



# AI Foah Automates Sorting with Key Technology's Optyx<sup>®</sup>

Al Foah, the largest producer of palm dates in the United Arab Emirates, is a shining example of Arabian innovation and the UAE's leadership of the Arabian Renaissance. They are the first in the world to automate the sorting of dates. To develop a sorter for this new application, they turned to sorting expert, Key Technology. Two years ago, Al Foah installed their first Optyx® sorter to separate various grades according to size and color, and based on the success of that system, installed four more Optyx sorters since then.



“Before we automated sorting, we relied on mechanical grading and manual labor to do the job. Our primary goals in automating this operation were twofold. We wanted to improve the consistency of the output and we wanted to increase the volume of product being inspected,” said Swaminathan Sriraman, Manufacturing Director at Al Foah. “We considered several suppliers and decided work with Key Technology because we were the most confident in their capabilities and commitment to support us in developing this new application.”

Sorters have been widely adopted around the world in facilities that process potatoes, fruits and vegetables where the technology is used to remove defects and foreign material (FM). As a result of the benefits achieved in these markets – improved food safety and product quality, increased yields and reduced labor – processors of other food products are increasingly looking to create competitive advantages in their respective markets by automating sorting. Al Foah is leading the way in the palm date industry.

“When we started our search, we knew that no supplier had a date sorting system that was ready to go,” explained Sriraman. “The fact that Key had systems installed in thousands of plants, inspecting hundreds of different kinds of products, gave us confidence in their ability to adapt a system to meet our exact needs. It was important to us that Key was able to show us systems that were successfully sorting products that are similar to ours, namely dried apricots and prunes. That, along with their cooperative nature, won our business.”

Today, Al Foah has three Optyx sorters at their Al Saad factory and two Optyx sorters at their Al Marfa factory. Three of these are Optyx 6000 series sorters, which feature a 1220-mm wide scan area and sort up to 6 metric tons of dates per hour. Two are Optyx 3000 series sorters, which feature a 610-mm wide scan area and sort up to 3 metric tons of dates per hour.

Key can configure Optyx with a combination of top- and/or bottom-mounted cameras and lasers to meet the exact needs of each application. Al Foah's Optyx 6000 sorters feature cameras and their 3000 sorters feature both cameras and lasers.



Using cameras, Optyx recognizes each object's size and shape as well as millions of subtle color differences. AI Foah uses this capability to grade dates according to size and color. Lasers detect foreign material (FM) based on differences in the structural properties of the objects, a capability that AI Foah uses to remove dates with calyx when they are producing the highest product quality for the Abu Dhabi royal family.

As product passes through the sorter, it is inspected from the top while still on the conveyor belt. Product is then launched off the end of the Optyx belt for in-air viewing from the bottom. Using proprietary image processing technology designed specifically for dates, the sorter quickly analyses the images, comparing each object to previously defined accept/reject standards.

When the sorter identifies objects to separate from the primary product stream, it activates the ejector system, which is made up of a series of air jets that span the width of the system. While still air-borne, the air jets pinpoint each object to separate and remove it from the primary product stream.

At AI Foah, the sorter is programmed to grade product based on size and/or color, with specific characteristics that differ from one date varietal to another. One pass through the sorter typically separates the highest grade. If AI Foah wishes to separate a second grade, product is simply passed through the sorter a second time.

Unlike mechanical grading systems that separate sizes by length only, optical sorters can be programmed to make more sophisticated decisions. AI Foah's Optyx sorters consider the length and width and the total surface area of each date and make decisions to separate by size based on both the absolute and relative dimensions of these parameters together. In addition to size sorting for the purpose of grading, AI Foah uses Optyx's size sorting capability to remove dates that have been crushed.



When processing varieties that define grades by both size and color attributes, Optyx can be programmed to consider both simultaneously so only one pass is needed to separate premium product. The color sorting capability can also be harnessed to remove dates with color defects such as zebra stripes and dates with detached skins.

Changing the sort parameters takes only seconds because the settings are stored in Optyx's memory and quickly retrieved on the color touchscreen control panel. Product characteristics are categorized on the user interface in terms common to the date industry, which reduces the skill level required to operate the sorter at peak performance. No change parts or mechanical adjustments are needed to change over the sorter to produce a different grade or handle a new variety.

"The single biggest reason for us to automate sorting is to improve the uniformity of our output. This is especially important when we're producing products for retail because consumers expect the product to always be the same. By comparison, mechanical grading is crude and manual sorting will never be consistent because humans are variable throughout the day and they make mistakes," noted Sriraman. "Additionally, automating sorting allows us to achieve higher volumes of high quality product. Other processors may be interested in reducing labor but for us, it is simply not feasible to use manual labor to inspect volumes as high as ours."

During the peak harvesting season from August to October, AI Foah operates 24 hours a day, 7 days a week to sort fresh dates coming from the field from more than 16,000 farmers. During the other months, dates are pulled from cold storage and sorted. After sorting, AI Foah washes and dries the product prior to packaging.

Dates can challenge automated technology because they are sticky and somewhat fragile. Rough handling can damage dates and damaged fruit is not only unacceptable in the final package, but can stick to automation technology and interrupt the process. With an expertise in product handling as well as sorting, Key designed AI Foah's Optyx to gently handle dates to preserve the highest product quality and ease sanitation.

"Key trained our operators and the maintenance engineer who is responsible for the sorters when they were here during installation. We were trained in how to operate, maintain and clean the system so we could achieve the highest levels of performance," said Sriraman. "It's very easy to use."

Optyx's graphical user interface (GUI) can reside locally on the sorter and can be accessed remotely via network or Internet, enhancing the flexibility in the operating





environment and easing access for remote factory troubleshooting and application assistance. Sophisticated real-time and on-demand diagnostics help minimize and avoid costly downtime and detect conditions that could compromise inspection.

“We had a test unit for three months before we decided to purchase the test unit and four additional sorters. Both the equipment and Key as a service

provider have met our expectations,” concluded Sriraman. “These sorters allow us to go to market with retail packs that satisfy the most quality conscious customers around the world.”

“Prior to installing the sorters, 95 percent of our product was sold in bulk to distributors. Thanks to Optyx and the high volume of high quality product we’re now able to produce, 15 percent of our output is now sold in retail packs,” said Sriraman. “We’re also able to satisfy export markets that require the highest quality product.” In fact, 95 percent of Al Foah’s 85,000 metric tons of annual production is now exported, going to 30 different countries, primarily in Asia, Europe and Africa.

Date Crown is Al Foah’s first international brand, which was introduced to the market in 2009. The brand offers a wide range of premium Emirates date varieties including Lulu, Fard, Dabbas and Khenazi in addition to the famous international variety, Khalas.

The company’s Al Dhafra brand, which is produced in its Al Marfa factory, offers all types of dates and value-added products such as whole dates with chocolate, dates with nuts, pitted dates, date syrup, date paste and more. These products are all produced from 100 percent natural ingredients.

The quality produced at Al Foah is a source of national pride. This state-owned company goes to great lengths to bring this ancient and remarkable food to the world in a manner that is relevant to contemporary life. Its dates are grown according to the highest agricultural standards to provide sustainable work and income for tens of thousands of people in farming communities. Its manufacturing processes are leading-edge and its finished products are of the highest quality. Al Foah’s use of Optyx is just one of many examples that illustrates the company’s innovation in date production.

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