



Experience with different heat transfer fluids for solar process heat plants

Stefan Minder - NEP Solar AG InSun Workshop 2013







Heat Transfer Fluids in NEP Solar Plants - Overview

Project Site	Max T (°C)	Min T (°C)	HTF	Particular	Experiences / Remarks
Almería (ESP)	220	-5	Therminol 55	Threaded joints	Leakage problems in threads -> welded
Newcastle (AUS)	180	0	Water		ОК
Avignon (FR)	220	-5	Therminol SP	Threaded joints	Leakage problems Flowmeter dyn. range
Sevilla (ESP)	220	0	Shell S2	Fully welded	ОК
Bever (CH)	190	-30	Fragoltherm FG-8	Extremely low ambient T. Fully welded	1 ½ years experience, very reliable
Saignelégier (CH)	130	-20	Water/Antifree ze JetFrost	Moderate supply T.	Collector hyd. balancing -> overheat danger
Fribourg (CH) under construction	170	-10	Water	Freeze protection with waste heat	Startup in April '13
Newcastle (AUS) under construction	320	0	Organic Fluid	Supercritical Fluid in Collectors	Startup in April '13
Basel (CH) cancelled	200	-10	Water/Steam	Direct Steam Gen. Vacuum drain back	Abandonned





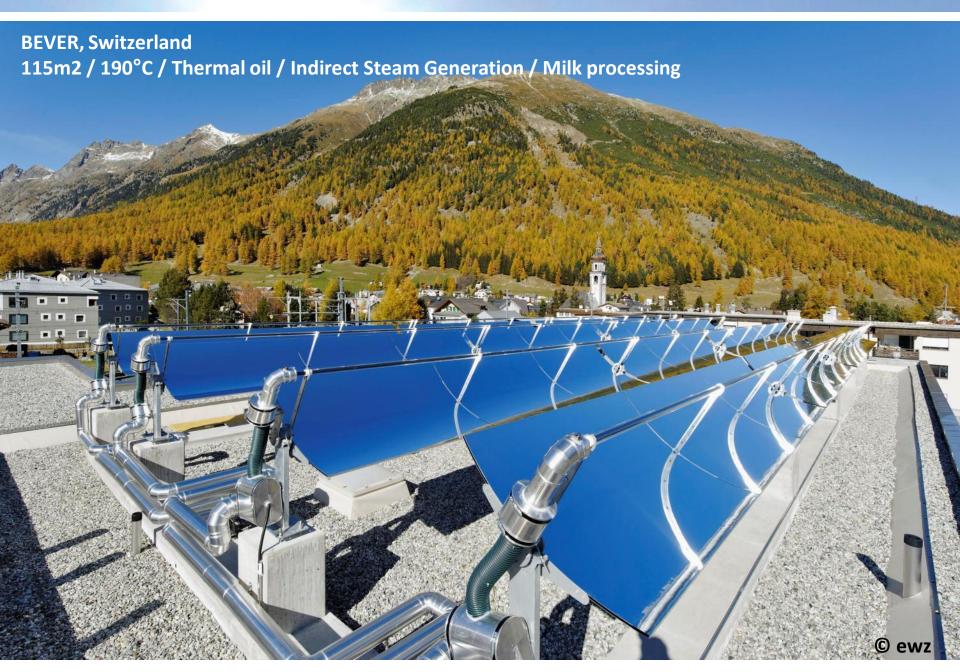








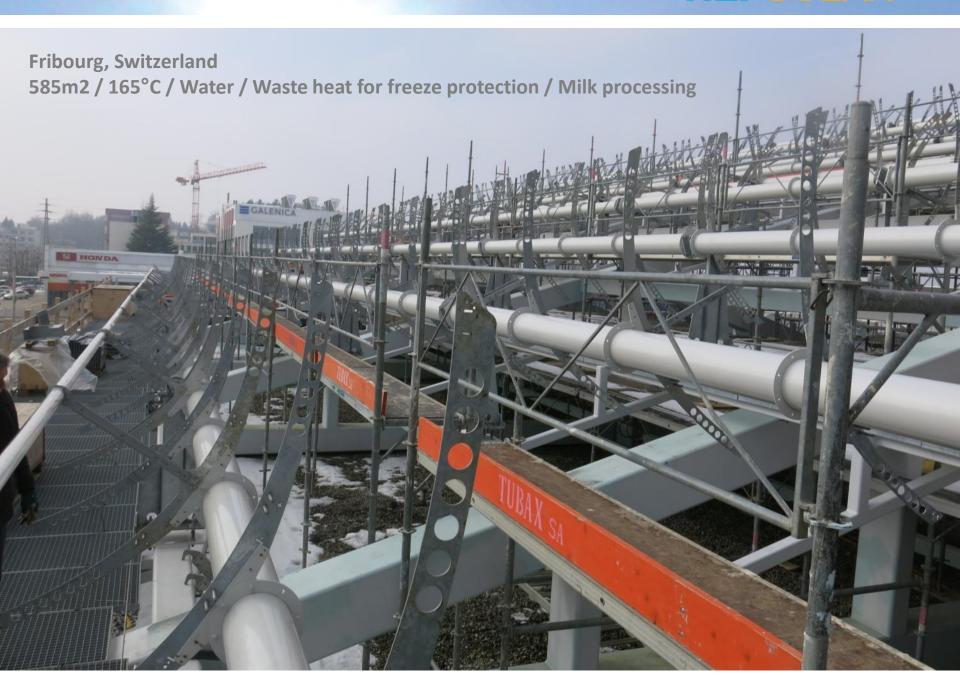




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Heat Transfer Fluids - Conclusion

Heat Transfer Fluid	Properties / Lessons
Thermal Oil	 Expensive and toxic (most of them) Avoid threaded connections to avoid leaks Choose flow meter for entire temperature and velocity range (properties very variable with T)
Water	 Heat circuit in winter if excess low T. waste heat available Evaporation through overheat can block flow
Water / Antifreeze	Antifreeze limited in max T
Steam	 Sub-zero temperatures are a challenge Concept for closed system with drain back under vacuum developed Other options: Replace with air (if allowed) or N2 Keep at >0°C
Organic Fluid	No experience yet