Noztek Nexus HT

User Manual

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Noztek Nexus HT Introduction

Noztek Nexus HT: Redefining Desktop Extrusion with Servo-Powered Precision for High-Temperature Materials.

The Noztek Nexus HT is a high-temperature desktop filament extruder bringing industrial-grade precision to compact research environments. Powered by a DC Servo Motor with a planetary gearbox delivering 24 Nm of torque, it overcomes traditional desktop limitations with ±0.1% speed accuracy and output speeds up to 4.5 m/min — more than double conventional systems.

The HT variant features three independently controlled heaterbands capable of reaching up to 500°C as standard (with an optional upgrade to 750°C), making it suitable for research labs developing novel polymers and composites, as well as production environments handling engineering-grade and high-performance materials such as PEEK, PEI, PPS, and high-temperature polyamides.

Precision-Driven Performance

Unlike conventional DC or stepper motor extruders, a servo motor and gearbox system delivers unmatched precision and reliability for filament production. Here is why it matters:

Exceptional Speed Accuracy

Servo motors use closed-loop feedback to maintain exact RPM regardless of material resistance or load changes. This translates directly into consistent filament diameter with minimal tolerance variation — critical for research-grade and production applications.

High Torque at Low Speeds

The planetary gearbox multiplies motor torque while reducing speed, enabling smooth extrusion of high-viscosity and demanding materials without stalling or speed fluctuation. Process everything from standard PLA to engineering-grade polymers with confidence.

Responsive and Adaptive

Real-time feedback allows the system to instantly compensate for changing conditions, maintaining stable output throughout your run.

Energy Efficient and Quiet

Servo motors draw only the power needed, reducing energy consumption and heat generation. Combined with smooth gearbox operation, this results in quieter, cooler, and more reliable performance.

Automation-Ready

Precise, repeatable control makes servo-driven extruders ideal for integration into automated workflows and robotic systems — essential for modern research environments and production lines.

Built for Longevity

Fewer mechanical stresses and optimised power delivery mean less wear on components, resulting in a longer service life and reduced maintenance requirements.

Contents

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 ENSURE THAT YOUR WARRANTY IS HELD IN EFFECT, PROPER OPERATION PROCEDURES MUST BE OBSERVED. READ THE SAFETY PRECAUTIONS BEFORE OPERATING THIS MACHINE.

Limitations of Warranty Cover

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

Warranty Does Not Cover

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

While we stand by the quality of our products, 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 reserves the right to reject any warranty claim if we feel the request falls outside our limitations.

Filing a Claim: Contact our customer support team — see the contact information at the end of this manual.

Safety

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. The HT variant is capable of up to 500°C as standard and up to 750°C with the optional upgrade.

Avoid direct contact with exposed surfaces to prevent the risk of burns.

Allow the equipment to cool fully before handling or performing maintenance — cool-down from HT operating temperatures may take 60 minutes or more.

Exercise caution and keep out of reach of children.

Caution: High Voltage Zone

This equipment contains high-voltage components.

Do not use liquids near the machine. Keep all liquids, including water, away from the equipment.

Do not modify internal wiring. Only authorised 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 workspace.

Engineering polymers such as PEEK, PEI, polycarbonate, and high-temperature polyamides can release fumes when processed at elevated temperatures. Adequate fume extraction or ventilation is mandatory for HT operation above 280°C.

Failure to follow material handling guidelines may damage the machine and pose health risks to the operator.

Safety Guidelines

- Before operating, ensure you have a thorough understanding of the equipment. Carefully review this 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 energised.
- Non-flammable cleaning only — never clean the equipment with flammable solvents.
- Avoid probing into the barrel feed section while the machine is running. Never use a metal probe; a wooden probe is recommended.
- Personal protective gear: wear a face shield and heat-insulated gloves while operating or being near the extruder during operation, particularly when handling the die, nozzle, or any heated surface.
- The feed hopper must be installed on the extruder feed section at all times when in operation.
- Never put your hands into the feed section or vent to remove material.
- Only switch on the motor when the recommended temperature has been reached.
- HT-specific: ensure adequate workspace ventilation for processing temperatures above 280°C. Fume extraction is strongly recommended for processing PEEK, PEI, and other high-performance polymers.

Product Specification Sheet

1. Product Information

- Product Name / Model: Noztek Nexus HT, Mk 2
- Brand / Manufacturer: Noztek
- Serial Number: See invoice
- Date of Manufacture: 2025

2. General Description

The Noztek Nexus HT is a desktop filament extruder that delivers industrial-grade precision through its 750 W servo motor, 24 Nm torque, and ±0.1% speed accuracy — doubling conventional output at up to 4.5 m/min. The HT designation indicates the high-temperature variant, equipped with three independently controlled heaterbands capable of up to 500°C as standard (750°C with optional upgrade). Built for research labs and production environments alike, it enables reliable extrusion of everything from standard polymers to aerospace-grade composites with full automation compatibility.

3. Technical Specifications

Specification	Value
Voltage Requirements	220 VAC or 110 VAC
Power Rating	10 A
Frequency	50 Hz or 60 Hz
Operating Temperature Range	−40°C to 85°C ambient
Maximum Barrel Temperature	500°C standard, 750°C with optional upgrade
Dimensions	68 cm × 24 cm × 24 cm
Weight	20 kg
Material Composition	Steel or stainless steel
Colour / Finish	Black powder coat or brushed stainless steel
Motor	DC Servo, 150 RPM, 24 VDC, 24 Nm
Heaterbands	3 × independently controlled

4. Key Features

- Program Memory: the system retains the most recently used target temperature, speed settings, and timer configurations even after a system restart.
- Noztek Nexus Controller Software: the Nexus HT comes complete with Noztek's proprietary integrated software, seamlessly connecting to a computer to provide real-time performance monitoring, with detailed temperature and speed charts.

- Warm-Up Function: the warm-up feature is engineered to ensure the barrel reaches optimal operating temperature within 15 minutes. This minimises the risk of unmelted material obstructing the motor and prevents potential damage.
- Emergency Shutdown Capability: in cases of urgency, the system offers a rapid electrical shutdown mechanism for immediate cessation of all operations.
- Motor Block Management: should the motor face any operational hindrance, the system issues a notification message and halts the motor to prevent further complications.
- Sensor Anomaly Detection: the system incorporates sensor malfunction detection, which promptly communicates deviations from correct temperature readings.
- 7-Inch TFT Touchscreen Control Panel: the machine features a sophisticated 7-inch Thin-Film Transistor touchscreen, providing an intuitive and responsive interface for operating and configuring the equipment.

5. Performance Data

- Heating: three heaterbands, each independently controlled, capable of reaching 500°C as standard. Upgrade to 750°C available on request.
- Quick release heater bands: available on request, for convenient cleaning and changeover between materials.
- Screw: proprietary stainless steel screw, designed and manufactured by Noztek, optimised for generating substantial barrel pressure and producing uniform filament.
- Servo motor: 750 W DC servo with planetary gearbox, closed-loop feedback, 24 Nm torque, ±0.1% speed accuracy.
- Hopper capacity: 750 g maximum, 50 g minimum.
- Extrusion output: approximately 6–8 metres of filament per minute, equivalent to approximately 360–480 metres or 2 kg per hour.

6. Accessories Included

- Mains cable
- A-B USB cable
- Hopper
- Spare nozzle

7. Compliance and Certifications

- CE marked

Set-up Instructions

1. Unpacking and Placement

Caution: do not plug the machine into the mains or turn it on during set-up.

Carefully unpack the machine and accessories. Place the machine on an even, stable, non-flammable surface, ensuring there are no flammable materials nearby. The heaterbands can reach temperatures of up to 750°C on the HT variant.

2. Hopper Attachment

Begin by attaching the hopper. Locate the four bolts in the barrel's designated holes. Unscrew these bolts, position the hopper over the holes, and securely screw the bolts back in place.

3. Power Connection

Once the initial steps are completed, plug the mains cable into the machine. Before doing so, double-check that the mains voltage (220 VAC or 110 VAC) matches the voltage specified on the machine — refer to the sticker on the machine.

4. USB Connection (Optional)

To use the Noztek Nexus Controller software, connect the supplied A-B USB cable from the back of the machine to your computer. The controller software is compatible with Windows machines only.

Operation Instructions

Important

Ensure that you acquaint yourself with the proper handling guidelines for the material you are using, particularly its melting point.

Filament quality is influenced by factors beyond just the operation of the machine — room humidity, ambient temperature, material humidity, and ensuring the correct temperature settings all play crucial roles.

Many engineering polymers (nylon, PC, PEEK, PEI) require pre-drying before extrusion. See the Material Temperature Reference section.

Step 1 — Familiarisation

Familiarise yourself with the following components of your Noztek Nexus HT:

- Touch screen
- Emergency power switch
- 220V / 110V AC inlet power switch
- USB connector
- Barrel (with three heater bands)
- Hopper
- Nozzle
- Heater bands (HB1, HB2, HB3)
- Fan
- Servo motor
- Gearbox

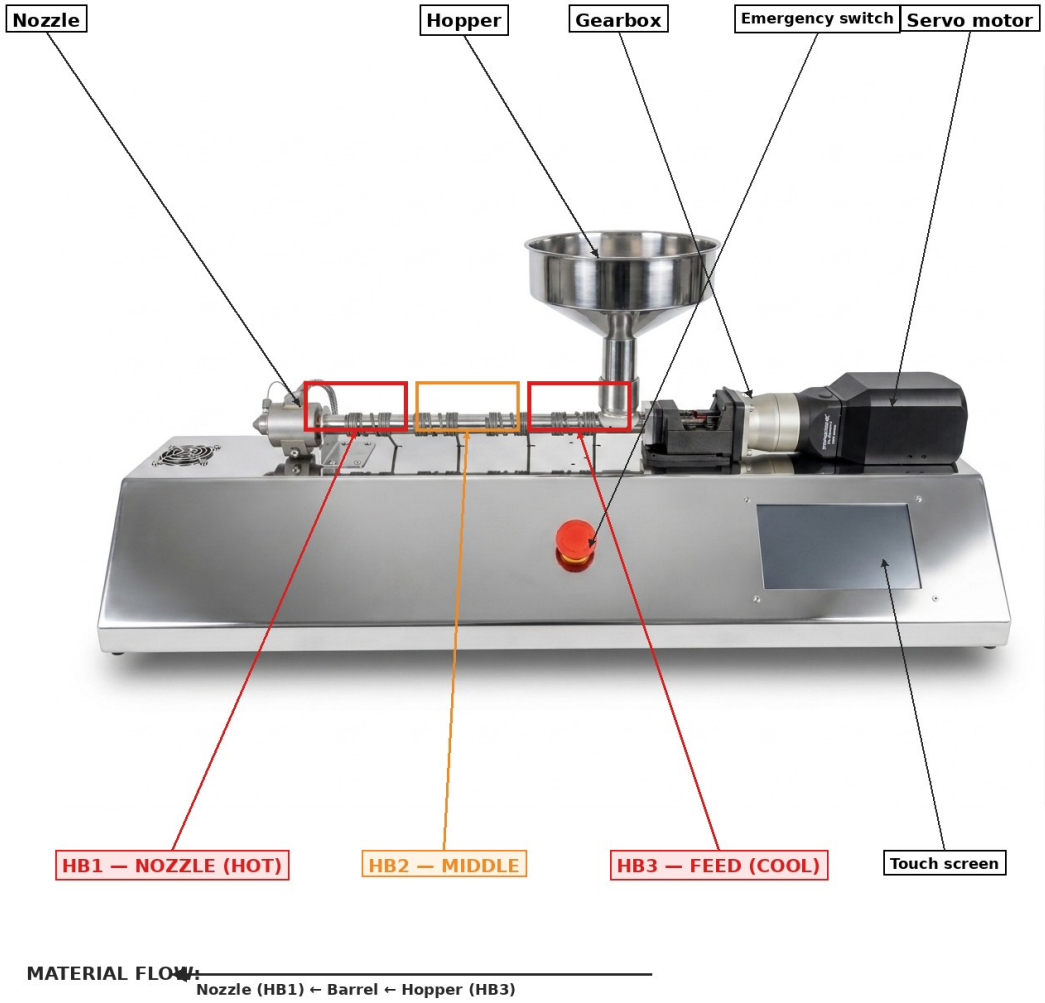

Figure 1: Noztek Nexus HT component layout, with heaterband zones highlighted.

Heaterband Orientation

Important: Noztek Numbering Convention

On the Noztek Nexus HT, heaterbands are numbered with the nozzle as HB1 and the feed as HB3.

HB1 = Nozzle zone (hot end, closest to where filament exits the die)

HB2 = Middle zone (transition / metering)

HB3 = Feed zone (cool end, closest to the hopper)

This convention is specific to Noztek. Some other extruder manufacturers number heaterbands in the opposite direction. When configuring temperature profiles on the Nexus HT, always work with the Noztek convention.

In single-screw extrusion, the polymer travels from the feed zone (under the hopper) through the barrel to the nozzle at the opposite end. The three heaterbands on the Nexus HT correspond to the three functional zones of the barrel:

HB3 — Feed Zone (Cool End)

Located closest to the hopper. This is where solid pellets enter the barrel. The feed zone is typically the coolest of the three zones — keeping it slightly below the polymer's full melt temperature helps the screw bite into the pellets without them bridging or melting prematurely in the hopper throat. A too-hot feed zone causes pellets to soften and stick together before the screw can grip them, leading to inconsistent feeding.

HB2 — Middle Zone (Transition / Metering)

Located in the central section of the barrel. The polymer transitions from solid pellets to a fully molten state in this zone. The temperature is typically set between the feed and nozzle values.

HB1 — Nozzle Zone (Hot End)

Located closest to the die and nozzle. This is the hottest zone and where the molten polymer exits as filament. The temperature here must be high enough to maintain a flowable, homogeneous melt as it passes through the nozzle, but not so high that it causes thermal degradation.

Temperature Profile Guidance

A correctly configured temperature profile is critical to consistent filament production. The Nexus HT uses a rising profile — coolest at the feed (HB3), hottest at the nozzle (HB1). The typical relationship is:

HB3 < HB2 ≤ HB1

As a general rule, set HB1 at the polymer's recommended extrusion temperature, then step down by approximately 10–20°C for HB2 and a further 10–20°C for HB3. This is a starting point only — fine-tune from there based on the appearance and consistency of the extruded filament.

Symptoms and Adjustments

Symptom	Likely Cause	Adjustment
Unmelted pellets visible in filament	HB3 or HB2 too cool, or warm-up incomplete	Increase HB3 by 5–10°C. Allow a longer warm-up.
Filament sags or droops at the nozzle exit	HB1 too hot, polymer too fluid	Reduce HB1 by 5°C and observe.
Filament emerges rough or grainy	HB1 too cool, polymer not fully homogenised	Increase HB1 by 5°C.
Filament discolours (yellow, brown, scorched)	HB1 too hot — thermal degradation	Reduce HB1 by 10–15°C immediately. Material may need replacing.
Bridging at the hopper throat	HB3 too hot — pellets softening before the screw grips	Reduce HB3 by 10°C.
Motor stalls or struggles	Barrel not fully at temperature, or polymer too viscous	Verify all three heaterbands have reached their set values. Allow further warm-up. Consider increasing HB2 by 5°C.
Filament foams or contains bubbles	Material absorbed moisture — needs drying	Stop extrusion. Dry the material per manufacturer specification (see Material Reference).
Filament diameter inconsistent	Temperature variation along the barrel, or screw speed too high	Ensure all heaterbands stable. Reduce screw RPM.

Material Temperature Reference

The following table provides typical starting temperature profiles for common materials processed on the Noztek Nexus HT. These are recommended starting points only; final values may need to be adjusted based on the specific grade of polymer, ambient conditions, and target filament tolerance. Always consult the polymer manufacturer's processing data sheet.

Standard Polymers

Material	HB3 (Feed)	HB2 (Middle)	HB1 (Nozzle)	Notes
PLA	165°C	180°C	190°C	Air-cool acceptable.
PETG	210°C	225°C	240°C	Hygroscopic — dry at 65°C for 4 h.
ABS	215°C	230°C	245°C	Ventilation required.
TPU 95A	200°C	215°C	225°C	Slow extrusion. Pre-dry at 65°C, 4 h.
PP (homopolymer)	180°C	195°C	210°C	Low melt strength — water bath essential.
HDPE	190°C	205°C	220°C	Often used as purge for HT materials.

Engineering Polymers

Material	HB3 (Feed)	HB2 (Middle)	HB1 (Nozzle)	Notes
PA6 (Nylon 6)	230°C	250°C	265°C	Highly hygroscopic — dry 80°C, 8 h.
PA12 (Nylon 12)	215°C	235°C	250°C	Dry at 80°C for 6 h.
PC (Polycarbonate)	260°C	280°C	295°C	Dry at 120°C for 6 h.
PC-ABS blend	245°C	260°C	275°C	Dry at 100°C for 4 h.
ASA	225°C	240°C	255°C	UV-stable alternative to ABS.
PPS	295°C	315°C	330°C	Dry at 150°C for 4 h. Fume extraction.

High-Performance Polymers (HT Required)

Material	HB3 (Feed)	HB2 (Middle)	HB1 (Nozzle)	Notes
PEI (Ultem 1010)	340°C	365°C	385°C	Dry at 150°C, 4 h. Fume extraction mandatory.

Material	HB3 (Feed)	HB2 (Middle)	HB1 (Nozzle)	Notes
PEI (Ultem 9085)	330°C	355°C	375°C	Dry at 150°C, 4 h.
PEEK (Victrex 450G)	350°C	380°C	400°C	Dry at 150°C, 4 h. Slow cooling for crystallinity.
PEKK	340°C	365°C	390°C	Dry at 150°C, 4 h.
PPSU	335°C	360°C	380°C	Dry at 135°C, 4 h.

Drying is critical for engineering polymers

Most engineering and high-performance polymers are hygroscopic — they absorb moisture from the air. Extruding wet material causes foaming, surface defects, voids, hydrolytic degradation, and significantly reduced mechanical properties.

Drying conditions vary by polymer. Refer to your material supplier's processing data sheet, or use the guideline values in the tables above as a starting point.

A dedicated polymer dryer or vacuum oven is recommended. The Noztek Dehydrator is available as an accessory.

Operation Procedure

Step 2 — Start-up Procedure

To turn on the machine, use the illuminated 220V / 110V AC inlet switch located at the back of the unit.

Step 3 — Initialisation

After switching the machine on, the Noztek logo appears on the touch screen before automatically proceeding to the initialisation page. No user input is required here — the machine will verify that all systems are functioning correctly and display status messages in the rectangular box. If any issues are detected, detailed information will appear and the machine will remain on this page until the problem is resolved. Once all checks pass, the screen automatically proceeds to the next page.

Step 4 — Heaterband Setup

On this page you can set the temperature values in degrees Celsius for each of the three heaterbands. Use either the slider or the + and − buttons to adjust your required temperature setting for HB1, HB2, and HB3.

Refer to the Material Temperature Reference section of this manual for recommended starting values for your chosen polymer.

When you are happy with all three values, press SET to confirm them. This takes you to the warm-up page.

Step 5 — Warm-up

Press the START button to begin a 15-minute warm-up cycle. A timer and progress bar will appear to track the warm-up. The barrel must reach operating temperature before the motor can run safely — for HT operation at high temperatures, the warm-up may take longer than 15 minutes to fully stabilise.

Under each heaterband section you can monitor the current live temperature and its set value. If you need to adjust your values during warm-up, press STOP and then tap the Set Value button. The warm-up timer will restart when you begin again.

Once warm-up is complete, the screen automatically advances to the main control screen.

Step 6 — Main Control

On this screen you can operate the extruder. Press START to run the motor and begin extrusion. The extruder performs a quick check at low RPM to detect any issues. If a problem is found, the motor stops and a troubleshooting message appears in the system message box. If all checks pass, the machine becomes fully operational.

Set your desired operating speed in the Motor Speed section using the slider or the + and − buttons. The speed range is 1–150 RPM and can be adjusted at any time during operation. The motor ramps up and down slowly for safe operation.

In the Motor Control box you can monitor gearbox RPM, servo RPM, load, and torque. The gearbox RPM shows the actual live motor speed.

In the Temperature Control section you can see the live temperatures for each heaterband. Using the + and − buttons you can make micro-adjustments while the extruder is running. There is a 5°C upper and lower limit calculated from the live value, so you may need to wait until the new temperature is reached before adjusting again.

Never stray too far from the recommended material temperature, as incorrect temperatures can damage the machine and the polymer.

The Fan Control button switches the cooling fan on or off — by default it is off.

Additional Information

Initiating Extrusion

After a short duration, the plastic will emerge from the nozzle. Pull the filament through the guide. The extruded filament will be hot — use heat-resistant gloves. Some materials may require immediate cooling after extrusion; turn on the fan using the Fan ON/OFF button to facilitate this.

Shutdown Procedure

When finished, turn off the machine using the power switch at the back.

Important for HT materials: do not simply switch off after running a high-temperature polymer such as PEEK or PEI. The polymer remaining in the barrel will solidify and may cause a difficult-to-clear blockage on next start-up. Best practice is to purge through with a lower-temperature compatible material (typically HDPE) before shutting down.

Colour Mixing

Adding colours is straightforward. Mix the natural pellets and colorant at the given ratio, then pour the mixture into the hopper. It will take a few minutes to observe changes in colour.

Temperature and Diameter

Adjusting temperature affects filament diameter. Higher temperatures result in slightly thinner filament (lower melt viscosity, more die-swell relaxation), while lower temperatures result in slightly thicker filament. Make adjustments in 1–2°C increments and allow several minutes for the change to propagate.

Connecting to a Computer

The Noztek Nexus Controller software empowers you to control the extruder and gather data through a USB connection. Please refer to the Nexus Software Manual for detailed instructions.

Cleaning and Purging

We recommend purging the barrel between material changes and at the end of each run. The recommended purge material depends on the polymer you have been running:

Previous Material	Recommended Purge	Notes
PLA, PETG, ABS	PLA or HDPE	Run 100–200 g at the previous temperature.
TPU, PP	HDPE	PP is itself often used as a purge for HT materials.
Nylon, PC	HDPE	Run at the polymer's processing temperature, then ramp down.
PEEK, PEI, PPS	HDPE then PE wax	Always purge before cooling — solidified PEEK is very difficult to clear.

Maintenance

Changing the Nozzle

Use heat-insulated gloves at all times. To switch between nozzle sizes, heat the unit to the temperature required to melt the material previously used. Wait 10 minutes to ensure all material is molten. Unscrew the nozzle using a spanner, clean any excess plastic from the internal threads, and screw on the new nozzle.

Routine Maintenance

Regular cleaning of your extrusion tooling is crucial for prolonging machine life, reducing waste, and maintaining tighter tolerances. Run purging agents through the barrel between runs. If you are unsure how to clean the barrel for a specific material, contact the Noztek helpdesk.

Barrel Jam

Depending on the material type, you may occasionally encounter a barrel jam. The motor will not start, or it will stop automatically, if it detects a jam. To free the jam, increase the temperature to approximately 25–50°C above the recommended melt temperature of the material and leave it for 5–10 minutes. Then switch on the motor again — this should allow the screw to rotate and purge the barrel. For HT materials, never exceed the polymer's degradation temperature.

Screw Wear (HT-specific)

Processing abrasive composites — fibre-reinforced polymers, ceramic-loaded blends, graphene-filled materials — accelerates wear of the screw and barrel. Periodic inspection is recommended after every 50 hours of running with such materials. Contact Noztek for hardened-steel screw options if your work routinely involves abrasive feedstocks.

Contact Noztek

For more in-depth troubleshooting assistance, please explore our FAQ help section at www.noztek.com. If your specific query is not addressed, please contact our team for direct support.

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