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FULL SYSTEM USER MANUAL



Introduction

The Noztek full extrusion system is available as a comprehensive package, providing everything you need to seamlessly transition from pellets to spooled filament. This all-inclusive setup not only ensures efficient, uninterrupted operation but also enables real-time monitoring and data collection.

In response to increasing customer demand for greater control over material manipulation, our full extrusion system offers a reliable and interconnected solution. The Xcalibur, our powerful desktop extruder, initiates the process by converting pellets into a smooth filament. After passing through the Water Bath for cooling, the Tolerance Puller manages filament diameter, guiding it to the Winder 2.0 for precise spooling.

Notably, components within this system are interconnected and can be linked to your computer for comprehensive monitoring and data capture. Our dedicated software allows you to monitor the performance of both the Xcalibur and the Tolerance Puller conveniently on one screen, ensuring a smooth and controlled extrusion process.

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Warranty

We guarantee outstanding quality for our products and services. Customers who purchase Noztek-manufactured equipment for professional use are guaranteed that they will be free from defects in workmanship and materials for 1 year from date of shipment. If your machine is found to be faulty, we will repair or replace the machine. The warranty and functional guarantee does not cover damages caused by wear and tear or improper use.

TO INSURE THAT YOUR WARRANTY IS HELD IN EFFECT, PROPER OPERATION PROCEDURES MUST BE OBSERVED.

NOTE: READ THE SAFETY PRECAUTIONS BEFORE OPERATING THIS MACHINE.

For a full breakdown please read our Limitations of Warranty Cover below.

Limitations of Warranty Cover:

- You must own the machine
- The original invoice is decisive as this is your warranty claim (please keep a copy of this)
- Repair or replacement of machine will be determined by Noztek
- Warranty only covers manufacturing or material defects

Warranty does not cover:

- Incorrect use of machine /damage due to misuse
- Damage from force or fall
- Foreign objects inside of machine
- Water damage or dirt
- User failing to follow proper usage instructions
- Normal wear and tear in machine's lifespan
- Unauthorized repairs by consumer

While we stand by the quality of our products, it's important to note that our liability is limited. This warranty represents your sole remedy, and there are no other expressed or implied warranties.

In the rare instance of a covered defect, we offer remedies such as repair or replacement after assessing the reported fault.

Noztek have the right to reject any warranty claim if we feel the request falls outside of our limitations

Filing a Claim:

Need assistance? Our customer support team is ready to help. Refer to the contact information provided in this manual to start the claims process.

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Safety

For detailed safety cautions, kindly refer to the manual specific to each individual machine. Below is a summarized overview of the main safety cautions.

Caution: Injury Risk

This equipment contains moving parts. To prevent injury, keep hands, fingers, and other body parts clear during operation. Avoid wearing loose clothing or jewellery that may become entangled in moving components. Tie back long hair and secure loose items before using the equipment. Always follow safety instructions provided in the user manual.

Caution: Hot Surface

This equipment can reach high temperatures during operation. Avoid direct contact with exposed surfaces to prevent the risk of burns. Allow the equipment to cool before handling or performing maintenance. Exercise caution and keep out of reach of children. Follow all safety guidelines provided in the user manual.

Caution: High Voltage Zone

This equipment contains high-voltage components. To avoid the risk of electrical shock:

Do not use liquids near the machine: Keep all liquids, including water, away from the equipment. Liquids can conduct electricity and increase the risk of electrical shock.

Do not modify internal wiring: Modifying internal wiring or electronic components poses a serious hazard. Only authorized personnel should perform any maintenance or modifications.

Caution: Material guidelines

Ensure familiarity with the material being extruded, including melting temperatures and ventilation requirements of the space. Failure to do so may lead to damage to the machine and pose health risks to the user.

Safety guidelines

For detailed safety guidelines, kindly refer to the manual specific to each individual machine. Below is a summarized overview of the main safety guidelines.

- Before operating, ensure you have a thorough understanding of the equipment. Carefully review the provided instruction manual for complete guidance.
- Understand the proper, safe usage and limitations of the equipment.
- Never use this equipment for any purpose other than its intended use.
- Do not modify the equipment in any way.
- Do not make adjustments or perform maintenance while the system is in operation or energized.
- Non-Flammable Cleaning: Refrain from cleaning the equipment with flammable solvents.

What is included in the full system?

- Noztek Xcalibur
- Noztek Winder 2
- Noztek Tolerance puller
- Noztek Waterbath and/or Noztek Roller-conveyor

Product Specification Sheet

Please consult the respective manuals for detailed product specifications for each of the following machines:

- Noztek Xcalibur
- Noztek Winder 2
- Noztek Tolerance puller

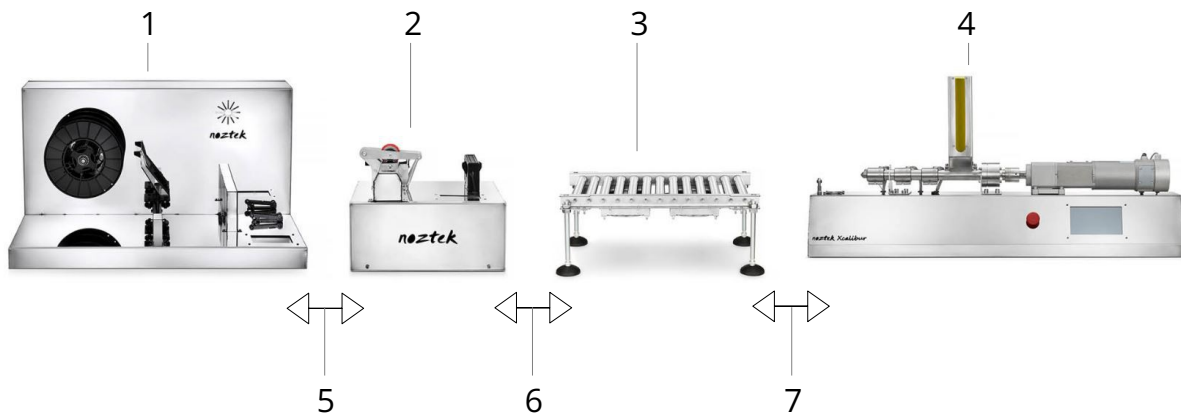
Set-up Instructions

For detailed instructions on setting up each individual machine, please refer to their respective setup instructions found in each individual manual.

1. Unpacking and Placement

Caution: Do not plug the machines into the mains or turn it on during set-up. Carefully unpack the machines and accessories. Place the machines on an even, stable surface, ensuring there are no flammable materials nearby as the heater bands can reach temperatures of up to 600°C.

Please consult the provided image for the placement order and correct spacing of each individual machine within the full system.



2. Full system placement & spacing

1. Noztek Winder 2
2. Noztek Tolerance Puller
3. Noztek Roller Conveyor or Waterbath
4. Noztek Xcalibur
5. 45 cm: Minimum space between Winder 2 and Tolerance Puller
6. 35 cm: Minimum space between Tolerance Puller and Roller/Waterbath
7. 35 cm: Minimum space between Roller/Waterbath and Xcalibur

3. Power Connection

Once the initial steps are completed, you can plug in the mains cables into the machines. Before doing so, double-check that the mains voltage (e.g., 220VAC or 110VAC) matches the voltage specified on the machines (refer to the stickers on the machines).

Note: Always follow these set-up instructions meticulously to ensure the safe and effective operation of the machine. If you encounter any issues or have questions, refer to the comprehensive user manual for further guidance.

Overview

General Overview

Here is a general overview of the full system's functionality. The Noztek full system is designed to execute a highly efficient extrusion process, mirroring that of large-scale industrial setups. Its desktop sized configuration allows seamless integration into diverse environments, including pharmaceutical labs and 3D printing operations.

Operation

The Xcalibur utilizes an oversized nozzle diameter compared to the desired target diameter of the filament. For instance, if your target filament size is 1.75mm, the extrusion process begins with a larger 3mm nozzle. Subsequently, the Tolerance Puller takes charge of managing the filament diameter, employing tensioning wheels to pull the extruded filament, initially at 3mm, down to the specified diameter, such as 1.75mm in this example. A high-precision laser continuously measures the diameter, and sophisticated error correction software ensures consistent tolerance throughout the process.

Finally, the Winder 2 oversees the meticulous and efficient winding of the filament onto a spool. Employing a tensioner, height laser sensor, and a linear drive with a guide, it ensures a tidy winding process.

Once the filament is manually threaded through the bath, puller, and winder, the entire process seamlessly transitions to full automation.

(Optional) Software

The Noztek controller software provides real-time monitoring of the Excalibur's motor speed, independent heater temperatures, and the Tolerance Puller's extrusion speed and filament diameter. It enables the download of a detailed Excel spreadsheet documenting the entire process. This data proves invaluable, aiding in identifying optimal settings or serving as a reference for past extrusion runs involving various materials. Both the Puller and the Excalibur seamlessly connect to your laptop or PC through USB A-B cables, with each machine being equipped with the necessary cable—all included in the comprehensive full system package.

Updates

In the latest iteration of the Xcalibur, a notable change has been made in the placement of the thermocouple, now directly connected to the nozzle. This adjustment facilitates a more precise temperature reading, albeit with a slightly extended time required to reach operating temperature. To ensure optimal performance, run the warm-up process for 15 minutes, followed by an additional run of 5-10 minutes to achieve full operating temperatures. Please be aware that, as a safety measure, the motor will not operate if there is a 10-degree difference between the set temperature and the current setting.

Operation Instructions

Important Note:

Before initiating the full extrusion process, please set up each machine according to the setup and operation instructions individually, as outlined in their respective manuals.

Familiarize yourself with the appropriate handling guidelines for the material you are using, especially its melting point. Failure to do so may compromise functionality and potentially lead to equipment damage.

Take into account that the quality of the extruded filament is influenced by factors beyond machine operation. Considerations such as room humidity, temperature, material humidity, and ensuring correct temperature settings all play crucial roles.

Mastery of the process of running filament through the entire system may require some practice. We recommend using a pair of tweezers or heat-resistant gloves to guide the filament through the water bath. Once cooled, use your fingers to guide the filament through the puller, lifting the spring-loaded roller mechanism, and then seamlessly feed the filament through the Winder 2.

Filament loading

Once all the machines are set up properly and ready to operate, it's time to proceed with loading the filament.

Kindly access the instructional video on the correct filament loading procedure through the full system by either clicking the provided link or scanning the QR code.



<https://www.youtube.com/watch?v=pnWg38PTNpA&t=8s>

Maintenance

Changing the Nozzle

Before attempting this operation, ensure you use heat-insulated gloves. To switch between nozzle sizes, heat the unit to the temperature required to melt the material previously used. Wait for 10 minutes to ensure all material is molten. Unscrew the nozzle using a spanner, clean any excess plastic from the internal threads, and then screw on the new nozzle.

Changing the thermocouple in the nozzle



<https://www.youtube.com/watch?v= 4MHyfcSiMw>

Maintenance

Regular cleaning of your plastic extrusion tooling is crucial for prolonging machine life, reducing waste, and maintaining tighter tolerances for your final product. For standard low-temperature polymers, we recommend purging the barrel with 200 grams of polypropylene after every extrusion run.



For higher temperature thermoplastics, it is advisable to purge the barrel using a specialized cleaning agent. Asaclean, a high-temperature purging agent used in the US, can be found at <http://asaclean.com>.



Alternatively, Ducapurge, a thermoplastic purge compound from the UK, is available at http://www.colourtone-masterbatch.co.uk/pdf/ducapurge_datasheet.pdf.

Barrel Jam

Depending on the resin type, you may occasionally encounter a barrel jam. If the motor starts laboring and slowing down during extrusion, immediately switch off the motor. To free the jam, increase the temperature to approximately 25-50 degrees Celsius above the recommended melting temperature of the material and leave it for 15-20 minutes. Then switch on the motor again; this should allow the screw to rotate, purging the barrel.

Anti seize grease

If you remove the nozzle holder, we recommend using an anti seize grease on the thread before it is replaced.



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Quality Measures

Extrude approximately 5m of filament, switch off the motor, cut off the excess material, and then restart the motor. This helps eliminate air bubbles and metal particles in the system.

Color Mixing

Adding colors is a straightforward process. Mix the natural and colorant at the given ratio, then pour it into the hopper. It will take 10-20 minutes to observe changes in color.

Temperature Adjustments

Adjusting the temperature also affects filament tolerance. Higher temperatures result in thinner filament, while lower temperatures result in thicker filament. Make adjustments in 5-degree Celsius increments.

Connecting to a computer

The Noztek Controller software empowers you to control the Xcalibur and gather data through a USB connection. Kindly refer to our Controller Software Manual for a more in-depth understanding of the software and detailed instructions.

Contact noztek

For more in-depth troubleshooting assistance, we encourage you to explore our FAQ help section on our website at www.noztek.com. In the event that your specific query is not addressed within this resource, please do not hesitate to reach out to our dedicated Noztek expert team for direct support and guidance.

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