FILTRATION news

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THE PUBLISHER

After a "break" we again publish the FILTRATION NEWS.

Our sector underwent a strong recession in the years 92-94. Some competitors disappeared, other companies sold themselves off cheap!..

WHO IS LEADER?

- A leader is whose products are being copied or imitated by his competitors.
- Whose employees or collaborators who left the company taking along technical and commercial documents try to compete against him making unfair competition, betraying the confidence placed in them.
- Who constantly seeks to better his products through a R&D department.
- Who works having obtained the ISO 9001 certificate and prepares for an environmental system, according to the norm UNE-EN-ISO 1400:1996/Regulations 1836:93 (EMAS)

We are LEADERS!!
The whole staff of NOVOTECNIC contributes with its efforts to make this leadership possible. Thanks.

Our customers recognize these efforts placing their confidence in us. Thanks.

I welcome you cordially

Jaume Lleal
Executive President

HOW TO FILTER CUTTING OIL CORRECTLY

HOW CAN YOU SELECT THE MOST SUITABLE FILTRATION SYSTEM?

The first step is to determine the parameters as indicated in the questionnaire on the following page:
Once the technical features have been listed in the questionnaire, it is then possible for NOVOTECNIC to determine the correct filtration system to solve the problem taking into account that in the same filtration system may be combined different types of machining or materials, there are possible different combinations, but the bases can already be determined regarding the type of equipment to be acquired.

CUTTING OIL FILTRATION PLANTS IN THE MACHINING OF CASTING, HARD METAL, CERAMICS, SAPPHIRE, ALUMINIUM, MAGNESIUM, AND SIMILAR MATERIALS.

WHEN THIS TYPE OF MATERIAS ARE BEING MACHINED, FILTERING CUTTING OIL WITH FILTERS WITHOUT FILTERAID OR WITHOUT CONSUMABLE FILTRATING MATERIAL, IS NOT ADVISABLE BECAUSE:

a) When machining these materials, a dust consisting of fine particles is produced which is maintained in colloidal suspension within the cutting oil.

b) To retain this dust, it is necessary to filter the oil with a very low nominal filtration degree of the order of 5µm.

c) It is not possible to use self-cleaning filtering elements, such as cartridges, candles, endless bands, etc., since the paste formed by the dust retained with the oil makes it practically impossible to wash these self-cleaning elements.

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METAV 2000
HALLE11 STAND/A15
Düsseldorf, 27.6.-1.7.
Our engineers will attend personally to your consultations

novotecnic
FILTRATION
ENGINEERING

HOW MUST CUTTING OIL BE FILTERED IN THE MACHINING OF CASTINGS, HARD METAL, CERAMICS, SAPPHIRE, ALUMINIUM, MAGNESIUM OR SIMILAR MATERIALS?

YOU MUST ALWAYS FILTER WITH PRECOAT FILTERS

For the following reason:

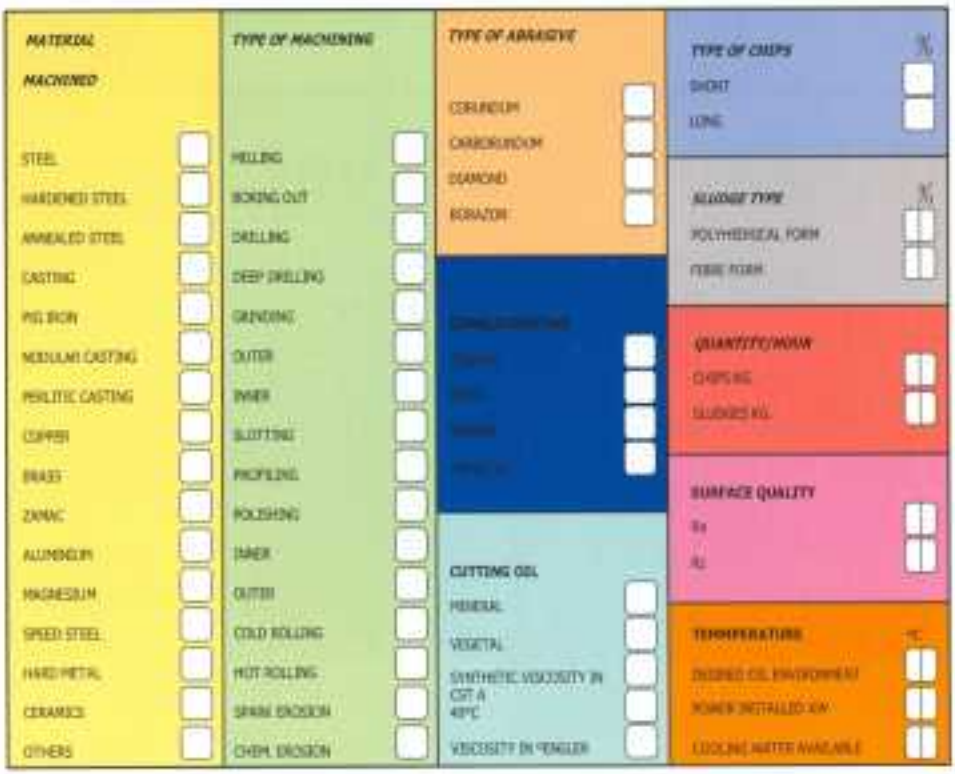
a) This is the only system which allows in a safe and economic way to eliminate the very fine contaminant particles which:
   - Degrade the oil
   - Alter the quality of the parts machined.
   - Cause a premature wear of the machine (Guides, joints, seals, etc.)
   - Blind the cutting pores of the grinding wheels, a specially serious effect when working with diamond grinding wheels, or CBN wheels!

b) The precoat filters are the only filter type, that allow in a rational and economic way sufficiently large filtering surfaces that can guarantee the nominal filtration quality.

c) The precoat filters, if they have been designed taking into consideration all the data stated in the questionary, allow to maintain the oil always clean and transparent, during an unlimited period of time.

NOVOTECNIC has customers who are machining casting and hard metal with cutting oil as coolant and who HAVE NOT CHANGED THE OIL OF THE NOVOTECNIC CENTRAL FILTRATION PLANTS IN THE LAST 18 YEARS.

BASIC TECHNICAL FEATURES FOR DETERMINATION OF THE CHARACTERISTICS OF THE FILTRATION EQUIPMENT



d) **It is not advisable to use the pressure band filters, or pneumatic vacuum or hydraulic vacuum filters** (which are also contained in the catalogue of the filters manufactured by NOVOTECNIC), since if you want to obtain a nominal filtration degree around 10 µm, filtering band of 110 to 140 gr./m2 have to be used.
The viscosity of the oil combined with the fine particles gives rise to a sludge that blinds quickly the filtering bands. This implies an exaggerated consumption of filtering band.

CUTTING OIL FILTRATION PLANTS IN THE MACHINING OF STEEL.

When machining steel, it is possible to filter with **different** filtration systems, depending on:

- The operations being carried out (rough-hewing, finishing, superfinishing)
- The type of machining
- The tools of machining.
- The desired surface quality
- The type of sludges produced.

WHEN CAN FILTERS BE USED WITHOUT FILTERING "MEDIA"?

This is only possible when

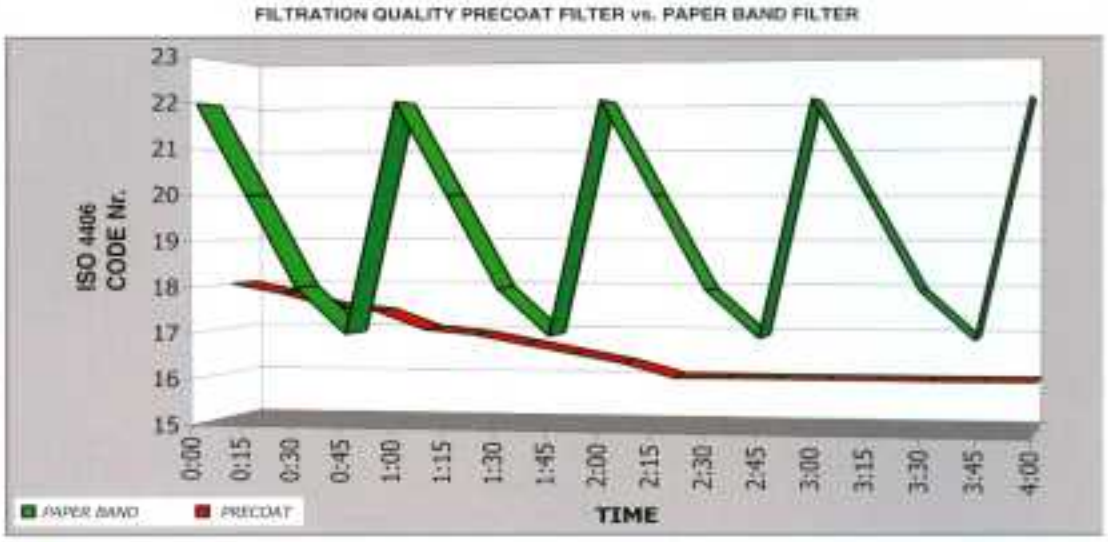
- Steel chips are produced which form a very porous filtering layer that allows to retain the particles < 50 µm y > 20 µm
- When there are no finishing or superfinishing operations with very strict quality controls.

In these cases self-cleaning filters with drum, candles or endless filtering band-with pressure, otherwise with pneumatic vacuum or hydraulic vacuum can be used:

- However, the use of these self-cleaning filters has the inconvenience that the oil accumulates fine particles in suspension< 20 µm, which finally degrade the cutting oil and make necessary the periodic changing of the cutting oil.

CAN CONSUMABLE BAND FILTERS IN THE FILTRATION OF CUTTING OIL BE USED?

This is possible, provided that during the machining process there are NOT fine steel sludges produced which have a trend to blind the filtering band, since this can give rise to an exaggerated consumption of filtering band which makes its use completely uneconomic.



GRAPH 1

WHY IS IT BETTER TO USE PRECOATING FILTERS INSTEAD OF PAPERBAND FILTERS OR ENDLESS-BANDFILTERS?

In the graphic No. 1, you can see the difference in operation of a 90 gr/m2 band filter, in this case, with hydraulic vacuum, and a precoat filter.

Observe that the filtration quality of the band filter is variable, and it passes from an ISO 4406 code 22 quality, when beginning the filtration cycle after the filtering paper has recently entered into the filtration chamber, to a code 17 when the paper is already filled up with dirt, but each time that the filtering paper advances, the filtration quality descends until a code 22 which is a low quality (see ***Filtration News*** n°2).

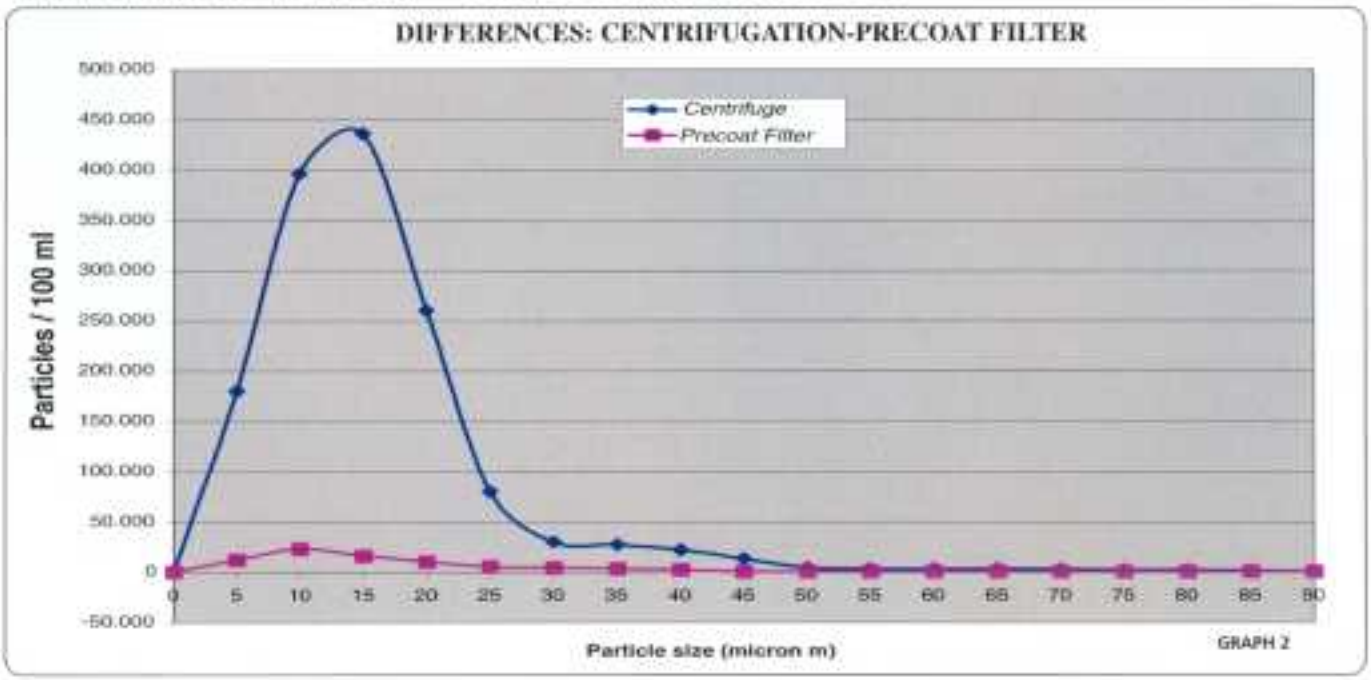
On the contrary, the filtration quality of the precoating filter begins with ISO 4406 code 18 quality almost the same being the best achieved on a band filter, and the quality is increased until stabilizing at a code 16, during the whole filtration cycle which can reach a duration of several days.

WHY IS IT BETTER TO USE PRECOATING FILTERS INSTEAD OF CENTRIFUGES?

In the graph No. 2, it is possible to see the difference between a filtration system with Centrifuges and a Precoating Filter.

On the graph the contents of solid particles in 100 ml oil can be seen, after three months' operation of both filtration types with the same oil and machining type, there is an enormous accumulation of fine sludge in the oil depurated by means of centrifuges. This fine sludge ends up degrading the oil.

The oil filtered with NOVOTECNIC precoat filters is keeping clean with a minimum amount of sludge in suspension. Thus, as mentioned above, the "lifetime" of the oil is unlimited.



GRAPH 2

CONCLUSION

THE MOST CONVENIENT THING IS TO ALWAYS USE PRECOAT FILTERS WITH THE CUTTING OIL.

Although it has been seen that, in some cases, it is possible to filter the cutting oil with filtration systems other than the Precoat Filters, the experience indicates that **IT IS ALWAYS BETTER AND MORE PROFITABLE TO FILTER WITH PRECOAT FILTERS.**

With NOVOTECNIC precoat filters you easily obtain the extraordinary filtration quality ISO 4406 Code 19/16. This means a contents of particles in suspension under 50 mgr./l. approximately.
Using other filteraids, the filtration degree may be ISO 4406 Code 16/13. In this case the contents of solids is appr. 15 mgr./l.

➢ **A TOTAL ELIMINATION OF THE PERIODICAL CHANGES OF THE OIL**

There are customers of NOVOTECNIC who have not changed the oil of their central filtration plants since 23 years ago.

➢ **LESS CONSUMPTION OF GRINDING WHEELS**

There are customers who have reduced the cosumption of grinding wheels up to 30%, which largely compensates for the paying-off of the filtration centrals and the cost of purchase of the filter-aid.

➢ **LESS WEAR OF THE HIGH PRESSURE PUMPS**

When working with gun drills or when working with Borazon grinding wheels at speeds from 100 to 180m/sec., cutting oil impulsion pumps are necessary which work at 60-120 bars. These pumps have an unlimited lifetime if the oil is filtered correctly with our precoat filters.

➢ **LESS CONSUMPTION OF TOOLS**

This is especially spectacular in the case of gun drills or Mapal type reamers, honing machines, etc, where a 5 and an until 10 years lifetime of the tools in some machining processes has been achieved.

➢ **REDUCE AND EVEN ELIMINATE THE CONSUMPTION OF WASHING AGENTS**

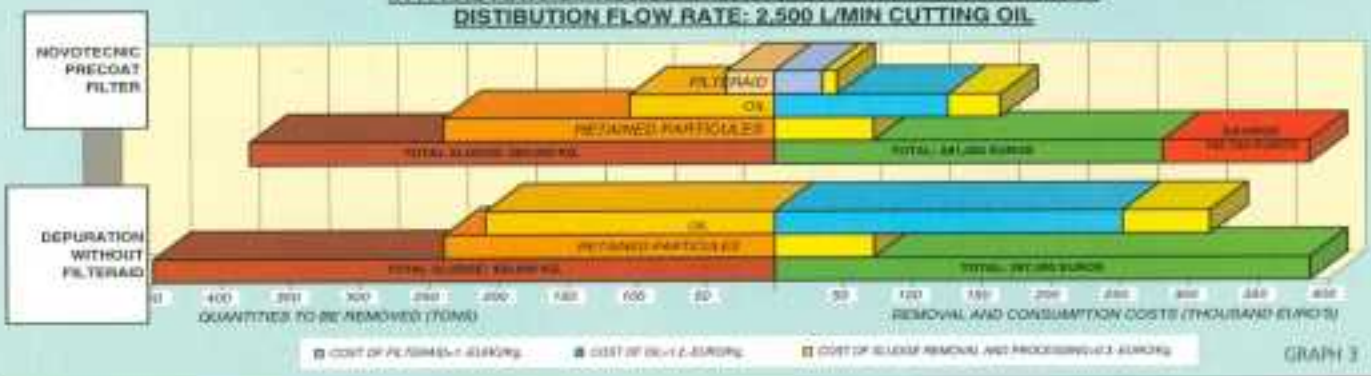
Owing to the extraordinary cleanliness obtainable with the precoating filters, the cooling oil cleans the machined part, so that it is possible to eliminate some washing operations, with the consequential saving of costs for washing machines and consuption of washing agents. On the other hand, when these parts are clean when arriving to the final washing machines prior to assembly, consumption of the washing agent is reduced.

➢ **REDUCTION OF THE WORKING EXPENSES**

Thanks to the foregoing indications and the fact that, with the precoating filtration systems of NOVOTECNIC, it is possible to evacuate the sludges with only 10-30% oil, the manufacturing costs are remarkably reduced.

In the graphic n°3 can be seen the difference of the working expenses of precoating filtration system and a filtration system without consumption of filter-aid. As it can be seen, the cost for consumption of filter-aid is largely compensated by the reduction of oil content in the residual sludges.

COMPARATIVE GRAPH OF ANNUAL RUNNING EXPENSES
IN A FACTORY OF NODULAR CASTIRON ENGINE PISTON RINGS
DISTIBUTION FLOW RATE: 2.500 L/MIN CUTTING OIL



GRAPH 3

PROTECTION OF THE ENVIRONMENT

Owing to:

- **Low Contaminating level of the Sludges Evacuated.**
  The sludge drying system which is incorporated into the precoating filters of NOVOTECNIC, allows an important reduction of the sludge evacuation costs.
- **Possibility of using "green" filter-aid**
  In most of the cases, it is possible to use as a filter-aid cellulose proceeding from the core of the grainless ears of maize, which is a residue of a yearly growing plant that, consequently, does not require the felling of trees or any chemical bleaching processes.
- **Reduction of the Volume to be Evacuated of the Baths of Used Washing Agents.**
  As the washing baths become less dirty, these have a much longer "lifetime", with the consequential reductions of the volume of the washing baths which must be treated.

CONTROL OF FILTRATION QUALITY

In our former FILTRATION NEWS we published a table of the ISO-4406 Standard regarding the contents of particles in a liquid. This is the most used standard in the metallurgical sector.
In this edition we publish the table of code NAS 1638 which is also being used in some cases.

We marked with a circle the average qualities, reasonably demandable, in metallurgical processes.

NAS-7: Honing or grinding operations which require an exceptional quality.

NAS-8: High quality rolling, honing and grinding operation.

NAS-9: General medium quality or machining operations.

NAS-10: Machining operations in general.

CODE NAS 1638

CONTENTS OF PARTICLES

SIZE OF PARTICLES	5-10µm	10-25µm	25-50µm	50-100µm	>100µm
*CLASS	QUANTITY OF PARTICLES IN MICRONS BY 100 ml. OF LIQUID				
0	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1.000	178	32	6	1
3	2.000	356	63	11	2
4	4.000	712	126	22	4
5	8.000	1.425	253	45	8
6	16.000	2.850	506	90	16
(7)	32.000	5.700	1.012	180	32
(8)	64.000	11.400	2.025	360	64
(9)	128.000	22.800	4.050	720	128
(10)	256.000	45.600	8.100	1.440	256
11	512.000	91.200	16.200	2.880	512
12	1.024.000	182.400	32.400	5.760	1.024

THE ENVIRONMENTAL IMPACT CAUSED BY FILTRATION PROCESSES SHOULD BE MINIMIZED



Sludge drying equipment type 2 CALL 400, installed in a cutting tools factory for drying the sludge coming from 4 precoat filters with flexible candles of our competitors.

NOVOTECNIC has developped systems for carrying out the drying of the sludge coming from filtration operations with precoat filters.

As a result of the excellent efficiency and function of this equipment many customers have acquired and aquire NOVOTECNIC drying equipment to couple them to precoat filters of our competitors.

Some of our competitors don't have efficient systems available for drying the sludge coming from the discharge of precoat filters.

You have to bear in mind that several customers who bought these drying units from, us recover up to 75% of the oil which formarly they removed along with the sludge of their factory and they are saving the high financial taxes implied.

KORTA, S.A. INAGURATES A NEW FACTORY OF BALL SPINDLES

The famous Basque company KORTA, S.A., engaged in the manufacture of high precision ball spindles, has inaugurated its new factory in ZUMAYA.

On a piece of ground of 10.000 m2 has been built a factory of 5.000 m2, equipped with all the means necessary to guarantee an exceptional quality of its ball spindles ranging from Ø 12mm. to Ø 200 mm, and with lengths of up 22 metres.



Besides installing the high precision machinery which is required for this type of manufacture, KORTA has completely climaticized the factory, so that all the departments of the factory (materials entry store, sections of rough grinding, finishing grinding, control, etc.) are always at the same temperature guaranteeing the stability of the "bars" and "spindles" length during the whole manufacturing processess.
The measure controls are completely reliable since there are no differences of temperature in the different departments of the factory.

Stress must also be given to the installation of a new central precoating filtration plant of NOVOTECNIC which filters the cutting oil proceeding from the grinding operations of the spindles.

The central precoating filtration plant type FTD 40 DA 35 of NOVOTECNIC has capacity of 35.000 litres of oil, and it filters and distributes a flow of 1.200 l/min. of grinding oil, with a nominal filtration quality of ISO 4406 code 19/16

This exceptional filtration quality assures a perfect geometrical and surface quality of the sliding tracks of the balls of the spindles, as well as an important increase in the efficiency of the grinding wheels and machines.

The central filtration plant is equipped with a cooling system for the cutting oil, by means of a powerful refrigerating group of 60.000 Kcal/hour, which allows to distribute to the machines, the grinding oil at the room temperature of the factory.

With this, it is achieved that all the grinding machines and all the spindles being ground always remain at the same temperature during the grinding operations, assuring a higher degree of precision of the same.

KORTA has realised a strong investment, but with the construction of the new factory and the equipment installed it places itself in a first line position in the world market of ball spindle manufacturers.

KORTA, S.A. Zumaya - Guipúzcoa - España **e-mail:** comercial@korta-sa.com

FILTRATION OF CUTTING OIL IN THE MACHINING OF GEAR BOXES OF MAGNESIUM

GROB

One of the main targets of the VOLKSWAGEN group is the manufacture of more robust, safe and reliable vehicles, but which at the same time are lighter, in order to achieve a maximum reduction of the fuel consumption and, consequently, a diminution of the environmental contamination.
This is why VOLKSWAGEN is carrying through large investments to incorporate to its vehicles components manufactured of MAGNESIUM, a metal which is lighter than aluminium, and very abundant in nature. This material has, beside its low specific weight, a high resistance and the advantage that it is easily machined.

clutch housings of MAGENESIUM alloys.
They have recently installed in their factory of GEAR BOXES DEL PRAT, S.A., a new Flexible machining System for gear boxes and clutch housings manufactured from MAGNESIUM.

The FMS line has been designed and supplied by the Bavarian company GROB that has entrusted NOVOTECNIC with the project, supply and assembly of the central filtration system for the oil and separation of the MAGNESIUM chips.

A.- SPEED CHANNELS:
There are two 45 m. long speed channels, into which the machines discharge the cutting oil together with the chips. These channels dispose of strategically situated dredging Jets to insure a total cleaning of the channels.

B.- TRANSFER TANKS
Two transfer tanks of the dirty oil together with the magnesium chips.
These tanks have two pumps with impeller centrifugal screw, which can pump solid materials. Moreover, they have a special stirring system which avoids the collection of chips on the bottom of the tanks.



For machining of magnesium, emulsions or solutions with water cannot be used. This material must be machined with entire cutting oils, since these do not undergo any reaction with MAGNESIUM.

The company VOLKSWAGEN is already incorporating in its vehicles gear boxes, differentials and

This is a precoating central filtration plant Type FTD 75 DA 90, capable of filtering a cutting oil flow of 5.000 l/min., with a total capacity of 100.000 litres of oil.

The central filtration plant is erected on the ground of the factory.
The complete system comprises:

C.- RETURN TUBINGS
A network of overhead pipes for the return of dirty oil and chips to the central plant.

D.-SETTLING TANK
A settling tank with automatic dredging for separation of the big Magnesium chips from the cutting oil . This tank disposes of a settling system, developped

especially by NOVOTECNIC, which allows to increase the settling yield up to 98-99%.With standard settling tanks is achieved the separation of 25-30% of the Magnesium chips arriving to the tanks, since magnesium chips have a high floating capacity.

E.- PRECOATING FILTERS
Two precoating filters NOVOTECNIC Type FTD 75, each of them having a flow of 2.650 l/min. These filters are prepared for using a filter-aid of cellulose.

This cellulose is proceeding from the core of the grainless ears of maize, which is a "green" product, since it is a yearly growing plant.

The filtration quality which is obtained with these precoating filters of NOVOTECNIC is 4406 code 19/16.

F.-Refrigerating System of the Cutting Oil
Oil refrigerating system of 110.000 Kcal/hour with a closed oil recirculation circuit in which the oil is cooled down by means of a water/oil heat exchanger and a water refrigerating group with an installed power of 44 Kw.

G.- Distribution Pipeline Network
Consisting of an installation of overhead pipe lines with spurs for each machining center and spurs for the cleaning "jets" of the speed channels.


ZERTIFIKAT

TÜV

Novotecnic Europa, S.A.

EN ISO 9001 07.94

The central filtration plant incorporates all new technological developments carried out in the last years by NOVOTECNIC.

Amongst these stress must be paid to the **Touch panel**, in which are centralized the drive and control of the different components of the central filtration plant and the emission of written messages of alarms and help to give a solution to the origin of the same, thanks to which the operator can establish a "dialogue" with the central filtration plant.

NOVOTECNIC EUROPA, S.A.

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