

*Do-it-yourself*

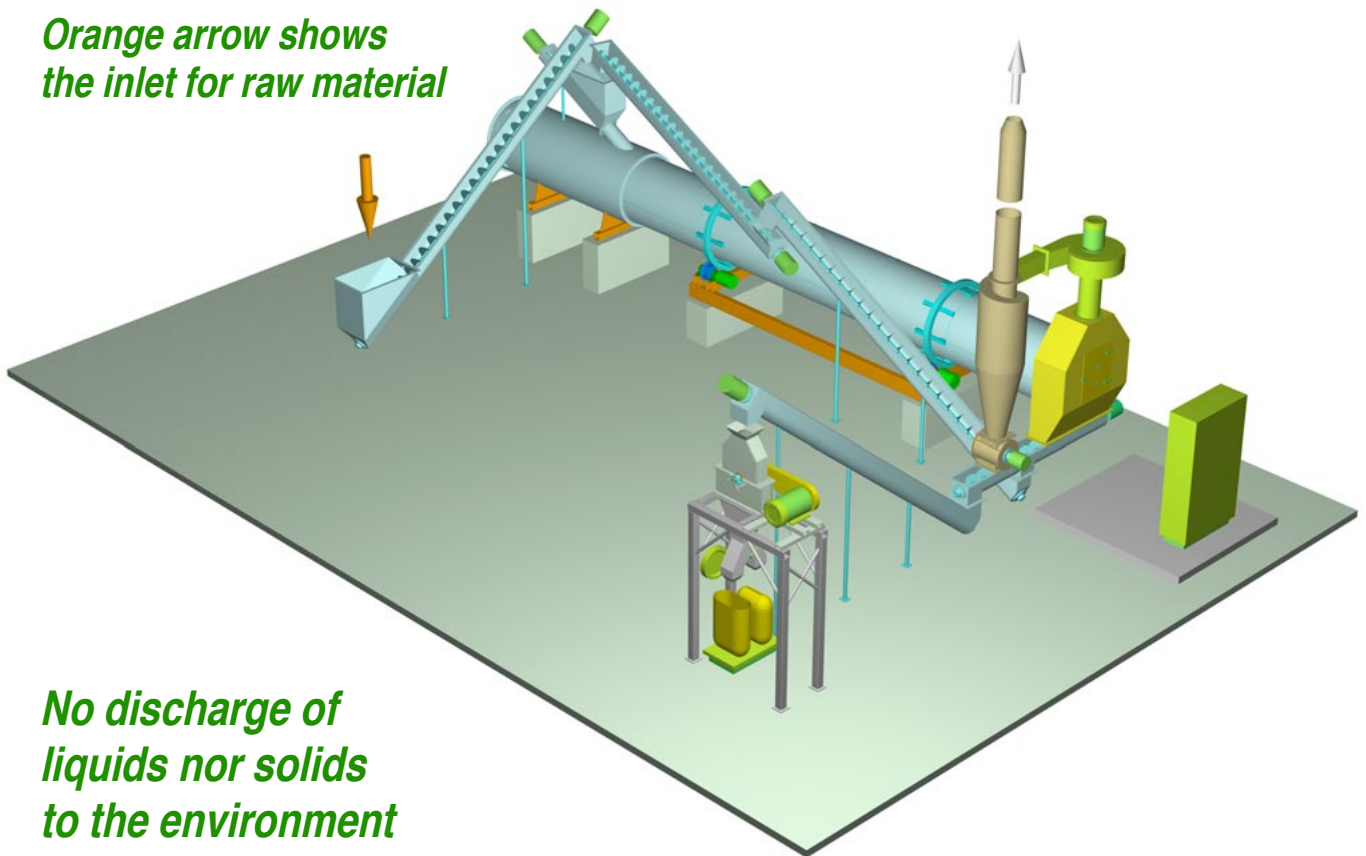
*Environment-compatible*



# **LeanFish Half Fish Meal Plant**

*Pale ('albino') arrow shows  
the outlet of the exhaust*

*Orange arrow shows  
the inlet for raw material*



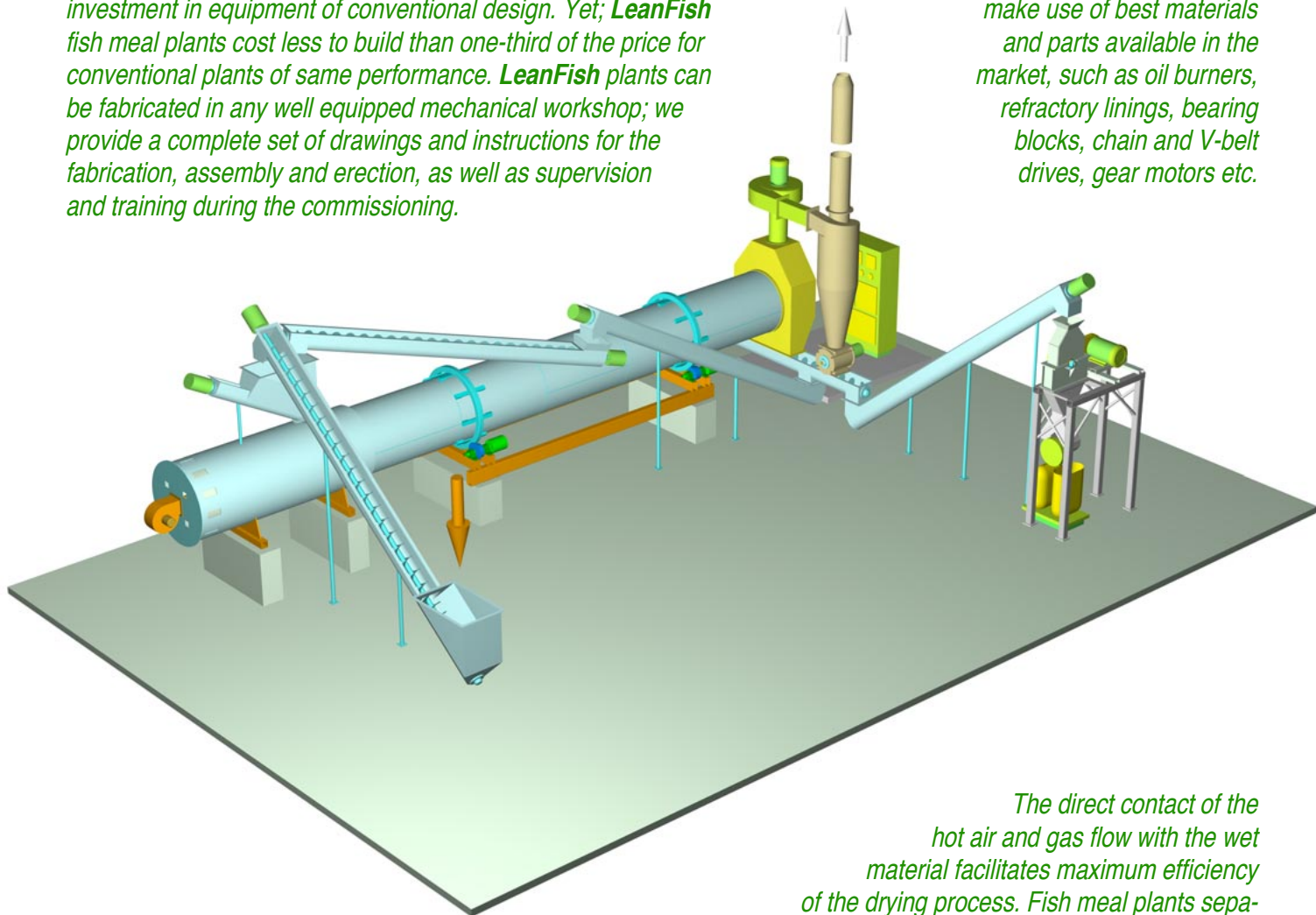
*No discharge of  
liquids nor solids  
to the environment*

**Raw Material: Lean Offal & By-catch**  
**Input (wet): 625 kg/h (raw material)**  
**Output: 140 kg/h (fish meal)**

*Unique*

## LeanFish - the do-it-yourself Fish Meal Plant

Prices for fish meal no longer sustain the depreciation of the investment in equipment of conventional design. Yet; **LeanFish** fish meal plants cost less to build than one-third of the price for conventional plants of same performance. **LeanFish** plants can be fabricated in any well equipped mechanical workshop; we provide a complete set of drawings and instructions for the fabrication, assembly and erection, as well as supervision and training during the commissioning.



The state-of-the-art designs employ latest technologies known for dry rendering and make use of best materials and parts available in the market, such as oil burners, refractory linings, bearing blocks, chain and V-belt drives, gear motors etc.

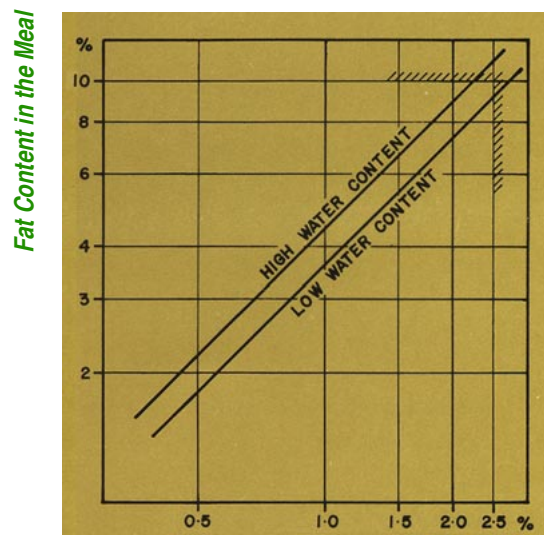
The direct contact of the hot air and gas flow with the wet material facilitates maximum efficiency of the drying process. Fish meal plants separating the stickwater through cooking and pressing prior to the drying discharge substantial quantities of valuable materials with the liquids, which results in a lower protein content of the meal and pollutes the environment.

## LOC - the Live Oil Content

The **LeanFish Dry Rendering Process** is particularly well suited for the processing of 'lean' marine and aquatic by-catch and offals, with LOC up to 2,5% (LOC is the oil content as percentage of the live weight, diagram right). Most demersal species—known as bottom fish—have oil contents less than 1% of the live weight.

For the processing of 'oily' raw materials (with the LOC higher than 2,5%, known as pelagic species), all **LeanFish** plants can be extended with an **Oil Extraction Unit**, consisting a cooker, a press, a centrifugal oil separator and a steam generator—at the time the plant is built or at a later date (separate leaflet).

The **LeanFish Process** recovers all solids from the raw materials and retains them in the meal, which guaranties highest possible protein content of the finished product and reduces environmental pollution to an absolute minimum.



Live Oil Content (LOC) in the Raw Material



## **LeanFish 25D - the the forerunner to LeanFish Half**



The picture shows a **LeanFish 25D** fish meal plant built by IceBits Pte Ltd in Singapore in the early 1980s and delivered to **Bintawa Fish Meal** in Kuching, Sarawak (East-Malaysia), a subsidiary of **Gold Coin Limited** in Singapore. Two years later, IceBits in Singapore built another **LeanFish 25D** plant—identical to the first one—and delivered to **Bintawa**. Both plants have operated for up to eighteen hours every day ever since they were commissioned, and are still doing so.

The **LeanFish Half** fish meal plant introduced in this leaflet is an upgraded 'mineature' version of the **LeanFish 25D**.

All **LeanFish** fish meal plants—whether old or new—can be extended with an **Oil Extraction Package** for the processing of 'oily' raw material—with the LOC above 2,5%—and an **Odour Control Unit** (separate leaflets).



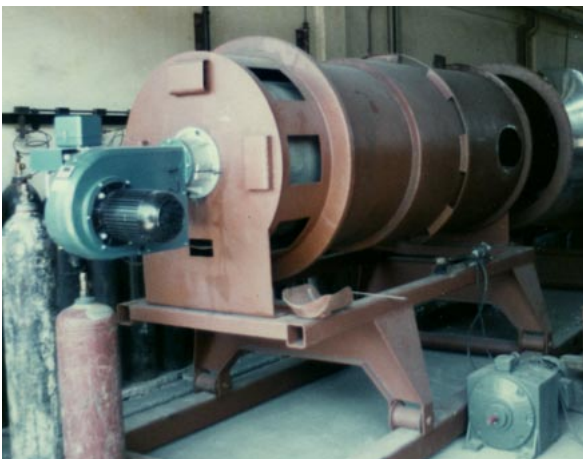
**Feeding of the Raw Material**



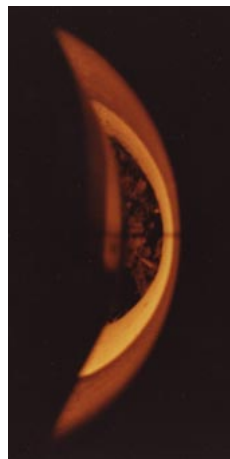
**Milling and Bagging**



**The Finished Product**



**Hot Gas Generator**  
mounted on slide rails to permit access to the rotary dryer for servicing



**Direct Firing**  
as seen through an air inlet on the Hot Gas Generator




**Electric Switch Board**  
central control of all electric operations in the plant

## A Testimonial from a Valued Client

**GOLD COIN LIMITED**

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REGISTERED OFFICE:  
ZUELLIG BUILDING,  
14, SHAW ROAD, SINGAPORE 1336.



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PLEASE ADDRESS ALL LETTERS TO THE COMPANY AND QUOTE OUR REFERENCE NUMBER

Our Ref: 138/M.6

29 October 1984

To Whom It May Concern

This serves to certify that we have operated one LeanFish 25D fish meal processing plant since November 1981 and another identical plant since October 1983 in Kuching, Sarawak, both designed and built by NIELSSONS Pte Ltd. The plants are based on the direct fired dry rendering process, ie. they operate without oil extraction equipment.

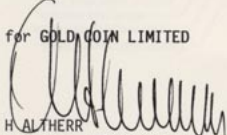
The raw material processed consists approximately 20 main species and approximately 30 less prominent species that are obtained as by-catch from traditional fishing vessels off the north coast of Sarawak. Most of the raw material is termed to be "trash", ie. not suitable for human consumption.

The product coming from the plant will typically have the following composition:

Crude Protein	:	60% to 64%
Fat	:	6% to 8%
Moisture	:	9%
Ashes	:	21% to 23%

We are satisfied with the performance, economy and mechanical execution of both plants.

for GOLD COIN LIMITED



H. ALTHERR  
DIRECTOR - GROUP OPERATIONS (DESIGNATE)

AH/c1

MEMBER OF THE ZUELLIG GROUP  
WITH SUBSIDIARIES IN MALAYSIA, INDONESIA, HONGKONG AND PEOPLE'S REPUBLIC OF CHINA  
AND AFFILIATED OFFICES IN THAILAND, PHILIPPINES, AUSTRALIA, U.S.A., SWITZERLAND.

## The Final Answer to a Perpetual Question: The LeanFish Fish Meal Plant



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