



KIMBERLEY TECHNOLOGY & EQUIPMENT CO. PTY LTD.

Registered office – No. 5 Hatch Close, Trinity Beach 4879, Australia.

Phone: (+61) 0402348935

Email: afitzma@hotmail.com

Email: alan.fitzmaurice@kimberley-technology.com

LISTING OF KIMBERLEY DESIGN SUGAR INDUSTRY EQUIPMENT PLUS KIMBERLEY SUGAR INDUSTRY PATENTED EQUIPMENT AND DESIGNS

KIMBERLEY DESIGN EQUIPMENT

- **Kimberley patented CANE HARVESTING SYSTEM -**

The development of the CANE HARVESTING SYSTEM designs is to improve the viability of cane sugar industries World-wide.

To achieve this performance the CANE HARVESTING SYSTEM must -

Greatly reduce the cane loss during harvesting. A high value gain.

Separate trash more efficiently at the sugar factory with almost zero cane loss. A high value gain.

Use the valuable trash fuel to generate a large supply of “green electrical power” for sale to the country’s power grid. A high value gain.

Thoroughly wash the cane without pol loss or increased evaporator loading, to greatly reduce costly wear, especially in the milling tandem and boiler/s. A cost much higher than recognised by mill owners. A high value gain.

So, for the first time, very clean cane without trash or dirt enters the milling tandem, improving the milling tandem’s pol extraction performance as well as greatly reducing wear costs.

Reduce the cost of cane harvesters. A high value gain.

Lower weight of harvesters so large four-wheel drive wheels have very low ground pressure (<15 psi) to allow the harvester to operate on soft ground. A high value gain

This design will “marry in” with the existing cane payment formular with additional benefits for Farmers, Harvester owners and Mills.

Reduce the need for having costly tracked type cane harvesters. A high value gain.

The two feed systems can be removed easily from the harvester chassis so the machine can be set up to do other farm duties. While doing these duties the feed systems can be maintained for the next crop season.

Eg. install a herbicide tank onto the chassis, plus boom sprays to kill weeds in inter rows. (The machine has about 1.6 meters clearance under the chassis)

Install a two-row cane planter onto the chassis.

install a two-row fertilizer applicator onto the chassis

- **Kimberley Patented Cane Preparation System –**

We believe this Cane Preparation System is by far the best cane preparation system available for sugar industries. It can handle manual cut cane plus mechanically cut cane. A magnet before the cane shredder has high efficiency removal (should be 100% removal) of metal objects before they can enter the shredder. So, very hard grade tungsten carbide shredder hammer tips can be used to give long hammer tip life

A vertical hopper with chute height control, controls the cane carrier speed depending on the height of cane in the vertical hopper, rather than by the height of shredded cane in the first mill vertical hopper. A Kimberley tooth feeder is positioned between the vertical hopper and the cane shredder. The speed of this tooth feeder controls the factory milling rate. The load on the cane shredder is constant, not with large variations like existing shredders have. And there is no windage from the shredder. The degree of cane preparation is better than for existing designs.

- **Kimberley Tooth Feeder for Shredders –**

The Kimberley Tooth Feeder is a variable rate feeding machine that sits on top of a vertical down feed, shredder. A suitable vertical hopper is positioned above the tooth feeder to hold a constant supply of knifed or billeted cane for feeding the tooth feeder. The tip diameter of each of the two feed rollers is typically 1200mm. The drum itself typically 700mm diameter. A shear pin provides security in case a large object enters the tooth feeder, although from our operating experience we find rocks cannot feed into the feeder due to the curved shape of the large “fingers” attached to the drum, plus their narrow spacing. And the magnet above stops steel / iron objects from entering the tooth feeder. Shaft mounted variable speed drives with torque arms provide the driving power required. The speed of these Tooth Feeder rollers is set by mill Staff to suit and control the required milling rate for the factory.

- **Kimberley Cane Shredder – in line type –**

Kimberley shredders operated as per our directions, will give shredding performance superior to any other type cane shredder for several reasons. These cane shredders are quieter than others and are designed to allow a mill stop, for replacement of hammer tips in less than one and a half hours, and to allow turning of hammer tips in less than an hour. Shorter time if brakes are fitted to the shredder rotor.

- **Kimberley Cane Shredder – vertical feed entry type -**

Kimberley shredders operated as per our directions, will give shredding performance superior to any other type cane shredder for several reasons. These cane shredders are quieter than others and are designed to allow a mill stop, for replacement of hammer tips of less than one and a half hours, and to allow turning

of hammer tips in less than an hour. This mill stop time can be reduced if the shredder rotor is fitted with brakes.

- **Kimberley Patented Maceration System –**

The Kimberley Maceration System is designed to wash most of the free cane juice out of the finely shredded cane in front of mills, especially between the cane shredder and the first mill. The conveyors are slat type conveyors with lots of 20mm holes over the surface of the slats plus a deep sloping drainage trough under the conveyor for collecting the very large flow of draining juice. There is a weir above the first Maceration Conveyor just after the cane shredder. All the first mill pressure feeder juice flows to this weir, then down onto the deep mat of finely shredded cane in the conveyor. The purpose of this large juice flow is to wash most of the cane juice out of the shredded cane. Shortly after the first juice weir there is a second weir. All the (now very low brix) juice from the second mill flows onto the surface of the deep mat of finely shredded cane via this second weir. This juice moves the No. 1 mill pressure feeder juice ahead of it through the shredded cane mat, through the holes in the conveyor slats and down into the collection trough under the conveyor. Therefore, the juice from the first mill pressure feeder is mainly low brix juice from the second mill. I am very confident of averaging well over 98% pol extraction from a milling tandem with these conveyors installed in front of four mills, depending on the degree of cane preparation.

- **Kimberley Rotary Juice Screen –**

Kimberley Rotary Juice Screens have a higher flow rate capacity than any other similar sized rotary juice screen. As well, there is considerably less bagacillo passing through the screen compared to other types, for obvious reasons. The rotating trommel sits on, and is driven by four foam filled pneumatic 4 x 4 vehicle wheels, or solid rubber wheel. No chain drives.

- **Kimberley Heavy Duty Pressure Feeder –**

Kimberley designed Heavy-Duty Pressure Feeders will outperform all other type pressure feeders for several very important reasons. Each roller has a separate shaft mounted drive. To allow space for working on the mill, the pressure feeder cheeks can be swung away from the mill and pegged in a vertical position. It is much easier than other type pressure feeders to set the chute to calculated chute settings which vary every year depending on settings and roll diameters, and install the pressure feeder chute into any position between the mill and pressure feeder cheeks. Also depending on settings and roller diameters. The roller bronze bearings are fully sealed so there is no loss of lubricant. Separate small gear pumps deliver a large flow of cooled lubricant to each bearing, and surplus lubricant is returned to the lubricant storage tank, so the bearings should never wear.

- **Kimberley H.D. Mill plus combined H.D. Pressure Feeder –**

The Kimberley designed Mill and Pressure Feeder combined unit has lots of advantages. All rollers are removed easily from the top of the mill cheeks, so it is very easy to assemble and disassemble. The top mill roller is mounted in two swing

arms that pivot from the pressure feeder side and have hydraulic cylinders on the opposite ends of the swing arms. Each roller is independently driven by shaft mounted drives. Due to the very short pressure feeder chute this mill design will outperform any other six or four roll mill design. The underfeed (fourth) roll is a perforated drum that has high juice extraction ability. It sits on swing arms that are very easy to adjust. All mill and pressure feeder roll bearings are fully sealed so a separate small gear pump delivers a large supply of cooled oil to each bearing, which then overflows back to the oil storage tank. So, the lubrication system is very reliable. Bearings should never wear.

Kimberley Light Duty Pressure Feeder -

The Kimberley design Light Duty Pressure Feeders have similar features to the Heavy-Duty Pressure Feeders, but have a lower CAP cost. However, their performance will not match the heavy-duty pressure feeder design. Each roller is chain driven using very well proven Kimberley transmission chain.

- **Kimberley capacitance type Chute Height Control Units –**

Kimberley Chute Height Control units are well proven and operate well even with very large quantities of maceration liquid in the vertical hopper. There are two sizes offered. One with 5 capacitance type sensors with adjustable sensitivity, and the other with 8 capacitance type sensors with adjustable sensitivity. These sensors are housed in sealed type stainless steel housings.

- **Kimberley Cane Carrier Chain –**

We have well over 40 years' experience with Kimberley Cane Carrier Type Chain, so it is well proven. Each link has recesses in the side plates to allow the sprocket teeth to force material, that would otherwise compact in the links, to be expelled rather than cause the chain to ride up over the drive sprocket teeth.

- **Kimberley intermediate mill Conveyor Chain –**

As for the cane carrier type chain Kimberley Conveyor Chain is well proven over more than 40 years.

- **Kimberley 180-ton Transmission Chain –**

Our Kimberley Transmission Chain is well proven with over 40 years' experience. It is a 6" pitch chain with a breaking load of over 180 tons. We use it for driving light duty pressure feeders plus underfeed rollers. It has a long working life without lubrication.

- **Kimberley design Glandless Mill Juice Pumps –**

Kimberley designed Mill Juice Pumps are well proven with over 40 years of milling operation. They do not have glands so they are very clean pumps. No juice leaks. They have very hard wear resistance white iron impellers and pump housings so they have very long operating life.

- **Kimberley mill Lubrication System –**

In Line mill lubrication systems are very unreliable, causing continual bronze bearing failure. Plus, waste of costly lubricant. The Kimberley Mill Roller Lubrication System uses small dedicated slow speed gear type pumps to deliver

cooled lubricant separately to each mill or pressure feeder bearing, so they are very reliable. All roll bearings are fully sealed so there is no loss of lubricant. Each gear pump delivers a large quantity of lubricant which flows around the loaded bearing surface then out of the bearing and back to the lubricant storage tank. Oil is cooled while on its way to each bearing.

- **Kimberley Maceration Weirs –**

Kimberley designed Maceration Weirs are designed to give relatively even flow of maceration liquid across the full width of the weir, unlike maceration sprays that supply more maceration liquid to each side of the conveyor.

- **Kimberley Milling Tandem –**

The Kimberley milling tandem will outperform any other design. Even outperforming diffuser tandems. Only four mills are required to give well over 98% pol extraction plus low bagasse moistures. They consist of – a patented Kimberley Cane Preparation System, a patented Kimberley Maceration System in front of each mill, four Kimberley designed mill/pressure feeder combined mills, Kimberley glandless juice pumps, Kimberley rotary juice screen, Kimberley scraper plate tooth cutting machine.

- **Kimberley patented Roberts type Evaporators –**

The Patented Kimberley Roberts type evaporators have a dividing partition in the juice space so each vessel acts like two vessels. Piping between the vessels suits “two vessels” so if a vessel has dirty tubes, one side can be isolated and all juice/syrup flow then passes through the other side of the cleaning vessel. The closed off side is then drained and washed clean with condensate spray water, prior to having cleaning chemical liquid pumped into this side of the vessel. After about two hours of boiling, the tubes should be clean, so the chemical liquid is then drained, the tubes washed with condensate spray water, which also goes to the chemical liquid storage tank. Then juice/syrup is allowed to flow back through the cleaned side of the evaporator vessel. So, these vessels can be cleaned during normal milling operations, rather than having to stop milling for 10+ hrs to clean the vessel tubes ever two or three weeks.

- **Kimberley design 3 Effect Evaporator set –**

The Kimberley three effect evaporator set will operate at about 33.5% steam on cane. The set feeds directly into an “A” continuous vacuum pan, which acts as a fourth effect. There is a flash vessel between the third effect and the “A” pan so there is a large volume of flash steam available from the syrup supply, for other vacuum pan duties which has not been included in the steam economy of this design. The three effects operate without a condenser working, (no cooling water supplied). Vapour bleeding is as normal from an evaporator set, but preferably from the third final effect. Lower installation cost compared to a five-effect evaporator stage. If required, a syrup clarifier can be installed between the second and third effects. It will work better in this position compared to after a final five effect set, due to the lower viscosity of the hotter syrup.

- **Kimberley patented design high capacity Trayless Clarifier –**

The latest Australian S.R.I clarifier was designed under my recommendations, in my Australian Sugar Factory. But I have since designed what I believe is a better design that has high throughput capacity but, unlike all other design, CFD modelling indicates it can remove the “floaters” that cause problems for sugar refineries. Unlike other clarifier designs that have light juice loaded muds, the Kimberley clarifier is designed to give heavy muds to reduce high pol juice loadings for the filter stage mud tank. Low pol filtrate is added to the mud tank to lower the mud velocity to allow for pumping to the filter stage.

- **Kimberley Sugar Drier –**

The Kimberley design Sugar Drier is designed to give better coverage of falling sugar across the full width of the drier, using two different shaped bolt-on flights.

- **Kimberley / Dr. Wright design Continuous Vacuum Pans. –**

We believe we have a very good design for Continuous Vacuum Pans. They consist of standard 20, 30, or 50 cubic meter modules which can be combined to give any sized CVP. These modules are mounted in a circular formation and have a common torri pipe. One vessel can be off line for cleaning while the other vessels operate. The feed entry and final vessel rotate on time schedules so the final vessel can go into a cleaning mode. These complete modules can be lifted to their operating site rather than being built on a working site which is costly. or, modules can be built in our workshop and shipped to site, or built on the ground then lifted onto the support stage, reducing fabrication costs. Batch pans with centre wells work much better than batch pans with “floating calandrias”. We believe the same is the case for CVP’s

It is highly likely the CVP design we are working on, will operate well in sugar refineries, reducing the heating requirement compared to a refinery with batch pans.

Kimberley Mill Settings -

KTC supplies mill settings for factories in various countries. We can also provide on-site time to make sure the mills are performing well. We can guarantee our mill settings will outperform any other mill settings.

- **Mill site visits by Kimberley Staff –**

If required, Kimberley Staff can visit mill sites to, improve factory performance, provide settings for mills, suggest design changes, improve the factory thermal efficiency, train factory Staff.

- **Milling Tandem Performance no other person can match –**

There is no doubt that the Kimberley Managing Director knows more about how a 4 or 6 roll mill works than any other person or company. No one can match the throughput capacity of a mill, nor give milling performance anywhere near as good as what he can. His average final bagasse moisture for a milling season in an Australian sugar factory from a 4-mill tandem, using his design pressure feeder plus

shredder was 40%. Sugar Research Staff checked this performance by sampling over a two-week period and analysing the samples in a neighbouring mill's lab, and got better results than from the mill's lab.

The pol extraction average for the same milling season was 98%. The first mill averaged 48% bagasse moisture and 83% pol extraction. Year 1978. Mill Mourilyan.

- **Kimberley training for Heads of Staff –**

Kimberley's Managing Director provides high level training for Heads of Staff in sugar factories in various countries. These training seminars typically last five days. Those attending must qualify by sitting for an exam at the end of lectures, based on the delivered training material.

- **This listing of Kimberley equipment is by no means a complete list.**

KIMBERLEY PATENTS

- **Kimberley Harvester** *(any cane row width, small or large farms, lower harvesting cost, lower cane loss, in-field boom spray conversion during off season)*
- **Kimberley Harvesting System.** *(Lower cane loss, dirt, trash and leuconostic bacteria removed prior to milling tandem, lower tandem pol loss, higher milling tandem capacity, lower wear rates for knives and shredder hammer tips, mills, pumps, boiler tubes, lots of extra fuel for co-generation)*
- **Kimberley Cane Preparation System.** *(World's best. Constant powerhouse or steam load, lower kW requirement per ton of cane milled per hour, no "windage" from shredder, dial and set the milling rate with this system) Strongly recommended system.*
- **Kimberley Maceration System – pre-No. 1 mill –** *Much improved pol extraction performance. Washes most of the free cane juice out of the prepared cane before the first mill, greatly improving the pol extraction of the milling tandem.*
- **Kimberley Maceration System – existing mill conveyors –** *Much improved pol extraction performance due to the much higher maceration efficiency and bagasse washing.*
- **Kimberley Juice Clarifier** *(high capacity, removal of "floaters")*
- **Kimberley Roberts type Evaporator** *(tube cleaning of working vessels during milling operations)*

KIMBERLEY DESIGNS

- COMPLETE "HIGH PERFORMANCE" MILLING TANDEMS
- COMPLETE EVAPORATOR STATION – CLEANING OF OPERATING VESSELS DURING MILLING OPERATIONS.
- COMPLETE CLARIFICATION STAGE
- 3 EFFECTS – 33.5% STEAM ON CANE FACTORY (Verified by Dr. Wright)
- COMPLETE CANE SUGAR FACTORY – HIGH SUGAR RECOVERY, HIGH ELECTRIC POWER SALES.

KIMBERLEY ASSOCIATES

S.T.G. GLOBAL Ltd.

- The owners of STG GLOBAL Ltd. were the heads of Staff of TLPT a technology division of Tate & Lyle. They have registered this company to continue the business that TLPT was providing to the World's cane sugar industries, especially regarding "refining of raw sugar"
- Dr. Wright, ex Chemical Engineer, SRI Australia.

Alan Fitzmaurice

Managing Director

KTC (China based company and workshop)

K TEC (Australian based company)