WHITE PAPER · HWACHEON HI-TECH 400 × OIL & GAS

Hwacheon Hi-Tech 400 for Oil & Gas

Mid-size CNC lathe with live tooling — turn, mill, drill, and thread in one setup. This paper covers what the machine does, the oil & gas parts we produce with it, the alloys we run, the tolerances and finishes oil & gas 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 Oil & Gas customers — Frac fleet operators, wellhead crews, wireline and coil-tubing service companies, downhole tool manufacturers, completion tool OEMs, subsea equipment vendors, produced-water handling equipment suppliers.

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 Oil & Gas

Typical buyer: Frac fleet operators, wellhead crews, wireline and coil-tubing service companies, downhole tool manufacturers, completion tool OEMs, subsea equipment vendors, produced-water handling equipment suppliers.

What's hard about oil & gas work: Chloride stress-corrosion cracking, sour service (H2S), high-cycle pressure loading, exotic superalloys, and rig-down clocks that turn every hour into money. Documentation trails required for API-adjacent work.

Typical Oil & Gas parts we produce on Torque & Tumble

- Wireline tool bodies with turned OD + drilled cross-holes in one setup
- Valve stems with keyways and milled flats
- Downhole tool components with concentric machined + drilled features
- Frac pump internals combining turning and light milling
- Precision oilfield parts where feature concentricity is critical

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 Oil & Gas

Standard range: Inconel 718 (aged and annealed) · Inconel 625 · Super Duplex 2507 (UNS S32750) · Duplex 2205 · 17-4 PH (all conditions H900 to H1150) · Monel K-500 · Nitronic 50/60 · F22 · F91 · 4130/4140.

Alloy behavior is different in oilfield service. Inconel 718 in the aged condition (H900, roughly 40-45 HRC) is a different machining problem than annealed 718 — feeds, speeds, and tool geometry all shift. Super Duplex 2507 machined without cutting-temperature control develops brittle intermetallics that destroy the chloride-resistance the alloy was chosen for; a shop that shrugs when you ask about phase balance is a shop that will quietly ruin your part. 17-4 PH in Condition A machines like a well-behaved stainless; in H900 it's a different animal. Every one of these alloys we run weekly, not experimentally.

> **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, oil & gas 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 Oil & Gas

±0.0005" routine on critical sealing and mating surfaces. Bore concentricity and roundness held tighter than most job-shop lathes can offer. Surface-finish targets measured with a profilometer, not estimated. For seat grooves and packing bores, finish is often the difference between a sealing part and a leak-path.

Documentation and quality workflow

Material traceability by heat and lot on every job — non-negotiable for API-adjacent work. First-article layout and CMM verification standard. Customer-specific ITPs (Inspection and Test Plans) supported. PPAP-style packages produced on demand. Certificate of conformance issued with delivery.

Response time and emergency work

Rig-down and fleet-down work prioritized over routine production. Same-day and next-day realistic when material is on the shelf. Call (936) 291-7827 direct — say "rig-down" and the phone gets to the shop floor. For emergency work off-hours, leave a voicemail; we route emergencies.

How we compare

Compared to buying finished components from an OEM: we're faster for one-offs and low-volume runs, and we hold traceability the OEM often won't share when you're outside their warranty window. Compared to a commodity job shop: we run the alloys weekly and won't ruin your metallurgy on cutting-temperature mistakes.

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 Oil & Gas 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.

What kind of oil & gas customers does B&R Productions work with?

Frac fleet operators, wellhead crews, wireline and coil-tubing service companies, downhole tool manufacturers, completion tool OEMs, and subsea equipment vendors. We work with new customers regularly — first-time orders don't get worse service.

Do you handle rig-down and emergency work?

Yes. Same-day and next-day are realistic when the material is on the shelf (Inconel 718, 625, Super Duplex 2507, 17-4 PH, 4140/4340). Call (936) 291-7827 direct and say "rig-down" — the phone gets to the shop floor, not a form.

Do you machine to API 6A / API 6D tolerances?

Yes. API-adjacent tolerances routine. Material traceability by heat and lot standard on every job. Customer-specific ITPs and PPAP-style packages supported.

How do you keep Super Duplex 2507 from losing its chloride resistance during machining?

Controlled cutting temperature — moderate SFM, aggressive feed with sharp coated carbide, high-pressure through-tool coolant. The failure mode nobody wants (sigma-phase intermetallics forming from overheating) shows up months later in service. We run 2507 weekly — this is a process we've internalized, not a spec we're learning on your part.

Can you reverse-engineer discontinued OEM oilfield parts?

Yes — routine work. Send a worn sample and any print or spec you have. We produce the replacement with material traceability the OEM often won't share when you're outside their warranty window.

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Ready to talk about your Oil & Gas 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.