94/2
M 453 C

Wear limit for ring grooves

On the M 453 C engine we have carried out more than 150 piston checks. The result is very satisfactory. Normally the intervals for overhauling the pistons stated in the maintenance schedule can be observed without any problem.

However, fuel quality and the operating mode of the engine have a decisive influence on the wear and tear values of piston rings and ring grooves. Regular maintenance of the fuel injection system and very careful fuel treatment are required.

All particulars in connection with piston checks are described in the operating instructions on job card A5.05.02.07.01.01. The wear limits of the piston ring grooves stated there are based on cautious assumptions. Experience has shown that, taking into account the present standard of the pistons, the wear limits may be increased. Therefore, the job card of the operating instructions was revised and the new limits stated.

The new edition (dt. 12.01.94) is attached to this service information, and the job card has to be exchanged in the operating instructions.

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See also:	*01.06.01.nn / 02.04.01.nn / 02.06.01.nn*
Spare parts list:	*B1.05.02.1.2617*
Time requirement:	*2 Pers./ 1 h*
Personnel qualification:	*Chief engineer / skilled engine hand*
Operating medium:	*Distillate fuel*

Inspection:

of one piston and its rings after 12,000 h

Maintenance:

of all pistons and their ring after 24,000 h

Tools:

Piston ring expander	W1	6.9227-B

Note:

If the running surfaces of all liners are without scores or high spots or any other damage and if the parts of the drawn piston are in proper condition, all piston rings free and no heavy wear can be detected, the check of the other pistons can be postponed to a later date, but not beyond a maximum of 24,000 operating hours. During inspection pay special attention to any sharp edges of the rings, ring tension, rings sticking due to carbon deposits.

Do not remove the graphite coating on the piston skirt.

After fitting new piston rings, the engine output must be increased as indicated in the Engine Operating Instructions, 2.10.

Built-up pistons with chromium-plated first ring groove must only be reconditioned by the manufacturer.

Sequence of operations:

1. **Piston inspection** (12,000 h)

1.1 Open all crankcase doors.

1.2 Check the running surfaces of the cylinder liners from the crank chamber.

1.3 Draw the piston from the liner with the worst running pattern (02.06.01.nn). Draw the other piston too, if the piston rings are stuck or rotten.

1.4 Remove piston rings only with the correct tool (W1). Mark the rings to maintain their position on assembly **(Fig. 1)**.

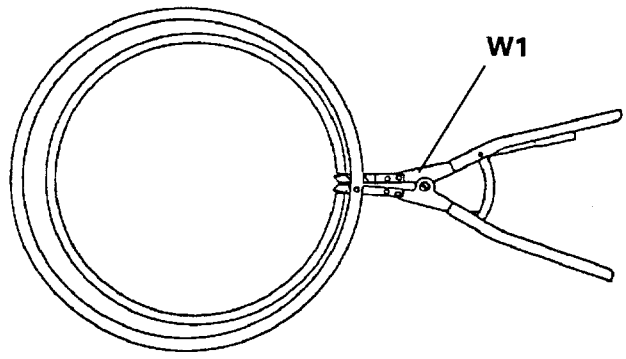

Fig. 1

1.5 Clean the piston rings.

1.6 Check the chromium layer for wear, particularly at the cut and the opposite side. Renew all rings of this piston if there is no chromium visible in some spots only.

If the chromium layer of one ring has been worn, check the rings of all pistons.

1.7 Clean the piston, ring grooves and oil return holes for the scraper ring.

1.8 Smooth light friction and seizing marks with an oily fine emery cloth or a fine carborundum stone. In case of heavy damage or deep scores renew the piston.

1.9 Measure the groove width h_N **(Fig. 2)** in the front area of the groove in the longitudinal and transverse directions of the engine. When exceeding the limits, have the grooves reconditioned by MaK and use oversize piston rings.

1.10 Measure the ring thickness h_R **(Fig. 2)** at four different points.

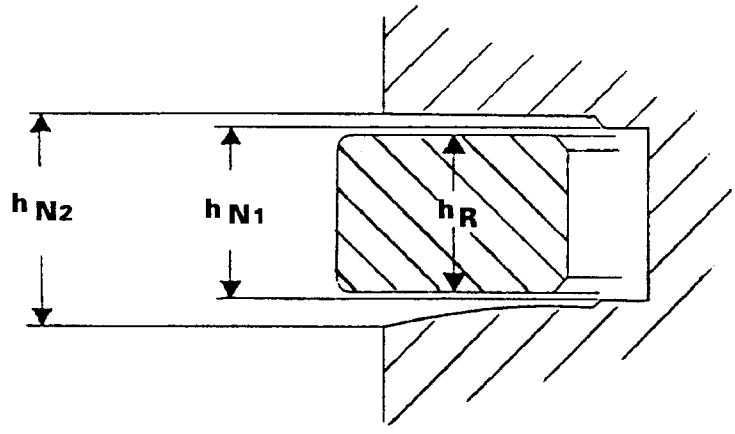

Fig. 2

h_{N1} = new
h_{N2} = worn

1.11 Determine the clearance by calculation and check it against the table (page 3).

1.12 Fit the piston (02.10.01.nn).

2. **Maintenance** (Distillate fuel: 24,000)

2.1 Draw all pistons (02.06.01.nn).

2.2 Check the state of lubrication and appearance of the running surface of the piston and clean it.

2.3 Remove the piston rings with the expander.

2.4 Clean all ring grooves.

2.5 Measure the groove width h_N to 1.9.

2.6 Renew all compression and scraper rings (**see the TOP marks**) (Fig.3/X).

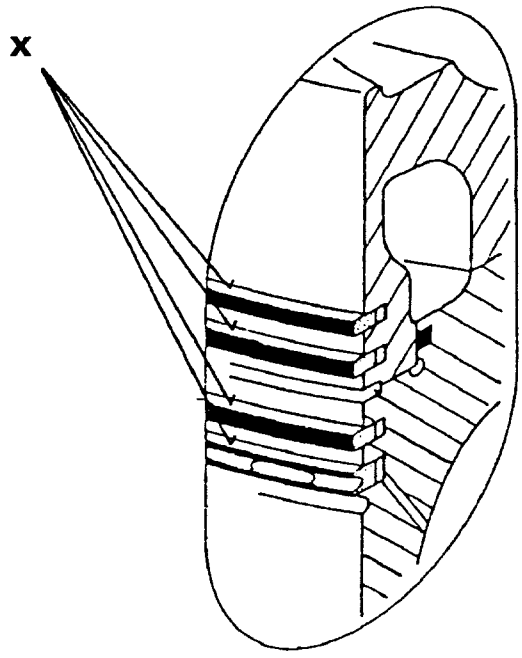

Fig. 3

2.7 Fit all pistons (02.10.01.nn).

Place the piston rings in the grooves with the marking **on top**.

See the set of piston rings on sheet B1.05.02.1.2617 of the spare parts catalogue.

Ring thickness h_R nominal mm	Groove width h_N Wear limit mm	Limit of $h_N - h_R$ mm measured with new piston ring
6	**6,45**	**0,5**
8	**8,45**	**0,5**
10	**10,2**	**0,3**

This applies to the series set of piston rings and not to oversize rings used for repairs.