

# MAXIMIZING THE RECOVERY OF DRY KERNEL AND SHELL VIA A 4-STAGE WINNOWING COLUMN



Figure 1: 4-stage winnowing column

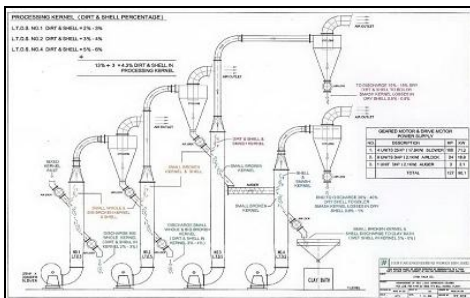


Figure 2: Process flow diagram of the 4-stage winnowing column

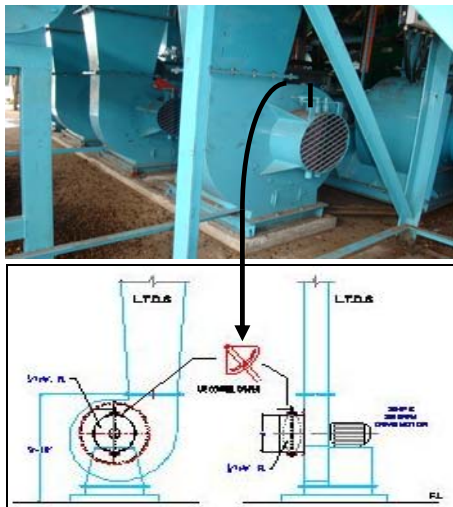


Figure 3: Blower and adjustable flap controller

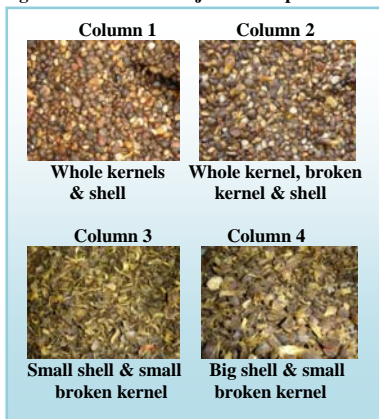


Figure 4: Products and by products from 4-stage winnowing column

## A NOVEL TECHNOLOGY

- Towards zero effluent discharge, the dream of all millers.
- A dynamic approach to efficiently separate kernel from the shell using a 4-stage winnowing system followed by clay bath to recover even tiny fragment of kernel (Figure 1).
- Comprises 4-stage winnowing column, cyclone, blower fans (25HP) & airlock (Figure 2).
- Separating velocity controlled by varying air mass flow rate using easy to operate dampers on force draught ducting at ground level (Figure 3) - to maximize the recovery of dry kernel.
- Design capacity : 60 t/hr mill

## RECOVERY PRODUCTS (Figure 4)

- Main products :
  - Column 1 – whole kernel & shell
  - Column 2 – whole kernel, broken kernel & shell
- By-products :
  - Column 3 – small shell & small broken kernel
  - Column 4 – big shell & small broken kernel

## COMMERCIAL BENEFITS

- Low maintenance cost
- Increment in the Kernel Extraction Rate (KER)
- Less effluent discharge – less dependent on the wet separation
- Saving in operational cost – reduction in clay and power consumption
- Reduction in kernel losses
- Generates more dry shell for fuel

## ECONOMIC ANALYSIS

- Payback period : < 2 years ( based on KER increment, reduction in kernel losses and saving in operational cost )

## INTELLECTUAL PROPERTY (IP)

- A Malaysian Patent Application No. PI 20085278
- IP is jointly owned by MPOB, Hur Far Engineering (HF) & Felda Palm Industries Sdn Bhd ( FPISB )
- The technology is licensed to HF

