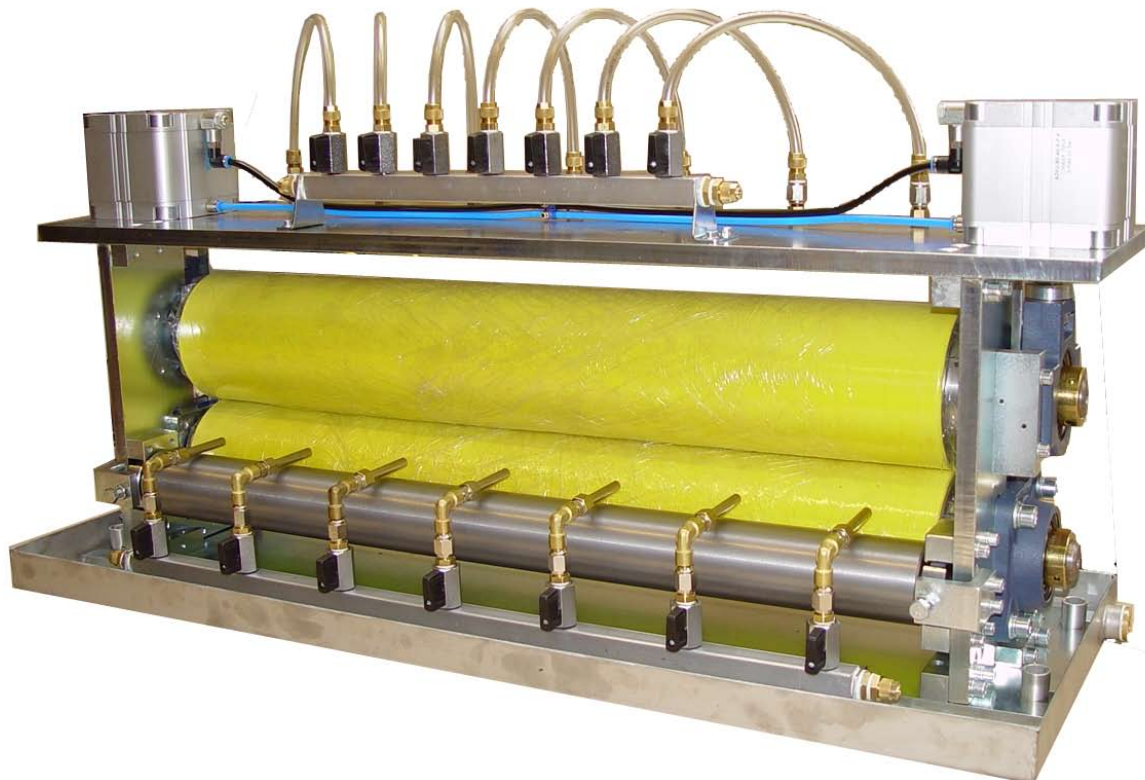


# The new generation of roll-oiling systems in metalforming technology



## Squeegee rollers WQ-E - WQ-P



## Lubrication in metalforming technology

In the pressing and metalforming-processes the selective lubrication of coil-material and blanks is most unavoidable. If it can be guaranteed that the lubricant application can be realised without free spots and even on the whole surface with a high quality lubricant, it is often sufficient to apply a thin coat of oil (1,5-5 g/m<sup>2</sup>).

The high quality lubricants that are used these days should be applied in thin homogeneous coats. Thicker application is not meaningful because the surplus of oil is not integrated in the forming process but is getting superseded when the forming tool is closing.

Decisively is a homogeneous lubricating film without free spots that guarantees a separation between the blank and the pressing tool even as the extension of the blank without ripping off.

- Costs for lubricants and the effort in the afterwards cleaning will be reduced considerably if the application amount is reduced to the necessary needs.
- Less lubricant reduces the contamination of carriers and hauls particularly at cropping parts.
- These are also ecological aspects that should find consideration in a time of limited resources and responsible handling of our world's nature.

The Eckardt Company builds and develops plants for lubrication since many years. We are always considering our customers' wishes and new requirements even as new innovative developments of our suppliers. That way the ROTOL<sup>®</sup>-Squeegee roll has been developed. It now enables an application of nearly any lubricants with thin homogeneous coats from approximately 0,8 g/m<sup>2</sup>.

Single-presses, press-working-lines even as whole plants at home and abroad are already equipped with that kind of oiling-systems.

### Extract of reference list

BMW AG - Dingolfing  
Brose AG - Coburg  
BSH - Traunreut  
Daimler Chrysler - Stuttgart  
Daimler Chrysler - Wört  
Rieber Werke - Reutlingen  
Stow - Belgien  
Thyssen-Umformtechnik - Brackwede  
VW AG - Wolfsburg  
WMU - Han.-Münden  
uva.



**Lubrication systems are differentiated in three main groups**

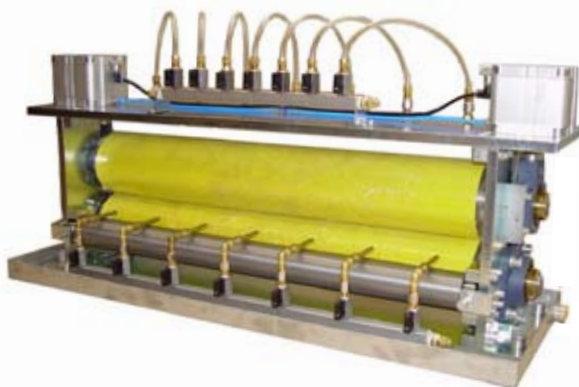
**Felt rolls**



**Spray-application**



**ROTOL® - Squeegee roll**



## Felt rolls

The today mainly used roll-systems are appereled with a felt cover. This felt cover soaks up with oil and gives it back when it gets in contact with the blank. In their use and as new requirements have raised in the manufacturing process (e.g. change of the oil-type) it came out that these felt rolls have some problematic characteristics in some range of application.

These are short mentioned

- The regulation of the oil amount that is regulated with the degree of moistness can not be defined exactly.
- The felt roll is suitable for only one type of lubricant. It can not be changed in a short time period from one type of lubricant to a second one. On account of the soaked up cover the whole roll has to be replaced.
- On account of the oil-feed from the inside only homogeneous oils without suspended matters can be handled. Lubricants like emulsions that tend to formation of resin can not be handled with those rolls because they „clog“ very quick and loose their function.
- The choise of the oil-viscosity is very restricted. Raising the oil-viscosity the absorptive capacity of the felt material declines rapidly. This causes that higher viscosities can not be applicated.
- It has to be further mentioned that the width of the roll has to be adapted to the width of the blank. That means that for different blank dimensions the rolls have to be changed or sumptuos, segmented oilers have to be realised.
- Additionally the touchiness makes the rolls prone to wear and tear. The sharp edges of the blank are harmful to the surface of the felt-rolls and may cause cuts.
- Changing of the felt cover is time consuming and expensive, especially in complex plants like press-working-lines.
- Brush-rolls as a rule used for high-viscous lubricants are leaving extremely thick and uneven coats. At stoppages the lubricant drops down and builds a „lake“. So this method must not come to consideration.

## Advantages

- Easy managable technique
- Low need of space in passing through direction
- No complexity of the control-unit
- Budget-priced equipment
- Short delivery periods



## **Spraying systems**

Spray-chamber systems like they come to exertion also show some prejudicial factors in their use and aquisition.

These are short mentioned

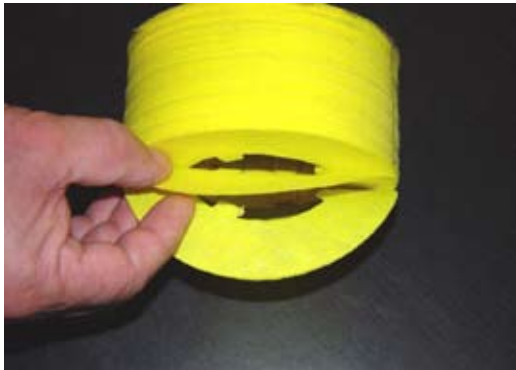
- Spray-chambers are built big and have extra needs of space for their peripherals. Additional integration in already existing press-working lines can not be realised easily.
- The control-units (drive) electrical even as pneumatic-hydraulic of each singular nozzle requires considerable control effort.
- Spraying always requires an oil-mist separator to draw off the surplus of oil, filter it and bring it back to the oil-circulation. This has effects on its costs.
- The spray-nozzles and the total air- and oil-preparation are subject to relativ short maintenance rates.
- A change of the oil medium requires extense of time. To avoid a commixture of the different oil-types the spray-chamber has to be totally cleaned (rinsed).
- Low viscosities are needed. If this can not be realised the oil-feed, the spray-nozzles and eventually the storage tanks and circulation pipes have to be heated. This is manageable but expensive.
- Spray-chambers are in their aquisition and due to the degree of their technical equipment cost-intensive.

## **Advantages**

- Contact free application of the spray medium.
- No or only inferior wear of the spray nozzles.
- Possibility of partial application (spray-patterns).
- Different amount of application on each field of the pattern.
- Exactly adjustable coat thickness.
- Quick modification of the amount of application.

## ROTOL® - Squeegee roll

With the **ROTOL®** - Squeegee roll we could eliminate some of the aforementioned disadvantages. We succeeded in building sturdy, durable oilers that made it possible to applicate nearly any lubricant in tabular defined coats.



The cover of the **ROTOL®** Squeegee roll is made of non woven material (nylon-matter-fabric). This material is extremely strong and resistant to mechanical damaging.

The roll is made of many single lamellas that are lined up to a shaft, than pressed and afterwards sticked together in a heating process to a pipe.



This pipe is winded up on an axle, the actual roll body. Than it get pressed together from both sides. The roll surface now has to be brought to one level by turning on lathe or by milling.

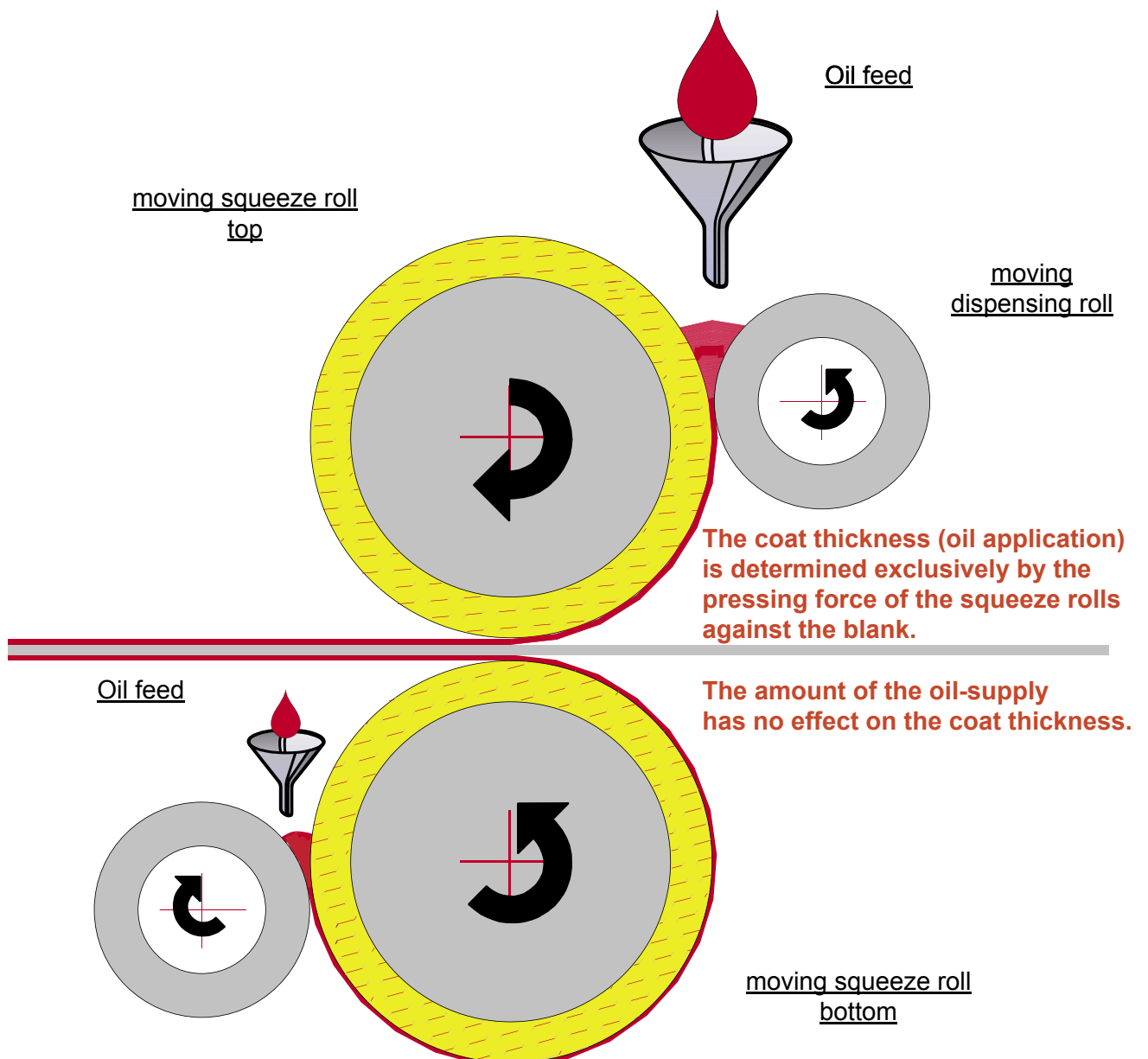
The endurance compared to customary felt rolls is for sure over 100 times higher!

Nevertheless wear and tear of these rolls is still existing and mechanical damage e.g. by a crash is not always avoidable but these rolls can be worked over with cutting tools.

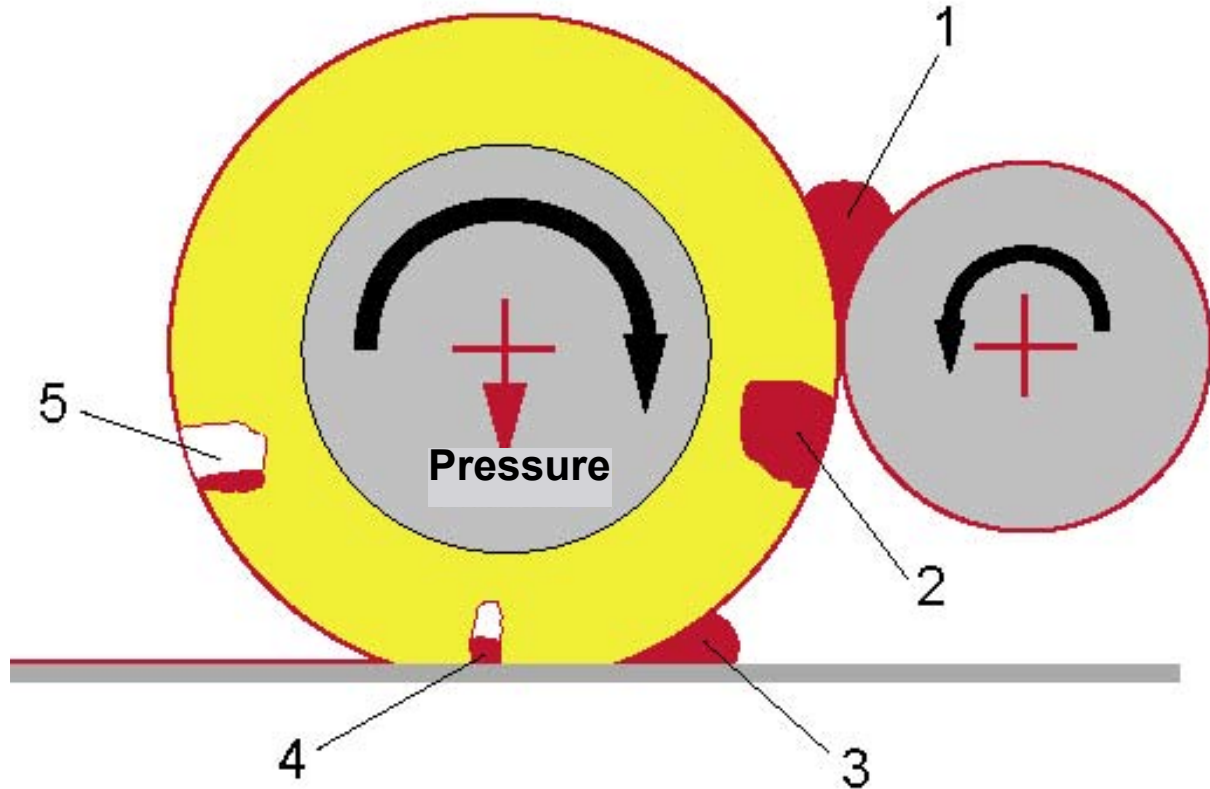
Possibly this can be done by the customer



The Squeegee principle



## Function of a Squeegee roll



1. The free-flowing medium is applied between dispensing roll and non-woven roll.  
(The quantity of oil poured into the gap between the rolls has no bearing on the resulting amount of oil on the blank).  
The medium is dispensed evenly over the full width of the roll.
2. The porous surface of the non-woven fabric absorbs the liquid.
3. The linear pressure onto the pores increases as soon as the roll turns towards the blank; the non-woven fabric begins to flatten as it contacts the steel sheet. The liquid forms a wedge between nip and the blank.
4. Depending on the pressure, porosity of the non-woven roll goes toward zero. The medium is equally spread over the full width of the sheet. Increased pressure on the non-woven roll reduces film thickness of the medium.
5. As the roll turns, the linear pressure onto the lining is decreasing; the pores in the non-woven open again and act like a sponge absorbing a certain amount of liquid.

With the rolls high pressures can be realised. This allows even coats with less than 1 g/m<sup>2</sup> (depending on the lubricant).





## Which forming lubricants can be processed?

Any just viscous liquids up to greases and dry lubes can be handled. As soon as the lubricant is brought between the rotating dispensing and squeegee roll it dispenses smooth caused to the pressure raised temperature.



Even manual blank feed results in an evenly dispensing of the lubricant at any time.

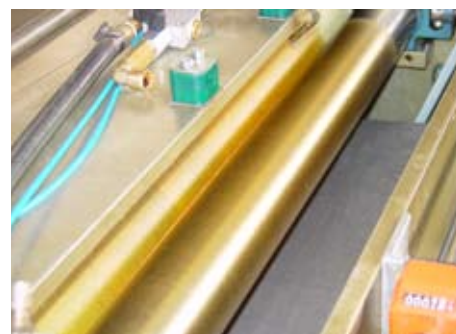
This process takes only some moments time.



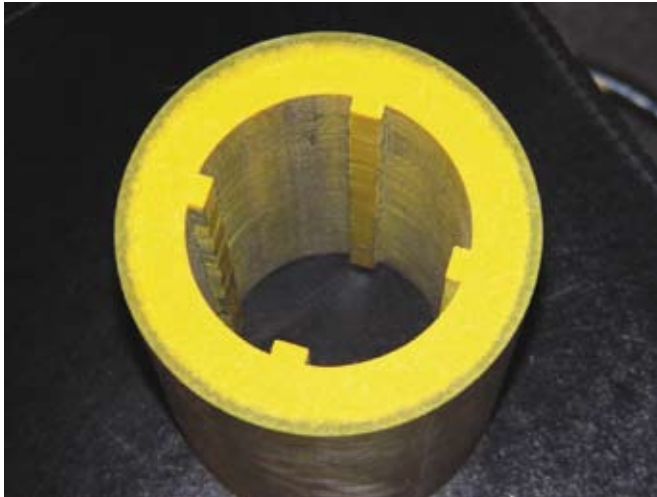
After that the homogeneous application can begin.

The free-flowing medium is applied between dosing roll and non-felt roll.  
(The quantity of oil poured into the gap between the rolls has no bearing on the resulting amount of oil on the sheet).

The medium is distributed evenly over the full width of the roll.



The surface of the Squeegee roll is absorbent only up to a special degree. The application medium is intruding the roll only little. The absorbent effect is much less than you find it at felt rolls. This allows an easier change of the medium. The lubricant exchange takes place very quick. That means that the same rolls may be used for different oil-types.

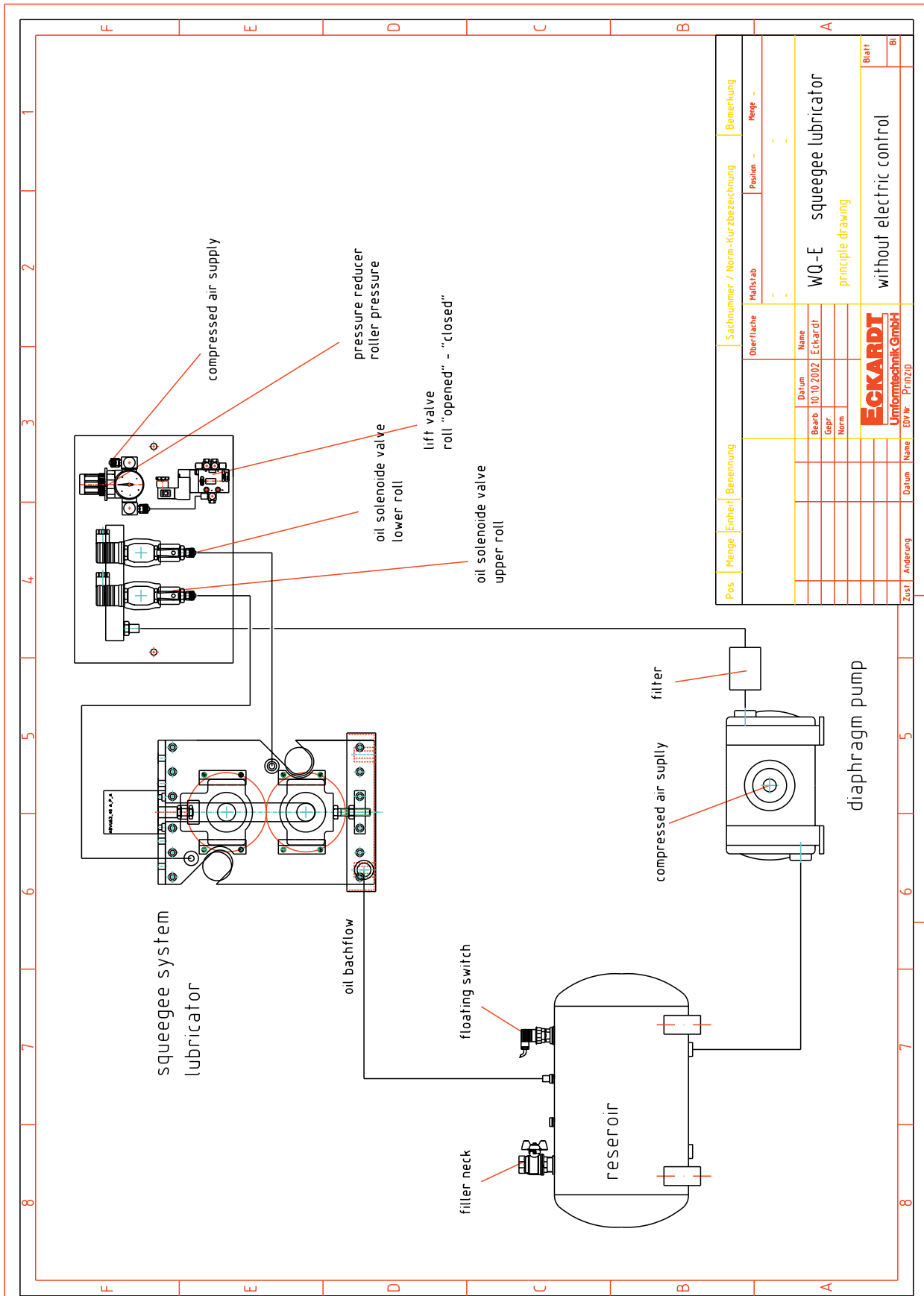


On a wide roll strips can be handled unscrupulous without showing signs of wear and tear. On account of the high refractiveness of the ROTOL® material hardly no abrasion can be seen. That means that for any width up to the maximum one appliance can be used for all strips. The length of the blank feed does not result in application. As long as lubricant is existent in the oil feed it will be squeezed on the blank as set.

It is irrelevant how much lubricant is fed because the surplus of oil can not reach the blank. The adjustment of the slit itself regulates the amount of application. If too much lubricant is fed it will flow sideways in the sink and from there back to the storage tank.

It is possible to realise a closed circulation. This is useful when emulsions are used because a stirrer is not needed.





Pos.	Menge	Einheit	Benennung	Sachnummer / Norm-Kurzbezeichnung	Benennung

<b>ECKARDT</b>	<b>Umforn-technik GmbH</b>	
EDV Nr.	Prinzip	
<b>WQ-E squeegee lubricator</b>		
principle drawing		
<b>without electric control</b>		

Zust.	Änderung	Datum	Name

Oberfläche		Maßstab		Position		Menge	
Datum	Name			Benennung			
Bearb. 10.10.2002	Eckardt						
Gepr.	Norm						

## Advantages and range of application

- Any just viscous lubricants up to greases and dry lubes can be applied.
- A even dispensing of the lubricant is guaranteed by rotating dispensing and Squeegee rolls.
- On a wide roll strips can be handled unscrupulous without showing signs of wear and tear. On account of the high refractiveness of the ROTOL® material hardly no abrasion can be seen. That means that for any width up to the maximum one appliance can be used for all strips. The length of the blank feed does not result in application. As long as lubricant is existent in the oil feed it will be squeezed on the blank as set.
- The coat thickness can be set by a display control, that means that the slit between the top and bottom squeeze roll is responsible for coating thickness. So the thickness is related to a numeric value that is always reproducible.
- In spite of transference of high pressures the **ROTOL® - Squeegee rolls** are extremely flexible so that unevennesses of the blanks will be equalized. This flexibility can be set before the rolls are fixed together. This comes so far that even blanks with different strength (tailored blanks) can be applied with lubricant without step
- It is not necessary to install a sumptuous dosing system. It has only to be assured that the lubricant feed is guaranteed. The coating thickness is not set by the amount of the oil but by pressure and the distance between the two Squeegee rolls. Even if there is an overflow the coating thickness is steady.
- The **ROTOL® - Squeegee rolls** can be installed in automatic punching machines with automatic feed. Depending on the strip thickness the rolls are driven by the automatic feed or a own drive unit. Most of the time there is no need for a own drive unit.
- Longitudinal cutting lines caused many problems. Up to now sumptuous expensive electrostatic spray systems are used because the cutting edges destroyed the so far known rolls with rubber-made or felt covers.
- High endurance can be realised with **ROTOL® - Squeegee rolls** because it is insensitive for cuts. The machine is construed that high passing through rates can be realised.
- For cut-to-length lines the machines are nearly ideal. They require coating thicknesses of about 1 g/m<sup>2</sup>. The blanks are coated absolutely homogeneous.

