Action code: WHEN CONVENIENT

POP Piston Ring Pack

New standard for piston top ring

SL12-562/JAP
June 2012

Concerns

Owners and operators of 26-50 small bore MAN B&W two-stroke marine diesel engines.
Type: MC/MC-C, ME/ME-C/ME-B and ME-GI

Summary

New POP ring pack configuration standard for 26-50 bore two-stroke diesel engines.

Dear Sirs

Recently, we have seen a number of incidents with high top ring wear on our small bore engine types 26 to 50. For this reason, we have successfully tested a new piston top ring, which we now introduce as part of the standard ring pack configuration for our two-stroke MAN B&W 26-50 bore engines.

On our small bore engines, the smaller depth of the controlled leakage (CL) grooves reduces the wear potential of the piston top ring compared to the large bore engine types.

In the cases observed, premature wear out of the controlled leakage (CL) grooves on the top ring running surface can be seen. As a result, the pressure drop over the top ring increased further and caused increased wear on the top ring, as well as a high liner wear rate and an increased ring groove wear.

To remove the negative influence from worn out (CL) grooves, we have tested an alternative ring type to replace the CPR-CL ring. The new ting type is called CPR-POP (Port-On-Plane).

Yours faithfully

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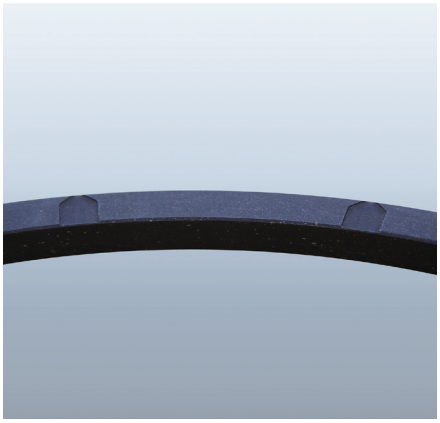
Senior Manager, Operation



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On our small bore engines, the smaller depth of the controlled leakage (CL) grooves reduces the wear potential of the piston top ring compared with the large bore engine types.

We have observed areas with premature wear out of the controlled leakage (CL) grooves on the top ring running surface. As a result, the pressure drop over the top ring increased further, resulting in increased wear on the top ring, high liner wear rate and increased ring groove wear.

To eliminate the negative influence from worn-out (CL) grooves, we have tested an alternative ring type to replace the CPR-CL ring. This new ring type is called CPR-POP (Port-On-Plane).

The main configuration with the double S-lock and gas relief grooves remains unchanged. The CL grooves on the running side have been omitted and replaced with a number of ports milled into the lower side of the piston ring, see Fig. 1.

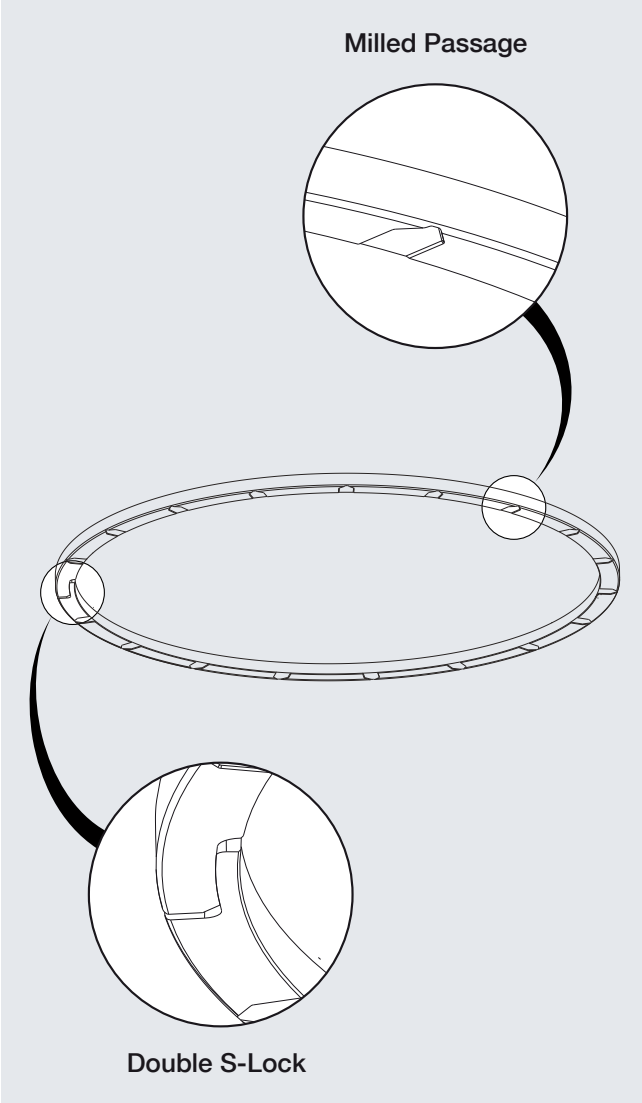

Fig. 1: CPR-POP piston ring

These passages have been configured with a 90 degree narrowing, causing the ring to increase the bypass area as the ring wears, instead of reducing it when the minimum depth is reached, as is the case with the CL grooves. Thereby, the pressure drop decreases instead of increases.

To measure the wear of the ring, the width of the leakage passage can be measured using a feeler-gauge-type measuring tool, see Fig. 2. The opening is 3 mm from the beginning, and the milled passage is designed in such a way that for every 1 mm the ring is worn radially, the gap opens 2 mm. Table 1 lists the maximum allowable width of the leakage gap for our small bore engines.

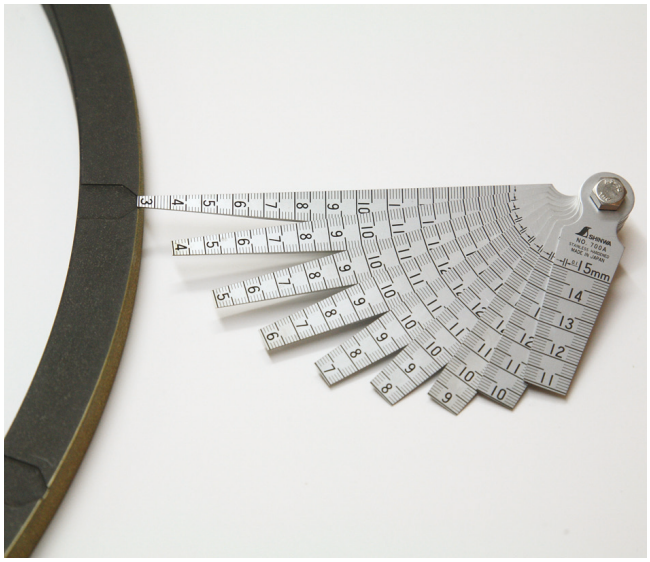

Fig. 2: Feeler-gauge-type measuring tool

Bore size [mm]	Max. radial ring wear [mm]	Max. width of leakage groove (measured with feeler gauge)
260	1.8	6.6
350	2.2	7.4
400	2.2	7.4
420	2.2	7.4
460	2.2	7.4
500	3	9

Table 1: Ring wear

All ring packs from 26 to 50 bore with the new CPR-POP top ring have alu-coat on the running surface, see Table 2.

26 to 50 Bore	
1st ring	
Controlled Leakage	Port-On-Plane (POP)
Base material:	Vermicular cast iron, CV1
Running-in coating:	Alu coating
2nd ring – left cut	
Base material:	Grey cast iron, CF5
Running-in coating:	Alu coating
3rd ring – right cut	
Base material:	Grey cast iron, CF5
Running-in coating	Alu coating
4th ring – left cut	
Base material:	Grey cast iron, CF5
Running-in coating:	Alu coating

Table 2: New CPR-POP piston ring configuration

The new piston top ring has been tested on the various engine types. The test results have shown improved TBO in all cases, compared with the previous CPR-CL piston top ring.

Therefore, we now feel confident in introducing the CPR-POP ring as the new standard on our small bore engine types 26-50.

Liner hardening

It is important that operators experiencing worn-out top rings of the CPR-CL type on small bore engines note that there is a risk of liner surface hardening when running with a worn-out top ring.

In a number of cases, we have seen a high increase in liner and ring wear rates after installing new rings in a liner suffering from a hardened surface due to running with worn-out piston rings.

To ensure normal wear rates and eliminate surface hardening, the liner surface must be machined by honing or grinding.

If the oil film between the cylinder liner and the piston rings is damaged, adhesive contact will occur, followed by temporary high temperatures on the surface and, subsequently, cooling, with hardening of the running surfaces as the result.

These areas of hardened surface must be removed to facilitate the running-in of new piston rings.

To place an order, or for further advice or clarification, you are welcome to contact MAN Diesel & Turbo PrimeServ in Copenhagen (email: Primeserv-cph@mandieselturbo.com).

Questions regarding this service letter can be directed to our Operation department in Copenhagen (email: Operation-cph@mandieselturbo.com).