Optical Sorting.

Nuts and dried fruit.
Outstanding Performance.
Nut and dried fruit sorting from Bühler.

Bühler provides optical sorting solutions for nut and dried fruit processors who demand the highest standards of safety, hygiene and quality. With a focus on maximising the yield, the SORTEX range is able to sort many varieties of nuts and dried fruit; peanuts, almonds, walnuts, pecans, pistachios, cashews, macadamia, hazelnuts, pine nuts, Brazil nuts, raisins and others.

Bühler’s commitment to substantial investment in R&D ensures that its advanced optical sorting technology produces excellent results in removing even the most challenging of nut and dried fruit defects and foreign material. Bühler can offer these solutions to small or large-scale processors.

Key benefits
- Setting new standards of safety and hygiene
- Maximising the value and yield
- Consistent performance and stability
- Multiple, configurable machine options
- Increased productivity and lower operational costs
- Dedicated shell removal capability

Sorting solutions
Bühler offers flexibility to nut and dried fruit processors where our precision sorting will improve product quality and process efficiencies at various stages of the process.

In-shell nuts
- Improving efficiencies further down the process stream by reducing levels of foreign material and rotten nuts
- Grading by size and shape to ensure consistent input to the cracking process
- For in-shell nuts used as final product, optical sorting ensures output of the highest quality

Natural/Unblanched
- Ensuring safe food by removing visible defects, imperfections and foreign material which have been missed by mechanical cleaners or introduced during the shelling process, e.g. shells
- Grading by size to achieve uniform appearance
- Grading by colour to maximise value

In-shell peanuts  |  In-shell pistachios  |  In-shell almonds  |  Red skin peanuts  |  Natural almonds  |  Walnut halves
Special applications

Bühler can satisfy more specialised requirements, such as sorting roasted nuts and product (waste) recovery. It is possible to sort nuts and dried fruit, using any combination of colour, size and shape as well as by the area of the individual blemishes.

**Blanched**

- Whether used as ready snacks, ingredients or toppings, optical sorting removes discolouration, yellows, adhering skin and foreign material from blanched nuts

**Special applications - few examples:**

- Aflatoxin reduction
- Colour grading of raisins
- Almonds: Product recovery (hash sort), chip & scratch sorting, broken butt and doubles removal
- Walnuts, Pecans, Cashews: large, medium, and small pieces and product recovery
- Pistachios: Stick removal
- Size grading, using PROfile (shape) technology

Pecan halves  Blanched peanuts  Blanched almonds  Whole cashews  Blanched hazelnuts  Raisins
Partner for solutions.
Increasing profitability.

Setting new standards of safety and hygiene

- Bühler optical sorting solutions, including the latest MultiVision inspection technology, are highly efficient in the removal of defective nuts and dried fruit with very subtle colour variations, rotten, yellows, insect damaged and mouldy nuts, etc
- Bühler offers an ejector which is able to precisely sort very small products, such as walnut pieces. A powerful ejector is also available for end of line applications to remove heavier foreign material, e.g. stones and metals
- Reduction of aflatoxin levels through the efficient removal of particular defects
- Within the SORTEX E range, the open design and stainless steel construction allows hygienic operation and easy cleaning

Maximising the value and yield

- Precise colour and size grading achieves uniform appearance and added value
- A combination of advanced custom-built technology, which includes long-life LED and Broad Spectrum Lighting, high resolution visible cameras, InGaAs (NIR, SWIR) and PROfile technology, ensures the selection of the highest quality of nut products
- The high precision ejection system minimises the false ejection of the good nuts and dried fruit
- Gentle product handling design minimises damage to the good product
- Simultaneous resort option allows the recovery of good product from the reject stream
- Improved dust management system maximises yield by further reducing machine downtime
- Reverse sorting capability allows extensive recovery of good product from the reject with over 50% contamination level

Consistent performance and stability

- Consistent performance and a reliable operation with automatic calibration while maintaining a clean optical viewing area
- Maximum stability with the Climate Control System option, by maintaining a constant temperature in the optical and control cabinets in the extreme ambient temperature ranges between 0°C - 50°C (32°F - 122°F)

Multiple, configurative machine options

- Modular design options are available in up to five sizes to suit processors with capacity requirements ranging from 0.5 tonnes/hour to 12.5 tonnes/hour
- A combination of advanced custom-built technologies allows sorting multiple size nuts at various stages of the process, such as in-shell, natural, blanched and roasted pieces
- The Graphical User Interface (GUI) enables fast product changeovers and covers a wide range of pre-stored product modes

Increased productivity and lower operational costs

- Assisted by the Anyware remote connection, SORTEX engineers can respond quickly in support of a machine, maximising up-time
- Lower power consumption, lifetime defect detection optics, low replacement cost lamps and re-buildable ejectors, reduces operational costs

Dedicated shell removal capability

- Bühler has an easy to use, pre-defined configuration that can effectively target shell removal in applications such as Almonds, Pistachios, Pecans, Walnuts and Macadamia
Safe Food.
Clean Food.
SORTEX A MultiVision.
Subtle colour detection and shape sorting.

- Equipped with MultiVision inspection system for very subtle colour detection, colour grading/grouping, foreign material removal and the reduction of aflatoxin
- Offered with PROfile (shape) technology as a standard feature to detect defects by shape, maximising yield, as well as delivering a homogeneous appearance by size grading
- A range of lighting options including LED, fluorescent and Broad Spectrum lighting targeting a wide range of defects to suit various nut applications
- State-of-the-art Enhanced InGaAs technology and lighting maximises product safety targeting defects ranging from NIR up to SWIR range
- Available in 3 to 5 modules offering the highest throughput and flexibility in the sorting configuration
- Low voltage digital drive technology vibrators and enhanced background for even feed and improved module to module sorting consistency
- Climate Control System ensures a consistent performance and stability for maximum uptime
- Improved dust management increases capacity and reduces downtime by using self wiping windows and the sealed optical boxes minimise maintenance even in dustier environments
- CE marked with option to meet ATEX/Hazloc/NRTL requirements

Peanuts (yellows removal)

Accept

Reject
SORTEX A MultiVision InGaAs.
Targeting shell and other foreign material.

- MultiVision Inspection
- LED Lighting
- Enhanced InGaAs
- PROfile (shape)
- Broad Spectrum Lighting
- Climate Control

**Technical details**

<table>
<thead>
<tr>
<th>Air requirements</th>
<th>Power consumption (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>72-102 psi (5-7 bar)</td>
<td>(200-240V, 50/60 Hz single phase)</td>
</tr>
<tr>
<td>A3</td>
<td>25 l/sec@5 bar</td>
</tr>
<tr>
<td>A4</td>
<td>35 l/sec@5 bar</td>
</tr>
<tr>
<td>A5</td>
<td>45 l/sec@5 bar</td>
</tr>
</tbody>
</table>

Compressed air consumption is approximate and varies depending on throughput and input contamination level. Power consumption can vary depending on the machine configuration.

**Dimensions and weight**

<table>
<thead>
<tr>
<th>Weight (kg, lbs)</th>
<th>Width (mm, in)</th>
<th>Depth (mm, in)</th>
<th>Height (mm, in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>850, 1874</td>
<td>2387, 94</td>
<td>1685, 66</td>
</tr>
<tr>
<td>A4</td>
<td>1000, 2205</td>
<td>2387, 94</td>
<td>1685, 66</td>
</tr>
<tr>
<td>A5</td>
<td>1150, 2535</td>
<td>2387, 94</td>
<td>1685, 66</td>
</tr>
</tbody>
</table>

Weight can vary depending on the machine configuration.

**Capacities (tonnes/hour)**

<table>
<thead>
<tr>
<th>Per module</th>
<th>In-shell</th>
<th>Natural/Unblanched</th>
<th>Blanched</th>
<th>Special application</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>2 - 3</td>
<td>2 - 3.5</td>
<td>2 - 3.5</td>
<td>1 - 3</td>
</tr>
<tr>
<td>A4</td>
<td>2 - 3.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A5</td>
<td>1 - 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All figures are indicative only and could vary for example in case of fragile handling and shape sorting applications.

**Almonds (shell removal)**

Accept

Reject
**SORTEX Z+.**

Maximum flexibility for colour and foreign material sorting.

- Visible Cameras
- Enhanced InGaAs
- PROfile (shape)
- Broad Spectrum Lighting
- Climate Control
- Reverse sorting

Also available in visible monochromatic and bichromatic range

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### Technical details

<table>
<thead>
<tr>
<th>Typical Air requirements 72-102 psi (5-7 bar)</th>
<th>Power consumption (kW) (200-240V; 50/60 Hz single phase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z+1 8.6 l/sec</td>
<td>1.5 (2.2)*</td>
</tr>
<tr>
<td>Z+2 17.3 l/sec</td>
<td>2.5 (3.7)*</td>
</tr>
<tr>
<td>Z+3 26.0 l/sec</td>
<td>2.5 (3.7)*</td>
</tr>
<tr>
<td>Z+4 34.6 l/sec</td>
<td>3.0 (NA)</td>
</tr>
</tbody>
</table>

Compressed air consumption is approximate and varies depending on throughput and input contamination level.

* For the SORTEX Z+ InGaAs range

### Capacities (tonnes/hour)

- In-shell
- Natural/Unblanched
- Blanched
- Special application

<table>
<thead>
<tr>
<th>Per module</th>
<th>2 - 3</th>
<th>2 - 3.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanched</td>
<td>2 - 3.5</td>
<td>1 - 3</td>
</tr>
</tbody>
</table>

Note: The SORTEX Z+ InGaAs model is only available in three sizes

### Dimensions and weight

<table>
<thead>
<tr>
<th>Weight (kg, lbs)</th>
<th>Width (mm, in)</th>
<th>Depth (mm, in)</th>
<th>Height (mm, in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z+1 612,1349</td>
<td>650, 22.8</td>
<td>2198, 86.5</td>
<td>2081, 80.0</td>
</tr>
<tr>
<td>Z+2 800, 1764</td>
<td>1680, 66.4</td>
<td>2198, 86.5</td>
<td>2081, 80.0</td>
</tr>
<tr>
<td>Z+3 900, 1984</td>
<td>1680, 66.4</td>
<td>2198, 86.5</td>
<td>2081, 80.0</td>
</tr>
<tr>
<td>Z+4 1050, 2315</td>
<td>1980, 78.0</td>
<td>2198, 86.5</td>
<td>2081, 80.0</td>
</tr>
</tbody>
</table>

Climate Control System for the SORTEX Z+ InGaAs range adds ~570mm to the width and ~95kg.

### Compressed air consumption

- Approximate and varies depending on throughput and input contamination level.

### InGaAs technology

- Available in four sizes for monochromatic or bichromatic range
- Designed for handling nearly all types of nuts at any stage of the process line
- High resolution, visible monochromatic and bichromatic cameras, combined with InGaAs technology, enable efficient colour sorting and removal of challenging foreign material
- PROfile technology enhances the detection of unwanted objects using shape characteristics
- Climate Control System ensures a consistent performance and stability
- Broad Spectrum Lighting enables viewing of a wide range of defects
- Dust extraction system improves management of dusty products
- Capable of performing different sorts simultaneously in the same machine, including re-sort of the reject
- Reverse sorting capability for recovery of good product
SORTEX E1C.
Hygienic design for colour and foreign material sorting.

Technical details

<table>
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<tr>
<th></th>
<th>Typical Air requirements (72-102 psi / 5-7 bar)</th>
<th>Power consumption (kW) (200-240V, 50/60 Hz single phase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1C</td>
<td>32 l/sec@5 bar</td>
<td>2.5 (3.5 incl infeed vibrator)</td>
</tr>
</tbody>
</table>

Compressed air consumption of the sorter varies depending on the throughput and input contamination level.

Dimensions and weight

<table>
<thead>
<tr>
<th>Machine (with vibrator)</th>
<th>Weight (kg, lbs)</th>
<th>Width (mm, in)</th>
<th>Depth (mm, in)</th>
<th>Height (mm, in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1C</td>
<td>680, 1500</td>
<td>1514, 60</td>
<td>3194, 126</td>
<td>2190, 86</td>
</tr>
</tbody>
</table>

Capacities (tonnes/hour)

<table>
<thead>
<tr>
<th></th>
<th>In-shell</th>
<th>Natural/Unblanched</th>
<th>Blanched</th>
<th>Special application</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1C</td>
<td>6 - 9</td>
<td>6 - 9</td>
<td>6 - 9</td>
<td>4 - 9</td>
</tr>
</tbody>
</table>

All figures are indicative only and can vary for example in case of fragile handling and shape sorting applications.

- Equally suitable for the largest in-shell nuts down to pieces used as ingredients
- Stainless steel, open design construction allows easy access for thorough cleaning
- High resolution visible bichromatic cameras, InGaAs technology combined with Broad Spectrum Lighting further improves detection of subtle defects, colour sorting and the removal of challenging foreign material
- PROfile technology enhances detection of objects using shape characteristics such as length grading, broken nut removal and foreign material
- Visible Bichromatic Cameras
- Enhanced InGaAs
- PROfile (shape)
- Broad Spectrum Lighting
- Climate Control
- Dust management device built into the in-feed vibrator and receptacle dust extraction points improve the sorting of dusty products such as red skin peanuts
- Curved “Accept” receptacle ensures gentle handling of delicate products
- The combination of forward-feed vibratory system with no need for automatic wiping or calibration, maximises capacity and productivity
- State of the art construction and Climate Control System leads to stable performance
Enhanced InGaAs (NIR - Near Infra-Red/SWIR - Short-Wave Infra-Red) technology provides much better separation of good product from foreign material of the same colour, in comparison with a visible camera, such as shell, hull, gummies, pee wee, membrane, sticks, stones, glass.

PROfile technology analyses objects by shape. It can separate under/over-sized or misshapen nuts as well as remove sticks, twigs and other foreign material, even when they are the same colour as good product. It can sort objects by the area of the individual blemishes or even by the combined area of all the blemishes on the object.

The SORTEX A MultiVision range offers the option to use a high intensity solid state LED lighting system. Energy efficient and durable, Bühler’s LED system generates less thermal heat but still produces more light, resulting in sorting consistency over a longer period of time.
SORTEX Customer Care.
Secure tomorrow’s profits today.

Solutions and support to ensure that your optical sorter is performing to maximum efficiency, delivering maximum productivity and making a maximum return on investment.

Bühler’s worldwide Customer Care organisation delivers the highest quality local support by offering a variety of services under SORTEX Total Care*.

**SORTEX Total Care**
SORTEX Total Care offers customers the opportunity to create their own service package, composed of individual service features, to best suit their needs.

Customers have the flexibility to create their most (cost) effective programme - whether that covers just those areas of prime concern, or a fully-comprehensive cover.

Comprehensive cover is suitable for customers who require continuous operation of the optical sorter where the processing line is of the utmost importance. This way, customers can ensure that their investment is fully protected.

Customers can tailor their individual package from the following options.

- **WearCare - Preventative Maintenance**
  A fixed number of visits per year. During the visit an engineer will carry out checks, adjustments and when necessary replace consumable or wear parts.

- **RepairCare - Emergency Repair**
  In the unlikely event of the machine failing, an engineer will visit and repair the optical sorter.

- **EjectorCare - Ejector Service and Repair**
  When the ejectors reach their refurbish point an engineer will visit to replace the ejectors with the appropriate number of units for the whole machine.

- **AnywareCare - Anyware Health Check and Alerts**
  The Anyware system allows the performance of optical sorters to be monitored remotely. This diagnostic system facilitates a quicker response to any issues that might emerge. It automatically emails an alert message to the server, if an optical sorter develops a fault, or begins to operate outside normal working parameters.

  An authorised engineer reviews the information in the alert, and advises whether adjustment is needed, or if the problem needs further attention.

**SORTEX Spares Kits**
For customers who require spare parts available on site, Bühler’s technologists have created appropriate spares kits for the different machinery available.

**SORTEX Upgrade Kits**
Customers seeking the latest technology available on their optical sorter - whether software or extra functionality - benefit from a range of upgrade kits available.

* All contracts are available for different durations