

USE AND MAINTENANCE MANUAL

IN ORDER TO PREVENT PERSONAL INJURIES AND MATERIAL DAMAGE, THIS USE AND MAINTENANCE MANUAL MUST BE READ BY ALL PERSONNEL INVOLVED WITH THE HANDLING OF THE MACHINE

THIS MACHINE IS NOT AUTHORIZED TO BE USED IN EXPLOSIVE ATMOSPHERES



**PNEUMATIC
SUBMERSIBLE PUMPS**

BN-30 AND BN-60

MANUFACTURING YEAR:

SERIAL NUMBER:

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NEUMAC

1.- GENERAL OVERVIEW

The present manual applies to the NEUMAC pneumatic submersible pumps, models BN-30 and BN-60. This manual is intended to provide the user and the maintenance technician with the fundamental knowledge of the machine, its construction and its application.

This manual also includes indications about:

- ❑ General safety rules.
- ❑ Operating instructions.
- ❑ Instructions for maintenance and repair.

The observance of these instructions will help to prevent possible accidents from occurring and will diminish repair costs, increasing the machine's reliability and service life.

In addition to the safety rules found in this manual, other locally operative regulations concerning working conditions must be followed.

This instruction manual must always be available near the machine and must be read and used by all the people related with the use of the machine, specially by the people that works with it and by the people who is in charge of its maintenance.

This machine is not authorized to be used in classified explosive atmospheres.

The manufacturer has no direct control over machine application, operation, inspection, lubrication or maintenance. Therefore he is not liable for the machine's shortcomings nor for the possible injuries produced by it, whenever the user fails to follow the contents of the present manual, or when the machine is used for other than the intended purpose.

The following denominations correspond to important information for all those somehow involved with the unit:

NOTE: Important information, useful for a correct use of the equipment.

WARNING: Important information, do's and don'ts, aiming to avoid damage to the machine.

DANGER: Important information, mandatory and prohibitive warnings aiming to avoid personnel injuries.

2.- SAFETY RULES

2.1 GENERAL RULES

The user has the responsibility to make the contents of the present manual available to all workers and to the personnel involved with the work and maintenance of the machine.

This pump has been carefully manufactured in compliance with all EU safety regulations, aiming to provide the user a safe and efficient machine. Nevertheless, the pump can still constitute a hazard to the operator, nearby persons and/or property if, in any way:

- It is used with no respect to the instructions and safety rules.
- It is modified in its essential characteristics.
- It is employed for other than the intended purpose.
- It is operated by personnel not duly qualified or without proper age.

DANGER: This machine is not authorized to be used in explosive atmospheres.

DANGER: Although the pump is operated by compressed air, its use in classified explosive atmospheres is subjected to an eventual official authorisation.

DANGER: This pump is not intended to pump flammable liquids.

For this reason, it is necessary to carefully read the instructions manual, especially the **safety rules** before starting the pump up.

It is necessary to always observe the following safety procedures:

- Keep working area clean of oil, trash or debris.
- Do not use the unit in presence of flammable liquids or gases.
- Wear proper clothing and personal protective equipment.
- Keep all non-essential personnel clear of the working area.
- Always observe locally operative safety instructions concerning working conditions, operator's clothing and personal protective equipment.
- Keep this manual accessible to the operator and maintenance personnel.

The lack of respect to any of the instructions outlined in the present manual frees the manufacturer from any kind of responsibility.

Alterations in the machine, omissions and the use of non-authorized spare parts free the manufacturer from any kind of responsibility regarding property, people and the apparatus itself.

DANGER: To avoid being exposed to the noise produced by the air exhaust, keep away as much as possible the air outlet pipe from the personnel, and use a silencer and acoustic protection if necessary.

2.2 SAFETY RULES FOR NORMAL USE

The pneumatic pumps can work either on vertical position or inclined. They cannot work upside down (chapter 3 and 5). They are easily handled by one man.

DANGER: This machine is not authorized to be used in explosive atmospheres.

DANGER: This pump is not intended to pump flammable liquids.

They have been designed to pump liquids with a pH between 5 and 8. They have not been built to pump salty water. The salty water will heavily damage the aluminium housing.

2.3 SAFETY RULES FOR OPERATION

It is extremely necessary to carefully read this manual before starting up.

On the following pages, it is described the machine's characteristics and some tips for a correct use of the equipment. Follow these tips to guarantee your apparatus a longer service life.

Always have the motor off when immersing or taking the pump out of the liquids.

2.4 SAFETY RULES FOR MAINTENANCE AND REPAIRS

Carefully follow all maintenance instructions. Periodically inspect and repair the machine as outlined by the contents of this manual, in order to maintain its initial safety conditions.

- Maintenance and repair work should only be performed by qualified personnel. Always use original spare parts.
- Do not work with the pump if any of its parts are somehow damaged.

2.5 SAFETY RULES FOR TRANSPORTATION

On transport vehicles the apparatus is to be secured against rolling off, slipping or tipping over.

The ring on the top of the pump has been built to tie a rope for easy carrying.

3.- DESCRIPTION OF THE MACHINE

DANGER: This pump is not intended to pump flammable or corrosive liquids.

NOTE: The pneumatic pumps BN-30 and BN-60 have been designed to pump clean water or liquids of similar density with a pH between 5 and 8.

WARNING: Do not pump mud, sludge or salty water. The salty water will heavily damage the aluminium housing.

They are compact, lightweight and easily handled by one man. For their size, they can be introduced in small holes.

They can work half or totally submerged. They start pumping when submerged more than 80 mm.

Each pump has three fittings on top of it. The central one is the inlet racord, which is the pump's air supply channel. The 1-1/2" diameter fitting is threaded against the aluminium and is to be coupled to an air exhaust pipe. The third port is equipped with the steel outlet adaptor and the outlet fitting. The water discharge hose should be coupled to the outlet fitting.

Never allow water or any liquid to enter the air exhaust pipe.

The housing is made of resistant heat-treated aluminium. The pumps incorporate a powerful vane type high quality pneumatic motor.

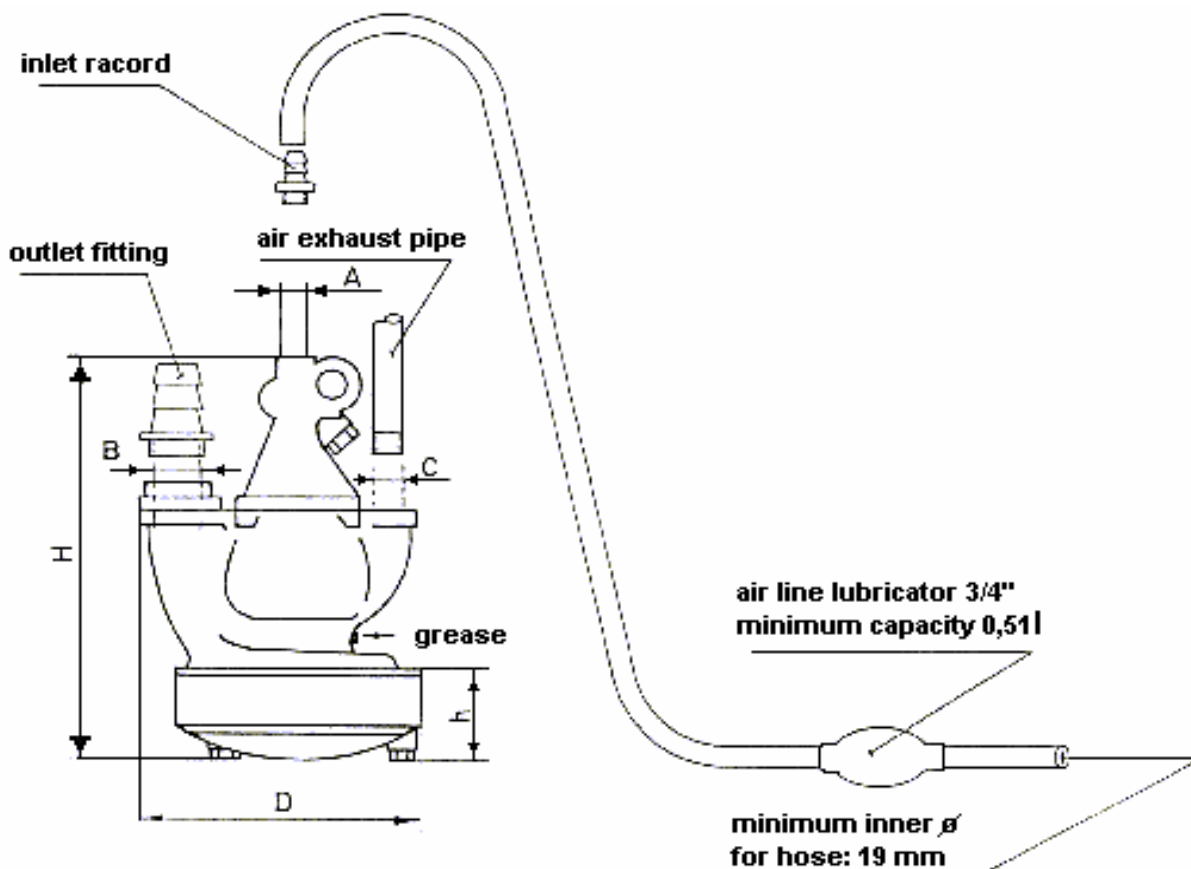
The bearings are grease packed for life. A seal prevents water from entering the motor.

There are two models of pump. The BN-60 model has been designed to work in deeper depths. The BN-30 has been designed to deliver more water (see next page).

4.- TECHNICAL DATA

Model	Air consumption m ³ /min	Air working pressure Kg/cm ²	Weight Kg	A	B	C	D	h	H
				Inches			mm		
BN-30	3,2	6 - 7	13,5	3/4	2-1/2	1-1/2	270	80	375
BN-60			13		1-1/2		230		

The graphic beside shows the theoretical capacity of the pumps in clear water at rated air working pressure of 6,5 Kg/cm². The total head in each application has to be calculated considering air pressure losses and water friction losses on the pipes and connections.



5.- OPERATING INSTRUCTIONS

All pneumatic machines need to be operated on a clean, dry and lubricated air supply. For this reason, it is important to install an air filter and a lubricator before the inlet racord, as close to the pump as possible.

We recommend an inlet hose of 19 mm of inner diameter. If the hose length exceeds 25 m, a 25 mm diameter hose should be used instead.

The pumps air consumption is 3200 l/m and the working pressure ranges between 6 and 7 Kg/cm². This data is important when choosing the best compressor.

5.1 STARTING UP

Before coupling the air compressor hose to the machine, it is important to drain all the water condensed in the interior of this hose. For that, start the compressor and let all the water out.

The air hose must be securely connected to the inlet racord to avoid air loses and water penetration when totally submerged. An air-cock can be installed at the air inlet to operate the pump.

Never allow water or any liquid to enter the air exhaust pipe. A longer pipe, or a rubber hose extension of the same diameter, can be installed when the pump is going to work at greater depths. A check valve can be used for this purpose too.

Before starting the pump up, submerge it. After opening the air exhaust pipe, the pump will start to work.

5.2 NORMAL USE

The pneumatic pumps will suffer no damage when working dry.

Stop the motor before taking the pump out of the liquid.

Before the day's work or when storing, pour some oil directly into the air inlet and then run the pump for a few seconds. This procedure ensures the air motor a longer life as well as an easy starting.

6.- MAINTENANCE AND REPAIRS, ASSEMBLING AND DISASSEMBLING

The BN pumps have been built in accordance with all safety regulations applicable in Spain and in the European Union (EU).

All parts have been carefully selected and have passed many tests that guarantee their quality. In order to assure the apparatus reliable conditions always use original spare parts. Only allow qualified personnel to perform maintenance and repair work.

Most of the problems occur due to an improper air supply.

Rubber particles, condensed water and air without proper lubrication, block the motor up. For this reason, it is important to install an air filter and a lubricator before the inlet racord, as close to the pump as possible. Always check the lubricator's oil level.

There is an air filter right after the air inlet. Periodically inspect and clean it.

Another source of problem for the pneumatic pumps is the leakage of water through the racord and thread connections into the motor. Ensure the connections are securely made.

Periodically add grease SHELL ALVANIA EP 2 to the pump removing the grease screw.

If any problem is identified, disassemble the pump as described below.

When assembling or disassembling the pneumatic pumps BN-30 and BN-60, consider:

All threads are right hand ones, except the union of governor body 11 with rotor 4.

When applying blows, do it softly and use a plastic mallet.

Disassembling

First, take off air exhaust pipe 48 and outlet adaptor 50. Release base plate 3 and strainer 49.

Free diffusor 9 and remove impeller shims 42.

Take off cap 2 after unscrewing its four union bolts, and proceed to disassemble the upper part of the governor as follows. Press down spring support washer 17 against the spring, and extract spring clips 18. Remove governor valve 15, governor spring 16 and spring support washer 17.

Turn the pump upside down and place it on a vice, holding the end of the rotor. The jaws of the vice should be made of a soft material, as this is the most delicate part of the rotor.

Unscrew nut 36 with a 19 mm socket wrench. Take out impeller 8 and key 34. With the aid of a screwdriver, carefully take out V-ring 30.

Release the pump from the vice. Place it horizontally and, with a plastic mallet, apply light blows on the rotor-threaded end and release the motor package from housing 1.

Remove rotor sleeve 28. Place the rotor on the same vice and hold it vertically by its threaded end.

Unbend the stop washer's clip and unscrew governor body 21 (left hand threads). Take out stop washer 21. With a tensioning wrench, unscrew bearing cover 19.

Free cylinder 5, top plate 6 and bottom plate 7 with the aid of a plastic mallet, by applying light blows at the rotor's end. This must be done extremely carefully to avoid bending the ends of the rotor.

To release oil seal 31 and V-ring holder 29 from the housing, first remove retaining ring 32.

Assembling

In order to ease the assembling process, apply a little grease or oil on the part's outer surface.

Periodically inspect the conditions of bearings and seals. When necessary, replace them. Always use original spare parts

Check that the vanes softly slide in the rotor's grooves and fit properly. When worn, replace them.

To start the assembling process, insert V-ring 30, V-ring plate 40 and O-ring 33 into housing 1 through the bottom of the pump. Check parts list to make sure of the correct position of the parts. Place them 2 mm after the thread of retaining ring 32.

Install retaining ring 32 (bottom one). Through the top part, firmly press down V-ring holder 29. Install V-ring plate 40, oil seal 31 and the other retaining ring 32 (top one). Before proceeding, check if the parts were assembled correctly.

Insert rotor sleeve 28 and full with SHELL ALVANIA EP 2 grease the space above it, unscrewing grease screw 53.

Mount separately the package containing the top and bottom plates with their respective bearings, cylinder 5, rotor 4, vanes 10 and bearing cover 19. Insert washer 14 and then stop washer 21 on the top of the rotor. Screw governor body 11 to the rotor (left hand threads). Bend one of the stop washer's clips and lock governor body 11.

Gently tap this package into housing 1. Make sure that spring pin 38 is well fitted in the housing and that spring pin 37 has not come out. Make sure the rotor's ends have not been bent. The top plate should stay a distance of 9 mm into the housing. Ensure that the rotor spins gently. If it does not, carefully apply light blows on the ends of the rotor and try to spin it again.

Turn the pump upside down and hold the rotor's end. Install key 34, impeller 8 and impeller nut 36.

Through the other side, mount governor valve 15, governor spring 16, spring support washer 17. Insert spring clips 18 into the rotor's end groove.

Place cup springs 23 and mount cap 2 with O-ring 22.

Screw diffuser 9 against the bottom of the pump, not forgetting to install impeller shims 42 to guarantee a 0,5 mm space between impeller 8 and diffuser 9.

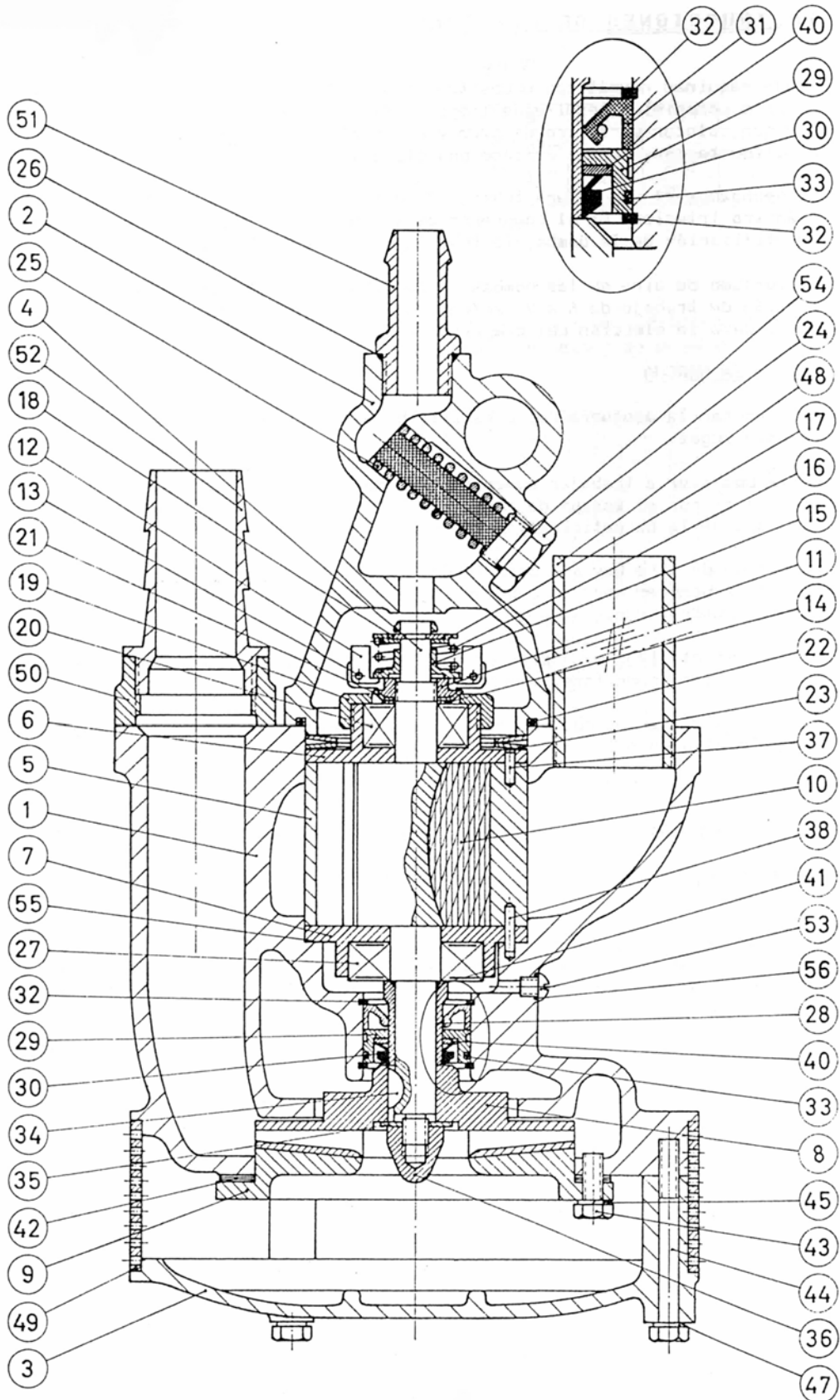
Screw base plate 3 against strainer 49.

6.1 STORAGE

Before the day's work or when storing, pour some oil directly into the air inlet and then run the pump for a few seconds. This procedure ensures the air motor a longer life as well as an easy starting.

Store the pump dry and clean. Avoid sharp bends in the pipes.

7.- PARTS LIST



#	DENOMINATION	Quantity	REF. BN-30	REF. BN-60
1	Housing	1	41201	41301
2	Cap	1	41302	41302
3	Base plate	1	41303	41303
4	Rotor	1	41304	41304
5	Cylinder	1	41305	41305
6	Top plate	1	41306	41306
7	Bottom plate	1	41307	41307
8	Impeller	1	41208	41308
9	Diffusor	1	41209	41309
10	Vane	5	91962	91962
11	Governor body	1	41311	41311
12	Governor weights	2	41312	41312
13	Governor spring pins 4x24	2	93526	93526
14	Washer	1	41314	41314
15	Governor valve	1	41315	41315
16	Governor spring	1	41316	41316
17	Spring support washer	1	41317	41317
18	Spring clip	2	41318	41318
19	Bearing cover	1	41319	41319
20	Bearing 3203 2RS	1	95128	95128
21	Stop washer MB3	1	94793	94793
22	O-ring 82,14x3,53	1	91336	91336
23	Cup spring	2	94708	94708
24	Air filter nut	1	93120	93120
25	Air filter	1	41325	41325
26	O-ring 17,12x2,62	1	91321	91321
27	Bearing 6304 2RS	1	95343	95343
28	Rotor sleeve	1	41328	41328
29	V-ring holder	1	41329	41329
30	V-ring V20S	1	91585	91585
31	Oil seal 20x40x10	1	91516	91516
32	Retaining ring I-40	2	93706	93706
33	O-ring 36x2	1	91347	91347
34	Key	1	93680	93680
35	Impeller washer	1	94841	94841
36	Impeller nut	1	41336	41336
37	Spring pin 4x10	1	93531	93531
38	Spring pin 4x16	1	93580	93580
39	Allen screw M8x20	4	94162	94162
40	V-ring plate	1	41340	41340
41	O-ring OR14x1,6	1	91351	91351
42	Impeller shim	3	41242	41342
43	Hexagonal head screw M8x20	3	94145	94145
44	Hexagonal head screw M8x70	3	94148	94148
45	Spring washer 8	3	94744	94744
46	Allen screw M8x25	4	94160	94160
47	Allen washer 8	11	94773	94773
48	Air exhaust pipe	1	41348	41348
49	Strainer	1	41249	41349

50	Outlet adaptor	1	41250	41350
51	Inlet racord	1	41321	41321
52	Outlet fitting	1	93176	93175
53	Grease screw	1	94192	94192
54	Air filter nut seal	1	94816	94816
55	Paper gasket	1	41345	41345
56	O-ring 6,07x1,78	1	91317	91317
	Air filter assembly	1	41358	41358
	Governor assembly	1	41363	41363
	V-ring assembly	1	41366	41366



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“EC” DECLARATION OF CONFORMITY



NEUMAC, S.A., as the manufacturer, declares that the machine described below:

PNEUMATIC SUBMERSIBLE PUMP

Type: BN-30 / BN-60

Serial No.:

complies with the following applicable Directives:

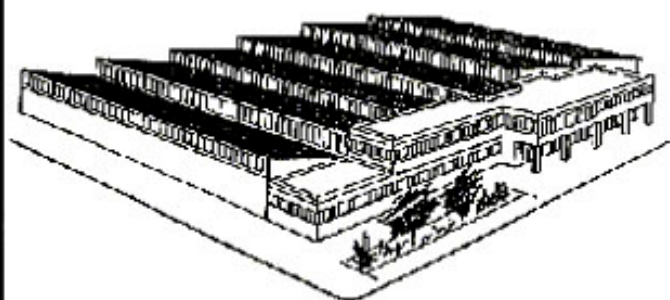
Directive 98/37 CEE

and conforms with the following harmonized Standards:

STANDARD	DESCRIPTION
EN-ISO 12100-1:2003	<i>Safety of machinery. Basic concepts, general principles for design. Part 1: Basic terminology, methodology</i>
EN-ISO 12100-2:2003	<i>Safety of machinery. Basic concepts, general principles for design. Part 2: Technical principles</i>
EN 1050:1996	<i>Safety of machinery. Principles for risk assessment</i>

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