



**BELL ENGINEERING WORKS LTD.
KRIENS/SWITZERLAND**



ESCHER WYSS DIVISION



Group Member

CH-8010 Kriens/Lucerne
Switzerland
Telephone 041 - 40 55 86
Telex 78 167 bell ch
Cables Bell Kriens

Certain Teed Corporation
Pipe and Plastics Group
attention Mr. F.E. Hawkins
1400 Union Meeting Rd.

Blue Bell, PA 19422
(215) 542-0500 USA

Your ref.

Our ref. MV-Ba/Cn

Kriens, January 3, 1980

**MACHINES FOR SLURRY PREPARATION
FOR ASBESTOS CEMENT PIPE PLANTS**

Dear Sirs,

With reference to your letter December 18, 1979, as well as our telex of 3.1.1980 we ask you to please note that we have airmailed our tender to our agency Sulzer New York to forward two copies of this tender to you.

Since you have not yet received this mail we now enclose one further copy of our tender.

We regret the inconvenience this delay may have caused you. Assuring you of our best attention, we trust our offer finds your approval, we remain,

Yours faithfully,
BELL ENGINEERING WORKS LTD.

Enclosure:

copy of tender No. 53'832

MV/D

CTD029096



BELL ENGINEERING WORKS LTD.
KRIENS/SWITZERLAND

ESCHER WYSS DIVISION



Group Member

CH-8010 Kriens-Lucerne
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Telephone 041 - 40 55 66
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Certain Teed Corporation
Pipe and Plastics Group
Attention Mr. F.E. Hawkins
1400 Union Meeting Rd.

Blue Bell, PA 19422
(215) 542-0500 USA

Your ref.

Our ref. MV-Ba/bo

Kriens, December 12th, 1979

MACHINES FOR SLURRY PREPARATION
FOR ASBESTOS-CEMENT PIPE PLANTS

Dear Sirs,

We thank you for your enquiry dated October 31, 1979 and are pleased to offer you our turbo refiner and counterflow mixer successfully proven on various application.

Additionally we offer you our technological assistance together with our equipment as an package deal.

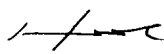
Enclosed please find our technical specification as a reply to the questions risen with your enquiry and our offer for a turbo-refiner and counterflow mixer. Furthermore we enclose our flow sheet of a similar slurry preparation plant as called for.

In order to achieve the most economical consumption of raw material as well as a high output rate, some additional information of the complete system of the existing slurry preparation plant will be required. Considering this, even a turbo blender could be used, instead of a turbo refiner.

If required, we will submit our offer for a complete slurry preparation plant, including electrical control, etc.

We trust our offer finds your approval and ask you to please not hesitate to contact us for any further information you may require, we remain,

Yours faithfully,
BELL ENGINEERING WORKS LTD.

 *iv. P. Kriens*

Enclosures:

Technical Specification
Tender No. 53'832
Flow Sheet Drg. No. MV 97'940

MV/D

CTD029097



**BELL ENGINEERING WORKS LTD.
KRIENS/SWITZERLAND**

ESCHER WYSS DIVISION



Group Member

CH-6010 Kriens/Lucerne
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Telephone 041 - 40 55 56
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**Certain Teed Corporation
Pipe and Plastics Group
Attn. Mr. F.E. Hawkins
1400, Union Meeting Rd.**

**BLUE BELL, PA 19422
(215) 542-0500 U.S.A.**

Your inquiry of
Your order of
Your ref.
Our ref.

KV-Ba/HU

**TENDER NO. 53'832
CONFIRMATION OF ORDER NO.**

of: **14.12.1979**

re: **Machines for Asbestos-Cement**

for: **Certain Teed Corporation**

Packing: **included**

Freight: **not included**

Insurance: **--**

Erection: **not included**

Conditions of payment: **see page 4**

Delivery: **7 months**

Validity of tender: **31.3.1980**

The tender is subject to the General Terms of Quotation and Delivery stated overleaf

General Terms of Quotation and Delivery

1. Tenders

1.1. Tenders which do not stipulate an acceptance date are not binding.

2. Conclusion of contract

2.1. The contract is deemed concluded when, on receipt of an order, we confirm its acceptance in writing. Verbal agreements are valid only if they are confirmed in writing.

3. Scope and execution of contract

3.1. The scope and execution of the contract shall be as specified in our Confirmation of Order. Material or work not referred to therein shall be charged separately.

4. Technical documents

4.1. Technical documents, such as drawings, descriptions, illustrations and the like, and all weight data, shall serve as an approximate indication only, provided they have not expressly been specified as binding. We reserve the right to make any alterations considered necessary.

4.2. Technical documents are to be treated in confidence by the purchaser. They remain our exclusive property and may be neither copied nor reproduced nor communicated to a third party in any way whatever nor used for the construction of the goods or parts thereof. They may be used for operation and maintenance.

4.3. All documents submitted with tenders which do not result in an order shall be returned to us on request.

5. Regulations in force at destination

5.1. The purchaser must inform us of all laws, governmental and other regulations, which must be observed during the execution of the contract.

6. Price

6.1. Our prices are net ex works, excluding packing, in freely available Swiss francs, without any deductions whatsoever. All additional costs, such as charges for packing, carriage, insurance, fees for export, transit, import and other permits and certifications shall be borne by the purchaser. He is also liable for all kinds of taxes, fees, customs duties and other charges. If we have included in our offer or contract price or indicated in our offer or confirmation of order the charges for packing, carriage, insurance and other additional costs, we reserve the right to adjust our prices should the tariffs on which they are based, be modified.

6.2. Price adjustments after conclusion of the contract are made, provided that:

- sliding prices have been agreed;
- the delivery time is subsequently extended for one of the reasons stated in Section 9.2.;
- the extent of the agreed delivery or work involved has been changed, or
- the goods or execution have been changed because the information submitted to us by the purchaser did not correspond to the actual circumstances or was incomplete.

7. Terms of payment

7.1. Payments shall be made in Swiss francs by the purchaser with no deductions for cash discount, expenses, taxes or dues of any kind, in accordance with the conditions stated in the confirmation of order. Payment is deemed effected when Swiss francs have been made freely available to us in Switzerland. If partial consignments are invoiced, payment shall be made for each individual consignment in accordance with the agreed terms of payment.

7.2. The due dates of payment shall also be observed if transport, delivery, erection, commissioning or acceptance of the goods is delayed or prevented by circumstances beyond our control. The purchaser shall not withhold or reduce payments on account of complaints, claims or counterclaims not accepted by us. Payment shall also be made if unimportant parts are missing, which do not prevent the goods from being used, or if subsequent work on the goods is found to be necessary.

7.3. If the purchaser does not observe the agreed due dates of payment he shall without formal notice be liable to pay interest on overdue amounts from the due date, at a rate depending on the usual interest rate prevailing at the purchaser's domicile but exceeding the rate of discount of the Swiss National Bank valid at that time by at least 4 per cent, provided that a higher rate of interest has not been agreed. Payment of such interest does not release the purchaser from his obligation to make payments on the agreed dates.

8. Property right

8.1. The goods supplied by us remain our property until full payment has been received. The purchaser undertakes to cooperate in taking any measures necessary for the protection of our property.

9. Delivery time

9.1. The delivery time commences as soon as the contract has been concluded, all official formalities, such as import and payment permits, have been obtained, payments due with the order have been made, any agreed securities furnished and the essential technical points have been settled. The delivery time shall be deemed duly observed if the goods are ready in the works by that time.



TENDER NO. 53'832

1.0) GENERAL INFORMATION

1.1) Subject

Subject of this proposal is a turborefiner and a counterflow-mixer for your existing slurry preparation.

1.2) Capacity

The capacity of the turbo refiner and counterflow mixer is set out in our technical specification herewith enclosed.

1.3) Weight and dimensions

- Turborefiner, net weight approx. 4'000 kg
 gross weight approx. 4'600 kg
 packing approx. 3800x2200x2200 mm
- Counterflow mixer, net weight approx. 2'300 kg
 gross weight approx. 3'000 kg
 packing approx. 4000x2000x2500 mm

1.4) Paint

One priming, coated with colour RAL 6011, parts in contact with slurry are painted specially with chloride caoutchouc.

1.5) Works erection

Each machine will be assembled and tested in our works as far as practicable.

1.6) Site erection

For supervision of the erection and commissioning Bell is prepared to delegate the necessary skilled personnel upon customer's request, such as Supervisor, erectors, electric engineer and commissioning engineer.

Bell's personnel will be put at customer's disposal on a time basis and charged according to the tariffs valid at the time of erection. Furthermore, Bell's General Conditions of Erection are applicable.

CTD029100



2.0) Scope of supply

The items stated below will be supplied by Bell except for the parts indicated with "local supply" which are suggested to be supplied locally.

2.1) Turbo Refiner

Consisting of:

- 1 vessel, useful volume 2.5 cbm, formed by 4 semicircular segments and flanged to the main frame. For quick access to the refiner cone two of these segments are hinged whereas the fixed segments take the inlet and outlet connections
- 1 vertical drive shaft, axial shiftable to adjust the play between stator and rotor cone, supported by 2 bearings which are situated above the vessel
- 1 refiner arrangement made of wear resistant steel casting.
The stator is in two parts for easy access for cleaning purposes.
- 1 pump wheel at the bottom of the rotor cone for intensive water circulation inside of the vessel
- 1 belt drive between drive shaft and motor

Local supply:

- 1 Squirrel-cage drive motor for refiner, 55 kW, 4-pole, foot-mounted.
- 1 Slurry pump, to pump the slurry from the turborefiner to the counterflow mixer.

2.2) Counterflow mixer

Consisting of:



- 1 container, 4.0 cbm useful volume, foot mounted, with feed opening 1750 x 800 mm at the top for asbestos and water supply discharge port, funnel shaped outlet with inspection cover and flange connection for discharge pump. Container with two bearing brackets and stuffing boxes.
- 1 agitator with two rollerbearing pillar blocks

Local supply:

- 1 gear motor for the counterflow mixer,
11 kW-output speed approx. 45 rpm, with semi flexible coupling
- 1 slurry pump to pump the slurry from the counterflow mixer to the stuff chest.

3.) Bounds of Delivery

Our offer is for the items as specified above only but excludes all parts supplied locally.

Not included in our delivery are:

- drive motor for turbo refiner
- slurry pump for turbo refiner
- drive motor for counterflow mixer
- slurry pump for counterflow mixer
- electrical equipment and installation
- valves and piping
- foundations
- erection on site and commissioning
- spare parts
- transport costs, etc.

Bell

- 4 -

1 SF = \$.635 1/11/80

4.0) PRICES

4.1) Turbo Refiner

SFr. 78'400.--

4.2) Counterflow Mixer

SFr. 50'700.--

\$ 49,784 + fut. \$5,000 + install.

60,000

Price basis:

The prices are to be understood as:

- fix, validity of tender until 31.3.1980
- ex works
- seaworthy packing included
- (seafreight charges will be invoiced according to the actual costs)

Conditions of payment:

20% with the order

80% against shipping documents, however, in case shipment cannot be effected due to reasons beyond our control, at the latest 2 months after advice of completion of the material in our works, covered with the order by an irrevocable letter of credit, confirmed without reserve by a first-class Swiss bank, valid for the delivery period plus 2 months and allowing part shipments.

CTD029103



TECHNICAL SPECIFICATION

(Preparation plant for CERTAIN TEED)

To secure the capacity of a preparation plant according to the mixture and production time set out in your letter of 31st October, 1979 our company Bell would normally propose for the refining of asbestos and mixing with cement, silica and ground asbestos cement scrap in water:

- Pan Grinder to crush and mix the different moistened fibres
- Turbo Refiner to open asbestos alone in water, to the highest degree of desintegration.
- Counterflow Mixer to mix and homogenize asbestos, cement, silica and scrap in the desired quantity of water
- Stuff Chest to feed the slurry continuously into the sieve cylinder vat of the pipe machine.

The working programm of the required capacity would be as follows:

		Pounds/min	=	kg/hour
Cement	45,6 %	196		5340
Silica	30,4 %	131		3570
Scrap	8,0 %	34		930
	<u>84,0 %</u>	<u>361</u>		<u>9840</u>
Asbest	16,0 %	69		1860
	<u>100,0 %</u>	<u>430</u>		<u>11700</u>
Water		1650		45000

(1 kg = 2,2 pound)

Density of asbestos cement in water = 3 gr/cc

CTD029104



The density of 1,15 gr/cc results of 225 gr solids in a liter.

according to: 925 cc water + 75 cc solids

925 gr water + 225 gr solids

For the concentration as stated in the enquiry result 11700 kg/hour of solids in 52'000 l/hour of mixture, thus results in 48'000 l/hour of water + 3900 l/hour of solids.

- A BELL-Pan Grinder Size 1000 will prepare 930 kg different asbestos in 30 minutes corresponding to 1860 kg/hour. For moistening to prevent dust and brackage of fiber we add 15 % water, $2 \times 140 = 280$ Liter/hour.

The pan grinder is provided with feed hoper, dust exhaust unit, water container for moistening with level control.

The crushed asbestos is collected in a silo and from there a weighing device distributes the asbestos into the

- Turbo refiner with water. If the capacity stated above is handled by one turbo refiner only the consistency results to approx. 6 %, but a proper desintegration at a consistency of 6 % can not be guaranteed. We therefore suggest the use of two turbo refiner in parallel, each having an operating cycle of 5 minutes for refining of 77,5 kg asbestos, thus to total capacity of two turbo refiners will be
 $(2 \times 77,5 \text{ kg}) \times 12 = 1860 \text{ kg/hour of asbestos}$
 $(2 \times 1992,5 \text{ kg}) \times 12 = 47820 \text{ kg/hour of water}$

Consistency in turbo refiner will be approx. 3,8 %.

The use of two turbo refiner is only required in case the capacity stated in your enquiry is for continious operation, that means a production of approx. 14 tons/hour of finished pipes. If the capacity is lower as stated it must be chequed whether one only turbo refiner will be sufficient.

The mixture in water is pumped from the turbo refiner into the



- Counterflow mixer having a capacity of approx. 4,5 m³ and an operation cycle of approx. 5 minutes:

Cement	445 kg
Silica	297 kg
Scrap	<u>78 kg</u>
820 kg x 12 = 9840 kg/hour	

From the counterflow mixer the mixture is pumped into the

- Stuff chest, feeded each hour with
 - Asbestos = 1860 kg/h
 - Cement+Silica+Scrap = 9840 kg/h
 - 11700 kg/h at SG 3,0 = ~~39000~~ l/h
 - Water ~~2800~~ l/h + 47820 kg[?] = 48100 l/h

From the stuff chest the prepared slurry can be fed continuously into the sieve cylinder vat of the pipe machine.

Note:

The operating treatment time of the turbo refiner and counterflow mixer have to be adjusted according to the quality of the asbestos used, in order to obtain the highest degree of desintegration with the maximum surface value of the fiber, the highest degree of homogenizing of asbestos cement slurry and to assure the required strength of the finished products with an economical asbestos consumption together with a high output of the plant.

Such a plant is normally able to save 1 to 2 % asbestos compared with other systems.

Bell undertake complete redesign, modification, and modernisation of existing plants of any make. In the other way we suggest to study your preparation plant and discuss with you the possible improvement by introduction of new apparatus such as turbo refiner and or counterflow mixer.



Continuous feeding:

The counterflow mixer could also be fed continuously from one side with the required quantity of prepared asbestos, solids and water. On the other side, on a sliding up and down way out, the level and so the volume in the mixer would be adjusted according to the necessary time of refining.

However, a discontinuous process occurs always with the weighing of raw material, and so the preparation of components and control of treated material after each operation is much easier.

MV-Ba/bo

CTD029107

9.2. The delivery time shall be reasonably extended:

- a) if the information required by us to execute the order is not received in time or if subsequent changes which delay delivery are made by the purchaser;
- b) if hindrances occur which, despite our due care, we cannot avoid, such as epidemics, mobilization, war, riots, strikes, picketing, lock-outs, serious breakdowns, accidents, labour conflicts, delayed or deficient delivery of necessary raw materials or semimanufactured and manufactured products, the need to scrap important components, official or other measures of whatever kind, transport difficulties, natural catastrophes and acts of God;
- c) if the purchaser is behind schedule with the works he has to carry out, or late in fulfilling his contractual obligations, in particular if he fails to observe the terms of payment.

9.3. The payment of liquidated damages for late delivery can only be imposed when it has been expressly agreed upon in writing and when it can be proved that the delay is our fault and as far as the purchaser can show that he has suffered a loss due to late delivery. Should we, however, put a replacement at the purchaser's disposal, liquidated damages cannot be imposed.

9.4. The payment of liquidated damages for late delivery, if such have been agreed upon, shall for each full week's delay not exceed 1/4 per cent, and in total not exceed 5 per cent of the sales price ex works of the delayed part of the goods (i. e. excluding all expenses for packing, customs duties, dues of all kinds, erection, etc.). In case the delivery time exceeds 6 months the purchaser has no right to impose any liquidated damages for the first two weeks' delay.

9.5. In the event of late delivery the purchaser has no right to claim indemnity nor to cancel the contract.

10. Testing and acceptance of goods

10.1. Testing of the goods before shipment is carried out in accordance with our test procedures and at our cost. Additional tests shall be agreed specifically on conclusion of the contract and shall be charged to the purchaser.

10.2. The purchaser shall examine the goods within a reasonable time and inform us immediately in writing of all defects and deficiencies for which we are responsible according to our contractual obligations. If the purchaser omits to do this, the goods shall be deemed to have been accepted.

10.3. Acceptance tests are carried out only if they have been agreed in writing with the purchaser. As far as circumstances allow, such tests will be carried out in our works. If, for reasons beyond our control, the acceptance tests cannot be carried out within the specified time, the qualities to be determined by these tests shall be deemed proved.

10.4. If it is found from one of the afore-mentioned tests that the goods do not fulfil the terms of the contract, the purchaser shall without delay make available to us suitable opportunity to remedy any deficiency.

10.5. The purchaser shall have no other rights in case of deficient delivery, in particular to claim damages and to cancel the contract.

11. Packing

11.1. Packing shall be charged separately and is not returnable. However, if it is declared our property, it shall be returned to us carriage paid.

12. Transfer of use and passing of risk

12.1. The benefit and the risk of the goods are transferred to the purchaser not later than the date of their leaving our works, even if delivery is carriage paid, cif, fob or under similar clauses, or includes erection, or if transport is arranged and supervised by us. If dispatch is delayed or prevented by circumstances beyond our control, the goods will be stored at the purchaser's expense and risk.

13. Transport and insurance

13.1. Special requests concerning forwarding and insurance must be made known to us in due course. The goods are transported at the purchaser's expense and risk. Complaints regarding transport shall be submitted by the purchaser to the last carrier immediately on receipt of the goods or the shipping documents.

13.2. It is up to the purchaser to take out insurance against damage of any kind. Even if insurance cover is arranged by us, it shall be taken out on behalf of the purchaser and at his expense and risk.

14. Erection

14.1. If we also undertake erection of the goods, our General Conditions of Erection shall apply.

15. Guarantee

15.1. During the guarantee period we undertake upon written request of the purchaser to repair or replace at our discretion and as soon as possible any parts of the goods delivered which can be proved to be damaged or unfit due to bad material, faulty design or poor workmanship. Replaced parts shall become our property.

15.2. We shall bear the costs only of repairing or replacing the defective parts in our works. If, for reasons beyond our control, such parts cannot be repaired or replaced in our works, all additional costs arising therefrom shall be borne by the purchaser.

15.3. The purchaser shall have no other rights in case of deficiencies in the goods delivered, in particular claims for damages and cancellation of the contract.

15.4. The guarantee period is 12 months, or 6 months in the case of 24-hour operation. It begins when the goods are ready for dispatch or, if we undertake erection, when it is completed. If dispatch, erection or commissioning are delayed for reasons beyond our control, the guarantee period shall end not later than 18 months after the goods are ready for dispatch.

15.5. For replaced parts the guarantee period begins anew. It ends not later than 24 months after the beginning of the guarantee period for the main goods or, if dispatch, erection or commissioning are delayed for reasons beyond our control, not later than 30 months after the main goods are ready for dispatch.

15.6. The guarantee does not cover damages resulting from normal wear and tear, improper maintenance, failure to observe the operating instructions, incorrect operation, excessive loading, the use of unsuitable material, the influence of chemical or electrolytic action, water which is contaminated, contains sand or is liable to form deposits, from corrosion, erosion, cavitation and such like, unsatisfactory foundation, building or erection work not undertaken by us and other reasons beyond our control.

15.7. The guarantee expires if the purchaser or a third party undertakes alterations or repairs to the goods without our written consent, or if the purchaser does not immediately take appropriate steps to prevent any damage from becoming more serious and to enable us to rectify the defect.

15.8. If on expiry of the guarantee period the purchaser has made no specific written claims under the terms of the guarantee, we are released from our guarantee obligations.

15.9. We accept liability for goods supplied by subcontractors only to the extent of their guarantee obligations.

16. Liability

16.1. We undertake to carry out the order in accordance with the terms of the contract and to fulfil our guarantee obligations. We shall not be liable to the purchaser for any further claims.

17. Place of performance

17.1. The place of performance is Kriens both for us and for the purchaser, even if delivery is made carriage paid, cif, fob or under similar clauses. If we also undertake erection, the place of erection shall be deemed the place of performance only in respect of our erection obligations.

18. Jurisdiction and law applicable

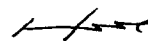
18.1. The court of jurisdiction is in Kriens both for us and for the purchaser. However, we also reserve the right to appeal to the competent court in the purchaser's country.

18.2. The contract shall be governed by Swiss law.

19. Validity

19.1. These General Terms of Quotation and Delivery are valid in all respects not otherwise settled by mutual written agreement. Special conditions stipulated by the purchaser which are in contradiction with these General Conditions of Supply are valid only if we have accepted such special conditions in writing.

BELL ENGINEERING WORKS LTD.



i.v. Pixner

CTD029109



Asbestos Cement Machines

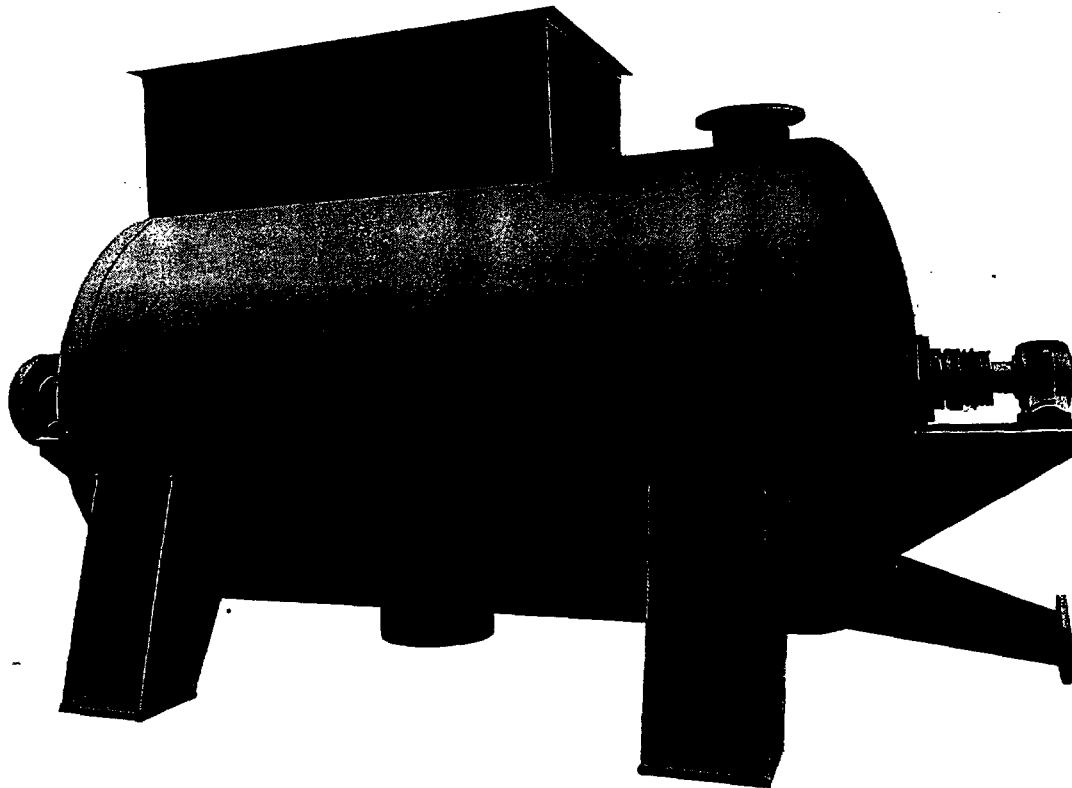
Turbo-Refiner

- Opens fibre bundles without shortening of individual fibres
- Homogenizes asbestos, cement and water
- Prevents local agglomerations of fibres and cement resulting in an even texture
- Improves layer adhesion
- Increases capacity of preparation plant

Upper background of photo shows grinded sheet surface in full scale by using conventional preparation with pan grinder.

Lower background shows sheet surface by additional slurry treatment in Turbo-Refiner. All parts in contact with slurry are easy accessible for cleaning and inspection.

Bell Engineering Works Ltd.
Kriens-Lucerne, Switzerland



Asbestos Cement Machines

Asbestos Cement Mixer

Both the specially formed agitator and the peculiarities in design ensure an extreme efficient intermixture of water, asbestos and cement.
The mixer is adaptable to manual or automatic operation.

Bell Engineering Works Ltd.
Kriens-Lucerne/Switzerland