WHITE PAPER · HWACHEON HI-TECH 400 × MILITARY & DEFENSE

Hwacheon Hi-Tech 400 for Military & Defense

Mid-size CNC lathe with live tooling — turn, mill, drill, and thread in one setup. This paper covers what the machine does, the military & defense parts we produce with it, the alloys we run, the tolerances and finishes military & defense buyers expect, and the documentation package.

12.5" OD × 49" L max turning ENVELOPE	**±0.0005" routine on critical features** TOLERANCE	**1994** SINCE
ISO 9001:2015 QMS	**Same-week / rig-down direct** RESPONSE	

Torque & Tumble · 12.5" OD × 49" L max turning · mid-size CNC lathe with live tooling

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Executive summary

Machine: Hwacheon Hi-Tech 400 (shop nickname: *Torque & Tumble*). mid-size CNC lathe with live tooling at B&R Productions, running from our New Waverly, Texas shop under an ISO 9001:2015 quality system.

Application: Mid-size CNC lathe with live tooling — turn, mill, drill, and thread in one setup for Military & Defense customers — Defense primes, subassembly manufacturers, tactical vehicle component OEMs, munitions component suppliers, weapon-system integrators, sustainment (out-of-production replacement) contractors.

Envelope: 12.5" OD × 49" L max turning. **Tolerance:** ±0.0005" routine on critical features. **Traceability:** Material by heat and lot on every job.

The machine, in context

The Hi-Tech 400 is Hwacheon's heavy-duty box-way turning platform — the class of lathe you reach for when you're taking real chips off tough alloys. The 15" hydraulic chuck and 5.3" spindle bore let it accept the kind of stock most job-shop lathes won't clear, and the box-way construction keeps roughing cuts stable in Inconel and Duplex. Torque & Tumble handles wellhead spools, downhole tool bodies, valve stems, and any oilfield turning where rigidity and bore size matter more than cycle time.

Full specifications

Model	Hwacheon Hi-Tech 400 ("Torque & Tumble")
Type	Heavy-duty box-way CNC turning center — Hi-Tech 400 platform
Max turning capacity	12.5" OD × 49" L (B&R working spec)
Platform Z travel	1,270 mm (50") on the Hi-Tech 400 platform
Platform X travel	280 mm (11")
Chuck	15" hydraulic (Hi-Tech 400 platform)
Spindle nose	A2-11; 135 mm (5.3") spindle bore
Spindle speed	1,800 RPM (heavy-duty configuration)
Spindle motor	28/30 kVA
Tailstock	Programmable hydraulic; MT-6 taper
Turret	12-station

Rapid traverse	24 m/min
Control	Fanuc 18iTB
Structure	Box-way construction for heavy roughing rigidity
Machine weight	~18,700 lb
Tolerance capability	±0.0005" routine on critical features
Materials	Stainless, carbon steel, Inconel, Duplex, 17-4 PH, Monel, aluminum

Values marked "platform" reflect the machine manufacturer's published spec range for this platform family; B&R's working spec is what we quote on this specific unit.

Who this serves in Military & Defense

Typical buyer: Defense primes, subassembly manufacturers, tactical vehicle component OEMs, munitions component suppliers, weapon-system integrators, sustainment (out-of-production replacement) contractors.

What's hard about military & defense work: ITAR compliance, security-sensitive prints, program-specific quality plans, tight-tolerance structural components, exotic-alloy selection driven by service environment, and legacy-part sustainment where the OEM no longer supports the design.

Typical Military & Defense parts we produce on Torque & Tumble

- Defense parts combining turned surfaces with drilled cross-holes
- Weapon-subassembly parts with concentric machined features
- Actuator components with keyways and milled flats
- One-setup finished parts for program-quality assurance
- Legacy-sustainment turned parts with mixed features

Above list is representative; if your part isn't shown, call and ask — most oilfield / aerospace / defense / industrial turned or milled work fits somewhere in the shop.

Alloys we run for Military & Defense

Standard range: 17-4 PH · 15-5 PH · 13-8 Mo · 4140 pre-hard · 4340 · Titanium Grade 5 · Inconel 718 · Aluminum 7075 · High-strength steels · Customer-specific alloys on request.

Defense parts routinely spec 4140 pre-hard, 4340, and precipitation-hardening stainless — condition-specific machining knowledge matters, same as aerospace. Titanium is common on weight-critical structural components. Legacy sustainment often specifies materials nobody sees anywhere else; we work with the spec sheet you provide and validate machining strategy before we cut.

> **What "we run these weekly" means:** we stock or reliably source the common alloys in the industry's typical spec range. Sharp tooling, proven feeds and speeds, and process control specific to each alloy family. Your part is not the one we're experimenting on.

How we machine it — our 5-step process

This is the process B&R runs on every job, military & defense or otherwise. The specifics of feeds, speeds, and tooling shift by alloy and machine; the discipline is universal.

1. **Material verification.** Every job starts with material traceability. Heat and lot numbers documented against the mill test report. For customer-supplied material, we verify against the CofC before touching the stock.

2. **First-article layout.** Stock is measured and laid out before any cutting starts. Concentricity, roundness, and squareness of the starting material established; if the stock is out of tolerance we call the customer before wasting time on a bad blank.

3. **Roughing with process control for the alloy.** Feeds, speeds, and coolant strategy set for the specific alloy family — sharp coated carbide (or PCD for high-volume Ti Grade 5), positive rake, high-pressure through-tool coolant on 2507 and Inconel to control cutting temperature. Interrupted cuts get extra attention because they cycle heat into the workpiece.

4. **Finish pass to spec.** Finish pass with a fresh insert, controlled DOC, and measured surface-finish targets. Critical features (bore concentricity, seat grooves, sealing surfaces) are held tighter than most job-shop lathes can offer.

5 **CMM verification + documentation.** Every critical dimension CMM-verified. First-article report generated. Certificate of conformance issued with delivery. Customer-specific ITPs and PPAP-style packages produced on demand.

Tolerance and finish expectations in Military & Defense

±0.0005" routine on critical features. Tighter with proper setup and fixture. GD&T-driven tolerancing supported. CMM verification on first articles; customer-plan-driven measurement on production runs. Documentation the level a program office expects.

Documentation and quality workflow

ITAR-controlled work under NDA with customer-specific document control — prints stay in-shop. Customer-specific quality plans, PPAP, and first-article documentation standard. Material traceability by heat and lot on every job. Certificates of conformance with delivery.

Response time and emergency work

Program-driven schedules honored. Emergency component replacement supported for sustainment programs with established relationships. Legacy-part reverse-engineering supported for out-of-production sustainment.

How we compare

Compared to a large defense-prime captive shop: we're faster for one-offs, small runs, and legacy sustainment where the prime's supply chain has moved on. Compared to a lowest-bidder commodity shop: we handle ITAR, we document properly, and we understand that a program-office audit is a real thing.

Working with B&R Productions

New customer or existing, the process starts the same way: call (936) 291-7827 or send a print through the quote form. Prints are accepted as PDF, STEP, IGES, DWG, or DXF; if you only have a sample part, we reverse-engineer routinely. NDAs on request. ITAR-controlled prints handled under document control with prints staying in-shop.

Quotes typically come back within 24 hours for standard work, same-day for repeat customers on stocked materials, and near-immediately by phone for emergency and rig-down situations. Lead times are quoted honestly — we don't promise Wednesday and deliver next month.

Frequently asked questions

8 questions covering the Hwacheon Hi-Tech 400 platform and Military & Defense work. Also indexed as FAQ schema for AI answer engines.

What makes the Hi-Tech 400 different from a standard CNC lathe?

Box-way construction and a heavy-duty spindle assembly rated for real chips in tough alloys. 15" hydraulic chuck, 5.3" (135 mm) spindle bore, and a programmable hydraulic tailstock with MT-6 taper for long-part support.

What's the max turning length on the Hi-Tech 400?

B&R's working spec is 49" L × 12.5" OD. The platform Z-axis travel is 1,270 mm (50") — matching B&R's stated envelope.

What control does the Hi-Tech 400 run?

Fanuc 18iTB. 12-station turret, rapid traverse 24 m/min, machine weight ~18,700 lb.

Do you handle ITAR-controlled defense work?

Yes. ITAR-controlled prints handled under NDA with strict document control. Prints stay in-shop. Program-specific quality plans, PPAP, and first-article documentation supported.

What defense-adjacent parts have you machined?

Weapon subassembly components, defense actuator parts, vehicle armor bracket hardware, sensor housings, hydraulic cylinders for defense platforms, tactical vehicle component reverse-engineering, and legacy-sustainment parts for out-of-production programs.

What alloys are typical for defense work at B&R?

17-4 PH, 15-5 PH, 4140 pre-hard, 4340, Titanium Grade 5, Inconel 718, aluminum 7075, high-strength steels. Customer-specific alloys on request.

Can you reverse-engineer legacy defense parts?

Yes — sustainment work for out-of-production programs is a regular part of our mix. Send a worn sample and any documentation available; we'll produce the replacement with full material traceability.

What tolerances do you hold on defense components?

±0.0005" routine on critical features. Tighter with the right fixture. Every critical dimension CMM-verified. Documentation to customer spec.

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Ready to talk about your Military & Defense work?

Send us a print or a sample photo and specs. Emergencies: call direct and say "rig-down."

Published by B&R Productions — a precision CNC machining shop in New Waverly, Texas, in business since 1994. ISO 9001:2015 certified. Serving oil & gas, aerospace, defense, and industrial customers across Texas and the Gulf Coast.

Written by the B&R Productions team. Machine specs verified against manufacturer data. Alloy and process notes reflect shop practice as of 2026-01-15.