

CASE STUDY: Hydraulic Systems — Injection Molding Equipment

PROVANTAGE™ with proper filtration improves reliability and reduces cost

PROBLEM

Significant heat and pressure are an integral part of the injection molding process. These conditions demand special attention and advanced lubricant technology. Like many injection molding facilities, this customer was experiencing high repair and maintenance costs for hydraulic equipment and spiraling costs of hydraulic oil.

Injection molding is a manufacturing process for producing parts from plastic materials.

Steel or aluminum molds are precision-made to form the shape and features of a designed part. To produce the finished product, material feeds into a heated barrel, where it is mixed and forced into the mold cavity to cool and harden to the shape of the mold opening.

Notable problems found at this location include

- High operating temperatures, pressure and gaps in seals created hydraulic oil leaks in injection molding machinery
- Significant levels of water, dirt and wear metals were found
- Oil analysis indicated filtered oil was of lower quality and had suffered additive depletion
- Each of the above contributed to additional repair costs
- High cost of oil filtration service (approx. \$2 per gallon)



CHEMSEARCH SOLUTION

CHEMSEARCH has been working with the customer to improve equipment reliability, while reducing repair and maintenance costs previously rising out of control.

Steps taken include

- Filter all oil with vacuum dehydration process to remove all water (emulsified and non-emulsified), along with solids (wear metals and others) up to 5-micron size
- Add PROVANTAGE (at 15:1 ratio) to filtered oil for improved equipment protection and extended change intervals
- Perform oil analysis to ensure quality of filtered oil
- Randomly sample oil in machinery to monitor oil quality and protect equipment
- Utilize oil filter carts on a regular basis to filter oil in equipment

RESULTS

CHEMSEARCH helped the customer save \$186,662 during the first year of program implementation. Equipment oil temperature decreased and oil additive levels improved.

Hydraulic Systems

Injection Molding Equipment



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TESTING DATA DETAIL

Equipment & operation: Injection molding machines (28 Millicron®, 6 Van Dorn®, 6 HPM units) producing battery casings for automobiles. The facility is operational 24/7.

STUDY DATA

Description	Before	After	Change
Oil temperature	128-132°F*	116-118°F	-13°F (-10%)
Oil additive levels (per oil analysis)	Substantial depletion	High levels	Significant protection improvement

* Machine shut-down temperature 135° F

DATA INTERPRETATION

Operating temperature was reduced by 13°F or 10%. This extended oil life by reducing oil breakdown. The improved lubrication provided longer equipment life and ensured higher reliability. Oil analysis reports indicated recycled oil treated with PROVANTAGE™ contained higher additive levels than new, unused oil.

COST SAVINGS

Description	Before	After	\$ Savings
New oil	100,000	20,000	80,000
PROVANTAGE	0	33,720	(33,720)
Oil filtration (Mobile service)	43,200	0	43,200
Servo valve and hydraulic pump parts	144,000	12,000	132,000
Labor costs for repair (after includes filtration equipment operation costs)	6,720	13,440	(6,720)
Filtration equipment**	0	21,600	(21,600)
Replacement filters	0	6,498	(6,498)
Total Annual Cost†	\$293,920	\$107,258	\$186,662

**Amortized over 5 years, includes two carts and two dehydrators

†Down time costs not included

CONCLUSION

As a result of implementing oil filtration and adding PROVANTAGE, the customer experienced improved reliability of their hydraulic injection molding systems and reduced cost.