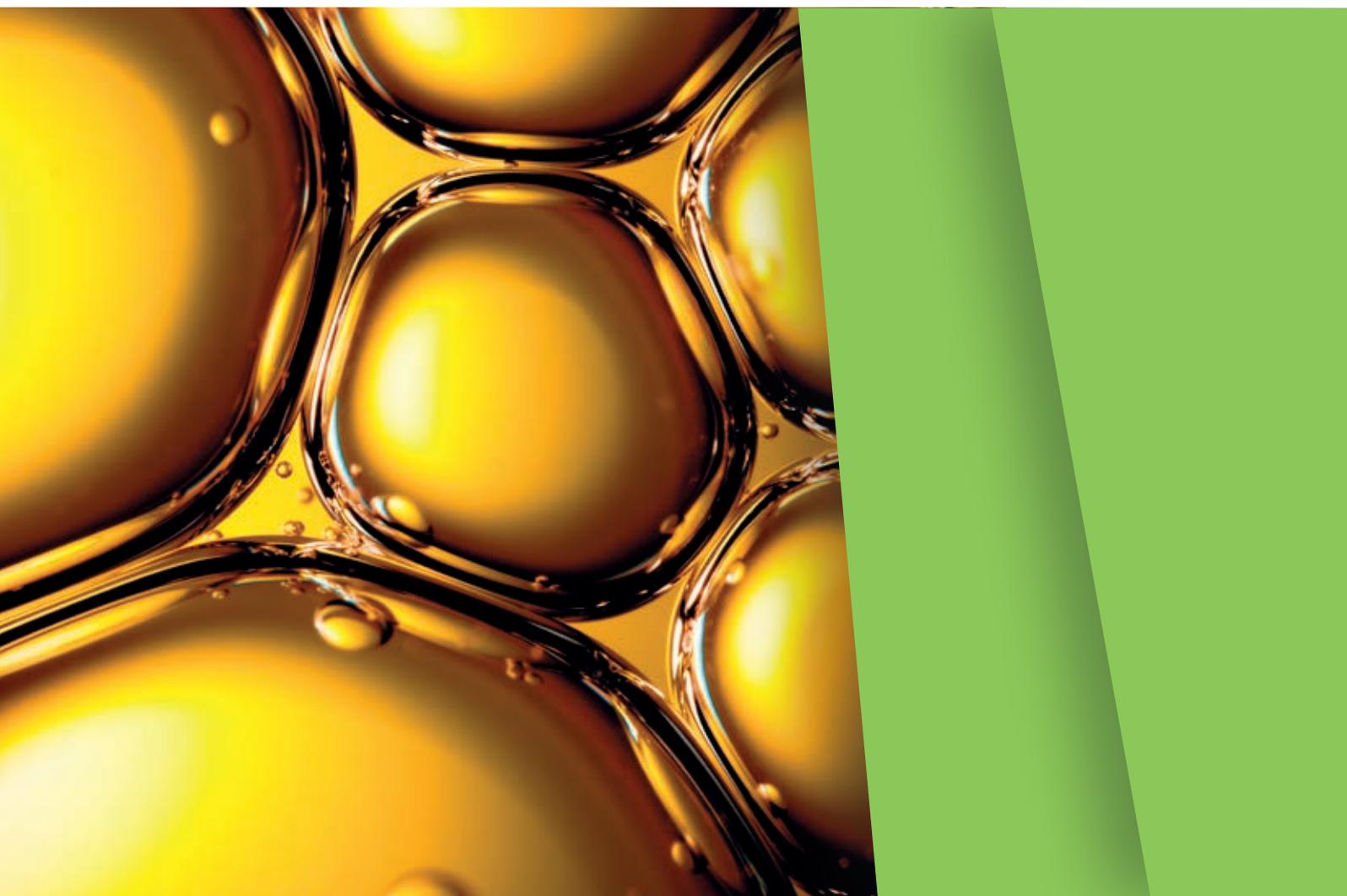


Oil Maintenance

Clean. Stable. For a lifetime.



ENGEL
be the first

the problem: soiling

Soiling causes 80% of all hydraulic system failures!

Precise hydraulic systems work with clearances in the micrometer range. This means: even the smallest particles of dirt can cause your production equipment to fail – especially during warm-up operation.

Particles

Particles in the hydraulic oil collide with metal parts. This damages the surface and releases new metal particles. Hard particles between moving parts can result in chemical subversion.

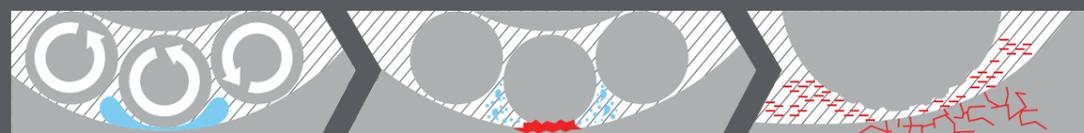


Oil degradation

Oxidation and high temperatures of the hydraulic oil lead to resin build-up or resin deposits (gumming).

Water

Water in the oil evaporates. The microscopically small vapour bubbles implode under high pressure (cavitation). The resulting pressure peaks tear particles off the metal surface. Additionally, water in the oil causes corrosion.



the solution: ENGEL Oil Maintenance

Clean oil with constant quality and viscosity.

The cellulose cartridge with its 3 µm fine filter removes dirt particles, condensed water and oil degradation products ("soft contaminants") in a single step.

The cellulose cartridge is available in 3 performance levels:

- OM 1.0: max. 1 kg dirt + 0.7 l water
- OM 2.0: max. 1 kg dirt + 0.7 l water
- OM 3.0: max. 4 kg dirt + 2 l water
- OM 5.0: max. 8 kg dirt + 4 l water



Low Investment, High Impact.

Less downtime, less maintenance, increased productivity – ENGEL Oil Maintenance reduces your maintenance costs and unplanned machine downtime. Your plant's productivity increases.

improved productivity

- up to 55%* less downtime and unplanned outages

Less maintenance

- Less wear and an extended service life for
 - hydraulic components
 - hydraulic oil
 - system filters
- less downtime and maintenance costs due to micro-fine filtering
- longer service intervals

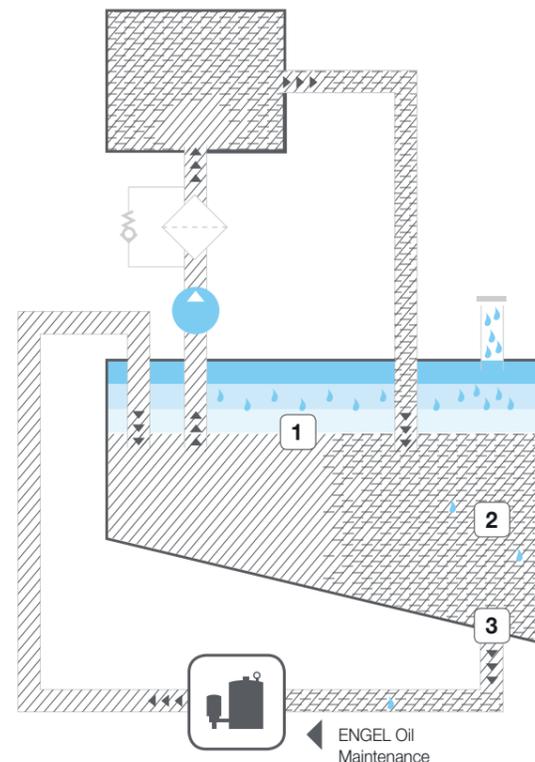
Lower energy consumption

- less friction
- Excellent oil quality and viscosity remain unchanged

All of the benefits listed here have a direct positive influence on your profit!

The ENGEL Oil Maintenance overview

- 1** Avoiding oxidation, hydrolysis and acid build-up
- 2** Filtering corrosion residue
- 3** Removal of gumming and micro-particles



* Computations based on best practice examples

Best Practice

Example 1 | GE Industrial Solutions, Belgium

Superior in a benchmark of external filter systems at GE - ES 14000/1400

GE Industrial Solutions in Gent, Belgium, benchmarked various external filter systems over a period of several months and confirmed the manufacturers' test results in an independent laboratory: gumming was drastically reduced from 75% to 35%. After 3 months, the purity class had improved from 15/14/11 to 14/13/6.



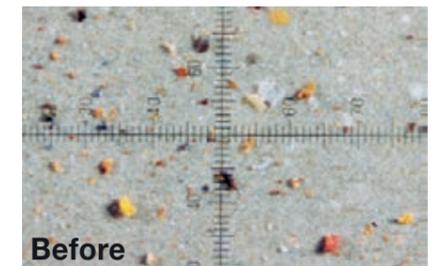
Oil maintenance with a cellulose cartridge was the only method that achieved the promised results. Servo valve and main filter contamination was resolved. We will be retrofitting ENGEL Oil Maintenance on existing production cells to reduce downtime and spare parts costs in the long term."

Marc Van Hassel, Production Manager | Wim Callaerts, Maintenance Manager | Christian De Groote, Team Leader Maintenance

Example 2 | Cork Plastics Ltd. Ireland (Oil analysis according to ISO 4406)

Oil analysis without ENGEL Oil Maintenance

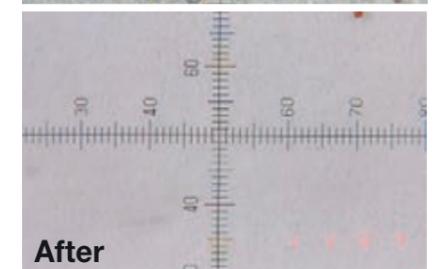
The sample was taken before installing ENGEL Oil Maintenance. The dark brown colour on the membrane indicates a high level of gumming.



Before

Oil analysis with ENGEL Oil Maintenance

Analysis results	Day 1	Day 100	Day 250
2 µm particles	3,384,008	84,656	7,054
5 µm particles	178,319	32,480	1,924
15 µm particles	24,817	2,312	143
ISO purity class	22/18/15	17/16/12	13/11/8



After

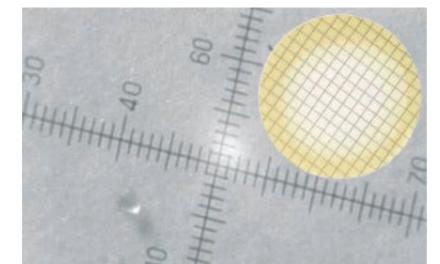
Example 3 | DBI Plastics: no change of oil for 16 years



I can only remember one oil change on one of the injection moulding machines. There had been a leak in an oil cooler. Otherwise we use the same oil throughout the machine's service life."

Preben Jensen, DBI Plastics

Oil sample after 16 years ▶



ENGEL Services

Always there where you need us



450 of the best equipped service technicians

55 support hotline technicians

9 production plants

29 sales subsidiaries

60 representatives

Your concern is **our challenge**

It is important to always keep your injection moulding equipment in top shape and constantly available. The wide range of services offered by ENGEL ensures that you can produce competitively at any time. It doesn't matter whether your production cell is a single machine or a complex integrated system solution. ENGEL makes it possible for you to utilise all options for optimisation at any time, and therefore consistently get the most out of your machine over the long term. In addition, we offer professional training for machine operators as well as the fastest delivery worldwide, and experienced installation of spare parts. Diverse maintenance contracts also guarantee top-level machine availability. Because our goal is the best possible performance of your ENGEL machinery.

Support – we assist you on-site

- save costs incurred by downtime
- immediate support around the clock, worldwide
- knowledgeable help from the ENGEL service team
- for ENGEL injection moulding machines of any generation
- for all ENGEL technologies and any control unit version

Upgrade – install reliable added value

- for all ENGEL injection moulding machines
- professional upgrade solutions
- to supplement and optimise
- equip machines for use with completely new applications
- utilise machines with greater cost-effectiveness

Know-How – increase your competence

- thorough training with a comprehensive transfer of know-how
- make optimal use of machine potential
- individual seminars and training programs for you and your staff
- informative events on industry-specific topics
- take advantage of efficient, targeted and practical information, instruction and training
- either at your own facility or at one of the worldwide ENGEL training centres

