

## Reasons for Regular System Exhaust

Heat transfer fluid will cause thermal cracking during the high temperature operation. Also, oxidization reaction occurs due to its contacting with air, generating low boiling point substances. Low boiling substances adversely affect the chemical properties of fluid and increase system safety risk.

There is an exponential relationship between thermal cracking rate and fluid temperature. The expected rate doubles as fluid temperature increases every 10°C. The service life of a mineral oil is around 3 to 6 years under the 240°C operating condition; while its lifetime will be shortened to 2 to 3 years when the operating temperature is up to 260°C. Factors affecting fluid thermal cracking include its chemical molecular structure, purity, operating temperature, temperature distribution and impurities. In practical operation, fluid thermal cracking occurs at 50°C below the maximum operation temperature. Factors like using inferior-quality fluid, overheating, oxidation and contamination in operating process speed up fluid thermal cracking and oxygenolysis, generating metamorphic products and rapidly worsening its quality.

Low boiling point substances are matters whose boiling point is lower than unused fluid initial boiling point. These matters decrease fluid flash point and increase its vapor pressure. Some low boiling point matters, under operating temperature, will experience phase change and stay in system in gaseous state, leading to inside pressure increase and fluctuation. The more production and longer stay of low boiling point matters, the higher liquid vapor pressure and more severe pressure fluctuation in the system, resulting in circulating pump cavitation and heat transfer deterioration, which keeps the overheating and oxidation condition in the system accelerating fluid deterioration and generating more low boiling point matters. The existence of large number of low boiling point substances also decreases the flashing point of fluid in use, if without proper measures, it will easily cause fire and explosion during system operation.

Schultz expert think it is highly necessary to regularly exhaust low boiling point gas, in order to control the metamorphic rate of in-use fluid, lengthen its service life and guarantee the long-term safe and stable function of heat transfer system. To keep the proportion of low boiling point matters in in-use fluid within a reasonable and safe range is a crucial task in fluid system management. Statistics show that when low boiling point matters reach above 5% in fluid and the distillation temperature is lower than the furnace inlet temperature, it is very easy to cause cavitation, system circulation deterioration and quality worsening in fluid. The newly revised Safety Technique Monitor of Boiler says, "Proper measures of degassing should be taken when low boiling point matters in fluid in use reach above 5%, and its condensation products should be collected safely." This regulation provides supportive basis for controlling the amount of low boiling point matters in fluid during system operation. Exhausting low boiling point matters in a timely manner and reducing its content in fluid will benefit the long-term safe and stable operation of system.

[Schultz expert recommends](#) necessary measures should be taken during system operation to avoid

accelerating fluid degradation. Fluid should avoid contacting with water, acid-based materials and other impurities before filling into system. The first start-up system must be dehydrated and removed of low boiling point substances before operating. Operators should operate system in strict accordance with the related regulations, avoid overheating and fill the operation record on time. The online fluid should be sampled and tested in every six months. Take measures according to the test results.