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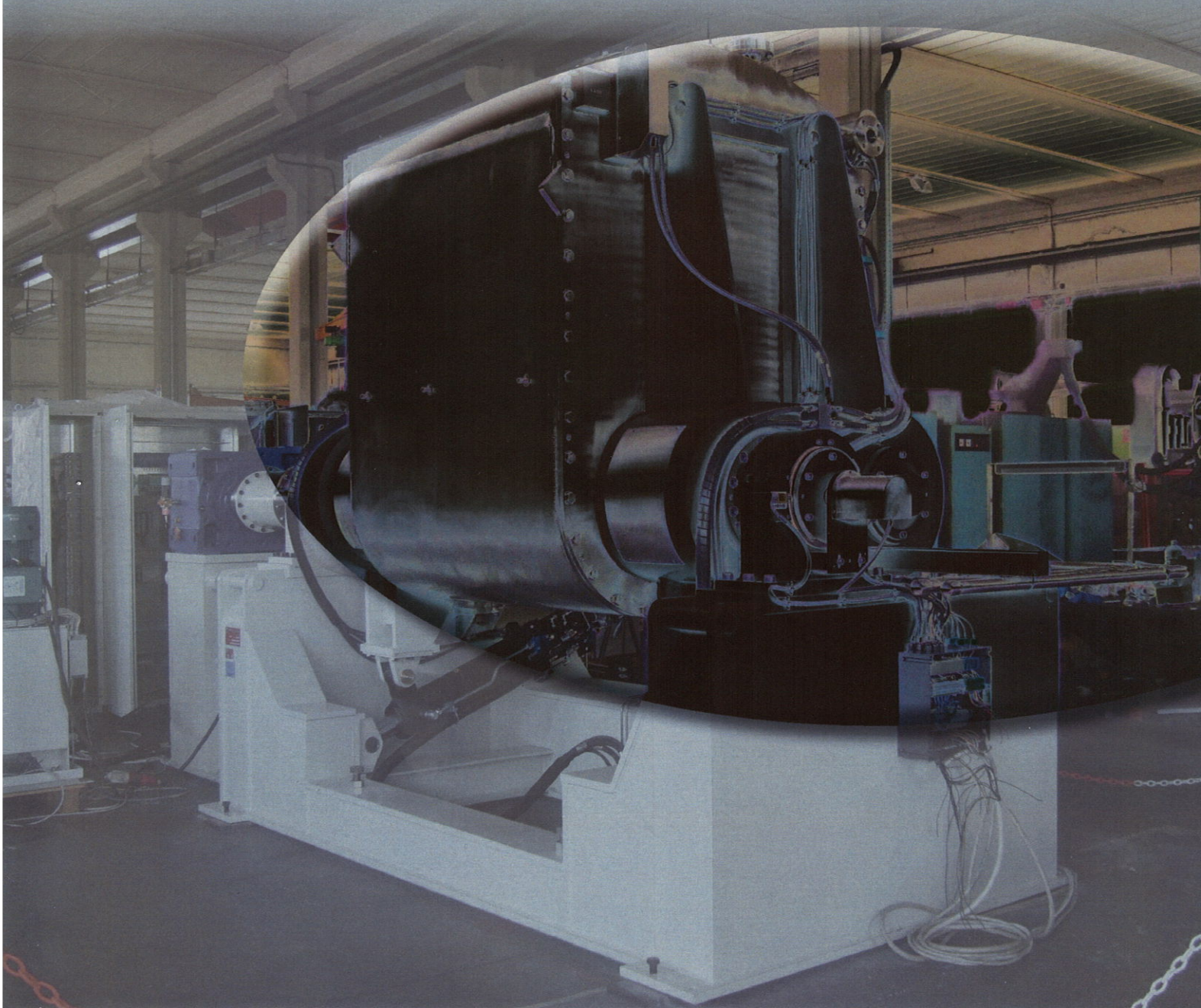
KNEADER

SB 2000



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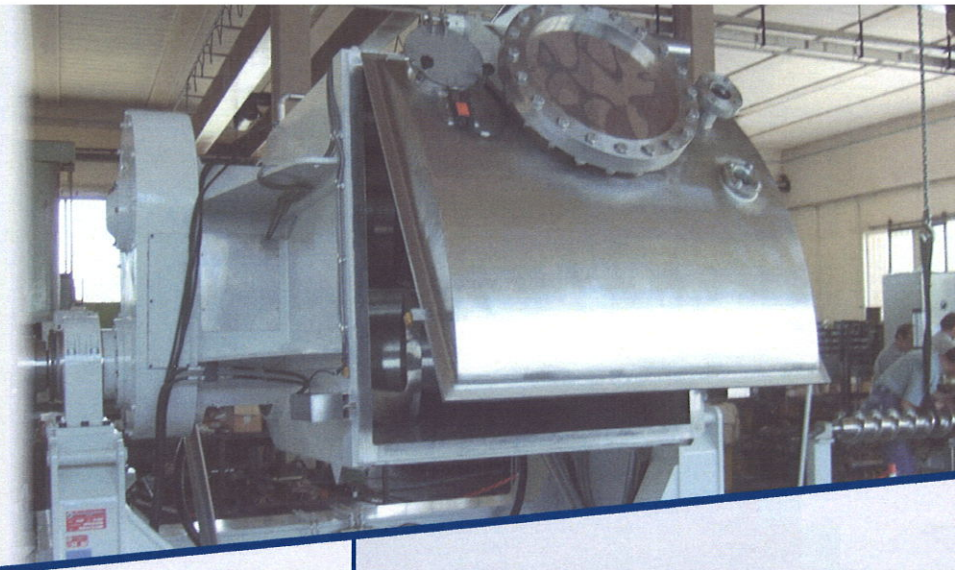

KNEADER
SB 2000 LTR

Main Operation

■ The production of doughs of various compositions for different types of *single base* or *multibase propellants.*

Available Capacities

■ For *single base propellants* from 100 up to 2300 ltr total tanks capacity and for *multibase propellants* from 500 up to 900 ltr.

BOWAS Kneading Process

BOWAS is in a position to offer a modern, state of the art plant concept which fits into the concept of existing *client's* plant sections actually under modernization and as stand alone solutions. The plant concept aims at offering the most economic solution which follow the *client's* requirements.

The core kneading system consists of two parallel Z-shaped blades, tangent each other and counter rotating with fixed ratio.

The mixing blades shafts are properly manufactured to avoid any product stagnation and are supported by widely sized roller bearings.

It is assumed that NC as raw material will be supplied in drums in a fluffy form to the kneading plant and NC blocks have been already desintegrated after a dehydration press. The NC and solid additives will be supplied to the opened kneader via *lifting* and *tilting (loading) device*.

Liquid additive preparation

For the handling of e.g. DPA which is considered to be harmful to health, special attention has been paid. Therefore, whole packing units of DPA are dissolved in ether under special precautions and added to a preparation tank for the kneading solution via a dosing pump. Equally, the other liquid components are fed to the preparation tank via dosing pumps. From there, they are automatically fed to the closed kneader.

Solid additive preparation

A special attentention has been dedicated to the handling of DNT which is also considered to be harmful to health. It is

assumed that the DNT will be supplied to the kneading plant in milled condition same as all other solid additives requiring *milling, grinders* for potassium nitrate and *crusher* (Glove boxes). For safety reasons a *fire fighting system* is installed consisting of sprinkler nozzles at the kneader opening, nozzles in the area in front of the kneader where people may be present as well as nozzles at the NC feeding area.

Discharging of the kneader by *tilting* has been chosen since discharge by discharge screw limits the selection of solvents used, so for the discharge the kneader is opened and tilted. The content is distributed into several drums arranged in front of the kneader by using a special filling funnel with integrated suction nozzles for the solvent vapors to be connected to the existing adsorption system.

Advantages of the Process

Compared to other existing kneading process BOWAS process offers the following advantages:

Safety – Special care has been dedicated to increase the safety of the kneading plant. All equipment has been designed and built in accordance with the latest and most advanced technology and is based on our extensive experience in the field of explosives and propellant production. An important increase in safety is achieved by *remote controlled* operations, where required, with the operator in safety during the process optionally. CCTV cameras are used for monitoring critical and hazardous operations where operating personnel is not allowed to be present during operation.

The process is designed with the necessary *automation* level in order to minimize the number of operating personnel in areas of potential risk. This also reduces the frequency and duration of the operators' activities in these areas.

The kneader is equipped with specially designed *bursting discs* and a special designed LID which opens completely in case of a fire to release the combustion gases and to avoid a deflagration or detonation. Specially designed quick release fire detection and protection systems for personal safety are offered to reduce damages in the event of fire.

Ergonomics for the operating personnel in the different operation steps are improved by mechanized handling providing safety and cost effective production with known and tested technology.

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SB 2000

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Higher product quality and product consistency

Kneading of SB propellants in reproducible qualities does not only require knowledge of the decisive parameters and their possible interaction but also know-how and experience of how to adjust and control them in the plant. In the offered kneading plant, the decisive parameters for a uniform quality and consistency, e.g. kneading time and temperature, dosing accuracy, etc. are constantly controlled. Proven specially designed equipment and automation system are provided to exclude as effectively as possible human errors and to collect records for statistic process control and thus to obtain improvements in product quality and consistency.
For different kinds of SB propellants, the kneader can be designed with a double casing to allow kneading at preselected temperatures. A double-jacketed coolable tank is capable for preparation and dosing of the kneading solution. Dosing of solid additives as well as kneading solutions will be performed within close tolerances.

Better economic results

The design and concept of the BOWAS kneading process together with a predefined degree of automation offer an optimum balance between investment costs and necessary personnel requirements. The equipment is designed for a high availability at low maintenance costs.

Technical Characteristics

WORKING CAPACITY	about 50% of the tanks total capacity
EXECUTION	Heavy duty type
KNEADING BLADES	Z-Type
TEMPERING	Double jacket water circulation
Power	4-poles type up to 90 kW
SUPPLY VOLTAGE	400 V - 50 Hz - 3 phases
INSTRUMENT	24 V DC / 4 - 20 mA
BLADES SPEED	20 / 35 r.p.m at 50 Hz frequency
FRICTION RATIO	1 : 0,7
EXPLOSION PROOF	ATEX - IIB - T4
ATEX CLASSIFICATION	Inside Zone 0/1 and outside the kneader Zone 2
GLOBAL SUPPLY	CE Mark and/or Conformity Declaration
BODY MATERIAL	Stainless steel (AISI 321/1.4541, AISI 304/1.4301)
BLADES MATERIAL	1.4552 special material casted, polished Ra 0,8
COLOURING	RAL 5021, depending on Clients requirements
INSULATION	Glass wool thermal insulation of defined parts