SERVICE OVERVIEW

LABORATORY ANALYSIS

Extending equipment life and ensuring reliability

Gastops has performed laboratory testing services in the military, commercial, and business aerospace industry for 20 years. Our team is composed of aircraft maintenance engineers (commercial and military), professional engineers, data scientists, and lubrication specialists.

Laboratory Services

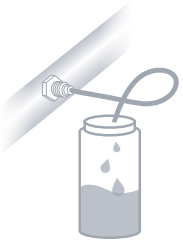
Gastops is a recognized leader in laboratory analysis services for condition monitoring of fluid, filter, and chip debris in aircraft and equipment. With the in-depth understanding of our customers' operations and the carefully selected test packages that meet the requirements of various OEM maintenance programs, we help our customers accurately, efficiently and cost-effectively diagnose the condition of their assets.

Filter Debris Analysis

Filters capture the majority of wear debris in lubricating oil. Gastops specializes in filter debris analysis – a proven and effective method of proactively monitoring gear and rolling element bearing damage modes.

Fluid Analysis

Fluid analysis of oil-lubricated systems is a commonly used condition monitoring technique used to evaluate fine wear debris, fluid condition, and fluid contamination.



Laboratory Chip Debris Analysis

Chip detectors typically capture 15% of wear debris from gears and bearings. When chip lights occur, there is often a requirement to identify the material of the chips collected, along with physical measurements and appearance. Gastops SEM-EDX provides customers with elemental composition of chips using our material library, which contains over 35 common alloys and materials used within engines and gearboxes.

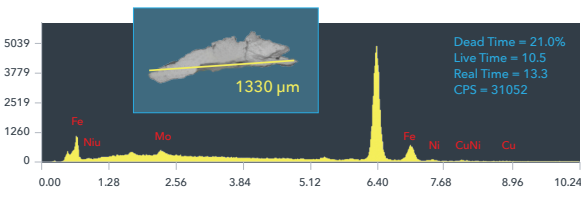
Condition Indicator Development

The production of actionable results from laboratory testing requires the development of acceptable limits and a recommendation ruleset. Gastops recommendations are developed through a combination of test rig testing and statistical characterization of test rig and in-service data. Data is validated for sensitivity, unambiguity, and statistical reliability.

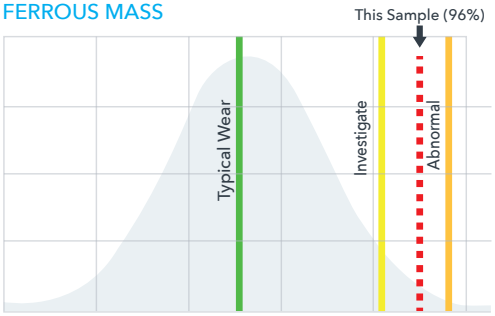
ELEMENTAL COMPOSITION (Wt%)

Fe	Mo	Ni	Cu	Cr
93.11	2.16	1.85	1.75	1.13

The closest match for this material is UNS K71040 Pyrowear 53



FERROUS MASS



Certifications

Personnel Certifications

- Society of Tribologists and Lubrication Engineers Certified Lubrication Specialists (STLE CLS)
- International Council for Machinery Lubrication (ICML) Machinery Lubrication Technician (MLT) & Machine Lubricant Analyst (MLA)
- Professional Engineering (P.Eng.)
- Aircraft Maintenance Engineers
- OEM-trained laboratory technicians

Certifications and Memberships

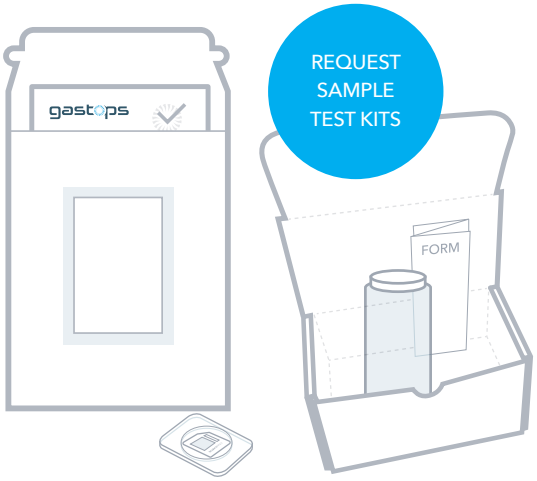
- ISO 9001:2015 Quality Management System
- Joint Oil Analysis Program (JOAP)
- Safran Helicopter Engines (Spectrometry)
- Innotech International Quality Assurance Exchange Program
- Society of Tribologists and Lubrication Engineers (STLE)
- Canadian Machinery Vibration Association (CMVA)

Service Options

- Customer-specific test packages
- Aircraft and engine type test packages
- Sample kit and consumable provision
- Instrument deployment and training
- Lubrication program audits
- Condition indicator development and validation
- Hardware correlation and damage severity analysis
- Advanced engineering analytics

Test Methods

CHIP DEBRIS ANALYSIS (SEM)	GASTOPS METHOD
CHIP DEBRIS ANALYSIS (LIBS)	ASTM D8182
FILTER DEBRIS ANALYSIS	ASTM D7919
SPECTROMETRY	ASTM D5185 ASTM D6595
ANALYTICAL FERROGRAPHY	ASTM D7690
PARTICLE COUNT	ISO 4406 NAS 1638 NAVAIR 01-1A-17 AS4059
FTIR	ASTM E2412
VISCOSITY	ASTM D445
FLASH POINT	ASTM D7236
TAN	ASTM D974
TBN	ASTM D4739
WATER CONTENT	ASTM D6304
TOTAL CHLORINE	SAE AIR 4713



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