

**KIX Centrifugal Fluid Bed Dryer Capacity Statement**

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**Fall**

**Jack Broadbent Trading as AKT International pty ltd**

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KIX Rapid 5 second CENTRIFUGAL FLUIDIZED BED DEHYDRATORS

CAPACITY STATEMENT

There exists several distinct and salient features in dehydration that endow the KIX dehydrator with technical and commercial advantages over competitors with the dehydration of organic matter.

#### High dehydration fuel efficiency,

#### Reduced floor space requirements,

#### Product comminution,

#### Maximum nutrient retention only on a few occasions surpassed by freeze drying,

#### Large product, type variety.

#### Reduced air emission,

#### Lower costs and,

#### Reduced maintenance

#### Plant longevity the original plant installed in 1982 still operates today.

**Flavours and Aromas**

It has recently been discovered that a Swiss company Firmenich is purchasing shrimp head meals from Royal Greenland’s KIX Machine for resale to companies such as Nestle.

*In recent times two other breakthroughs have catapulted the technology into new fields and areas of opportunities.*

**KIX Capabilities**

1. **The Push Pull system**

This was discovered with the CSIRO rumen by pass project, when the oil content in meals were able to be increased by close to 30% after a 2 stage dehydration system was used. This technology allows us to operate in fields normally reserved for the renderers and in fact can generate meals with oil contents of over 40%.

The advancement also gives us a great springboard into the new field of producing unsaturated oil meals.

As well, the capacity to operate at high first stage temperatures gives us better energy efficiencies and throughputs.

1. **Packaged product separation.**

This achievement permits a machine in the one operation to; dry, sterilize and then commercially cleanly separate medium level packaging from both supermarket and industrial food waste meals.

1. **Water intake capacity.**

Meals produced through the KIX machine will be able to absorb about 40% more water than standard milled flour. This with the oil absorption factor is of critical importance in the bakery industry.

*Source: Alfa-Laval and Wenger Reports*

1. **Oil absorption.**

Extra oil (up to 50%) can be absorbed by the meal. This can be good in terms of animal feeds but on other occasions this characteristic may neither be required nor wanted.

*Source: Alfa-Laval and Sorin data.*

1. **Super oil content meals.**

Work done at the State University of North Carolina and with Sorins USA in the poultry and DAF industry, indicates that when oil goes into emulsion, then the total oil content (up to 40%) may be treatable in the KIX dehydrator. In other dryers such an operation is very difficult. This factor will lend itself to operations such as high oil fish feed rations.

*Source: NCSU, Sorin and AKT report*

1. **FFA stabilization.**

If a material has an accelerating Free Fatty Acid problem then with correct thermodynamic settings, the KIX will stabilize this acceleration without a smoke problem.

*Source: AKT rice report and Sealord Russian Squid meal data.*

1. **FFA Reduction**

Reduction of high FFA can be attained but with both overall hexane losses and unfortunately the generation of dense black smoke.

*Source: AKT Rice bran and fish meal reports*

1. **Trypsin Inhibitor and some other antinutritional controls**

Under the correct conditions with either whole soybeans or pressings the urease factor can be reduced to under 0.2 mg/g.

*Source: Ziwag, Gold Coin Malaysia, AKT and Wenger reports*

1. **Size and screening control**

A large measure of size control can be attained but this should only be with materials over 150 microns as this coincides with cyclone efficiency.

The current work using our fluid bed retention plate allows for better control of size and this will work on screening by mass rather than by volume that allows for improved standard of nutrient classification.

*Source: CSIRO, AKT and AKT client reports.*

1. **Sterilization/pasteurization**

The AKT Dehydrator has an excellent record on treating pathogens. CSIRO reports clearly indicate excellent reduction rates. New work on the use of a post airlock conditioner will assist with a more elegant approach to sterilization.

*Source; CSIRO Reports, North Carolina State University.*

1. **Improved digestibility’s amino acids**

24 Listed and independent reports, thousands of analyses, all denoting superior performance and with only one item in over 2000 trials indicating reduced performance.

*Sources: Carpenter Hurrel UNESCO;* Ziwag 1989 report incorporating sugar beet residue; *Original D.Roberts and J. Ruiz-Avila report; Lincoln College NZ report; Alfa-Laval report.*

1. **Gelatinization of carbohydrates**

Higher maltose figures than available by using pelletizers and/or extruders have been recorded. These also have implication for digestibility. As well, under thermodynamic controls available with the machines the capacity

*Source; Ziwag (Switzerland report), Wenger and Feedlink data.*

1. **Control Afla toxins**

Afla toxins on grains will be separated and exhaust through the machine flue and must then be treated in a chemical bath. This is a most important characteristic as long as separation of the toxins can be guaranteed.

*Source: LGC Corporation Singapore*

1. **Roasting and palatent controls**

A roasting taste and other palatent controls can be imparted to meal by reducing moisture content below 4%.

*Source: general AKT observation and avocado trials*

1. **Extended shelf life, reduced aromas and protected nutraceuticals, vitamins with enhanced encapsulation**

If the product is not milled then the product will have a longer shelf life due to a skin that develops, which reduces the capacity to oxidize (see lipid bonding, point 27).

*Source: CSIRO, AKT and Alfa Laval reports*

1. **Improved Yield**

As both the thermodynamic conditions and the fact that we are operating in a vacuum product, yield improvements up to 5% have been recorded by Alfa-Laval.

Odours have mass, so any improvement in natural system odour controls will have an impact on yield

*Source: Alfa Laval, Heinz and AKT clients*

1. **Plastic paper separation from meals and nutrients without burning.**

This factor will allow more productivity with pelletisers and extruder. Electrical cost per tonne are reduced.

*Source: Reports on future trials*

1. **Fibre and bone separation**

Because of the ultra-short time drying technique, considerable exploding of tissue from bone, fibre or scale occurs. This characteristic then allows for ease of separation of these materials with not only a higher separation capacity but also an efficacy of separation.

*Source: Wenger, Alfa Laval, Bio-fractions, AKT and Purina reports*.

The KIX dehydrator won for the operator the best innovation in the food industry award, over a three year period.

With the following commendation from the Australian Institute of Food science and technology

 Naturale Pty. Ltd. and Westhaven Dairy Pty. Ltd. are privately owned

companies in Tasmania and are committed to innovation and development of

functional health foods for consumers. These enterprises have produced the

world’s first omega-3 yoghurt from cow’s milk which is naturally enriched with

Docosahexaenoic and Eicosapentaenoic acids; these essential nutrients have a

significant role in human health including brain development, cognitive

behaviour and heart disease. Naturale and Westhaven have shown outstanding

commitment, ingenuity and innovation to significantly improve and utilise

CSIRO’S unique feed technology that enables omega-3 oils to by-pass the

rumen environment of the cow, escape biohydrogenation, and be digested and

incorporated into milk fat.