FULLER RTO 9513	-	FULLER RT 9513	FULLER RT 9513	FULLER RT 9513
-	-	-	ZF GV-90	ZF GV-90	-	-	-	-	-	-
-	-	STEYR VG 1200	-	-	STEYR VG 1200	-	-	-	-	STEYR VG 1200
13/2	ZF 8+1 Cr./1 Fuller 12+1 Cr./2	ZF 2x (8+1 Cr./1) Fuller 2x(12+1Cr./2)	12/2	12/2	12/2	13/2	13/2	ZF 8+1 Cr./1 Fuller 12+1 Cr./2	ZF 8+1 Cr./1 Fuller 12+1 Cr./2	ZF 2x (8+1 Cr./1) Fuller 2x(12+1 Cr./2)
-	-	-	-	-	-	-	-	-	-	-
4.8+	+	+	+	+	+	4.8+	4.8+	+	+	+
tipper 6.72/80 truck tractor 4.8/113 others 5.73/94	truck tractor 4.8/106 others 5.73/89	6.72/76	6.72/93	043 S29 6.72/93 038 K29 7.49/83 B29	6.72/76	5.73/98	043 S38 5.73/98	5.73/98	tipper 6.72/76 others 5.73/89	6.72/76
11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20	11.00 R 20 12.00 R 20
	1) tipper chassis									1) tipper chassis

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-	-	-	-	**2925	-	-	-	-	-	-
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19,000	19,000	19,000	-	26,000/32,000**	26,000/32,000**	-	26,000/32,000**	-	26,000/32,000**	26,000/32,000**

200 truck tractor 570	200 truck tractor 550	200	200	200 truck tractor 400	200	200	200 truck tractor 400	200	200 truck tractor 380	-
23	30	30	23	23	23	23	23	30	30	30
13	13	13	15	15	13	13	13	13	13	13
-	-	3,5	-	-	3,5	-	-	-	-	3,5
-	-	8	-	-	8	-	-	-	-	8
10	10	10	10	12,3	12,3	10	10	10	12,3	12,3
-	-	-	-	10	10	-	-	-	10	10