Alfa Laval Moatti

10μm FOフィルタ
触媒粒子からのエンジン保護と稼働年数の改善

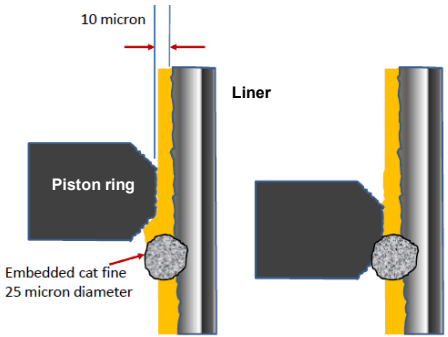
Thomas Semeraro
Regional Business Manager
Filtration

触媒粒子の脅威

- 触媒粒子は非常に硬質
  主機のシリンダライナやピストンリング
  にかみ込み、摩耗を誘発

- 触媒粒子は様々なサイズ
  特に10μm以上のものが主機に損傷を引
  き起こす

- 触媒粒子は燃料ポンプ、インジェクタ、
  バルブにも悪影響を及ぼす恐れ



主機メーカからの推奨 (1)

- MAN D&T: Service Letter SL2017-638

SL2017-638

Service Letter SL2017-638/DOJA

MAN Diesel & Turbo

Action code: WHEN CONVENIENT

Cleaning of Heavy Fuel Oil and Maximum 0.10% Sulphur Fuels

How to remove cat fines

SL2017-638/DOJA
February 2017

This SL replaces SL2005-452/KEA

Concerns
Owners and operators of MAN B&W two-stroke marine and stationary diesel engines.
For Holeby four-stroke engines, reference is made to SL2017-640/LNW.

Summary
Cat fines are small, very hard particles found in marine fuel. Cat fines can wear the engine down very fast, and they must be removed from the fuel by the fuel cleaning system on board the ship.

Recommendation:
Max. 15 ppm Al + Si at engine inlet for short periods

Dear Sirs

Abrasive particles entering the combustion chamber of two-stroke diesel engines are a cause of wear. Cat fines (catalytic fines) are small, very hard particles originating from the refining process. In case of insufficient cleaning onboard, cat fines may enter the engine with the fuel and cause wear. The latest ISO marine fuel standard specifies levels of up to maximum 60 ppm Al + Si in the fuel (ISO 8217). Such a level would cause high wear compromising reliability in the combustion chamber, and so the fuel must be cleaned on board the ship before it reaches the engine.

This Service Letter specifies the recommended maximum acceptable level of cat fines entering the engine, which is as follows:
- Always keep the level as low as possible and, max. at 15 ppm Al + Si at engine inlet for short periods.

Some guidelines on optimal operation are also given:
- Remove the cat fines from the fuel by setting a high temperature (min. 98°C) and a low flow in the fuel separators.
- Enable proper cleaning of the tanks in service by making the overflow pipe in the service tank go to the bottom of the tank, and/or by using a separate line to recirculate the fuel to the settling tank.
- To be warned when the fuel system is not operating optimally, a 10 µm abs. fine-filter should be installed in front of the engine.

More detailed information can be found in Ref. [1]. For questions or inquiries regarding the recommendations in this letter, contact our Operation Department at: leo@mandieselturbo.com

Yours faithfully

Mikael C Jensen
Vice President Engineering

Stig B Jakobsen
Senior Manager Operation

Al + Si
At engine inlet
>15 ppm
10 ppm
<5 ppm

Cat fines (Al + Si) content entering the engine.

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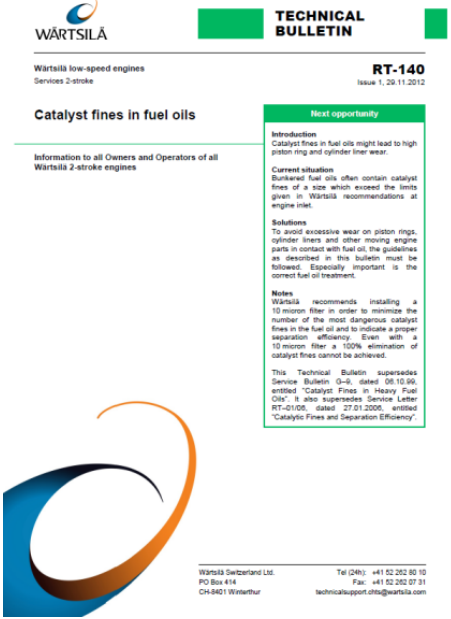
主機メーカからの推奨 (2)

- Wärtsilä: Technical bulletin RT-140 29/11/2012

RT-140



WÄRTSILÄ

TECHNICAL BULLETIN

Wärtsilä low-speed engines
Services 2-stroke

RT-140
Issue 1, 29.11.2012

Catalyst fines in fuel oils

Information to all Owners and Operators of all Wärtsilä 2-stroke engines

Next opportunity

Introduction
Catalyst fines in fuel oils might lead to high piston ring and cylinder liner wear.

Current situation
Bunkered fuel oils often contain catalyst fines of a size which exceed the limits given in Wärtsilä recommendations at engine inlet.

Solutions
To avoid excessive wear on piston rings, cylinder liners and other moving engine parts in contact with fuel oil, the guidelines as described in this bulletin must be followed. Especially important is the correct fuel oil treatment.

Notes
Wärtsilä recommends installing a 10 micron filter in order to minimize the number of the most dangerous catalyst fines in the fuel oil and to indicate a proper separation efficiency. Even with a 10 micron filter a 100% elimination of catalyst fines cannot be achieved.

This Technical Bulletin supersedes Service Bulletin 0–9, dated 06.10.99, entitled "Catalyst Fines in Heavy Fuel Oils". It also supersedes Service Letter RT–01/06, dated 27.01.2006, entitled "Catalytic Fines and Separation Efficiency".

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Information to all Owners and Operators of all Wärtsilä 2-stroke engines

Solutions

To avoid excessive wear on piston rings, cylinder liners and other moving engine parts in contact with fuel oil, the guidelines as described in this bulletin must be followed. Especially important is the correct fuel oil treatment.

Notes

Wärtsilä recommends installing a 10 micron filter in order to minimize the number of the most dangerous catalyst fines in the fuel oil

主機メーカからの推奨 (3)

- MAN D&T: Service letter SL SL2016-615/JFH

MAN Service Letter

Service Letter SL2016-615/JFH

MAN Diesel & Turbo

Action code: WHEN CONVENIENT

Fuel Oil Backflushing Filter

SL2016-615/JFH
May 2016

Concerns
Owners and operators of
MAN four-stroke diesel engines.
GenSet types: L16/24, L21/31, L23/30H, L27/38, L28/32H, V28/32S

Summary
Installing an automatic backflush filter in the fuel oil booster/circulation system protects the engines against abrasive particles and impurities in the fuel oil.

Reference is made to:
Engine – operating manual:
010.000.023-05 Specification of heavy fuel oil (HFO) and
010.000.023-14 Analysis of operating fluids.

Dear Sirs

MAN Diesel & Turbo has observed a number of incidents with high wear rates and damage to the fuel injection pumps / fuel injectors after only a few hundred running hours.
The poor performance of worn fuel injection pumps / fuel injectors affects the overall performance of the engine and causes the onset of fouling of the combustion chamber, exhaust gas ducts and turbine section of the turbocharger.

In order to maintain a trouble-free and safe operation of the engine MAN Diesel & Turbo requires that the onboard fuel oil cleaning system is able to bring down the particle content of bunkered fuel oil from 60 ppm to 20 ppm and specifically the catalytic fines content to maximum 15 ppm with a maximum particle size of 5 micron thereby defining the efficiency of the system. If fuel oil with a lower content of particles are bunkered consequently a lower level of particles will remain after treatment.

To ensure the correct cleanliness of the fuel oil and thereby protect the auxiliary engines against abrasive particles and impurities in the fuel oil, a 10 µm (absolute/sphere passing mesh) automatic backflush filter must be installed in the fuel oil booster/circulation system before the branch off to each auxiliary engine. The automatic backflush filter will also serve as an indication of failures in the fuel oil cleaning system and it removes self-generated contamination in the fuel oil booster/circulation system. Installing the 10 µm backflush filter has in more cases extended the service hours of the fuel injection nozzles from as low as 400 to at least 8000 hours.

Yours faithfully

Mikael C. Jensen
Vice President
Engineering

Jens Høj
Mechanical Engineer,
Operation

Excessive wear of fuel injector (nozzle holes)

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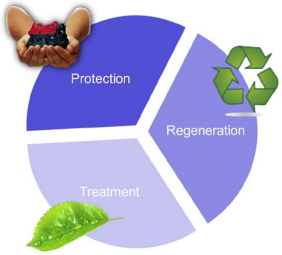
Amtsgericht Augsburg

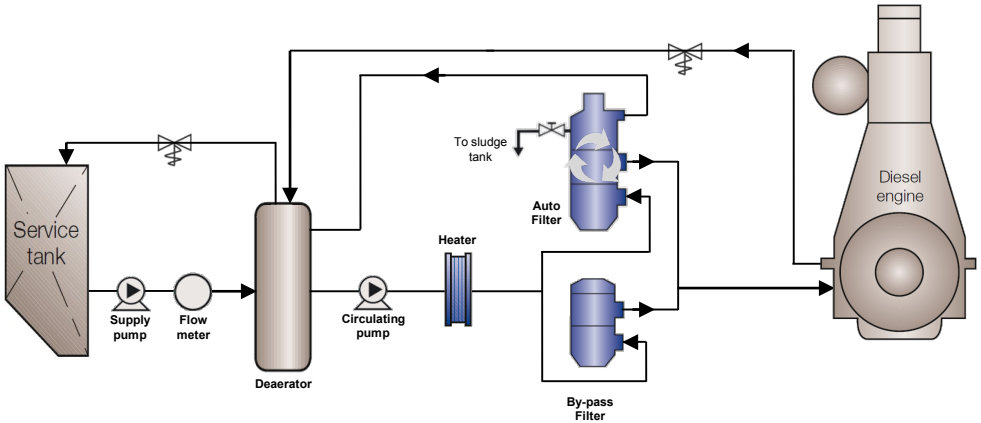
Owners and operators of
MAN four-stroke diesel engines.

To ensure the correct cleanliness of the fuel oil and thereby protect the auxiliary engines against abrasive particles and impurities in the fuel oil, a 10 µm (absolute/sphere passing mesh) automatic backflush filter must be installed in the fuel oil booster/circulation system before the branch off to each auxiliary engine. The automatic backflush filter will also serve as an indication of failures in the fuel oil cleaning system and it removes self-generated contamination in the fuel oil booster/circulation system. Installing the 10 µm backflush filter has in more cases extended the service hours of the fuel injection nozzles from as low as 400 to at least 8000 hours.

Alfa Laval Moatti - 特徴



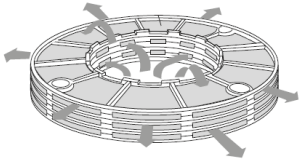
処理：自動濾過と一体型ダイバーションチャンバ
→ 濾過された逆洗油が再循環

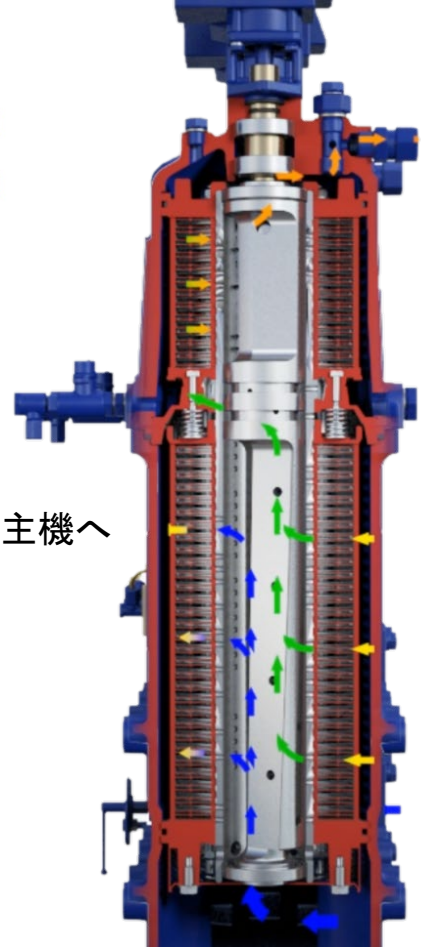


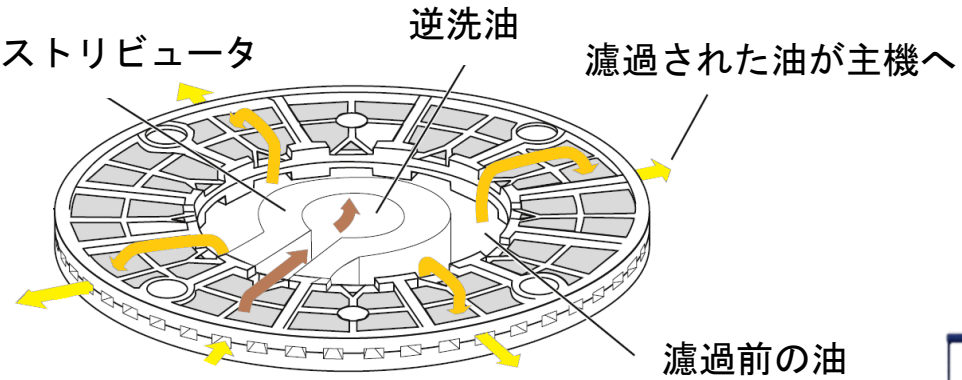
再生：連続逆洗

保護：10 µmメッシュ –
主機の直前に設置されたファイン
メッシュフィルタ

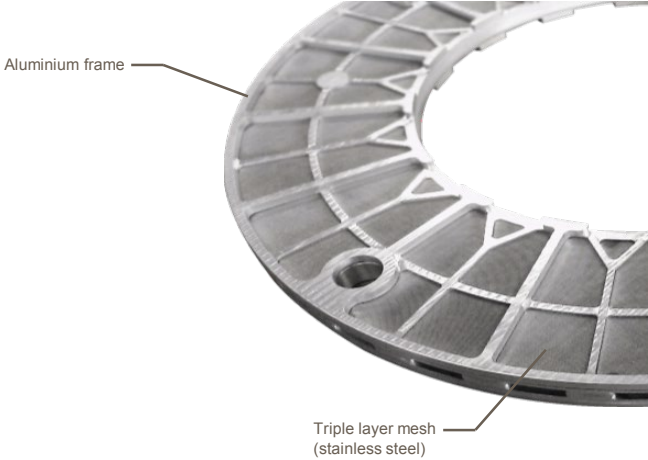
濾過の仕組み



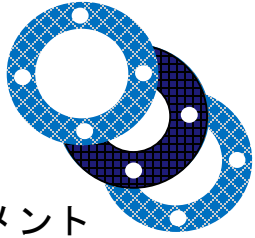


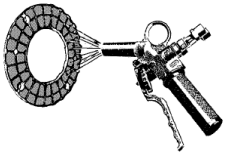


主要な利点



- 10 µmメッシュ（絶対値）
- 連続逆洗の技術
- 自動かつ一体型ダイバーションチャンバ
- 逆洗には濾過した清浄油を使用（エア不要）
- 低メンテナンスコスト – 長期間使用可能なフィルタエレメント
- 容易なメンテナンスと洗浄





アップグレードの利点

34 µmフィルタから10 µmフィルタへのアップグレード

Alfa Laval Moatti 10 µm FOフィルタ

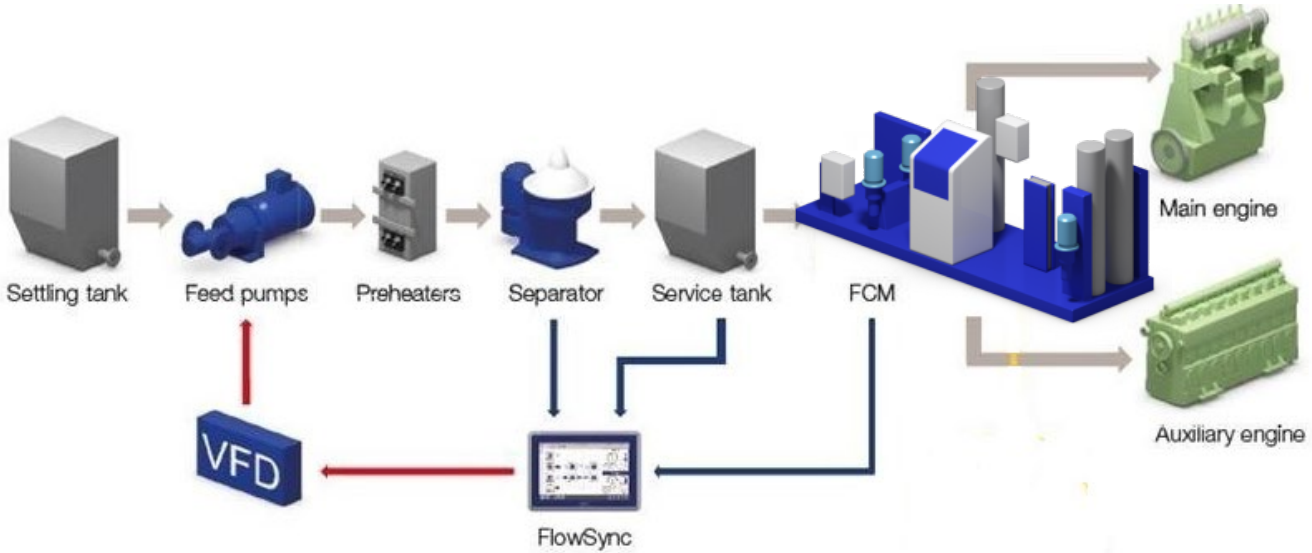
- ✓ **より小さな設置面積**
- ✓ **より細かな粒子の濾過** (よりよい主機の保護)
- ✓ **燃料ロスの低減** (逆洗油の再循環)

燃料油の取り扱い

アルファ･ラバル　燃料油コンディショニングシステム

Cynthia Gong
Regional Business Manager
FCM Marine Separation

The adaptive fuel line – Alfa Laval FCM



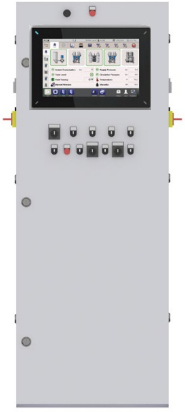
Alfa Laval FCM

Fuel Conditioning Systems / Booster unit （以下 FCM） とは？

- サービスタンクから主機に供給される燃料油の適切な調整
- 主機の仕様にマッチする燃料油を最適な流量、圧力、粘度で供給
- 多岐に亘る燃料油やそれらのブレンド油を管理できるよう設計、必要に応じた燃料油切り替えを管理

Alfa Laval FCM – 主要な構成機器

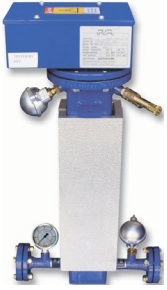
主要部分には当社の機器を使用





その他の重要部品には、信頼のあるサプライヤの機器で構成



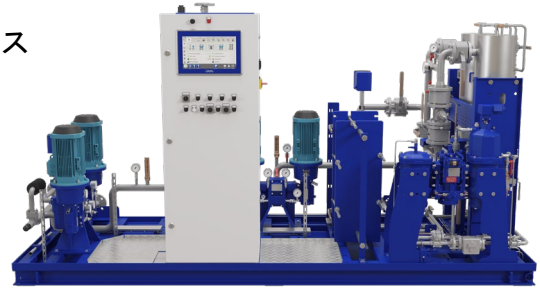
Alfa Laval FCM – 利点

各種燃料油に対する適応性

- 自動かつ遠隔操作の燃料油切り替え
- 最大４種類までの燃料油自動管理が可能
- それぞれの油の調整に対応したパラメータ

安全なオペレーション

- 簡単なインターフェース、モジュール設計
- 主機メーカの要求に準じた安全な燃料油切り替えプロセス



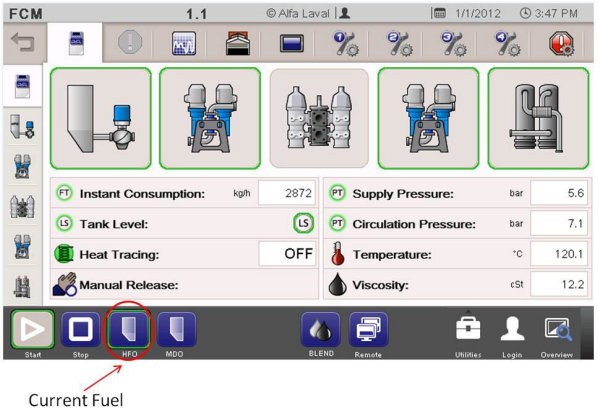
ワールドワイドネットワーク

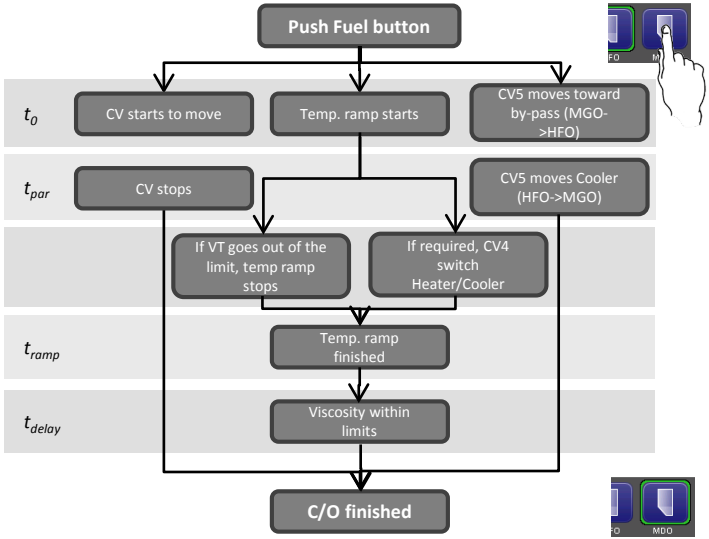
- 重要な機器をアシストするための世界的サービスネットワーク
- 予備品供給体制の充実（グローバルな供給体制）

Alfa Laval FCM – 制御された燃料油切り替え

制御された燃料油切り替えを確立

- 全自動燃料油切り替え
- タッチパネルによる安全かつ簡単なオペレーション
- 燃料油切り替え時の温度調整、粘度制限についても設定可能





要約

Alfa Laval FCM, link to 2020 Fuels

Fuel Flexibility

- 自動で安全な燃料切り替え
- 最大４種類までの燃料油の調整可能
- 安定性並びに適合性の問題回避

Engine Protection

- エンジン直前の10 µm Moatti Filter