

# Injection molding machines and Hydraulic applications

## The Study Case:

Injection molding machine: Engel 1701

Oil: Hydraulic oil LUKOIL Geyser ST 46

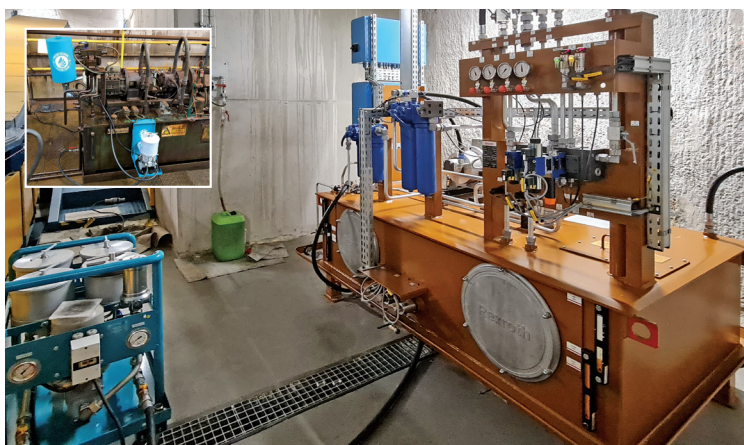
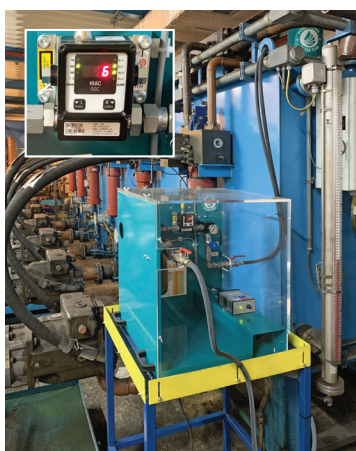
Tank volume: 3 000 l

**Why to implement bypass oil filtration to hydraulic applications:** the hydraulic oil in injection molding machines and hydraulic applications have standards for the cleanness class, viscosity, water content, total acid number and the last decade varnish content. The maintaining the standards incorrectly will reflect overall maintenance ability for breakdowns and down cost. 80% of all breakdowns lead to unclean oil. The primary filters are effective only in the certain degree protecting the specific parts of hydraulic systems but they are not able to protect overall hydraulic system with the extension of oil change intervals and reducing the breakdowns. The bypass filtration or the secondary filtration will maintain all standards in sustainable level for longer period of time in addition it will extend the oil change and primary filter elements intervals by 2-3 times. Moreover the whole process will lead to environment friendly culture by reducing dangerous goods and spills.

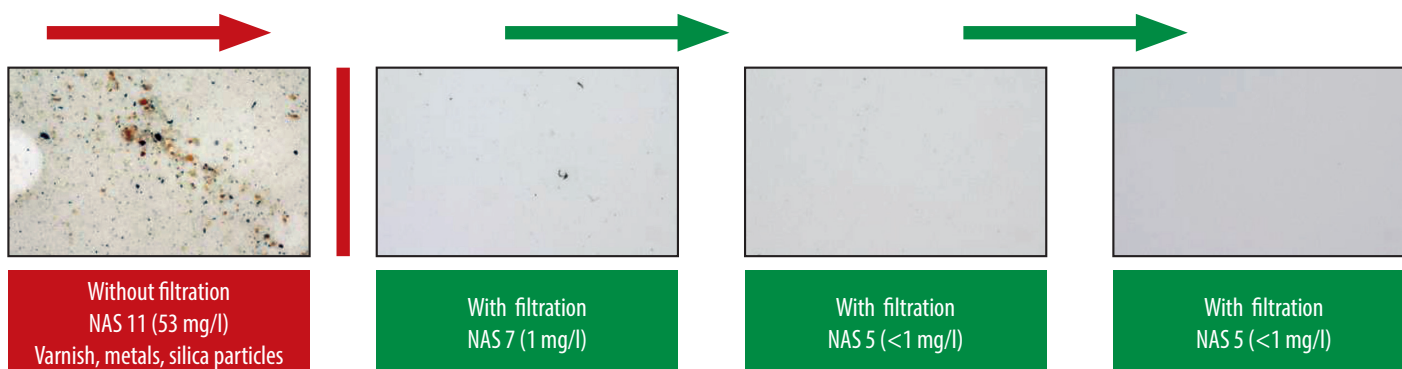
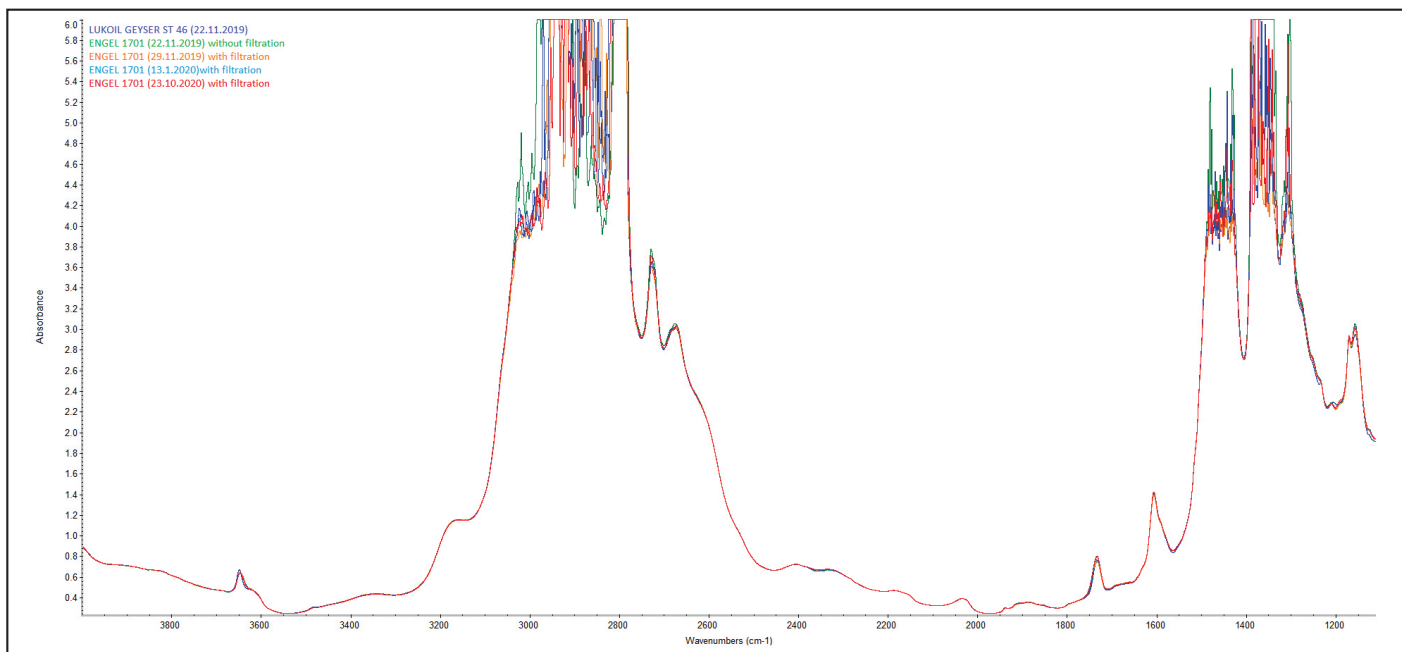
**The By-pass Oil Filtration unit will extend the lifetime of the overall hydraulic system, will prolong the oil change interval and will reduce exchange of primary filter elements. This implementation will lead to overall cost saving.**

**How it works:** The By-pass oil filtration unit works independently from main hydraulic circuit with own pump connected independently to the oil tank. It operates when the hydraulic system is on/off without effecting the hydraulic system and whole manufacturing process.

**The major benefits:** The extension of oil change intervals (2-3 times less). The extension of primary filters elements lifetime (2-3 times longer). The removal of varnish, mechanical contaminants (metal abrasion, silicates, fibers...) and water content. It will slowdown the oil degradation (acidity TAN level, oxidation, slower loss of low-temperature antioxidant). The cost savings related to buying less hydraulic oil and with reduction of disposal and waste oil. The reduction of general wear and tear. The extending the lifetime of the whole hydraulic system. The reduction in repair costs and downtime (up to 50 %). The environment friendly conditions.



# The study case of hydraulic oil in injection molding machine



No	0	1	2	3	4	Limit
Parameter	Reference oil Geysler ST 46	P 22.11. 2019 Without filtration	29. 11. 2019 With filtration	13.1. 2020 With filtration	23.10. 2020 With filtration	
Viscosity at 40°C [mm <sup>2</sup> /s]	46,26	47,83	46,62	46,54	46,71	±10 %
Cleanness class NAS 1638	NAS 8	NAS 11 + Varnish	NAS 7	NAS 5	NAS 5	NAS 5-7
Mechanical conta- mination [mg/l]	2	53	1	<1	<1	-
Water content [ppm]	83,5	141,5	52,3	44,8	49,3	Max. 200
TAN [mgKOH/g]	0,68	0,75	0,75	0,75	0,76	Max. 1,5
Low-temperature phenolic antioxi- dant [% wt]	0,23	0,21	0,21	0,21	0,20	Min. 0,05
IR Spectrum oil degradation	OK	LOW degradation	LOW degradation	LOW degradation	LOW degradation	-

