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SYRO OILING SYSTEM HB2000 HIGH PERFORMANCE MOULD OILING DEVICE

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ABSTRACT

The SYRO Oiling System HB 2000 is primarily used for the coating of running steel or aluminium coils in the steel moulds/plates production and for the coating of all kind of steel moulds in the fibre cement plates manufacturing. A wide range of drawing and punching oils and release agents are suitable with this spray device, but notably qualified is the SYROFORM S oil.

Description

The field-tested system can be equipped with multiple spray valves. They can be variously arranged, so that it is even capable to coat running coils on the surface and bottom side at the same time. The spray device is assembled on a frame with an adjustable track just before the compression moulding and above the running coil or plates. The spray coating width is adjusted with the distance of the valves to the running coil/plate. With a viscosity of 400mm²/s one spray valve can coat up to 200 mm width. The device control is positioned close to the oiling system. A time lag relay controls the magnetic valves and the spray air. The agent quantity and the spraying grade can be individually adjusted by a knurled nut at the spray nozzle. Any of the installed spray nozzles can be separately turned on and off.

Advantages

- Very low oil and release agents consumption
- Individually adjustable spray valves
- High throughput speed
- Practically unlimited coil or plate width
- Sectional coating of 200 x 50mm panel size
- More economical than rolling procedures
- Easy to install
- Optimal cost-value ratio

KEYWORDS:

Mould oiling, spray coating, mould oil economising, oiling - optional, release agent..

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INTRODUCTION

Since 30 years the economical consequences were not that drastic due to permanent raising oil prices than today. People are suffering from the high gasoline prices when they are fuelling their cars, buying their heating oil or travelling by airplane and have to pay fuel taxes. The reasons for the exploding oil prices are various and consistently of global nature. To clarify how complex the influences on the global oil prices are only the most important are listed:

- Insecurity in some of the oil providing countries (due to wars, strikes, political conflicts, terror, natural disasters)
- Booming markets in India and China
- Missing investments in the oil manufacturing
- Stock exchange speculators
- Worldwide exploitation and waste of the natural resources
- Exorbitant energy consumption in the industrialised countries
- Fact that no real alternative to mineral oil exists, yet

However, as long as no real alternative to today's mineral oil exists also the fibre cement manufacturers are more and more exposed to be under strain to lower their oil consumption and costs. A year ago nobody thought of saving oil in their production process. "The more, the merrier" was the common practice when the oil cost was still half of today's cost. However, since 2006 thirst signs of rethinking could be recognized.

But the fibre cement industry is not only under strain on economical aspects to lower their oil consumption, but have to comply more and more with national and international ecological regulations as well. What makes the situation even more difficult for them is that various oil providers like Shell and Exxon Mobile started to phase out their mould release agents, e.g. Shellflex, Shell Pad 1191 and Formrex. So there are enough reasons that the fibre cement industry starts to find new ways to arrange themselves with the economical and ecological situation.

Influences, which should make the fibre cement industry rethinking

- Rising oil price (doubled since August 2005!)
- New ecological regulations (e.g. 1999/13/EG to reduce VOC emissions)
- Phasing out of various mould release agents (i.e. Shellflex, Shell Pad, Formrex)
- Quality and economical aspects (e.g. corrosion protection endures the life-time of any steel moulds)

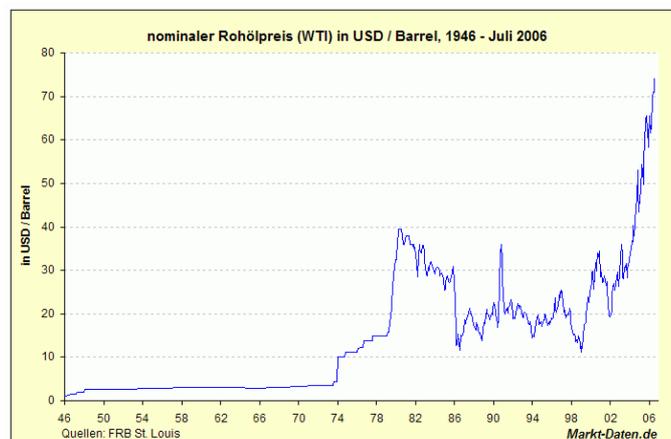


Figure 1 – Oil price development

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EFFICIENT OILING METHOD WANTED

In the following analysis we would like to clarify that there exist ways and means to reduce the oil and release agent consumption drastically, despite today's difficult conditions. During all of our countless visits of the fibre cement manufacturers around the world during the last years we received the impression and the knowledge what the fibre cement industry really requires. We never had a doubt that the more efficient use of release agent would not become essential to the producers. Other industries like the automotive industry have already switched to more efficient oiling systems some years ago. Obvious is that additionally to the oiling system the used oil has to be considered as well, as it is similarly important for the oil saving and quality assurance of the used steel moulds. Therefore we talk in the following about oiling system and form oil.

Example of a oil consumption calculation

Common oiling methods like brushing and/or rolling need a vast quantity of oil as it is impossible to technically control the coating quantity. Neither those methods cannot guarantee that the entire surface of a steel mould has a constantly thick oil coating. Today's average oil consumption of many fibre cement manufacturers is between 15g/m² and 30g/m², some even use more! Steel templates oozed with oil are no rarity in the various factories. For the following example we take a middle sized fibre cement mill with a production volume of 4 million square meters per year and a average oil consumption of currently 20g/m².

Template surface and bottom side	10 m ²	
Average oil consumption per m ²	20g/m ² ~ 23.5 ml/m ²	→ 235 ml/template
Quantity of manufactured fibre cement products	4'000'000 m ²	→ 940 000 l/year
Cost	€1.60/l	→ €1.504 million /year

Table 1 – Oil consumption calculation

The yearly costs are enormous and might not only a negligible factor!

SYRO Oiling Concept

Based on the gathered requirements of the fibre cement industry we developed a new oiling concept that leaves nothing to be desired and has a sensational cost-value ratio.

Requirements

- Constantly thick oil coating over the entire surface and bottom side of the steel templates
- Small coating thicknesses, individually adjustable within the range of g/m²
- No direct contact and abrasion due to rolling or brushing
- Small coat able areas
- Environmental friendliness (e.g. no mist) and economical efficient (reduction of more than 50%)
- Compact assembly and trouble-free fitting in existing production lines

Our oiling concept bases on an automatic oil spray device that has already been successfully used in the automotive industry. Customized to the requirements of the fibre cement industry we finally introduced the SYRO Oiling System HB2000.

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SYRO OILING SYSTEM HB2000

The SYRO Oiling System HB2000 is therefore one of the most innovative products that we can offer as a supplier of the fibre cement industry. Due to its veritable efficiency and therefore very low oil consumption it actually revolutionizes the oiling of steel moulds/templates in the fibre cement and wood cement production. And this all without any negative influences on the release of your fibre cement or wood cement pressure panels, plates or slides from the used steel moulds/templates. Compared to common oiling methods the oil consumption is much lower with the SYRO Oiling System HB2000!

Advantages on a glance

- Very low oil- or release agent consumption

For the production of fibre cement or wood cement pressure panels, plates or slides sensational 4 g/m² to 9g/m² are enough with the SYRO Oiling System HB2000, and not 15g/m² to 30g/m² as with common oiling methods. Due to individually adjustable spray valves almost every spraying picture and each amount of g/m² can be set.

→ **Highly economical efficiency**

→ **Very fast Amortisation**

→ **Ecologically harmless**

- Easy installation and operation

Even smallest areas of 200 x 50 mm can be spray coated and there are no constraints for the maximum width. The SYRO Oiling System HB2000 may be used for any coil or mould widths. Due to a light-barrier mechanism even moulds with a high throughput speed of 1 to 3 m/s can accurately be spray coated. Especially applicable are oils and mould release agents with a viscosity_{20°C} of about 20 mm²/s. However, our system is very flexible and we can offer a wide range of different nozzle sizes especially for oils with less viscosity. Only oils containing huge amount of greases and saponifications may not be used in order to not obstruct the nozzles of the spray valves!

→ **flexible System**

→ **highly efficient and precise**

→ **easy operation and maintenance**

Application

The SYRO Oiling System HB 2000 is primarily used for the efficient coating of running steel or aluminium coils in the steel moulds/plates production and for the coating of all kind of steel moulds in the fibre cement or wood cement pressure plates manufacturing and in the concrete roof tile production.

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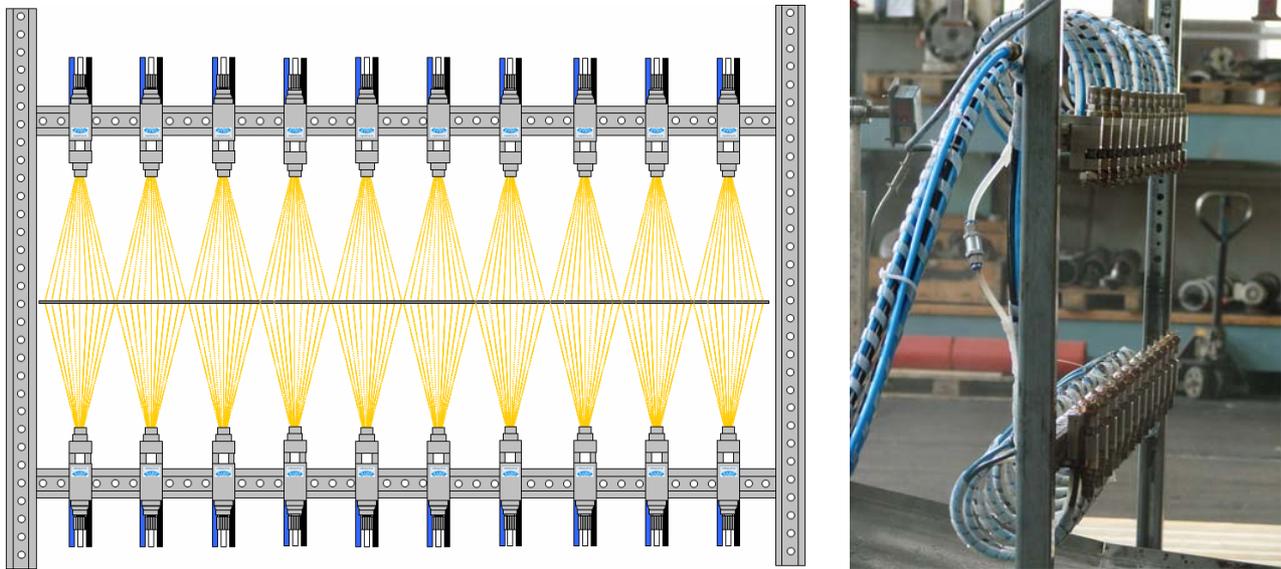


Figure 2 – SYRO Oiling System HB2000

Description

The field-tested system can be equipped with multiple spray valves. They can be variously arranged, so that it is even capable to coat running coils on the surface and bottom side at the same time. The spray device is assembled on a frame with an adjustable track just before the compression moulding and above the running coil or plates. The spray coating width is adjusted with the distance of the valves to the running coil/plate. The device control is positioned close to the oiling system. A time lag relay controls the magnetic valves and the spray air. The agent quantity and the spraying grade can be individually adjusted by a knurled nut at the spray nozzle. Any of the installed spray nozzles can be separately turned on and off.



Figure 3 – SYRO Oiling System HB2000 in use with a coil system

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Composition of SYRO Oiling System HB2000

- Spray valves (spray nozzles)
- Adjustable track on a base frame
- Compressed air controlled double diaphragm pump
- Adjustable pressure reducing valves with pressure gauge for agent and spray air control
- Control unit with built-in magnetic valves
- 230 Volt timing relay
- Cables incl. plugs and hose connections
- Stop valves and restrictor valves

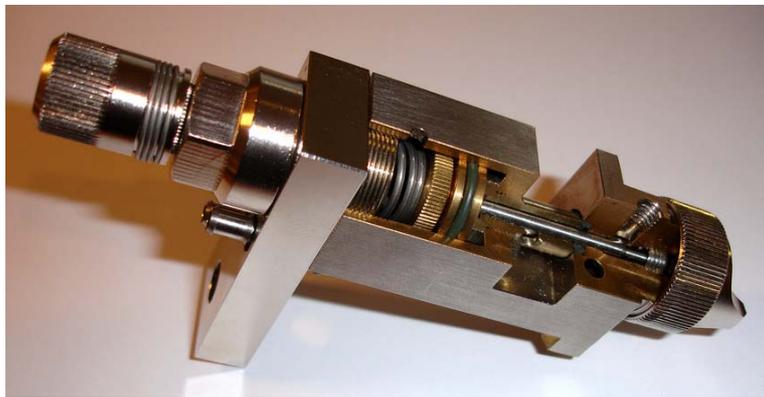


Figure 4 – SYRO HB2000 Spray Valve (Cross-section)



Figure 5 – SYRO HB2000 Control System

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Technical Specifications

Plate width	:	≤ 3'500 mm
Plate length	:	Depends on the transport system
Throughput Speed	:	1 m/s – 3 m/s
Flow height	:	On request
Drawing agents	:	Drawing and punching oils, release agents, SYROFORM S
Coating quantity	:	≥ 0.5 g/m ² with V = 1.0 m/s
Number of spray tracks	:	1 – 2
Spray width per valve	:	100 – 200 mm
Spray length per valve	:	≥ 50 mm, depends on the pulse length of the compression moulding
Minimum requirements	:	230 V, 6 bar of compressed air (size 7.2 mm), impulse of the compression moulding control or reed switch
Total weight	:	17 – 22 kg, depends on version

Table 2 – SYRO Oiling System HB2000 – Technical Specifications

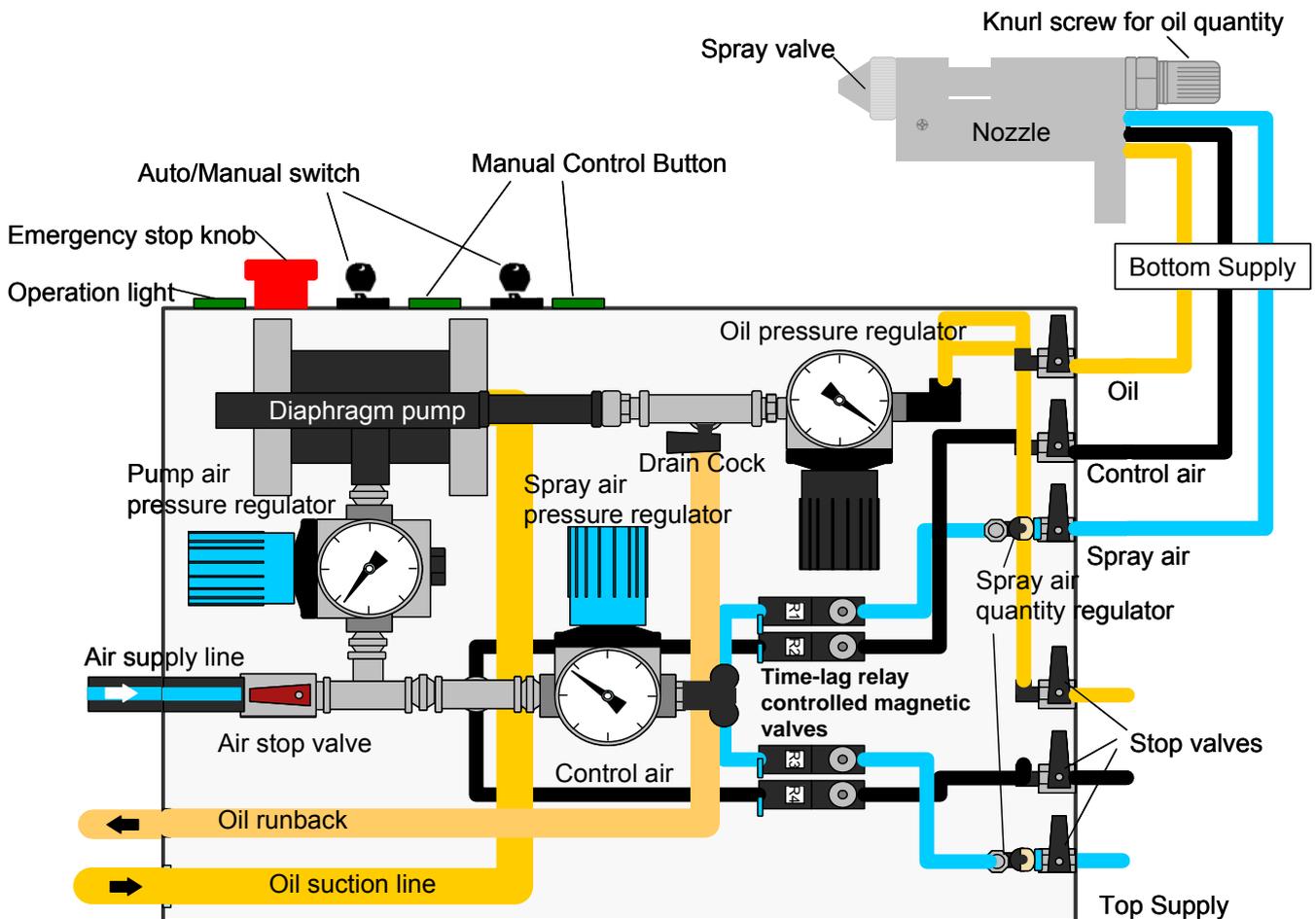


Figure 6 – SYRO HB2000 Control System – Bird view of control device

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Function

The spray valve works pneumatically. It is opened and closed by a needle spring that is controlled by the control air. A diaphragm pump pumps the spray material to the spray valve. Finally the separately controllable spray air atomizes the escaping oil to a cone-shaped spray pattern.

SYROFORM „S“ OIL

For the use of SYRO Oiling System HB2000 we designed a new mould release oil that is especially dedicated to the fibre cement and wood cement industry and contains of corrosion protection additives to guarantee a long life of your steel templates. However, it can be easily used with other oil coating systems as well. SYROFORM S is an exclusivity of SYRO Engineering Ltd. and contains no VOC's and complies with the latest EU-directives.

Application

It is recommended that the SYROFORM S oil is applied with the SYRO Oiling System HB2000. In delivery state a smooth coating by spraying, brushing or rolling is guaranteed. E.g. in the fibre cement plates production process the moulds are first cleaned and then passed through the SYRO Oiling System HB2000 where they are coated with sufficient oil by atomizing it against the upper and bottom side of the moulds. The coating quantity is approximately 0.5 g/m² with V = 1.0 m/s.

SYROFORM S is primarily used for the spray coating:

- of running steel or aluminium coils in the steel plate production
- of all kind of steel moulds/templates in the fibre cement or wood cement pressure panels, plates and slides manufacturing

Advantages of SYROFORM S on a glance

- Bases on the former successfull Formrex 7457-D (but with slight higher viscosity)
- Excellent corrosion protection due to special additive (even light red templates can be saved! Changes Fe₂O₃ to FeO!)
- Very good release characteristics without spotting
- Excellent surface finishing
- No VOC emission, complies with EC regulation 1999/13/EG
- Especially dedicated for the manufacturing of fibre cement and wood cement pressure panels, plates and slides
- Highly bio-degradable
- Economical in use
- Preferred mould release oil for the use with the SYRO Oiling System HB2000

Health and Safety

SYROFORM “S” Oil produces no adverse effects on health when properly handled and used. No special precautions are suggested beyond attention to good personal hygiene. Additional health and safety information are available on request.

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Nominal values

Colour		Brighter 1,5	DIN ISO 2049
Density / 15°C	kg/m ³	850	DIN 51757
Viscosity / 20°C	mm ² /s	19	DIN 51 562
Flash point	°C	> 150	DIN EN ISO 2592
Pourpoint	°C	< -15	DIN ISO 3016

Table 3 – SYROFORM “S” – Nominal Values

CONCLUSION

The today's economical situation and especially the high and still rising oil price make it necessary to think of new ways to reduce the oil and mould release oil consumption in the production process of the fibre cement and wood cement industry.

Due to our long lasting experiences we gathered requirements to develop a new oiling concept with the goal to design an economically efficient spraying system that revolutionizes the oiling of steel moulds/templates in the fibre, wood cement industry and concrete roof tile production.

- **Highly economical efficiency**
- **Very fast amortisation**
- **Ecologically harmless**
- **flexible System**
- **highly efficient and precise**
- **easy operation and maintenance**

In order to optimize the effectiveness of the SYRO Oiling System HB2000 we designed a new mould release oil that is dedicated to the fibre and wood cement industry and glances with its advantages:

- **Bases on the former successfull Formrex 7457-D**
- **Excellent corrosion protection due to special additive**
- **Very good release characteristics without spotting**
- **Excellent surface finishing**
- **No VOC emission, complies with EC regulation 1999/13/EG**
- **Especially dedicated for the fibre cement and wood cement industry**
- **Highly bio-degradable (40%)**
- **Economical in use**
- **Preferred mould release oil for the use with the SYRO Oiling System HB2000**

Together with us, SYRO Engineering Ltd., you have found a competent partner to discuss your oiling problems. We are pleased and happy if we can help you to solve your problems.

REFERENCES

<http://www.markt-daten.de/Chartbook/oel-preise.htm>