For your own Safety

The machine must not be started before all personnel concerned

1. has read the handbook
2. is familiar with the handling of the machine
3. has been approved to work with the machine.

Protection devices which have been delivered with the machine must be correctly installed and must not be modified nor changed.

Never start the machine without the inlet funnel, protection device, screen, rotor and outlet funnel.

Never start-up the machine if the screens are damaged or bent or the rotor is defective. There is a risk of mechanical touch (friction) and therefore sparks.

SAFETY ADVICE

The machine should be off the power supply during installation, maintenance or cleaning.

We recommend to always wear a pair of safety glasses to protect your eyes.

MAINTENANCE

Serious injuries may occur if these safety regulations are violated

FREWITT

Member of GROUPE FREWITT

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OPERATING INSTRUCTIONS

Sizing mill

G L A

with

Granulating head GL-0215

or

Crushing head GL-0215-3

or

Mixer LM-04

20.05.97 / CZ

FREWITT Fabrique de Machines SA Route du Coteau 7 CH-1763 Granges-Paccot
P O B 61 / CH-1706 Fribourg • ✆ 037/466 53 71 • Fax 037/466 51 14

INDEX

☞ Drawing with list of parts *see chapter 3 General documentation*

1. Generalities

The *FREWITT* granulating machines are of a strong and compact design. All parts in contact with the product to be granulated are of high quality stainless steel. All inner surfaces of the granulating head are polished to prevent adherence of the product and facilitate cleaning. The housing containing the motor-drive is made of aluminium casting and coated with a transparent varnish.

Fast fixing devices allow easy mounting and dismounting of the accessories such as inlet and outlet funnels as well as of the granulating head.

The rotor bearings are sealed and mounted on the outside of the housing thus preventing any leakage of grease and contact with the product to be granulated.

The oscillatory motion of the rotor against the sieve gives the granule a great uniformity and a high throughput. The grain size is determined by the mesh opening of the sieve or the hole diameter of the perforated plate *see also §5*.

The rotary motion is used with the lamella or roller rotor together with a perforated plate to make vermicelli-like granules, with the pin-rotor to pre-crush hard material and with the mixer.

The field of applications for the *FREWITT* granulators is very wide :

- ☞ Pharmaceutical : manufacture of granules for tabletting, pre-crushing of lumps, plates or coarse products
- ☞ Chemical : manufacture and preparation of colouring pigments, fertilizers, etc ...
- ☞ Food : crushing hazel-nuts, almonds, preparation of soups, condiments and lyophilized products, regularsing of granules (sugar), etc ...
- ☞ Explosive powders and smoke-producers, etc ...
- ☞ Granulation of plutonium and uranium
- ☞ Powder Metallurgy
- ☞ Solid fuel

2. Installation

2.1 Electrical connection

☞ The electrical control consists of a switch-box with green " ON " and red " OFF " buttons with thermal protection switch.

☞ The standard protection class of the motor is IP-54. If the motor is in explosion proof execution, the protection class will be automatically IP-55 and the switch-box will also be in explosion proof execution.

☞ The wiring between the switch and the motor is completed according to the ASE and VDE specifications. The *FREWITT* granulators type GLA are delivered without connecting cable and plug.

Check voltage before the machine is connected to the electric network. The voltage must be identical to the indication shown on the type plate.

The direction of rotation (clock-wise) has to correspond to the arrow shown on the machine housing cover.

Power supply **415 V - 50 Hz**

☒ 3P + E + N ☐ 3P + E

2.2 Selection of oscillatory or rotary motion

Only possible for granulating machine with driving unit ORV

↳ put the machine into operation at minimum speed

↳ turn handle on the right side as follows :

← backwards = rotary motion
→ forwards = oscillatory motion

Rotor with 3 arms is only suitable for oscillatory motion. It has to be mounted with round arm on top. *see enclosed drawing DVG-61-1*

3. Granulating head

3.1 Utilization

3.1.1 Start-up

1) select the right motion oscillatory or rotatory *see § 2.2*

2) fix the granulating machine *see 4) § 3.1.3* or the mixer *see § 4.1* to driving unit

3) mounting inlet and outlet accessories

4) adjust at minimal speed with the variator wheel counter-clockwise up to the end

5) adapt the speed to the product to be granulated, but only when motor is in operation

3.1.2 Dismounting of sieve / perforated plate or light screen-support and rotor

1) remove inlet and outlet funnels, safety grid and deflectors *(GL-0215/pos.5)*

2) pull out the two sieve tensioning bars *(GL-0215/GL-03-...)*

3) take sieve / perforated plate or light screen-support out of the granulating head

4) remove granulating head from the housing of the motor-drive by loosening the 2 fast fixing devices *(GLA-.../pos.70)* on each side

5) <u>standard version</u> - remove closing flange B *(GL-0215/pos.38)* on the drive side of the granulating head with the pin-wrench n° 5

   <u>sealed version</u> - remove the square *(GL-0215/pos.44)* with the srew *(GL-0215/pos.43)*
   - remove closing flange B *(GL-0215/pos.42)* on the drive side of the granulating head with the pin-wrench n° 5

6) remove Teflon seal *(GL-0215/pos.37)*

7) remove the rotor *(GL-0215/pos.36)* through the opening in the back of the granulating head

3.1.3 Mounting of arm-rotor, lamella or roller rotor

With the lamella or roller rotors use only rotary motion and perforated plate

1) insert rotor through the opening in the back of the granulating head

2) put in Teflon seal *(GL-0215/pos.37)* on the motor side

3) standard version - reposition closing flange B *(GL-0215-3/pos.38)* using the pin-wrench n° 5

   sealed version - reposition closing flange B *(GL-0215-3/pos.42)* using the pin-wrench n° 5
   - fix the square *(GL-0215/pos.44)* with the srew*(GL-0215/pos.43)*

1) put the granulating head back on the position pins *(GLA-.../pos.69)* of the housing of the motor-drive, and check the flat end of the rotor *(GL-0215/pos.36)* must engage in the corresponding opening in the drive shaft *(GLA-.../pos.11)* on the machine housing, and fix the granulating head with the 2 fast fixing devices *(GLA-.../pos.70)*

When the granulating head is fixed on the housing, it must be sure that the arms of the rotor with 3 arms are mounted downwards or the round arm is positionned on the top *see drawing DVG-61-1*, **as well as for the rotor with 5 arms, it must be sure that the *"O"* engraved on the drive side of the rotor has to be upwards *see drawing DVG-61***

3.1.4 Mounting and dismounting of pin-rotor - Crushing head

With the pin-rotor use only rotary motion

Mounting

1) insert rotor *(GL-0215-3/pos.53)* through the opening in the back of the granulating head

2) put in Teflon seal *(GL-0215-3/pos.54)* on the motor side like as *GL-0215/pos.37*

3) standard version - reposition closing flange B *(GL-0215-3/pos.38)* using the pin-wrench n° 5

   sealed version - reposition closing flange B *(GL-0215-3/pos.42)* using the pin-wrench n° 5
   - fix the square *(GL-0215-3/pos.44)* with the srew*(GL-0215-3/pos.43)*

4) fix the stator *(GL-0215-3/pos.50)* on the right side with the right sieve tensioning bar *(GL-0215-3/pos.GL-03-...)* marked in red, and reposition the left sieve tensioning bar *(GL-0215-3/pos.GL-03-...)*

5) the guard plate *(GL-0215-3/pos.51)* replace the deflector *(GL-0215-3/pos.5)* on the left side

1) the clearance between the stator and the rotor is adjusted by the screw *(GL-0215-3/pos.9)* fitted on the right side of the granulating head with fork key 17mm

Neither deflector plate *(GL-0215-3/pos.51)*, **nor stator** *(GL-0215-3/pos.50)* **must be in contact with the pin-rotor** *(GL-0215-3/pos.53)*

☞ when positioning the granulating head on the housing, the pin-rotor takes its correct axial position under the pressure of the spring *(GL-0215-3/pos.25)* loaded counter shaft

2) mount deflector *(GL-0215-3/pos.5)* on the right side

3) put the granulating head back on the position pins *(GLA-.../pos.69)* of the housing of the motor-drive, and check the flat end of the rotor *(GL-0215-3/pos.53)* must engage in the corresponding opening in the drive shaft *(GLA-.../pos.11)* on the machine housing, and fix the granulating head with the 2 fast fixing devices *(GLA-.../pos.70)*

4) mount inlet and outlet accessories

Dismounting

Dismounting of the pin-rotor is made contrariwise of mounting.

3.1.5 Mounting of sieve / perforated plate or light screen-support

1) slip the sieve / perforated plate or light sreen-support *(GL-0215/pos.35)* from below or above in the interior of the granulating head around the rotor

1) put back sieve tensioning bars *(GL-0215/pos.GL-03-...)* in their place by passing the upturned edges of the sieve / perforated plate or light screen-support in the slots of the two sieve tensioning bars.

Sieve tensioning bar marked in red must be on the right side

2) stretch the sieve / perforated plate or light screen-support slightly by rotating the sieve tensioning bars symetrically towards the exterior of the granulating head. Be careful not to tighten too much

3) put machine into operation at lowest speed

4) stretch the sieve / perforated plate or light screen-support with the 2 sieve tensioning bars up to the contact with the rotor (friction noise)

1) turn back as many notches until the friction noise stops

Not to stretch the sieves too much to avoid excessive wear of sieve and rotor
A very tight sieve does not increase the throughput !

2) put back deflectors *(GL-0215/pos.5)* and inlet and outlet accessories

3.1.6 Rigid screen-support

☞ The rigid screen-support is suitable for :

- sieves with a wire diameter from ∅ 0,20 mm to ∅ 1,00 mm
- perforated plates with a thickness of max. 2,00 mm

Mounting of sieve / perforated plate into rigid screen-support

1) slide sieve / perforated plate *(GL-0215/pos.51)* in the rigid screen-support *(GL-0215/pos.50)*

2) fix it by means of the 2 holding bars n^{r} *GL-80-2-2* on the screen-support

3) verify the proper position of the sieve mounted on the rigid screen-support. The sieve / perforated plate should not overlap the front or back of the rigid screen-support

Mounting of rigid screen-support into granulating head

1) execute before *§ 3.1.3*

2) insert rigid screen-support with mounted sieve / perforated plate from the bottom into the head in a symetrically and parallel way

1) insert the 2 tensioning bars *(GL-0215/pos.GL-0307-...)* and put crosspin of them into horizontal position - red dot on top

The right tensioning bar is marked in red

2) mount the 2 deflectors *(GL-0215/pos.5)* and after adjustement of rigid screen-support ,mount the inlet and outlet accessories

Adjustement of rigid screen-support

☞ The adjustement of the distance between sieve / perforated plate and rotor is made with the eccentric support-bars

☞ The lowest position is marked on the eccentric support-bars with a red dot

☞ The rigid screen-support with sieve / perforated plate is lifted per notch by approximately ~ 0,4 mm

☞ After 14 notches the highest position is reached (only possible with thin sieve / perforated plate)

☞ If the eccentric support-bars will be turned more than 14 notches, the rigid screen-support goes down again

Adjustement

1) put rigid screen-support to the lowest position
2) put machine into operation
3) turn both eccentric support-bars symetrically clockwise for the right and counter-clockwise for the left one until a friction noise is heard
4) turn back as many notches until the friction noise stops

Not to stretch the sieves too much to avoid excessive wear of sieve and rotor . A very tight sieve does not increase the throughput !

Dismounting of rigid screen-support

1) remove the 2 deflectors *(GL-0215/pos.5)*

2) lift clicks *(GL-0215/pos.6-7)* and remove eccentric support-bars *(GL-0215/pos.GL-0307-...)*

Rigid screen-support has to be held from bottom

1) push rigid screen-support *(GL-0215/pos.50)* downwards out of granulating head

3.2 Maintenance

☞ The *FREWITT* granulating machines require very little maintenance.

Granulating machine

The cleaning of the whole granulating head is very easy and can be done with water, all the parts being of stainless steel.

In addition to the lubrication of the variable speed gear-motor, it is recommended to lubricate the different pinions of the driving mechanism from time to time. To do this, it is enough to unscrew the protection-cover sheet *(GLA-.../pos.67)* of the drive.

All components, inlet and outlet devices, rotor, sieve, perforated plate, light screen-support,tensioning bars, deflectors as well as the machine head can be taken off the motor-drive housing, to be disassembled, cleaned and sterilized separately if required.

Variable speed gear-motor

Maintenance of the variable speed gear-motor is done according to the attached service instructions, to which is added a parts list *see chapter 5 General documentation.*

3.3 Spare parts

☞ Due to its very strong design, the *FREWITT* granulators do not require any special spare parts. However, it is clear that the sieve, perforated plate, light screen-support, seals and rotor will be submitted to a certain wear, depending on the hardness of the product to be granulated and the tension of sieve, perforated plate or light sreen-support. They will therefore have to be replaced from time to time.

sieves/perforated plates and light screen-supports ..... see enclosed lists

Rotors ..... for 2 to 3 year's operation, we recommend one spare rotor

Machine ..... see drawing with list of parts *chapter 3 General documentation*

↳ seals ..... only for sealed bearing heads and sieve tensioning bars

Variable speed gear-motor ..... *see chapter 5 General documentation*

3.4 Accessories

☞ Different accessories adapted to the customer's requirements can be supplied :

- inlet funnels (drawing enclosed with list)
- outlet funnels (drawing enclosed with list)
- special inlet and outlet funnels adapted to your requirements
- different rotors
- rigid screen-support
- mixer
- tubular stainless steel stand

4. Mixer

The mixer is only suitable for being fixed to the housing of the rotary driving unit instead of the granulating head

4.1 Mounting of mixer

1) take off top cover *(LM-04/pos.8)* of mixer *LM-04*

2) position mixer on the 2 position pins *(GLA-.../pos.69)* against the driving unit and engage milled end of mixing rotor *(LM-04/pos.9)* into the drive shaft *(GLA-.../pos.11)*

3) adjust the length of the 2 fast fixing devices *(GLA-.../pos.70)* to enable a correct attachment of the mixer to the housing of the driving unit

4.2 Product removing from mixer

1) take off top cover *(LM-04/pos.8)* of mixer *LM-04*

2) lift pin *(LM-04/pos.10)* of mixer fixing flange and turn mixer by 180° (opening on bottom)

4.3 Dismounting of mixer

1) turn mixer by 180° (opening on top) to engage pin *(LM-04/pos.10)* into mixer fixing flange

2) open the 2 fast fixing devices *(GLA-.../pos.70)* and remove mixer from the housing of driving unit

5. General advices for granulation

The FREWITT granulators are suitable for different applications, such as :

✓ Dry granulation (crushing and sifting)
✓ Wet granulation (manufacturing of vermicelli-like granules)

Generalities

It is important not to stretch the sieves too much to avoid excessive wear of sieve and rotor. A very tight sieve does not increase the throughput !

The throughput as well as the grain size distribution can mainly be influenced by the rotor speed.

The *FREWITT* granulators are also suitable for screening (sifting) of conglomerated material.

Dry granulation

For crushing and dry granulation it is important that sieves with a large wire diameter in relation with the mesh opening (mesh size) are used. The mesh opening as well as the rotor speed are greatly influencing the granule size distribution. With lower rotor speed less dust is produced and vice-versa.

If briquettes or tablets formed under great pressure (compactor) or a coarse hard product, which has been dried in a oven have to be granulated, then our square wire sieves should be used, which are marked in the sieve list with " X " and which are only avaible for *FREWITT* granulators. For your information, only the wires parallel to the rotor are square ones and the wires holding the square wires are round. The edges of the square wires are increasing the cutting effect as the material to be granulated is forced to pass through the mesh opening, thus producing less dust.

Is the product to be granulated very hard, we recommend to use a rigid screen-support with a square wire sieve. This support is mounted in the granulating machine by means of two special lifting devices to allow the adjustement of the distance between the sieve and the rotor, thus eliminating wear and tear of sieve and rotor.

The fine sieves, which are normally mounted with the normal sieve tensioning bars, are fitted with rubber edges to avoid any injury. These sieves are marked with " G " in the sieve list. Is the product to be granulated quite hard, we recommend to use for these sieves a light screen-support, only suitable for sieves with a wire diameter up to 0,80 mm. This support is mounted with the normal sieve tensioning bars, too.

If a dry granulation sieve is used for a wet product, then the mesh openings are getting obstructed and the throughput will drop. Furthermore , the granules will not any more reply to the grain size required for manufacturing tablets. The achieved granules will be of the vermicelli type.

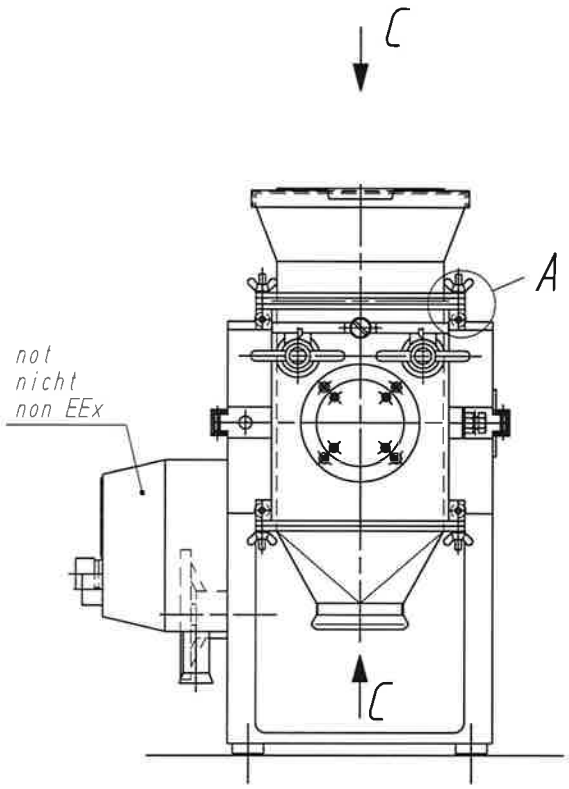
Wet granulation

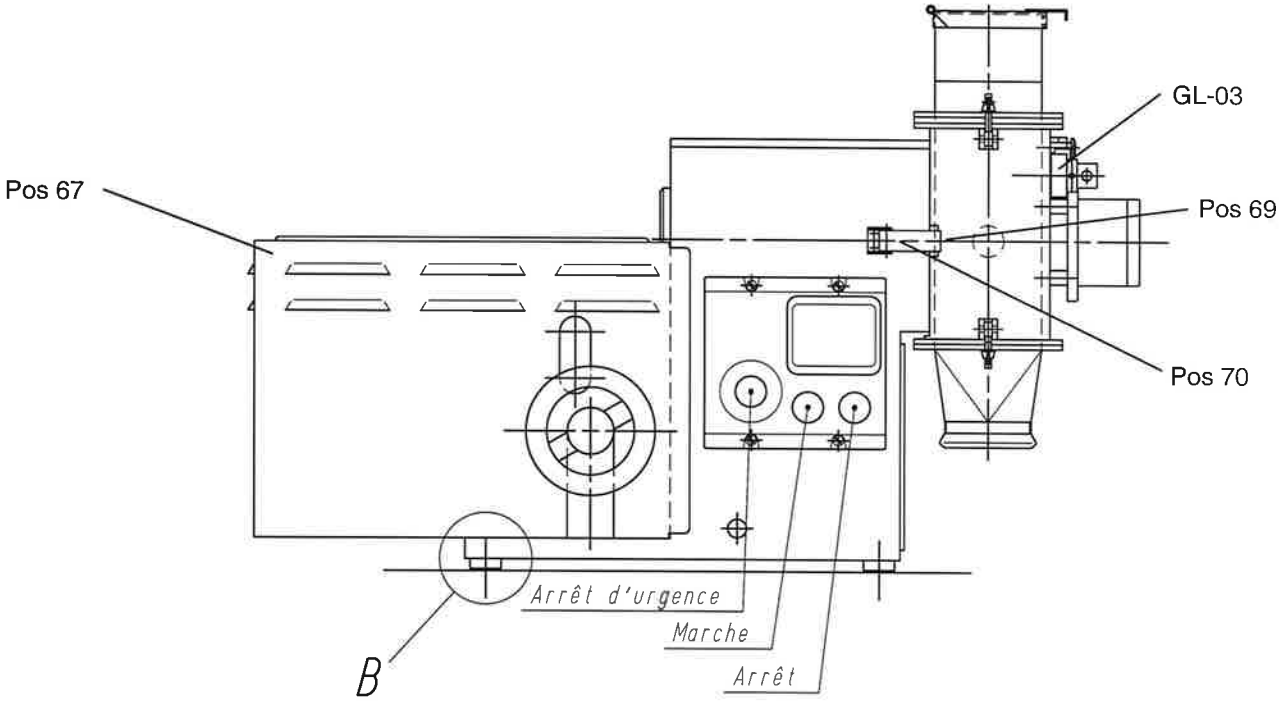
For wet granulation, the sieves used on the *FREWITT* granulators have a much smaller wire diameter in relation with the mesh opening to cut the product to be granulated. Thin wires avoid a building up of product and an obstruction of the mesh openings. Normally sieves for wet granulatoin have a mesh opening of 1,5 mm or larger. These thin wire sieves are fitted with rubber edges to avoid any unravelling or injury.

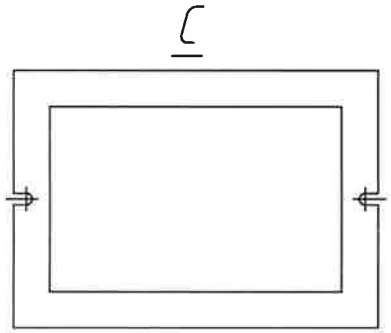
For wet granulation, the granules are influenced by the mesh opening, the degree of moisture and the rotor speed. To obtain a certain uniform grain size from material in powder form, the product has to be wetted in a mixer by means of a small amount of water, alcohol or another binder agent. The degree of moisture should be as low as possible.

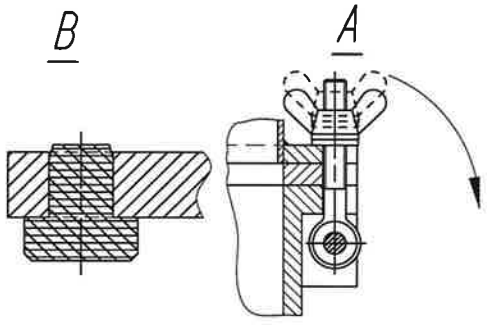
To granulate a sticky and pulpy material, first use a sieve with a large mesh opening. The required grain size will be achieved by re-granulating the dried material with a dry granulation sieve. The same procedure is also applied when the dried material sticks together and an uniform granule is required.

The wet granulation method is also suitable for manufacturing vermicelli-like granules. As there is no rule as regards the degree of moisture, we recommend to make trials. For manufacturing vermicelli-like granules, the drive of the rotor of the *FREWITT* granulators has to be transformed from an oscillatory into a rotary one to use a lamella-rotor working against a perforated plate. As there is more pressure on the product compared with the normal rotor with 3 or 5 arms, we are manufacturing vermicelli-like granules having a good strength and an easy solubility after being dried.

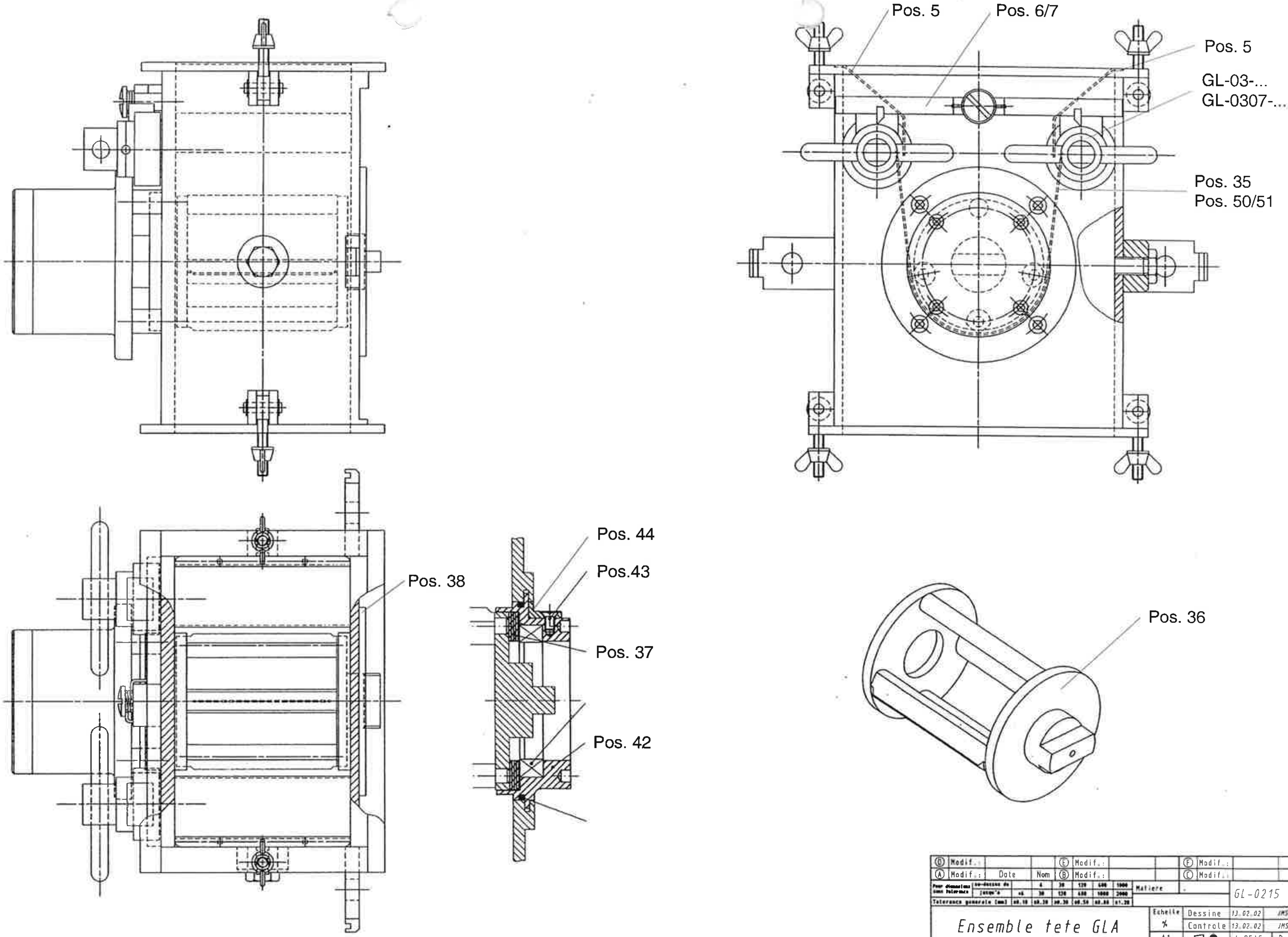








D	Modif.:			E	Modif.:			F	Modif.:		
A	Modif.:	Date	Nom	B	Modif.:			C	Modif.:		
Client	.							Dim. usinees		ISO 2768-m	
Reseau electrique	.							Dim. soudees		ISO 2768-c	
Machine à granuler de laboratoire GLA-ORV / non EEx						Echelle %		Dessine	13.02.02	JMS	
								Controle	13.02.02	JMS	
						A3		I-DEAS		Rev.	
GROUPE F						GLA-.....				.	



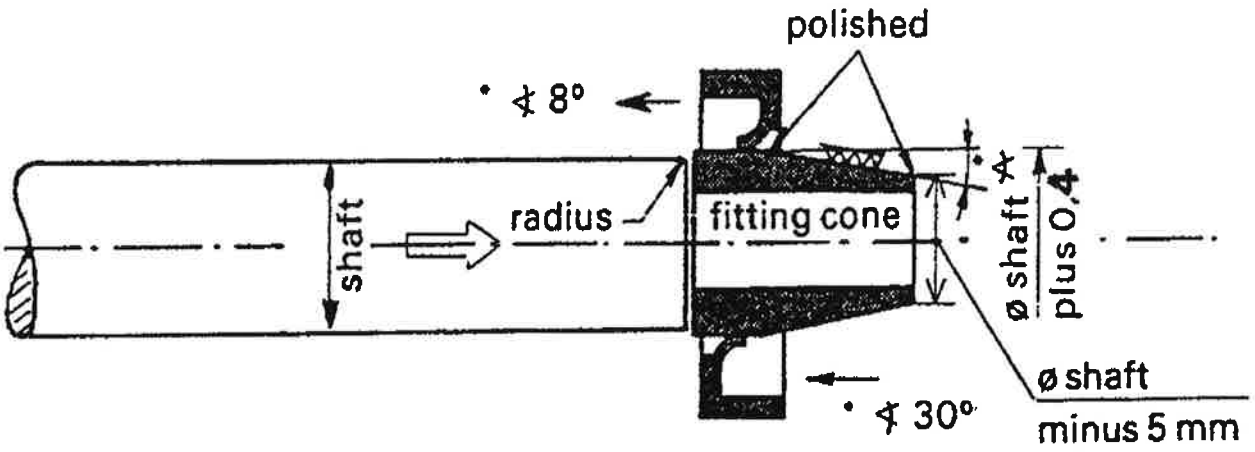
(D) Modif.:			(E) Modif.:			(F) Modif.:				
(A) Modif.:	Date	Nom	(B) Modif.:			(C) Modif.:				
Pour dimensions sans tolerance	au-dessus de		6	30	120	400	1000	Matiere	-	GL-0215
	jusqu'à	≤6	30	120	400	1000	2000			
Tolerance generale [mm]		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20			

Ensemble tete GLA	Echelle	Dessine	13.02.02	JMS
	%	Controle	13.02.02	JMS
	A1		I-DEAS	Rev.
	GL-0215			

Mounting instructions for GARLOCK P/S Seal

The P/S® -SEAL requires special care during installation to prevent lip damage.

Never mount over sharp edges!



The round wire sieves

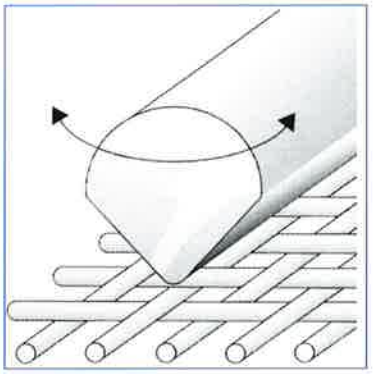
These sieves are adequate for sieving and loosening of lumped products.

Wet sizing

Round wire sieves

With the wet sizing, the material has to be cut to obtain granules. Therefore the sieves are made of fine wires in proportion to the mesh size. This process can be compared with cutting butter. The thinner the wire, the less power is required.

Action showed on drawing beside.



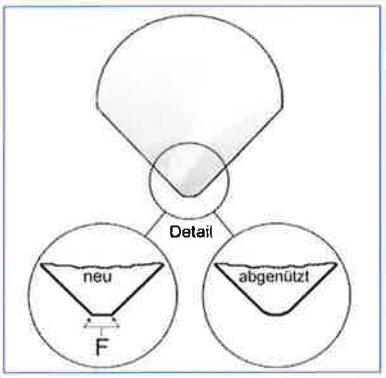
The Rotor

The capacity of the sizing mill is obviously also dependent on the rotor. Its long experience has allowed FREWITT to develop the best form of rotor arms. Due to the hard work done by the rotor, wear occurs after extended use.

Consequences of wear?

- lower output
- changes of the final grain size distribution
- more fines

Result shown on drawing beside



When is renewal of rotor required ?

When the edges F are rounded-off.

Correct adjustment of the machine

Machine with rigid screen support

The distance between rotor and sieve has to be ½ the mesh size but not exceeding 1 mm. In process, the adjustment is made as follows: turn on the machine, lift the sieve against the rotor by turning the handwheel «sieve position». When the sieve gets in contact with the rotor (friction noise), turn back the handwheel by 1 to 2 positions.

Machine without rigid screen support

The sieve is lifted against the rotor by symmetrical turning the two sieve tensioning bars. When the sieves touches the rotor, the adjustment is correct.

If the sieve is tensioned too much, the wear is too important with danger of sieve breakage. If the sieve is too loose, the output will decrease.

MF - Line

FREWITT

MF · Line

info

How important are sieves in the sizing process ?

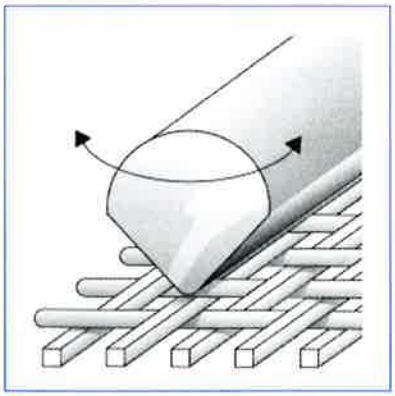
Besides the correct adjustment of the machine, the choice of the right sieve is of great importance for a quality sizing. This information gives you some details about the application of our various sieve types.

Dry sizing

Very strong sieves are required for crushing and dry sizing. FREWITT has introduced a sieve to the market, which provides remarkable advantages in comparison to conventional round wire sieves

The square wire sieves

These sieves, developed by FREWITT, are made of square wire lengthways, parallel to the rotor arms and of round wires perpendicularly.



What are the advantages ?

- up to 15% more output
- up to 10% less fines

How to explain such improvements ?

The sharp edge of the square wire provides a breaking effect as opposed to the crushing of the product against the curved surface of round wires.

The material breaks on the edge of the square wire. Thus producing less fines with a higher yield (see drawing beside).

We would have pleasure in providing that this increased efficiency is also valid for your applications. Do not hesitate to ask for a quotation!

FREWITT

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SIEBPREISLISTE
LISTE DES TREILLIS
PRICELIST FOR SIEVES

FREWITT

Für Zerkleinerungsmaschine Typ
Pour machine à fragmenter type
For sizing mill type

GLA + MG-123 + GLT

Siebabmessungen
Dimensions des treillis
Sieve measurements

103 x 330 mm

Rotor-∅
∅ du rotor
∅ of rotor

80 mm

Gesamtfläche - surface totale - surface total : 340 cm2
Wirksame Siebfläche – surface utile – useful surface :

Rostfreie Siebe Typ
Treillis en acier inox. type AISI 316 (1.4401)
Stainless sieves type

GL-106

ohne starre Stützwanne
sans berceau rigide
without rigid screen support

ord= Runddraht / fil rond / round wire
ocr= Viereckdraht / fil carré / square wire

Trockengranulation – granulation sèche – dry granulation
ohne Gummirand – sans bords gommés – without rubber edges

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
404870	408223	1,00	0,63	15,6	38
408490	408496	1,25	0,80	12,4	37
-	407662	1,50	1,00	10,0	49
407660	-	1,60	1,00	10,0	49
408525	408526	2,00	1,00	8,5	44
408529	408530	2,50	1,00	7,25	51
408533	408534	3,15	1,50	5,5	51
408537	408538	3,50	1,50	5,0	54
408541	-	4,00	2,00	4,2	44
408542	-	4,50	2,00	3,9	54
408543	408544	5,00	1,50	3,3	57
408545	-	5,00	2,00	3,6	51
408546	-	6,00	1,50	3,2	67
408547	-	6,00	2,00	3,1	56
408548	-	7,10	1,40	3,0	70
408549	408550	7,00	1,50	2,9	69
408551	-	7,00	2,00	2,8	64
408552	-	7,50	2,00	2,6	64
408553	-	8,00	1,50	2,6	69
408554	-	8,00	2,00	2,5	64
408555	-	9,00	2,00	2,3	69
408556	-	10,00	2,00	2,1	72
408557	-	11,00	2,00	1,9	77
408558	-	12,00	2,00	1,8	69
408559	-	15,00	2,00	1,4	78
408560	-	20,00	2,00	1,1	69

SIEBPREISLISTE
LISTE DES TREILLIS
PRICELIST FOR SIEVES

FREWITT

ord= Runddraht / fil rond / round wire

ocr= Viereckdraht / fil carré / square wire

Trockengranulation – granulation sèche – dry granulation
mit Gummirand – avec bords gommés – with rubber edges

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
407669	407655	1,00	0,63	15,6	38
408501	408502	1,25	0,80	12,4	37
-	408506	1,50	1,00	10,0	49
408505	-	1,60	1,00	9,8	38
408527	408528	2,00	1,00	8,5	44
408531	408532	2,50	1,00	7,25	51
408535	408536	3,15	1,50	5,5	51
408539	408540	3,50	1,50	5,0	54

Feuchtgranulation – granulation humide – wet granulation
mit Gummirand – avec bords gommés – with rubber edges

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408561	-	1,00	0,32	19,2	57
408562	-	1,25	0,40	15,4	57
408563	-	1,60	0,50	12,1	58
408564	-	2,00	0,63	0,7	58
408565	-	2,50	0,71	7,9	61
408566	-	3,15	0,80	6,5	64
408567	-	3,55	0,80	5,8	67
408568	-	4,00	1,00	5,1	64
408569	-	4,50	1,00	4,6	67
408570	-	5,00	1,25	4,1	64
408571	-	5,60	1,25	3,7	67
* 408572	-	8,00	1,25	2,7	75
* 408573	-	10,00	1,50	2,2	77

* ohne Gummirand – sans bords gommés – without rubber edges

Feine Siebe - treillis fins – fine sieves
mit Gummirand – avec bords gommés – with rubber edges

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
407014	-	0,25	0,16	62	37
407015	-	0,315	0,20	49	37
407016	-	0,40	0,25	39	38
407017	-	0,50	0,25	34	44
407018	408232	0,63	0,40	25	37
407019	407538	0,71	0,45	22	37
407020	408234	0,80	0,50	19,5	38

LOCHBLECHE
TÔLES PERFOREES
PERFORATED PLATES

Für Zerkleinerungsmaschine Typ
Pour machine à fragmenter type
For sizing mill type

GLA + MG-123 + GLT

Abmessungen
Dimensions
Measurements

103 x 330 mm

Rotor-∅
∅ du rotor
∅ of rotor

80 mm

Gesamtfläche - surface totale - surface total : 340 cm²
Wirksame Siebfläche – surface utile – useful surface :

Lochbleche *für Zerkleinerungsmaschinen FREWITT aus rostfreiem Stahl, werden vorzugsweise zur Herstellung von Würstchengranulaten eingesetzt (rundlaufender Antrieb des Lamellenrotors)*

Tôles perforées *pour machines à fragmenter FREWITT en acier inoxydable, utilsées de préference pour la fabrication de granulés « vermicelles » (entraînement rotatif du rotor à lamelles)*

Perforated plates *for sizing mills FREWITT in stainless steel, preferably used for manufacturing vermicelli-like granules (lamella-rotor with circular motion)*

Rostfreie Lochbleche
Tôles en acier inox. AISI 316 (1.4401)
Stainless plates

GL-107

ohne starre Stützwanne
sans berceau rigide
without rigid screen support

Artikel Nr. Article No. Article No.	∅ der Löcher ∅ des trous ∅ of holes [mm]	Blechdicke Epaisseur Thickness [mm]	Typ Type Type	Nutzfläche Passage Passage [%]
408595	1,00	1,00	GL-107-1	35
408596	1,50	1,00	GL-107	33
408597	2,00	1,00	GL-107	30
408598	2,50	1,00	GL-107	35
408599	3,00	1,00	GL-107	33
408600	3,50	1,00	GL-107	31
408601	4,00	1,00	GL-107	40
408602	4,50	1,00	GL-107	29
408603	5,00	1,00	GL-107	36
408604	6,00	1,00	GL-107	40
408605	8,00	1,00	GL-107	40
408606	10,00	1,00	GL-107	40

SIEBPREISLISTE
LISTE DES TREILLIS
PRICELIST FOR SIEVES

Für Zerkleinerungsmaschine Typ
Pour machine à fragmenter type
For sizing mill type

GLA + MG-123 + GLT

Siebabmessungen
Dimensions des treillis
Sieve measurements

192 x 103 mm

Rotor-∅
∅ du rotor
∅ of rotor

80 mm

Gesamtfläche - surface totale - surface total : 198 cm²
Wirksame Siebfläche – surface utile – useful surface :

Leichte Stützwanne Nr. 408945 (GL-108) *für Siebe mit Draht-∅ von 0,16 bis 0,80 mm ; aus rostfreiem Stahlblech, Lochung 10 x 10 mm, auf welcher 1 Sieb (MW und Draht-∅ sind im Bestellungsfall anzugeben) anhand von Befestigungsleisten angeschraubt wird*

Berceau léger No. 408945 (GL-108) *prévu pour treillis avec un diamètre de fil de 0,16 jusqu'à 0,80 mm; en tôle d'acier inoxydable, perforation de 10 x 10 mm, sur lequel un treillis (ouverture de maille et diamètre de fil sont à indiquer lors de la commande) est vissé au moyen de barres de fixation.*

Light screen support No. 408945 (GL-108) *for sieves with wire-∅ from 0,16 to 0,80 mm; made of stainless steel, perforation 10 x 10 mm, with 1 sieve (mesh opening and wire ∅ to be specified when placing the order) which is fastened by means of fixing bars.*

Rostfreie Siebe
Treillis en acier inox. AISI 316 (1.4401)
Stainless sieves

GL-108 (Pos. 2)

für leichte Stützwanne
pour berceau léger
for light screen support

GL-108

ord= Runddraht / fil rond / round wire
ocr= Viereckdraht / fil carré / square wire

Feuchtgranulation – granulation humide – wet granulation

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408574	-	1,00	0,32	19,2	57
408575	-	1,25	0,40	15,4	57
408576	-	1,60	0,50	12,1	58
408577	-	2,00	0,63	9,7	58
408578	-	2,50	0,71	7,9	61
408579	-	3,15	0,80	5,8	64
408580	-	3,55	0,80	5,1	67

SIEBPREISLISTE
LISTE DES TREILLIS
PRICELIST FOR SIEVES

Rostfreie Siebe
Treillis en acier inox. AISI 316 (1.4401)
Stainless sieves

GL-108 (Pos. 2)

für leichte Stützwanne
pour berceau léger
for light screen support

GL-108

ord= Runddraht / fil rond / round wire
ocr= Viereckdraht / fil carré / square wire

Trockengranulation – granulation sèche – dry granulation

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408581	408582	1,00	0,63	15,6	38
408583	408584	1,25	0,80	12,4	37

Feine Siebe – treillis fins – fine sieves

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408585	-	0,25	0,16	62	37
408586	-	0,315	0,20	49	37
408587	-	0,40	0,25	39	38
408588	-	0,50	0,25	34	44
408589	408590	0,63	0,40	25	37
408591	408592	0,71	0,45	22	37
408593	408594	0,80	0,50	19,5	38

SIEBPREISLISTE
LISTE DES TREILLIS
PRICELIST FOR SIEVES

FREWITT

Für Zerkleinerungsmaschine Typ
Pour machine à fragmenter type
For sizing mill type

GLA + MG-123 + GLT

Siebabmessungen
Dimensions des treillis
Sieve measurements

192 x 103 mm

Rotor-∅
∅ du rotor
∅ of rotor

80 mm

Gesamtfläche - surface totale - surface total : 198cm²
Wirksame Siebfläche – surface utile – useful surface :

Rostfreie Siebe
Treillis en acier inox. AISI 316 (1.4401)
Stainless sieves

GL-80-2

für starre Stützwanne
pour berceau rigide
for rigid screen support

GL-80-2

ord= Runddraht / fil rond / round wire
ocr= Viereckdraht / fil carré / square wire

Trockengranulation – granulation sèche – dry granulation
Siebe mit verstärkten Rändern – treillis avec bords renforcés – sieves with reinforced edges

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408608	408611	1,00	0,63	15,6	38
408613	408614	1,25	0,80	12,4	37
-	408615	1,50	1,00	10,0	49
407847	-	1,60	1,00	9,8	38
408616	408617	2,00	1,00	8,5	44
408618	408619	2,50	1,00	7,25	51

Rostfreie Lochbleche
Tôles en acier inox. AISI 316 (1.4401)
Stainless plates

GL-107-2

für starre Stützwanne
pour berceau rigide
for rigid screen support

GL-80-2

Artikel Nr. Article No. Article No.	∅ der Löcher ∅ des trous ∅ of holes [mm]	Blechdicke Epaisseur Thickness [mm]	Typ Type Type	Nutzfläche Passage Passage [%]
408621	1,00	0,80	GL-107-2	35

SIEBPREISLISTE
LISTE DES TREILLIS
PRICELIST FOR SIEVES

FREWITT

Leichte Stützwanne Nr. 409446 (GL-0108-4) *auf welcher 1 Sieb GL-108-4-2 (MW und Draht-∅ sind im Bestellungsfall anzugeben) anhand von Befestigungsleisten angeschraubt wird*

Berceau léger No. 409446 (GL-0108-4)*sur lequel un treillis GL-108-4-2 (ouverture de maille et diamètre de fil sont à indiquer lors de la commande) est vissé au moyen de barres de fixation.*

Light screen support No. 409446 (GL-0108-4) *with 1 sieve GL-108-4-2 (mesh opening and wire ∅ to be specified when placing the order) which is fastened by means of fixing bars* **CHF 631.00**

Rostfreie Siebe
Treillis en acier inox. AISI 316 (1.4401) **GL-108-4-2** **für starre Stützwanne**
Stainless sieves **pour berceau rigide** GL-80-2
for rigid screen support

ord= Runddraht / fil rond / round wire
ocr= Viereckdraht / fil carré / square wire

Feuchtgranulation – granulation humide – wet granulation
Siebe mit verstärkten Rändern – treillis avec bords renforcés – sieves with reinforced edges
für leichte Stützwanne GL-0108-4 – pour support léger GL-0108-4 – for light screen support GL-0108-4

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408627	-	1,00	0,32	19,2	57
408629	-	1,25	0,40	15,4	57
408630	-	1,60	0,50	12,1	58
408631	-	2,00	0,63	9,7	58
408632	-	2,50	0,71	7,9	61

Rostfreie Siebe
Treillis en acier inox. AISI 316 (1.4401) **GL-108-4-2** **für starre Stützwanne**
Stainless sieves **pour berceau rigide** GL-80-2
for rigid screen support

Feine Siebe – treillis fins – fine sieves
Siebe mit verstärkten Rändern – treillis avec bords renforcés – sieves with reinforced edges
für leichte Stützwanne GL-0108-4 – pour support léger GL-0108-4 – for light screen support GL-0108-4

Article Nr. [ord]	Article Nr. [ocr]	Maschenweite Ouverture de maille Mesh opening [mm]	Draht-∅ ∅ du fil ∅ of wire [mm]	Maschen Mailles Meshes [per inch]	Nutzfläche Passage Passage [%]
408633	-	0,315	0,20	49	37
408634	-	0,40	0,25	39	38
408635	-	0,50	0,25	34	44
408636	408637	0,63	0,40	25	37
408638	408639	0,71	0,45	22	37
408640	408642	0,80	0,50	19,5	38

Klübersynth® UH1 14-31

Lubricating grease for the food processing industry

Description

Klübersynth UH1 14-31 was developed especially for the food processing industry. It meets the requirements of the German law on foodstuffs and associated products (LMBG, sec. 5, para. 1, sentence 1) and the US requirements set forth in the "Guidelines of sec. 21 CFR 178.3570 of FDA regulations". Klübersynth UH1 14-31 has been authorized by the USDA for use in federally inspected meat and poultry plants (USDA H1).

Klübersynth UH1 14-31 exhibits excellent low-temperature and antiwear characteristics as well as good water resistance and an effective wear protection. It should preferably be used when smooth running properties within a wide speed range are required. Klübersynth UH1 14-31 also offers good protection against corrosion and a high stability to ageing and oxidation.

Application

Klübersynth UH1 14-31 is used for the lubrication of machines and equipment in the food processing industry. It is intended for sliding and rolling bearings, lifting cylinders, joints, seals etc. as well as for the lubrication of friction points in freezing and deep freezing tunnels or for chains which run more smoothly when lubricated with a soft grease.

Notes on application

Klübersynth UH1 14-31 can be applied using a brush, spatula or grease gun and can be pumped easily through central lubrication systems.

The operating temperature range of Klübersynth UH1 14-31 lies between -40 °C and 120 °C. Depending on the application, it can also be used at lower temperatures. Adequate lubrication properties are ensured down to approx. -70 °C.

Storage

The storage time is two years when the product is carefully stored in a dry place and in the sealed original package.

Pack sizes

1 kg tin
25 kg bucket

Klübersynth UH1 14-31

- excellent low-temperature characteristics
- good water resistance
- good corrosion protection
- high stability to ageing and oxidation
- good pumpability in central lubrication systems
- USDA H1 registration

Product data

Colour, appearance	white
Density, DIN 51 757 at 20 °C, g/cm³	approx. 0.90
Drop point, DIN ISO 2176, °C	> 220
Worked penetration at 25 °C, DIN ISO 2137; 0.1 mm	approx. 310 to 340
Speed factor (n · dm)	approx. 8 · 10^5
Consistency NLGI grade, DIN 51 818	1
Operating temperature range, °C	-40 to 120

Klübersynth® UH1 14-31
Material Safety Data Sheet

Section I

Manufacturer's name: Klüber Lubrication München KG
Chemical name and synonyms: Lubricating grease
Trade name and synonyms: Klüberfluid UH1 14-31
Chemical family: Synthetic hydrocarbon oil, ester oil, Al complex soap
Formula: Proprietary

Section II – Hazardous Ingredients

Paints, preservatives, solvents

	%	TLV (units)
Pigments		
Catalyst		
Vehicle		
Solvents		
Additives		
Others		

Alloys and metallic coatings

	%	TLV (units)
Base metal		
Alloys		
Metallic coatings		
Filler metal plus coating or core flux		
Others		

Hazardous mixtures of other liquids, solids, or gases

USDA H1 registration

Section III – Physical Data

Boiling point (°F):	n/a
Vapor pressure (mm Hg):	n/a
Vapor density (air=1):	n/a
Solubility in water:	not soluble
Specific gravity (H_2O=1):	approx. 0.9
Percent, volatile by volume (%):	0
Evaporation rate (____=1):	n/a
Appearance and odor:	white, neutral

Section IV – Fire and Explosion Hazard Data

Flash point (method used): (base oil) > 200 °C ASTM D-92
Flammable limits: – – Lel: Uel:
Extinguishing media: Water fog, foam, dry chemical, CO_2
Special fire fighting procedures: Use self-contained breathing apparatus, cool fire exposed areas and equipment.
Unusual fire and explosion hazards: Do not use direct stream of water, material may float and reignite.

Section V – Health Hazard Data

Threshold limit value: n/a
Effects of overexposure:
Eyes: mild irritation
Skin: n/a
Ingestion: No more than slightly toxic if swallowed.
Inhalation: n/a
Emergency and first aid procedures:
Eyes: Flush with large amount of water.
Ingestion: Do not induce vomiting.
Contact doctor for directions.

Section VI – Reactivity Data

Stability: stable
Incompatibility (materials to avoid): Strong oxidizing materials, such as pure oxygen.
Hazardous decomposition products: n/a
Hazardous polymerization: will not occur

Section VII – Spill or Leak Procedures

Steps to be taken in case material is released or spilled: Eliminate all sources of ignition. Recover free liquid. Add absorbent to spill area. Collect absorbent. Keep product out of waterways.
Waste disposal method: Incinerate absorbed material or dispose of it in accordance with your local, state and federal regulations.

Section VIII – Special Protection Information

Respiratory protection (specify type): n/a
Ventilation: n/a
Local exhaust: recommended
Mechanical (general):
Protective gloves: n/a
Eye protection: n/a
Other protective equipment: no

Section IX – Special Precautions

Precautions to be taken in handling and storing:
Minimize skin contact with all lubricants. Wash with soap and water prior to eating, drinking, smoking or using sanitary facilities.
Other precautions:
All chemical products should be handled as to prevent constant or repeated contact.

n/a = not applicable

Freudenberg Klüber Lubrication, a member of the Freudenberg group of companies

Klüber Lubrication München KG
Postfach 701047, D-81310 München
Tel. (089) 7876-0, Telex 5 23 131, Telefax (089) 7876333

Klüberpaste® UH1 84-201
White lubricating and assembly paste

KLÜBER LUBRICATION

Description

Klüberpaste UH1 84-201 is a white lubricating and assembly paste authorized in accordance with USDA-H1. It contains a fully synthetic base oil and a thickener consisting of a mixture of organic and inorganic solid lubricants.

The raw materials contain no heavy metals or sulphur.

Klüberpaste UH1 84-201 is universally applicable as an assembly paste and particularly suitable for lubrication points operating in a humid environment. The paste is very resistant to water, shows good anticorrosion behaviour and is compatible with high-alloy steels.

Application

Klüberpaste UH1 84-201 is generally suitable for all friction points in the food processing and pharmaceutical industries.

As an assembly paste

– for transition and clearance fits

As a screw compound

– for high-alloy steels to optimize the tightening torque and facilitate disassembly after a long service life

As a lubricating and assembly paste

– for low-speed plain bearings and axially guided plain bearings
– for guide rails, hinges, rollers, cams, etc.

Application notes

Before applying Klüberpaste UH1 84-201 it is important to clean and degrease the contact surfaces thoroughly. A thin layer of the paste is then applied by brush, leather rag or synthetic sponge. It spreads easily over the entire surface and thus prevents over-lubrication. If Klüberpaste UH1 84-201 is used on small gears ensure that the tooth flanks are covered evenly. We recommend carrying out a compatibility test before applying the paste to plastic materials.

Storage

The storage period is approx. 2 years if the product is stored in the original closed container is a dry place.

Pack size

25 x 50 g tubes
500 g cartridge
600 g can
25 kg drum

Klüberpaste UH1 84-201

- high-performance lubricating and assembly paste authorized in acc. with USDA-H1
- excellent low-temperature behaviour
- good pressure absorption capacity
- good corrosion protection
- neutral towards alloyed steel
- water hazard category 1

Product data

Colour	white
Service temperature range, °C, approx.	-45 to 120
Density, DIN 51 757, at 20 °C, (g/cm³), approx.	1.13
Base oil viscosity, DIN 51 561, at 40 °C, (mm²/s)	200
Drop point, DIN ISO 2176, °C	> 240
Worked penetration at 25 °C, DIN ISO 2137 (ASTM D 271); 0.1 mm	310 – 340
Four-ball welding test, DIN 51 350 Pt 4, N	> 3000
Corrosion behaviour, SKF Emcor test, DIN 51 802, 1 week, distilled water, rating	1

Klüberpaste® UH1 84-201
Material Safety Data Sheet

Section I

Manufacturer's name: Klüber Lubrication München KG
Chemical name and synonyms: Lubricating grease
Trade name and synonyms: Klüberpaste UH1 84-201
Chemical family: Synthetic hydrocarbon oil, PTFE, solid lubricant
Formula: Proprietary

Section II – Hazardous Ingredients

Paints, preservatives, solvents

	%	TLV (units)
Pigments	–	–
Catalyst	–	–
Vehicle	–	–
Solvents	–	–
Additives	–	–
Others	–	–

Alloys and metallic coatings

	%	TLV (units)
Base metal	–	–
Alloys	–	–
Metallic coatings	–	–
Filler metal plus coating or core flux	–	–
Others	–	–

Hazardous mixtures of other liquids, solids, or gases
—

Section III – Physical Data

Boiling point:	n/a
Vapor pressure (mm Hg):	n/a
Vapor density (air=1):	n/a
Solubility in water:	not soluble
Specific gravity (H_2O=1):	approx. 1.13
Percent, volatile by volume (%):	0
Evaporation rate (.....=1):	n/a
Appearance and odor:	white, characteristic odor

Section IV – Fire and Explosion Hazard Data

Flash point (base oil): > 200 °C, ASTM D-92
Flammable limits: — Lel: Uel:
Extinguishing media: water fog, foam, dry chemical, CO_2
Special fire fighting procedures: Use self-contained breathing apparatus, cool fire exposed areas and equipment.
Unusual fire and explosion hazards: Do not use direct stream of water, material may float and reignite.

Section V – Health Hazard Data

Threshold limit value: n/a
Effects of overexposure:
Eyes: Mild irritation
Skin: n/a
Ingestion: No more than slightly toxic if swallowed.
Inhalation: n/a
Emergency and first aid procedures:
Eyes: Flush with large amount of water.
Ingestion: Do not induce vomiting. Contact physician for directions.

Section VI – Reactivity Data

Stability: stable
Incompatibility (materials to avoid): Strong oxidizing materials, such as pure oxygen.
Hazardous decomposition products: > 300 °C fluorine compounds in traces possible.
Hazardous polymerization: will not occur

Section VII – Spill or Leak Procedures

Steps to be taken in case material is released or spilled:
Eliminate all sources of ignition. Collect lubricating grease. Keep product out of waterways.
Waste disposal method:
Incinerate absorbed material or dispose of it in accordance with your local, state and federal regulations.

Section VIII – Special Protection Information

Respiratory protection (specify type):	n/a
Ventilation:	n/a
Local exhaust:	recommended
Protective gloves:	n/a
Eye protection:	n/a
Other protective equipment:	no

Section IX – Special Precautions

Precautions to be taken in handling and storing:
Do not contact with tobacco. Minimize skin contact with all lubricants. Wash with soap and water prior to eating, drinking, smoking or using sanitary facilities.
Other precautions:
All chemical products should be handled as to prevent constant or repeated contact.

n/a = not applicable

The data in this brochure is based on our general experience and knowledge at the time of printing and is intended to give information of possible applications to a reader with technical experience without, however, constituting an assurance of properties for specific cases.
We recommend contacting our Technical Consulting Staff for information regarding specific applications. If required and possible we will be pleased to provide a sample for testing.

Freudenberg Klüber Lubrication, a member of the Freudenberg group of companies

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FREWITT

FICHE TECHNIQUE

Auteur: J.-P. Gutknecht **Date:** 28.09.01	**Liste der verwendeten Schmiermittel und Schmieranweisung** **Liste des lubrifiants utilisés et tableau de graissage** **List of used Lubricants and Lubricating chart**	**N° de projet:** S/N : 0591268
Révision: **Date:**		**Page:** 1 / 1

Maschinen-Typ / Type de machine / Type of machine.....: GLA-ORV
Bestell Nr / N° ordre / Order N°.....: S/N : 0591268
Serie Nr / N° de série / Serial N°.....: 0591268
Verstellbares Getriebe / Motovariateur / Variable Speed Drive...: Stoeber R17-1045-037-4

Maschinenteile **Eléments de la machine** **Component**	**Art der Schmierung** **Mode de lubrification** **Type of lubrication**		**Schmierfrequenz** **Fréquence** **Frequency** Normalbetrieb / Ambiance normale / Normal Conditions Nassbetrieb / Ambiance humide / Wet Conditions	**Qualität** **Qualité** **Quality**	**Typ** **Type** **Type**	**Menge** **Quantité** **Quantity**
Antrieb Entraînement Drive	Fett Graisse Grease	Packung Garnissage Packed	10'000 Stunden 10'000 Heures 10'000 Hours	Kugellagerfett Graisse à roulements Ball Bearing Grease	Klüber Klübersynth UH1 14-31	40 cc
Lager Granulierkopf Palier tête à granuler Bearing of granulating Head	Fett Graisse Grease	Packung Garnissage Packed	2'000 Stunden 2'000 Heures 2'000 Hours	Kugellagerfett Graisse à roulements Ball Bearing Grease	Klüber Klübersynth UH1 14-31	10 cc
Schrauben und Gleitflächen Visserie et surfaces de friction Screws and Frictions Surfaces	Fett Graisse Grease	Hand Manuel Manual	2'000 Stunden 2'000 Heures 2'000 Hours	Montage Paste Pâte de montage Paste for assembly	Klüber Klüberpaste UH1 84-201	- - -
Verstellbares Getriebe Variateur Variable Speed Drive	Oel Huile Oil	Bad Bain Bath	Lebenslänglich à vie for live	Hochdrucköl Huile haute pression High pression oil CLP 198-242 mm²/s ISO VG 220	Mobil Mobilgear 630 CLP-220	200 cc
Zahnstangenführung (Verstellbares Getriebe) Commande crémaillère (Variateur) Rack-and-pinion guide (Varable Speed Drive)	Fett Graisse Grease	Hand Manuel Manual	1 Fettpressenstoss pro Monat 1 Coup de pompe à graisse par mois 1 Grease gun shot once a month	Universalfett Graisse universelle Universal Grease	- - -	- - -