

UNISIG deep-hole drilling for Military & Defense

Precision gundrilling and BTA drilling for long, straight, tight-tolerance holes in oilfield and aerospace parts. 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.

Long-bore capability — high L/D ratios
ENVELOPE

1994
SINCE

ISO 9001:2015
QMS

Same-week / rig-down direct
RESPONSE



Deep Hole · Long-bore capability — high L/D ratios · gundrilling / BTA deep-hole drilling machine

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Executive summary

Machine: UNISIG Deep-Hole Drilling Machine (shop nickname: *Deep Hole*). gundrilling / BTA deep-hole drilling machine at B&R Productions, running from our New Waverly, Texas shop under an ISO 9001:2015 quality system.

Application: Precision gundrilling and BTA drilling for long, straight, tight-tolerance holes in oilfield and aerospace parts 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: Long-bore capability — high L/D ratios. **Tolerance:** ±0.0005" routine on critical features. **Traceability:** Material by heat and lot on every job.

The machine, in context

Deep, straight, concentric holes are one of the hardest features to produce on any CNC platform without a purpose-built machine. Most job shops don't have one. Downhole tool bodies, valve stems with long bores, hydraulic cylinders, and any part that needs a straight bore longer than a few diameters routinely gets outsourced — or worse, made poorly on an inadequate setup. UNISIG deep-hole drilling is a genuine capability moat.

Full specifications

Machine type	UNISIG deep-hole drilling center — gundrill + BTA capable
Manufacturer	UNISIG (Menomonee Falls, WI) — US-built purpose machines
Platform depth capability	From a few inches to over 65 ft (20 m) per drilled hole
Platform diameter range	Under 1 mm gundrill through ~1 m BTA-class bores
Common configurations	USC-M series combines gundrilling + BTA + up to 120 tools in one guarded machine
Reference model USC-3M	71" drill depth per side; angled holes at +30° / -15°; 63" × 78" rotating table; workpieces to 66,150 lb
Straightness control	Sub-thousandth-per-foot drift on typical setups
Concentricity	Held tighter than conventional CNC-lathe drilling can offer
Coolant strategy	High-pressure through-tool
Materials	Inconel, Super Duplex, 17-4 PH, 4140/4340, Monel, titanium

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 Deep Hole

- Gun barrel and weapon-component bores
- Hydraulic cylinders for defense platforms
- Long structural components with internal passages
- Sensor tube and probe components
- Actuator cylinder bores

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 UNISIG deep-hole drilling platform and Military & Defense work. Also indexed as FAQ schema for AI answer engines.

What's the max depth the UNISIG can drill?

The UNISIG platform can drill from a few inches to over 65 ft (20 m) per hole. Diameter range from under 1 mm gundrill through ~1 m BTA-class. Send us your part dimensions and we confirm feasibility.

Why can't a CNC lathe drill deep holes the same way?

Straightness and concentricity fall apart at high L/D ratios on a conventional lathe — chip evacuation, drill drift, and tool support don't scale. A purpose-built deep-hole machine keeps sub-thousandth-per-foot drift on long bores; a lathe can't.

Can the UNISIG drill angled holes?

Yes on capable USC-M configurations — reference USC-3M supports +30° / -15° angled holes with a 63" × 78" rotating table holding workpieces up to 66,150 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.

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