# ZITHA TECH SPECIALTY CABLES (Pty) Ltd

# Fiber Optic Sensor Sorting Process



## Overview

How Do Optical Sorting Technologies Identify Fiber Optical sorting technologies use Near-Infrared (NIR) light to identify the unique molecular Optical Sort.

## Key Takeaways

Fiber optic sensor sorting primarily uses optical and near-infrared (NIR) technologies to identify and separate fibers based on their chemical composition and physical properties.Overview of Fiber Sorting with Sensors

Fiber sorting systems employ optical sensors to detect and classify fibers in textiles or recycled materials. The process typically involves material feeding, sensory examination, data processing, and material separation. Fibers are transported via conveyor belts or chutes, where sensors capture data about each fiber's chemical or physical characteristics. This information is processed in real time, and actuators such as air jets or mechanical arms divert fibers into designated bins for recycling or quality control purposes .

Near-Infrared (NIR) Spectroscopy

A widely used method in fiber sorting is Near-Infrared (NIR) spectroscopy. NIR sensors shine light on fibers and measure the reflected wavelengths, which correspond to the unique molecular "fingerprint" of each fiber type. This allows the system to distinguish between cotton, polyester, wool, and blended fibers. The data is compared against a digital library of known fiber profiles, enabling high-speed, accurate sorting at industrial scales .

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved

Optical Sorting Machines

Advanced machines like FiberMax™ use high-resolution optical sensors to sort fibers at speeds up to 1,000 feet per minute (5 m/sec). These systems can handle contaminants, mixed paper, and various fiber types, reducing the need for manual sorting and improving recycling efficiency . Optical sorting can also be enhanced with AI-driven algorithms, which improve classification accuracy and reduce contamination in recycled streams .

Active vs Passive Optical Sorting

Optical sorting can be categorized into active and passive methods. Active sorting uses optical tweezers, Raman spectroscopy, or AI-assisted detection to manipulate and separate fibers at a microscopic level. Passive sorting relies on deterministic light fields and lens systems to sort fibers based on size, shape, or optical properties. Both approaches offer high resolution, non-invasive sorting, and are increasingly applied in textiles, recycling, and materials science .

Advantages and Limitations
• Advantages: High speed, precise identification, reduced labor, ability to handle mixed fibers, and integration with AI for improved sorting accuracy .

• Limitations: Dark-colored fibers or heavily dyed materials may reduce NIR sensor accuracy, requiring complementary technologies like mid-infrared spectroscopy or multi-sensor fusion .
Industrial Applications

Fiber optic sensor sorting is widely used in:

• Textile recycling: Separating cotton, polyester, wool, and blends for circular economy initiatives .

• Paper and pulp industry: Sorting OCC, ONP, and mixed paper streams .

• Quality control: Ensuring fiber purity and removing contaminants in commercial and industrial production lines . These systems enable millisecond-level sorting, processing thousands of fibers per hour, and are essential for efficient recycling and high-quality fiber recovery.

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*

## Article Content

How Do Optical Sorting Technologies Identify Fiber

Optical sorting technologies use Near-Infrared (NIR) light to identify the unique molecular

Optical Sorting Technology

All CIRRUS® PlasticMaxTM sorters combine high-resolution NIR, color, and metal sensors to accurately sort a wide variety of

Sensor-based sorting systems for bulk goods and recycling

This review aims to offer a comprehensive overview of the history, development, and perspectives of various optical

How Do Automated Sorting Sensors Identify Fiber Types?

As garments move along a conveyor belt, the NIR sensor shines light on the fabric and analyzes the reflected

Review of Optical Fiber Sensors: Principles, Classifications and

Optical fiber sensors (OFSs) have emerged as essential tools in the monitoring of physical, chemical, and bio-medical

Multi-Particle sorting using signals from particles trapped by single ...

We propose a multi-particle sorting method based on single optical fiber tweezer particle-trapped signals. When

Optical Sorter

An Optical Sorter is a specialized sensor-based machine designed to separate materials based on their optical properties such as

Understanding the Optical Sorting Process

Optical sorting involves the automated separation of items based on their optical properties such as color, shape, size, and texture. It

Optical Sorting: The Ultimate Guide

Optical sorting is a sophisticated technology that uses cameras and sensors to identify and sort objects based on their optical

Fibersort

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*

FiberSort - Infrared Sensor Sorting System by MSS, Inc.. If you are looking to separate out Non-Fiber items and brown cardboard

The Ultimate Guide to Optical Sorters in Waste Sorting

What are Optical Sorters? Optical sorters are advanced automated machines that use sensors, cameras,

Special Issue “Fiber Optic Sensors and Applications”: An Overview

We present here the recent advance in exploring new detection mechanisms, materials, processes, and applications of fiber optic

Optical sorting: past, present and future

Optical sorting combines optical tweezers with diverse techniques, including optical spectrum, artificial intelligence (AI) and

Optical Fiber Sensors Guide

An optical fiber sensing system is basically composed of a light source, optical fiber; a sensing element or transducer and a detector

Fiber Optic Sensors: Types, Working Principle

Explore fiber optic sensors: their working principles, types (intrinsic, extrinsic, hybrid), and diverse

Sorting Systems: Efficient Solutions for Quality and Yield

Industrial sorting is crucial in the recycling industry for efficiently separating materials and optimizing the value chain. Advanced

(PDF) Optical Fiber Sensors: Working Principle, Applications, and ...

PDF | Fiber-optic technology emerged originally for applications in data transmission and telecommunications.

Color Sorter Machine: The Ultimate Guide to Optical

Color sorter is optical sorting machine, get more about color sorter informations from this article.

MSS Unveils Next-Generation Optical Fiber Sorting Technology

MSS, Inc., the optical sorter division of the CP Group, is introducing its next generation fiber sorting technology, the

A novel approach for sensor based sorting performance determination

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*

Abstract Sensor-based sorters execute an “accept-reject” task to selectively remove the target particles from a

Sensor-based Sorting Machine | Intelligent AI Sorting System with ...

Sensor-based sorting machine using AI, NIR, and multi-spectral sensors for food, mining, and recycling. boosting sorting efficiency

pmc.ncbi m.nih.gov

We would like to show you a description here but the site won''t allow us.

How Optical Sorting Machines Work And All Their Benefits

A complete guide to optical sorting machines: types, how they work, applications, and future trends in smart sorting.

How Does an Optical Sorting Machine Work? | Weightsorting

An optical sorting machine is a type of automated sorting system. It separates products based on visual features.

(PDF) Optical Fiber Sensing Technology: Basics ...

In this paper, the current state of art of optical fiber sensing technology is reviewed. The basics of operating principle

Revolutionizing Industries: The Power of Optical Fiber Sorting

Optical fiber sorting technology, a cutting-edge innovation in various industries, has transformed the way companies process, sort,

Optical Sorter

An Optical Sorter is a specialized sensor-based machine designed to separate materials based on their optical properties such as

Understanding the Optical Sorting Process

Optical sorting involves the automated separation of items based on their optical properties such as color, shape, size, and texture. It

Optical Sorting: The Ultimate Guide

Optical sorting is a sophisticated technology that uses cameras and sensors to identify and sort objects based on their optical

Fibersort

FiberSort - Infrared Sensor Sorting System by MSS, Inc.. If you are looking to separate out Non-Fiber items and brown cardboard

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*

The Ultimate Guide to Optical Sorters in Waste Sorting

What are Optical Sorters? Optical sorters are advanced automated machines that use sensors, cameras,

Special Issue “Fiber Optic Sensors and Applications”: An Overview

We present here the recent advance in exploring new detection mechanisms, materials, processes, and applications of fiber optic

How to use fiber optic sensors on sorting machines?

How to use fiber optic sensors on sorting machines?Fiber optic sensors are widely

What is a Fiber Optic Sensor?

A fiber optic sensor operates with an optical fiber cable connected to a dedicated light source. These sensors offer great mounting

Turning Fiber into a Sensing System: The Magic of Fiber Optics Sensing

Imagine a world where the Internet doesn''t just connect but senses—detecting earthquakes, monitoring battery health,

What is Optical Sorting and How it Works?

What is Optical Sorting? Optical sorting is an automated process of sorting solid materials using advanced camera

Optical sorting: past, present and future

Optical sorting combines optical tweezers with diverse techniques, including optical spectrum, artificial intelligence (AI) and

Optical Fiber Sensors Guide

An optical fiber sensing system is basically composed of a light source, optical fiber; a sensing element or transducer and a detector

Fiber Optic Sensors: Types, Working Principle & Applications

Explore fiber optic sensors: their working principles, types (intrinsic, extrinsic, hybrid), and diverse applications in mechanical,

Sorting Systems: Efficient Solutions for Quality and Yield

Industrial sorting is crucial in the recycling industry for efficiently separating materials and optimizing the value chain. Advanced

How Do Optical Sorting Technologies Identify Fiber

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*

Optical sorting technologies use Near-Infrared (NIR) light to identify the unique molecular

Optical Sorting Technology

All CIRRUS® PlasticMaxTM sorters combine high-resolution NIR, color, and metal sensors to accurately sort a wide variety of

Optical sorting: past, present and future | Light: Science & Applications

This review aims to offer a comprehensive overview of the history, development, and perspectives of various optical

Sensor-based sorting systems for bulk goods and recycling

Sensor-based sorting consists of various process phases: Material feeding and transportation, sensory examination, data processing

What Are Near-Infrared Sensors in Textile Sorting? → Learn

When a garment passes under the sensor, the device captures this signature and compares it to a database of known

Review of Optical Fiber Sensors: Principles, Classifications and

Optical fiber sensors (OFSs) have emerged as essential tools in the monitoring of physical, chemical, and bio-medical

Multi-Particle sorting using signals from particles trapped by single ...

We propose a multi-particle sorting method based on single optical fiber tweezer particle-trapped signals. When

FiberMax™ Optical Sorting Machine

FiberMax™ enhances fiber product quality and reduces manual sorting on the fiber QC line. FiberMax™

Paper Sorting Equipment | Automated Fiber Recovery Systems | MSS

Our MaxSelect™ technology employs patented sequential processes to deliver the highest-definition imaging, while a wide range of

What Is Optical Sorting and How Does It Work? | PolySorter

Discover how optical sorting technology works. Learn about the RGB, NIR, and AI sensors driving efficiency in plastic

How Do Optical Sorting Technologies Identify Fiber

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*

Optical sorting technologies use Near-Infrared (NIR) light to identify the unique molecular

Optical Sorting Technology

All CIRRUS® PlasticMaxTM sorters combine high-resolution NIR, color, and metal sensors to accurately sort a wide variety of

Optical sorting: past, present and future | Light: Science & Applications

This review aims to offer a comprehensive overview of the history, development, and perspectives of various optical

Sensor-based sorting systems for bulk goods and recycling

Sensor-based sorting consists of various process phases: Material feeding and transportation, sensory examination, data processing

What Are Near-Infrared Sensors in Textile Sorting? → Learn

When a garment passes under the sensor, the device captures this signature and compares it to a database of known

Review of Optical Fiber Sensors: Principles, Classifications and

Optical fiber sensors (OFSs) have emerged as essential tools in the monitoring of physical, chemical, and bio-medical

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

## Contact Us

Continue your research online:

Website: https://zithatech.co.za
Technical inquiry: https://zithatech.co.za/contact.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

*© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved*