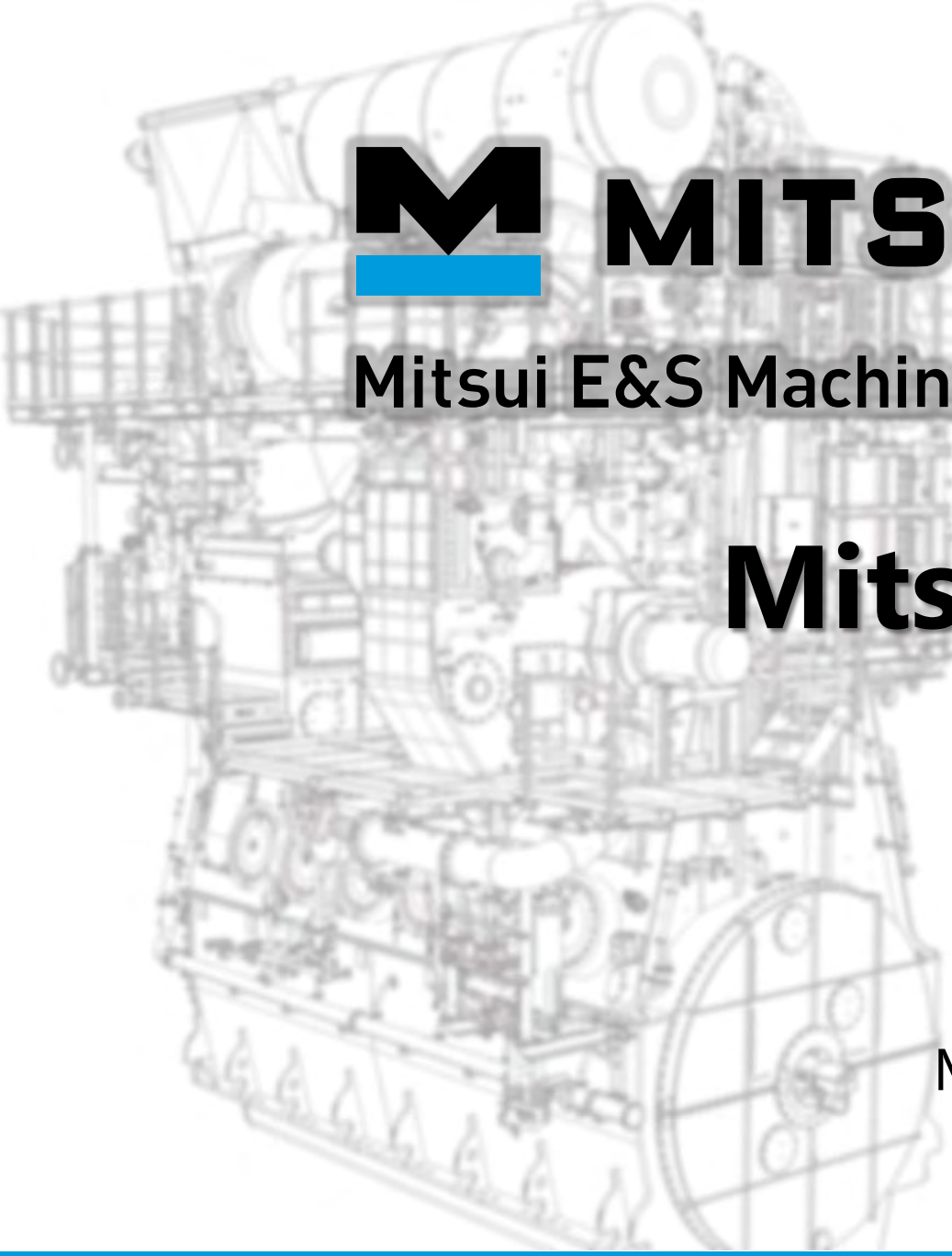


MITSUI E&S

Mitsui E&S Machinery Co., Ltd.

Mitsui-MAN B&W 7G50ME-C9.6

Planning Group
Diesel Design Dept.
Mitsui E&S Machinery Co., Ltd.

Sep. 2021

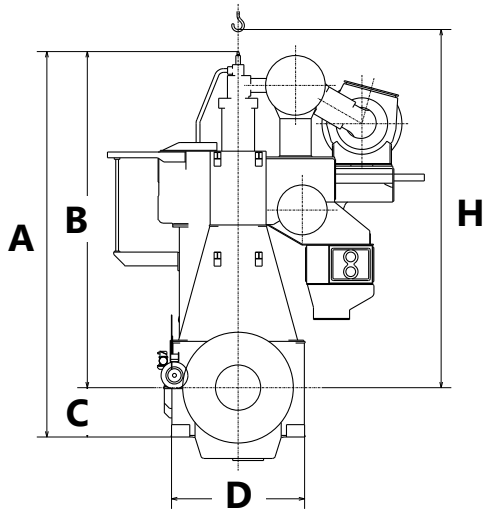
Contents

Main data①

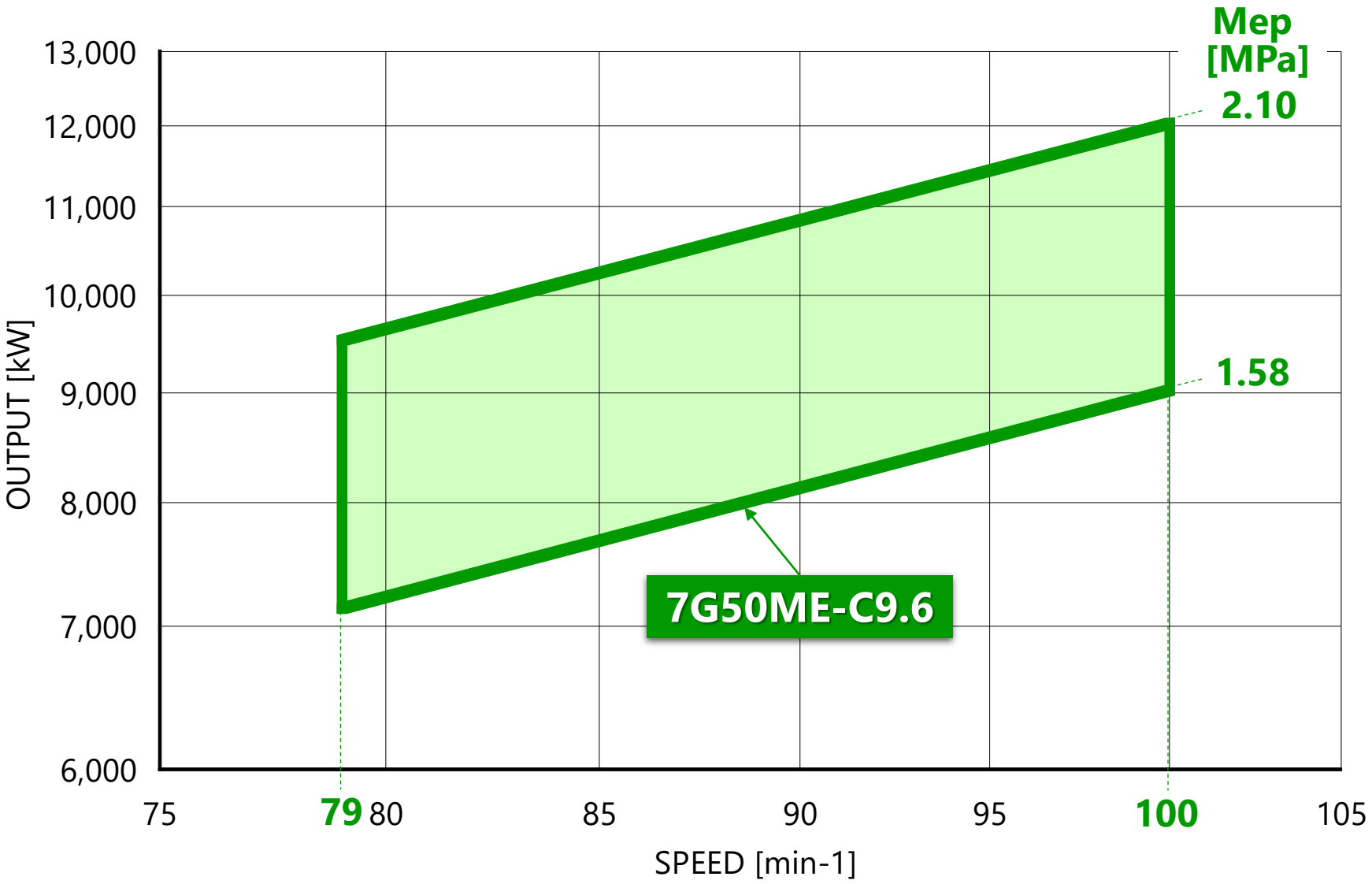
Item		G50ME-C9.6
No. of Cylinders		5 - 9
Cylinder Bore	mm	500
Stroke	mm	2500
Stroke / Bore		5.00
Output at L1 / L2 point	kW / cyl.	1720 / 1290
Mean Effective Press. at L1-L3 / L2-L4 line	MPa	2.10 / 1.58
Speed at L1-L2 / L3-L4 line	min^{-1}	100 / 79
Max. Cylinder Press. (Pmax)	MPa	18.5
Mean Piston Speed at L1	m/s	8.33
Power Rate at MCO	Pme x Cm	17.5
SFOC *1 at L1 point	g/kWh	167.0
System Oil Consumption *2	kg/cyl･day	4 - 5
Cyl. Oil Consumption *2	g/kWh	(0.20～0.40) × S%

*1) 5～7% tolerance, with IMO/NOx Regulation, Tier2, HLO
*2) Guidance only. (Cyl. Oil: Alpha ACC with Alpha Lubricator System, BN100)

Main data②

Item		G50ME-C9.6
Dimension mm	A	9962
	B	8757
	C	1205
	D	3776
	H	11350
	-	
	-	
	-	
Cylinder Distance	mm	872
Length	mm	7cyl. : 7523
Dry Mass (for Tier II)	ton	7cyl. : 275

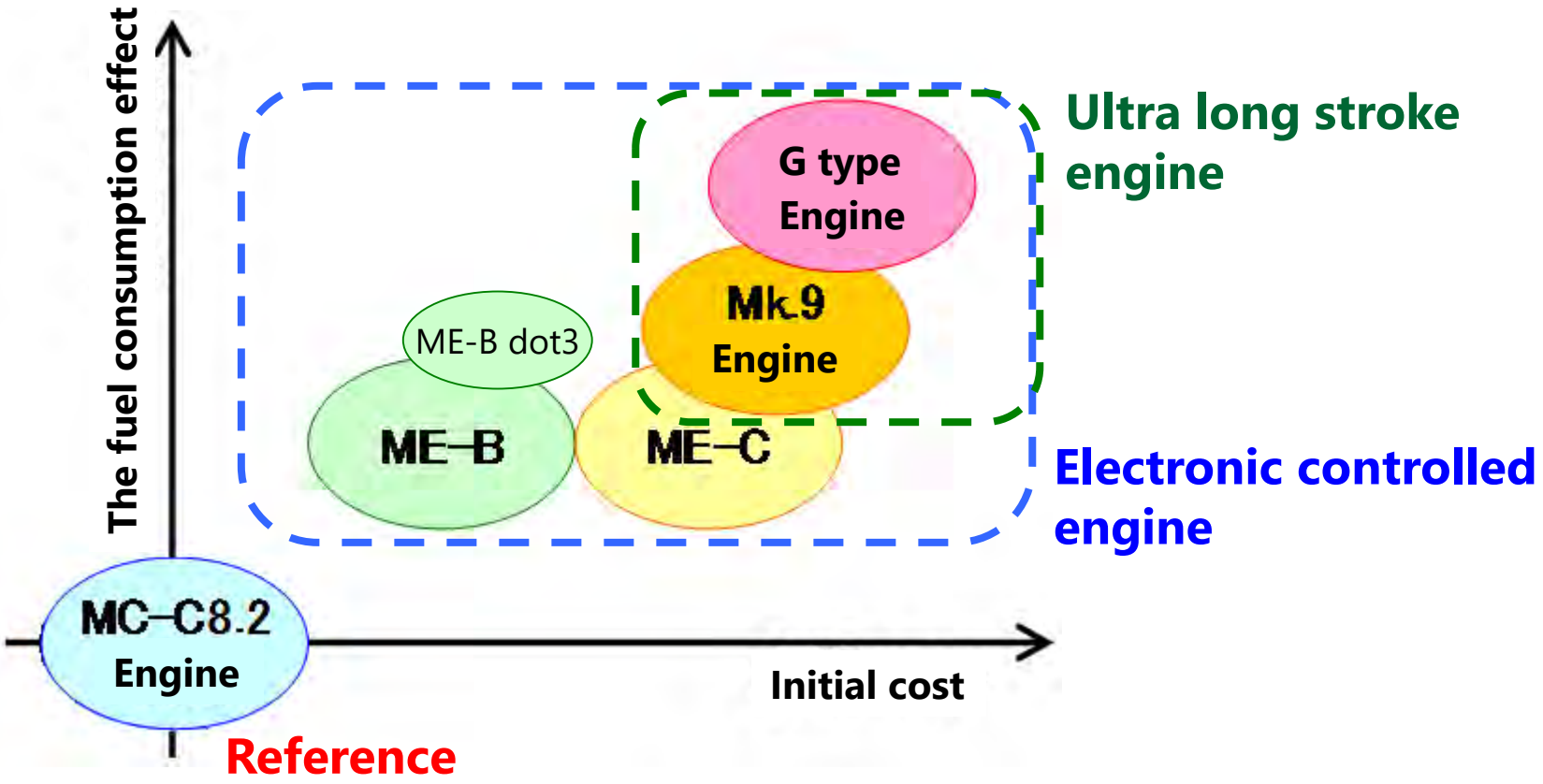
Layout diagram



Contents

Summary of G-type engine

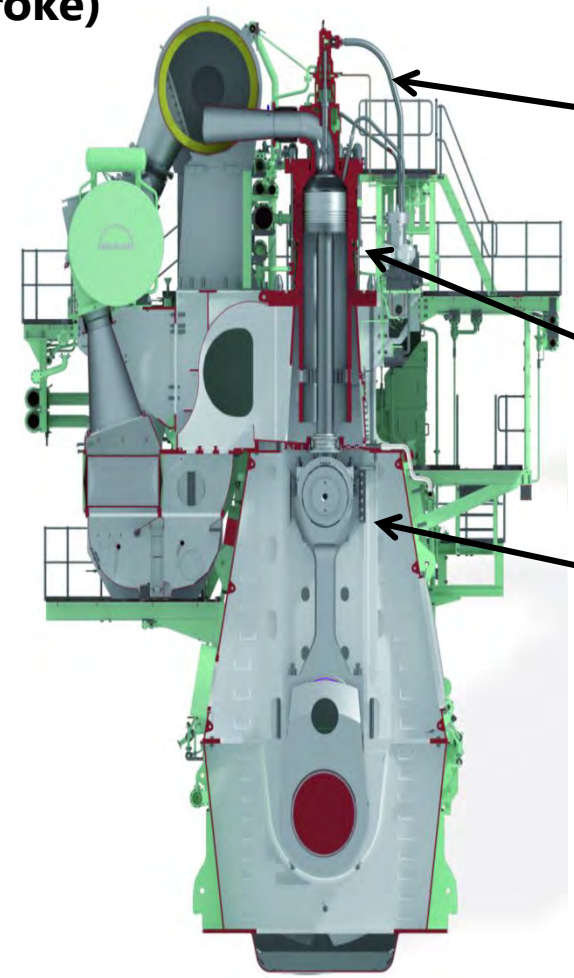
G-type engine (Green Ultra Long Stroke Engine)



Structure of G-type engine

Base is the reliable S ME-B/C Mk9 design.
(Super-long stroke)

Change to longer stroke than S ME-B/C Mk9 design.
(Green Ultra-long stroke)



Low force type Exhaust valve

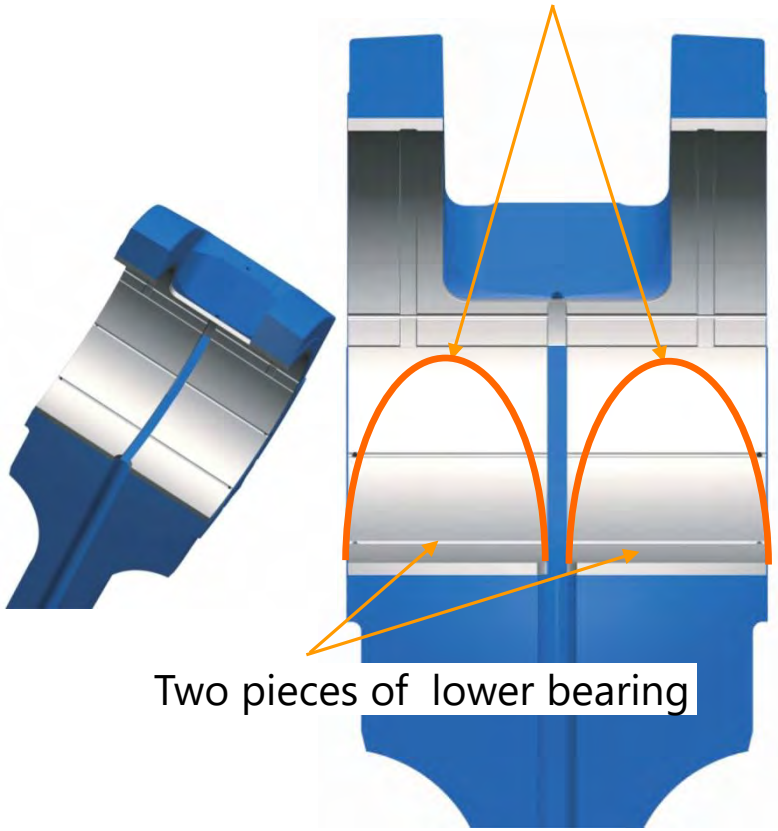
Bore cooled type Cylinder liner

Wide-pad Crosshead bearing

Wide-pad Crosshead bearing

・Bearing area is increased due to higher Pmax.

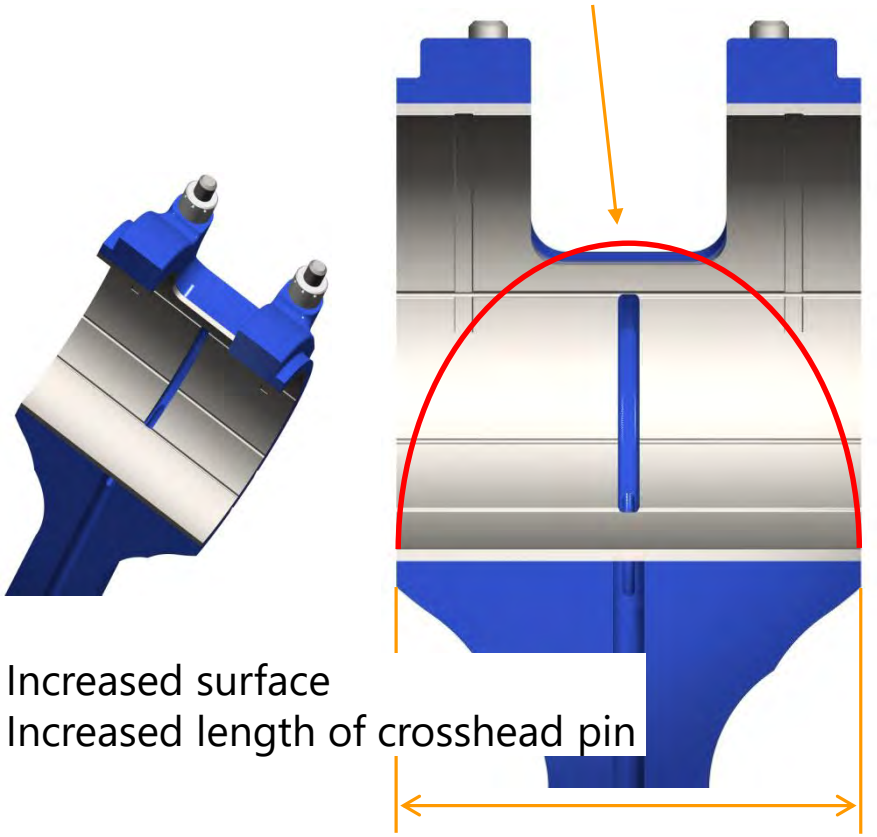
There are two peaks of lub. pressure distribution on crosshead bearings surface



Two pieces of lower bearing

conventional

Increased surface and integrated lower bearing
→ Lub. Oil thickness is increased



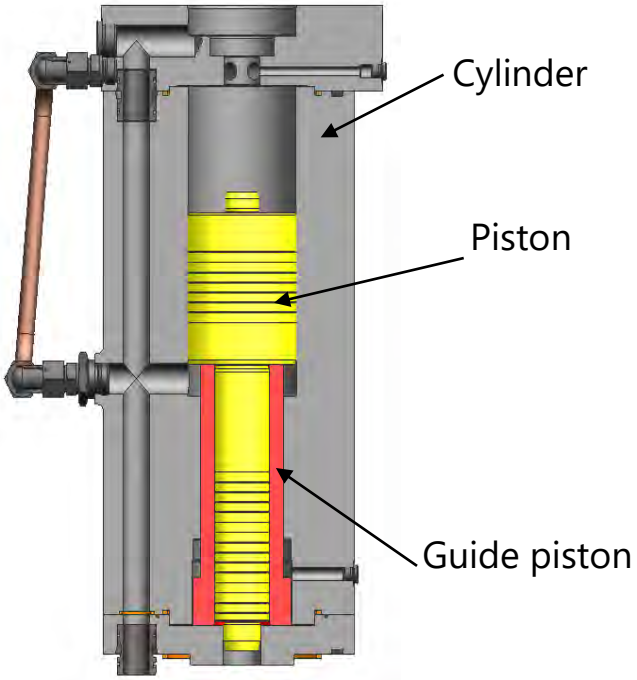
Increased surface
Increased length of crosshead pin

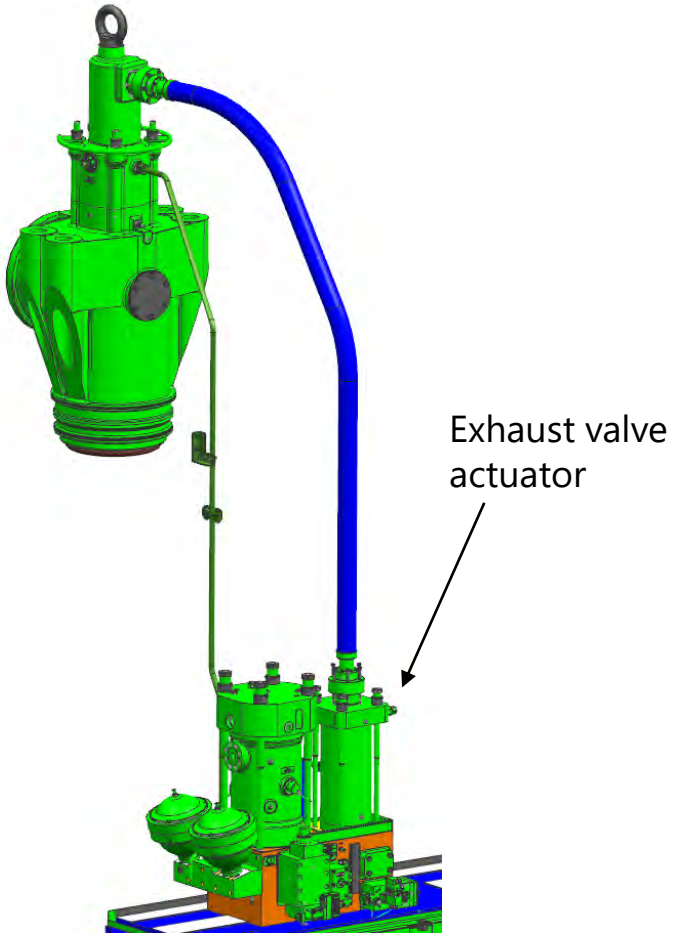
Wide-pad Crosshead bearing

Low force type Exhaust valve

・Reduced diameter of guide piston and piston
→ Required force for working the exhaust valve is lowered.

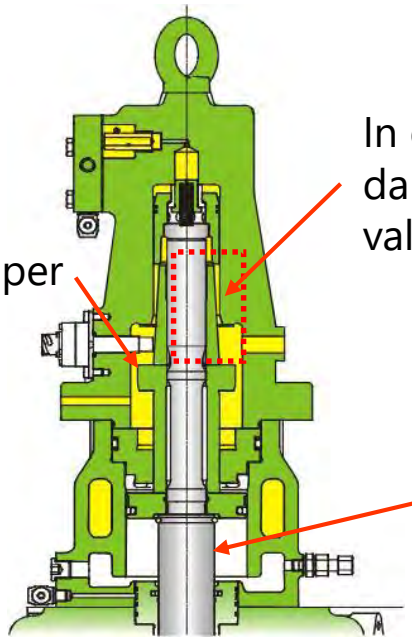
Exhaust valve actuator





Low force type Exhaust valve

- Simple structure (MC type)
- Adoption of Dura Spindle

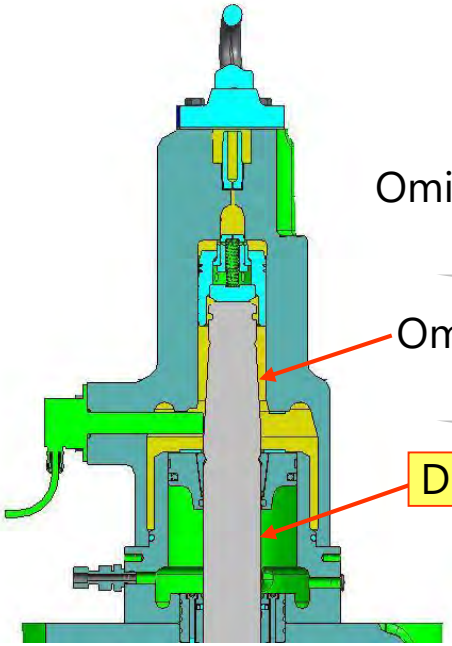


Oil damper

In order to hold on oil damper, top of Exhaust valve spindle is screwed

Nimonic exhaust valve

Conventional type for ME engine



Omit of oil damper

Omit of screw

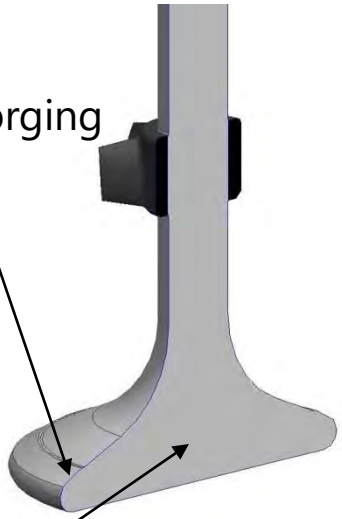
Dura-Spindle

Low Force type

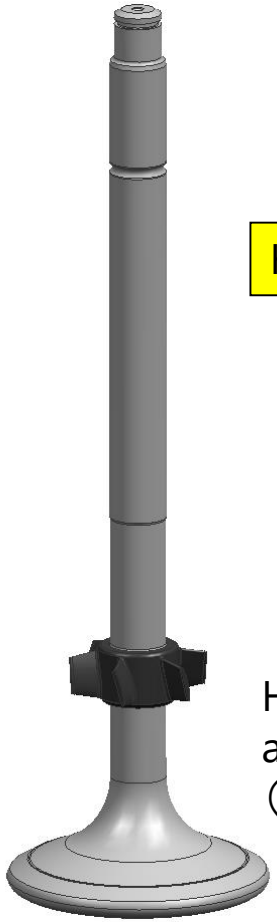
Low force type Exhaust valve

Nimonic exhaust valve

Seat surface
Special forging



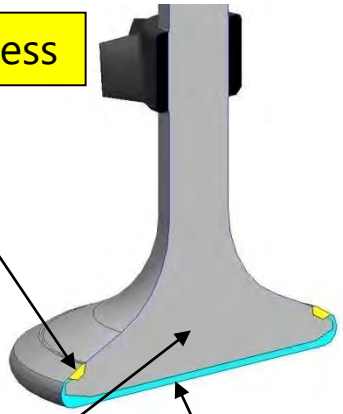
Nimonic80A



Dura-Spindle exhaust valve

Dura seat
Inconel718 coating
+cold rolling process
+age hardening by heat treatment

High hardness



Heat resistant alloy steel (SNCrW)

Inconel625 coating

High temperature corrosion resistance

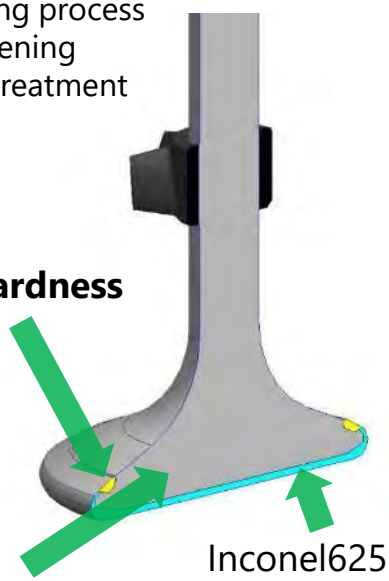
※The welding repair of surface facing the combustion chamber is easier than Nimonic.

Low force type Exhaust valve

Dura-Spindle

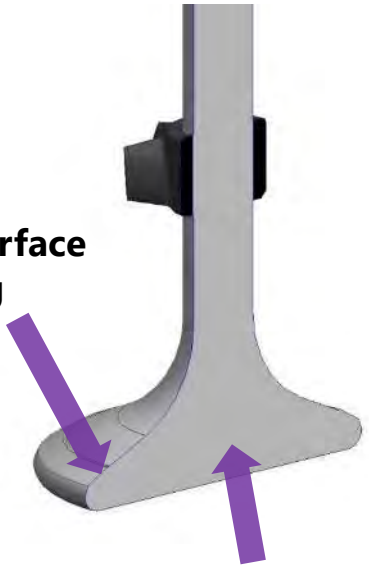
Dura seat

Inconel718 coating
+cold rolling process
+age hardening
by heat treatment



DSA

Forged material

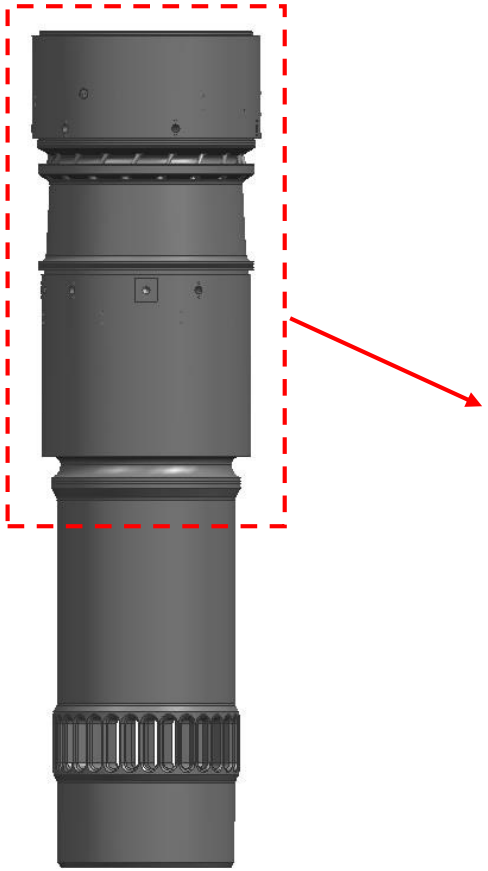


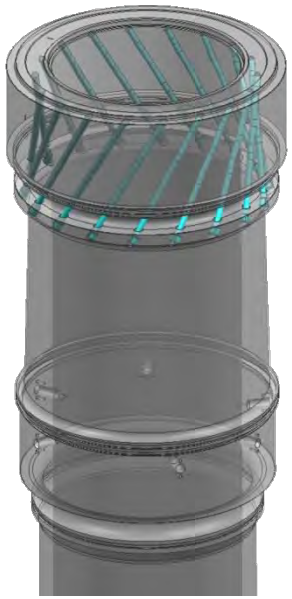
DSA760 (Ni-based alloy)
with **High hardness** and
high temperature corrosion resistance

Whether Dura-Spindle or DSA is applied depends on the main engine type and tuning

Bore cooled type Cylinder liner

・Improved cooling performance





Conventional (S50 Mark7/8)

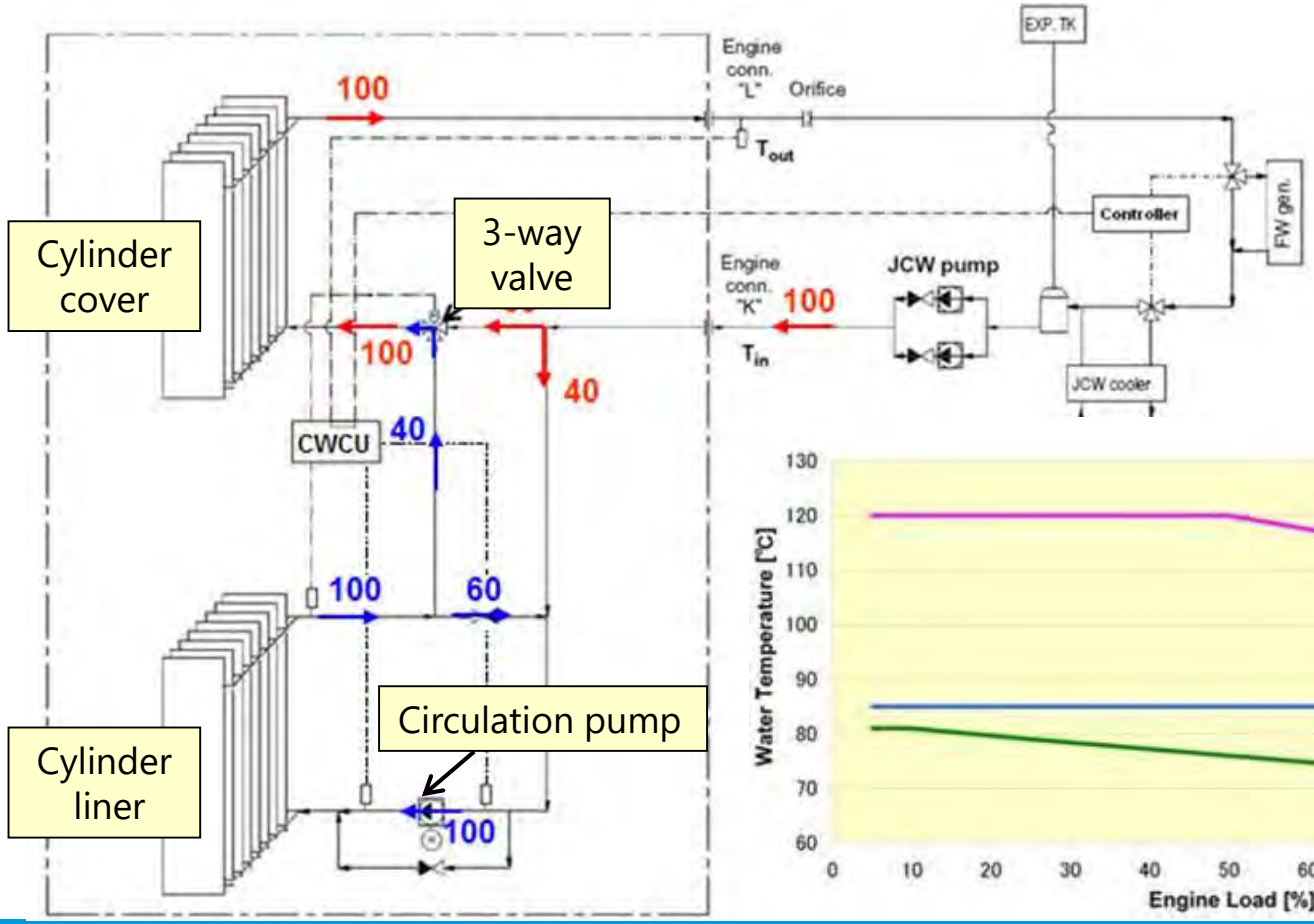
Bore cooled type (G50)

Countermeasure for cold corrosion: LDCL

【LDCL (Load Dependent Cylinder Liner cooling system)】

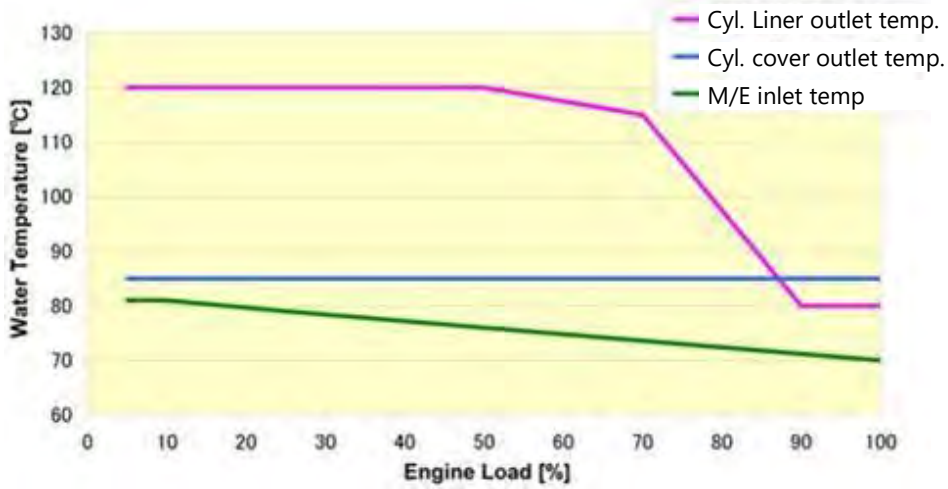
The countermeasure for higher risk of cold corrosion by increasing Pmax (17MPa ⇒19MPa)

Jacket cooling water temperature is increased up to 120℃ by adjustment of cooling water flow amount by 3-way control valve at part load.



MES-M Applied

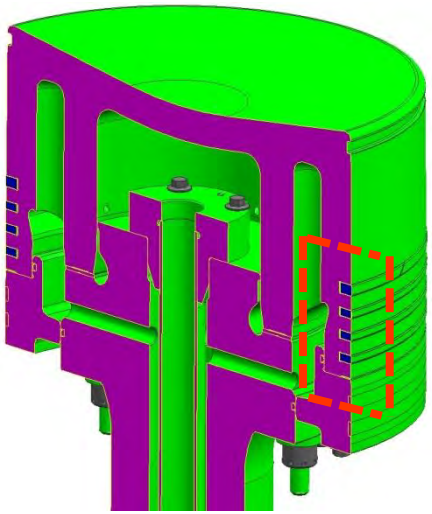
- S50ME-B9.5
- S50ME-C9.5/.6/.7/ 10.6
- G50ME-B9.3/9.5
- G50ME-C9.5/9.6
- Mk.9 and 10 engines with cyl. bore 60 cm and larger



Three-piston ring pack design

Specification of Three-piston ring pack

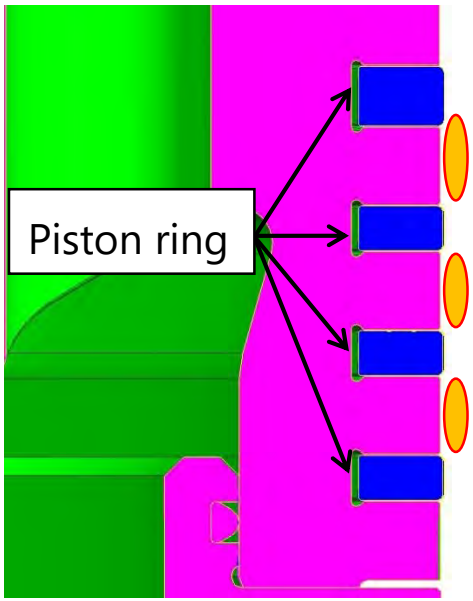
- Decreasing gas passing through the entire ring pack
- Decreasing the heat load of ring



: Combustion Gas

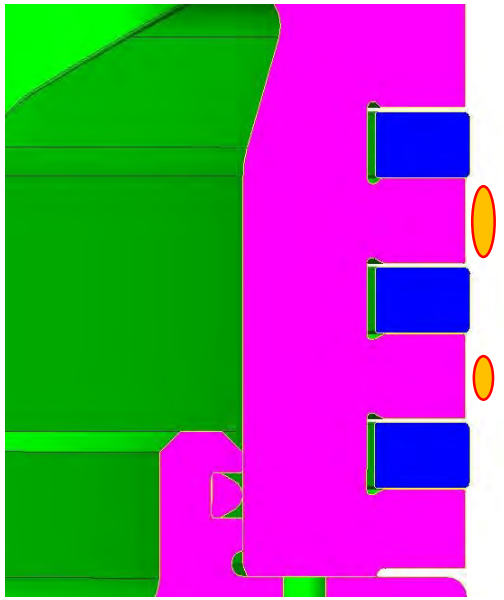
G50ME-C9.5

Four-ring pack design



G50ME-C9.6

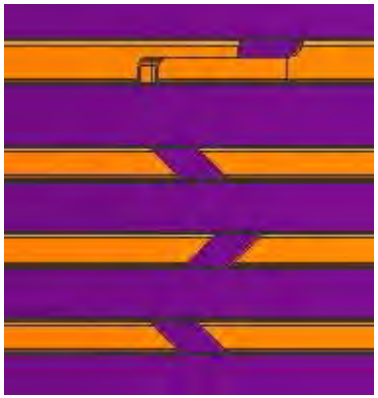
Three-ring pack design



Three-piston ring pack design

Specification of piston ring pack

Four-ring pack (ex. S90ME-C9.2)



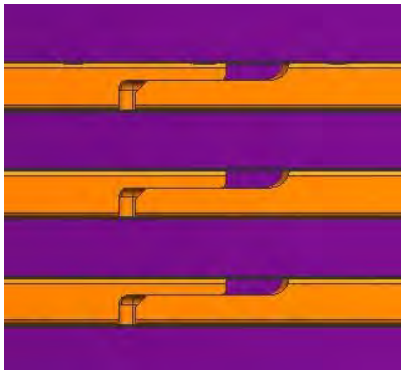
TOP: CPR ring
+CL groove(4X2mm)

2nd: Angle ring

3rd : Angle ring

4th : Angle ring

Three-ring pack (ex. S90ME-C10.5)



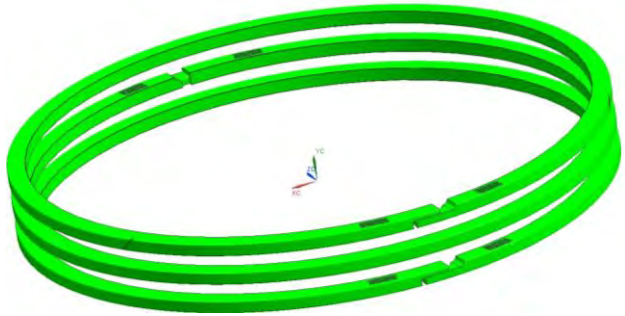
TOP: CPR ring
+CL groove(2X2mm)

2nd: CPR ring
+CL groove(1X2mm)

3rd: Gas-tight
(NO CL groove)

At present, three-ring pack is becoming standard

(Adopted by more than 60% of engines manufactured in 2019)



CPR ring : Controlled Pressure Relief Ring
CL groove : Controlled Leakage Groove

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~ Make with Heart ~