WÄRTSILÄ

SULZER **RTA Engines**

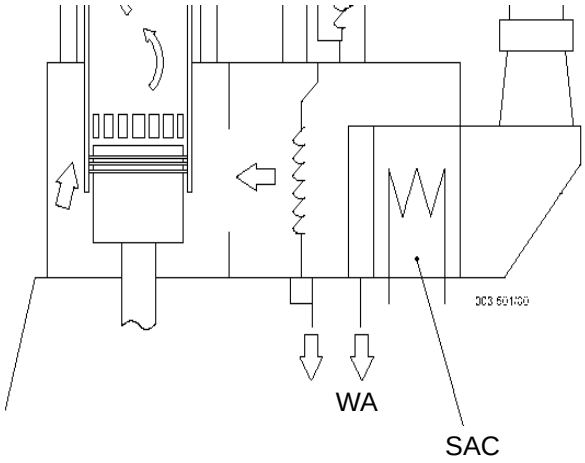
Service Bulletin

RTA–62

22.05.2003

Technical Information to all Owners / Operators of Sulzer RTA Engines

Prevention of Water Carry-Over and Liner Polishing



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28.88.71.40 – Printed in Switzerland

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1. INTRODUCTION

Piston running problems have been reported on RTA engines while passing tropical areas. Results of investigations have shown that water carry-over can damage the oil film which consequently leads to sudden severe wear (SSW). Formation of hard deposits on the piston crown due to excessive lubricating oil (calcium carbonate, BN oil additives) and combustion residuals additionally increase the danger of impairing the lubricating oil film on the cylinder liner (sponge effect) and liner polishing. Various factors contribute to safe piston running performance. By introducing the below mentioned countermeasures the safety margin against scuffing can be increased.

This Service Bulletin contains information about water carry-over, liner polishing and counter measures to reduce it.

2. WATER CARRY-OVER

Water in liquid or vapour form carried along with the scavenge air has a negative influence on the piston running behaviour.

2.1. Possible Causes of Water Carry-Over

Water carry-over could have various reasons, some of which have already been explained in earlier Service Letters and Bulletins (See Service Letter RTA-12/02 and Service Bulletin RTA-52). The main reasons are the following:

- Non-conformity in condense water drain system of water separators and scavenge air coolers
- Hot air by-passes around scavenge air cooler
- Insufficient water separator efficiency due to damaged or loose separator elements
- Too low Scavenge Air Cooler (SAC) water inlet temperature and consequently too low scavenge air temperature (T_{scav})
- Overload of water separator due to environmental conditions (high humidity)

2.2. Countermeasures

As some of the above mentioned causes often can not be eliminated immediately and mainly the last point is decisive, **we recommend (as specified overleaf) increasing the scavenge air temperature after cooler in order to reduce the risk of water carry-over** and consequently the risk of Sudden Severe Wear (SSW).

The figure on the next page illustrates how the amount of condense water reaching the cylinders depends on the cooling water inlet temperature of the scavenge air cooler (SAC).

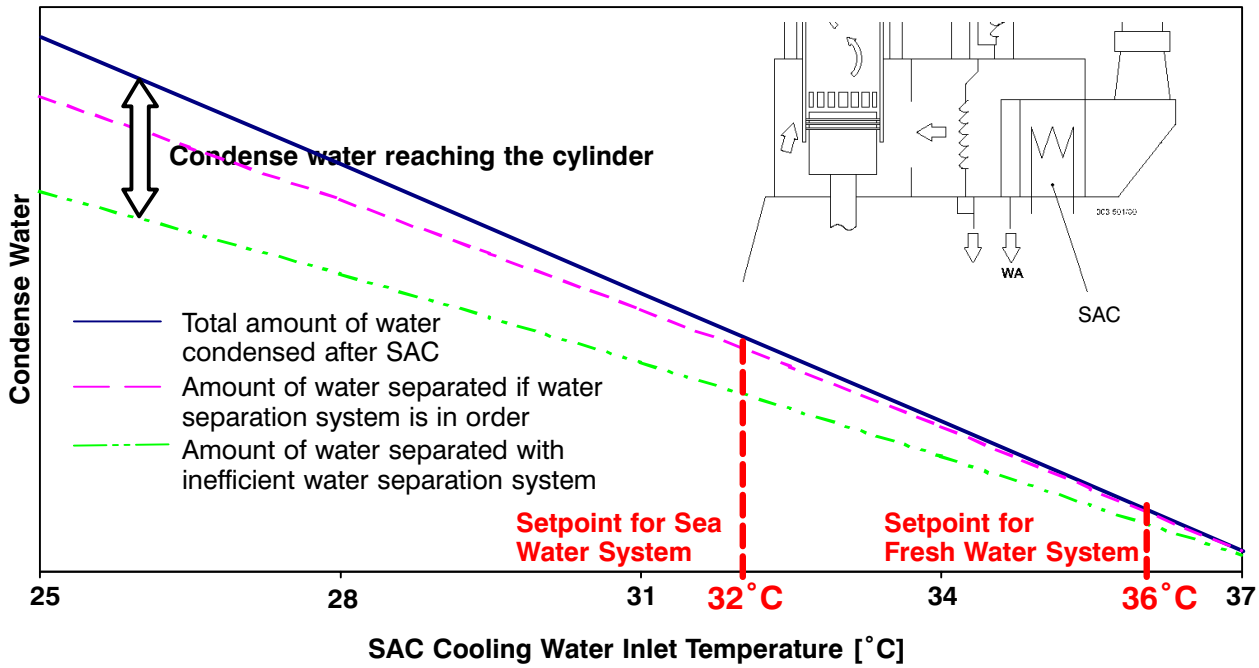

Fig. 1 Condense Water Separation

As preventive measure against water carry-over and the possible consequential damages, the water inlet temperature of the scavenge air coolers should be set to the value for tropical conditions as specified in the Operating Manual:

- **For central cooling systems 36˚C (LT)**
- **For sea-water cooling systems 32˚C**

These values must be set at the controller of the automatic temperature control valve of the corresponding cooling water circuit for all load conditions. With these settings and at full load T_{scav} should be around 48°C.

In order to ensure the measures are sufficient, check the sight glass (if fitted) of the receiver drain after the water separator (dry side) or make a visual inspection. There should be no indication of water. If water is visible check following:

- Condition of water separator (elements and by-passes)
- Condense water drain system must not be blocked (orifice)
- Orifice in condense water drain line must be of correct diameter
- Condition of SAC (broken tubes)

If the above mentioned measures are not sufficient to reach a T_{scav} of around 48°C i.e. condense water is found during visual inspection or if water is found draining from the dry side of the air receiver, a further increase in scavenge air temperature can be achieved by various means, for example closing off sections of the scavenge air cooler. Please contact Wärtsilä Switzerland for further details.

The recommended maximum temperature and alarm values are given in the engine Operating Manuals, pages 025 or 0250.

We do **not recommend throttling the SAC water flow** in order to increase scavenge air temperature because of the following reasons:

- The water flow has to be drastically reduced in order to increase the air temperature after cooler by just a few degrees.
- The accurate adjustment (reduction) of the water flow via the coolers is difficult, as the in- and outlet valves are not designed for regulating.
- Reduced water flow causes scaling of the cooling tubes (water side) in the case of sea water cooling.

3. LINER POLISHING

3.1. Possible Causes of Liner Polishing

Formation of hard deposits on the piston crown can be caused by excessive lubrication (calcium carbonate) and combustion residuals especially when running with low sulphur fuel with high BN cylinder oil. Low-load operation can lead to carbon build-up as well, resulting in a damaged lubricating oil film on the cylinder liner (sponge effect), liner polishing and increased risk of scuffing.

3.2. Countermeasures

3.2.1. Cylinder Lubrication

In order to minimise carbon build-up on piston crowns, the cylinder lubrication feed rate must be adjusted to the recommended values. At the same time the cylinder lubricating oil type has to match with the sulphur content of the fuel. See our Service Bulletin RTA-18.2 for details.

3.2.2. TriboPack

The TriboPack design standard (Anti-polishing ring, chrome-ceramic top piston ring, liner insulation etc.) is standard and incorporated in all newly built Sulzer RTA engines. Wärtsilä can offer TriboPack retrofits for a wide range of RTA engines. TriboPack considerably increases the safety margin against scuffing. The anti-polishing ring continually scrapes off excessive carbon deposit build-up on the piston crown and thus avoids polishing. The chrome-ceramic coating of the top piston ring improves the wear resistance.

Please contact Wärtsilä Switzerland Ltd or our Network Companies for further details.

4. SERVICE BULLETINS PUBLISHED FOR LARGE BORE RTA–TYPE ENGINES

We have so far published the following Service Bulletins which are valid for Large Bore RTA–Type Engines (RTA 48T to RTA 96C):

RTA–1	dated	01.03.88	**Recommendation Concerning Piston Running Behaviour**
RTA–2	dated	05.10.88	**Water Drain from Charge Air Receiver and Charge Air Temperature**
RTA–3.4	dated	30.03.98	**Fuel Injection Nozzles**
RTA–4	dated	20.11.89	**Oil Damping for Short Tie Rods**
RTA–8	dated	15.06.92	**RTA–Cylinder Liners and Reinforced Water Guide Jackets**
RTA–9	dated	20.07.92	**Cylinder Cover with Erosion / Corrosion Resistant Cladding**
RTA–10	dated	28.10.92	**RTA "–8 Series" Engines / Piston Skirt in Two Parts**
RTA–11.2	dated	11.05.2001	**Fuel Injection Pump Regulating Linkage**
RTA–14.1	dated	23.08.2002	**System Oil Care and Maintenance**
RTA–15	dated	10.02.94	**Elastic Studs on RTA-Type Engines**
RTA–16.1	dated	20.02.98	**Retrofit for Piston Rod Stuffing Boxes for RTA "-8 Series" Engines**
RTA–17.1	dated	28.02.95	**Circulation Valve to Fuel Injection Valve**
RTA–18.2	dated	14.06.2002	**Running-in of Cylinder Liners and Piston Rings**
RTA–19	dated	28.10.94	**Oil Supply Monitoring for Geislinger Torsional Vibration Damper**
RTA–20	dated	30.11.94	**Rotational Safety Studs for Roller Guide of Fuel Pump and Exhaust Valve Actuator**
RTA–21	dated	10.04.95	**Improvement of Starting Behaviour (For engines with DENIS–1 and DENIS–5 Control Systems only!)**
RTA–22.1	dated	28.11.96	**Waisted Bolts for Piston Crown Spraying Plate of RTA 84C, 84M, 84T and 84CU (up-graded), Engines**
RTA–24.2	dated	18.05.99	**VTR..4 Turbochargers After Sales Service Information issued by ABB**
RTA–26	dated	03.01.96	**Loss of Material on Piston Crowns due to High Temperature Corrosion and Erosion (Watercooled Pistons)**
RTA–27	dated	26.04.96	**Plastic Water Separator**
RTA–28	dated	31.05.96	**Improvement of the Engine Control System**
RTA–29	dated	21.10.96	**Improved Oil Supply to the Integrated Axial Detuner equipped with Internal Oil Supply Line**
RTA–30	dated	27.11.96	**Improvement of starting behaviour on RTA engines equipped with Type PGA200 and PGA EG200 Woodward Governors**
RTA–31	dated	23.01.97	**Alphabetical Index of Topics of Service Bulletins**
RTA–33	dated	11.04.97	**Crank Pin Bearing Shell**
RTA–34	dated	28.11.97	**Fuel Injection System Modification and Maintenance**
RTA–35.1	dated	07.06.2001	**Retrofit for Piston Rod Stuffing Boxes for RTA "-2 and -2U Series" Engines**
RTA–36.1	dated	08.06.2001	**Reconditioning of Piston Rods of RTA "-2 Series" Engines**
RTA–37.1	dated	11.06.2001	**Reconditioning of Piston Rods of RTA "-8 Series" Engines**
RTA–38	dated	26.02.98	**Piston Crown Loss of Material on Combustion Side**
RTA–39	dated	31.03.98	**Overhaul and Reconditioning of Pistons**
RTA–42.1	dated	14.03.2002	**Templates for Exhaust Valve Seat and Spindle**
RTA–43.2	dated	03.12..2002	**Piston Rings**
RTA–44	dated	26.02.99	**Tightening Instructions for the Plunger Guide Nipple**
RTA–45	dated	03.06.99	**Tightening Instructions for Screws and Waisted Studs**
RTA–46	dated	17.06.99	**Cracks in Columns**
RTA–47	dated	28.06.99	**Draining of Fuel Oil Pipes; Modification to Shut-off Valves of Fuel Pipes and Drain Plug of Fuel Pump Block**
RTA–48	dated	20.09.99	**Instruction for Replacement of NO_x Relevant Components on IMO Compliant Sulzer RTA Engines**
RTA–49	dated	08.10.99	**Gearing for Auxiliary Drives Z 42800**
RTA–50	dated	10.01.2000	**Leakage Oil Collector in Air Spring System**
RTA–51	dated	21.08.2000	**Deflagration in Engine Scavenge System and Exhaust Manifold**
RTA–52	dated	22.09.2000	**Water Separator on RTA – Type Engines**
RTA–53	dated	12.06.2001	**Variable Injection Timing and Fuel Quality Setting**
RTA–54	dated	18.07.2001	**Electronic Variable Injection Timing Troubles and Remedies**
RTA–55	dated	31.10.2001	**Exhaust Valve Seat and Exhaust Valve Spindle**
RTA–56	dated	26.02.2002	**Indicator Valves**
RTA–57	dated	20.06.2002	**Improved Starting Behaviour with Quick Venting Valves**
RTA–58	dated	15.10.2002	**Cleaning of Scavenge Air Cooler During Operation and at Standstill**
RTA–59	dated	03.02.2003	**Procedures and Relevant Information for Sulzer RTA engines to comply with the Annex VI NOx limit on Testbed and on Board**

RTA–60.1	dated	09.04.2003	**Cylinder Lubrication Diagrams for Vogel “PC” and “TA” Lubricating Pumps**
RTA–61	dated	25.03.2003	**Damping Elements to Piston Cooling Oil Flow Monitoring**
RTA–62	dated	22.05.2003	**Prevention of Water Carry-Over and Liner Polishing**

Should you not be in possession of the above mentioned documentation suitable for your plant, kindly contact your local Wärtsilä representative for your copy.