Heat Transfer Fluid Selection

Industrial vs. food grade fluids — what to choose for your TCU

Selecting the right heat transfer fluid affects more than initial purchase price. It determines service intervals, downtime, total cost of ownership, and the workplace and environmental procedures required for safe handling. This note summarises the practical differences between two common categories: industrial synthetic fluids and food grade fluids.

At a glance

	Industrial synthetic (dibenzyltoluene-based)	Food grade (NSF H1 certified)
Typical max. operating temperature	Up to 350 °C	Up to 220–250 °C
Thermal stability at high temperature	High	Moderate
Typical fluid lifetime at ≤ 250 °C bulk	5–8 years	2–3 years
Typical fluid lifetime at ≤ 200 °C bulk	8–12 years	3–5 years
Tolerance to oxidation and contamination	High	Lower
Food contact suitability	No	Yes (NSF H1)
Replacement frequency over 10 years	1–2 times	3–5 times
CLP / REACH classification	Reproductive toxicity Cat. 1B Aquatic hazard Cat. 1 Aspiration hazard Cat. 1	Typically not classified as hazardous
Handling and disposal	Specific PPE required Hazardous waste disposal UN 3082 transport	Standard PPE Standard waste oil disposal

Lifetime estimates assume continuous operation in well-maintained, inert-blanketed systems. Actual lifetime depends on operating temperature, duty cycle, contamination and maintenance practices.

What it means in practice

Initial fluid price is rarely the dominant cost. A full fluid change on a mid-size oil TCU typically involves the fluid itself, 1–3 days of downtime, system flushing, disposal of spent fluid, and verification before restart. Industrial fluids deliver significantly longer service intervals — typically twice as long as food grade fluids at comparable operating temperatures.

Industrial synthetic fluids are, however, classified under EU CLP regulation as reproductive toxicants (Cat. 1B) and aquatic hazards (Cat. 1). This requires documented PPE procedures, restrictions on handling by employees under 18 or by pregnant or nursing employees, and disposal as hazardous waste. Food grade fluids are typically not classified as hazardous and require only standard handling.

Selection guidance

Choose industrial synthetic when	Choose food grade when
• No risk of fluid contact with food or pharmaceutical product • Operating temperature above 220 °C • Lowest lifetime fluid cost is a priority • Long service intervals are valued • Plant has procedures for handling REACH-classified fluids	• Fluid could enter the product stream in case of leak • Plant operates under HACCP, BRC, IFS or similar • NSF H1 registration is required by the customer • Operating temperature is moderate (typically ≤ 220 °C) • Simpler handling, PPE and disposal are operational priorities

Boe-Therm recommendation

Our oil TCUs (TEMP 150, TEMP 300, TEMP 350L) operate with open expansion-tank systems where tank temperatures stay below 90 °C in normal operation. This gives a wide safety margin to flash point for both fluid categories.

The choice between industrial and food grade is rarely obvious. Lifetime cost favours industrial fluids; workplace safety and disposal complexity favour food grade. The right answer depends on your operating temperature, plant procedures, and workforce considerations. We are happy to talk it through with you.

Need help selecting the right fluid for your process?

Contact our technical team with your operating temperature, expected duty cycle and any food-contact or certification requirements. We will recommend a fluid specification matched to your TCU and application.

General guidance only. Fluid lifetime and performance depend on system design and operating conditions. Always consult fluid manufacturer's data sheets before selection.