



Industry 4.0, the Fourth Industrial Revolution

Transform your manufacturing process into a powerhouse capable of tackling any challenge with ease.

Unlock the full potential of your business by optimizing your operations for efficiency, scalability, and innovation. Let us help you build a manufacturing company that's not just prepared for the future – but leading the way. Ready to take your business to the next level? Let's make it happen with MarkForged!

Who We Are

RMT is a Professional & Custom 3D Printing Service Provider – Shaping Your Idea Into a Real Product.

As a pioneering rapid manufacturing provider in Kuwait, we specialize in 3D printing services, with the latest technologies of industrial 3D printers and scanners. Our focus is to deliver reliable, high-quality models and customized products to all our clients, ensuring high precision and time efficiency.

Our company designs and creates end-products, responding to the rapid prototyping and manufacturing needs of our clients. We assist in evaluating mechanical designs and help to improve and advance the final solutions. The production process is now; from a simple vision to creating a 3D model and printing your product – only a matter of a few days.

By applying cutting-edge additive manufacturing technology, RMT fulfills the unique demands of all clients, offering leading services in terms of efficiency, quality, reliability, affordability, and attention to detail.

Our company brings innovative dreams of passionate entrepreneurs to life.

But that's not all – visit us and pick from our wide range of custom-made services, including but not limited to high-performance products, end-user parts, and low-volume production runs.

Who We Represent

1 - MarkForged

Markforged is a leading manufacturer of industrial-grade 3D printers known for their ability to produce high-strength, functional parts using advanced composite materials and metal. Founded in 2013, the company revolutionized additive manufacturing by introducing Continuous Fiber Reinforcement (CFR) technology, allowing parts to be reinforced with carbon fiber, Kevlar, or fiberglass—delivering strength comparable to aluminum. Markforged printers are widely used across industries such as aerospace, automotive, and defense for prototyping, tooling, and end-use part production. With a strong emphasis on precision, durability, and digital workflows, Markforged continues to set the standard for high-performance 3D printing.

MarkForged Printers

X7

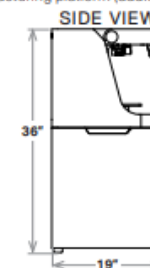
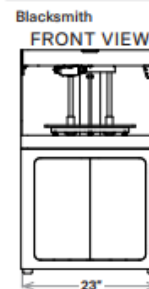


PRODUCT SPECIFICATIONS

X7 (Gen 2)

The X7 prints industrial-grade manufacturing jigs, jaws, tools, fixtures, and end-use parts. Designed from the ground up to survive the production floor environment and capable of printing parts stronger than machined aluminum for a fraction of the cost, the X7 delivers unparalleled surface finish, build size, and reliability. Accelerate part production with Turbo Print, our fastest print mode, and verify dimensional accuracy with Blacksmith adaptive manufacturing technology — only available on the X7.

Printer Properties	Process	Fused Filament Fabrication, Continuous Filament Fabrication
	Build Volume	330 x 270 x 200 mm (13 x 10.6 x 7.9 in)
	Weight	48 kg (106 lbs)
	Machine Footprint	584 x 483 x 914 mm (23 x 19 x 36 in)
	Print Bed	Kinematic coupling — flat to within 80 µm
	Laser	In-process inspection, active print calibration, bed levelling
	Extrusion System	Second-generation extruder, out-of-plastic and out-of-fiber detection
	Power	100–240 VAC, 150 W (2 A peak)
	RF Module	Operating Band 2.4 GHz Wi-Fi Standards 802.11 b/g/n
Materials	Plastics Available	Onyx, Onyx FR, Onyx ESD, Nylon White, P-PLA, S-TPU
	Fibers Available	Carbon Fiber, Carbon Fiber FR, Fiberglass, Aramid Fiber (Kevlar®), HSHT Fiberglass
	Tensile Strength	800 MPa (25.8x ABS, 2.6x 6061-T6 Aluminum) *
	Tensile Modulus	60 GPa (26.9x ABS, 0.87x 6061-T6 Aluminum) *
Part Properties	Layer Height	100 µm default, 50 µm minimum, 250 µm maximum
	Infill	Closed cell infill: multiple geometries available
Software	Eiger Cloud	Slicer, part / build management (other options available at cost)
	Security	Two-factor authentication, org admin access, single sign-on



MarkForged Printers

FX10



PRODUCT SPECIFICATIONS



FX10 (Composite)

The FX10 matches the part strength, surface finish, and reliability of our Industrial machines with a next-generation sensor package and flexible modular system design which enables users to upgrade to a metal printing engine. The heated print chamber and automated spool changeover let you print large, high-quality parts, while its laser micrometer and onboard vision module capture detailed composite part images for precise calibration, inspection, and verification.

Composite Printer Properties	Process	Composite Fused Filament Fabrication, Continuous Fiber Reinforcement
	Build Volume	375 x 300 x 300 mm (14.8 x 11.8 x 11.8 in)
	Weight	122 kg (270 lbs)
	Machine Footprint	760 x 640 x 1200 mm (30 x 25 x 46 in)
	Temperature Control	Heated chamber reaches up to 60°C ready-state
	Print System	Direct-drive print head with two nozzles (one plastic, one fiber), automatic material changeover
	Power	100-120 VAC 12A / 15A 200-240 VAC 6A / 8A
	Safety	UL 2011/CSA C22.2#301 certified, CE Marked, EU Machinery Directive compliant
Materials	Plastics	Onyx®, Onyx FR, Onyx ESD, Nylon White, Nylon White FS
	Continuous Fibers	Carbon Fiber, Carbon Fiber FR
Part Properties	Layer Height	125 µm minimum, 250 µm maximum
Software	Eiger™	Secure digital library, powerful slicer, and printer management (premium options available at cost)
	Inspection	Laser micrometer and vision module scan parts for accuracy
	Security	Two-factor authentication, org admin access, single sign-on, MFP print files encrypted by default and tamper resistant
	Connectivity	Eiger connection and over-the-air updates via wi-fi and Ethernet

FRONT VIEW



SIDE VIEW



MarkForged Printers

FX10



PRODUCT SPECIFICATIONS

FX10 (Metal)

The FX10 is built with a modular system architecture which allows users to unlock metal print mode with a simple swap of the print engine. With the additional purchase of a Metal Kit, the FX10 becomes the world's first industrial metal and composite printer. Reliably print composite and metal parts to drive supercharge manufacturing and productivity on your factory floor. Metal enabled FX10 printers will need a Wash-1 and a Sinter-1 or Sinter-2 to wash and sinter green parts into production-ready metal parts.

Metal Printer Properties	Process	Metal Fused Filament Fabrication
	Build Volume	375 x 300 x 300 mm (14.8 x 11.8 x 11.8 in)
	Weight	122 kg (270 lbs)
	Machine Footprint	760 x 640 x 1200 mm (30 x 25 x 46 in)
	Temperature Control	Heated chamber reaches up to 60°C steady-state
	Print System	Swappable metal print engine includes metal print head, material routing block, and material tubing. Automatic material changeover
	Power	100-120 VAC 12A / 15A 200-240 VAC 6A / 8A
Materials	Safety	UL 2011 / CSA C22.2 #301 certified, CE Marked, EU Machinery Directive compliant
	Metals	17-4PH Stainless Steel, 316L Stainless Steel (coming soon)
Part Properties	Layer Height	127 µm post-sinter
	Maximum Part Size	292 x 132 x 131 mm, (11.5 x 5.2 x 5.15 in), 10kg
Software	Eiger™	Secure digital library, powerful slicer, and printer management (premium options available at cost)
	Security	Two-factor authentication, org admin access, single sign-on, MFP print files encrypted by default and tamper resistant
	Connectivity	Eiger connection and over-the-air updates via wi-fi and Ethernet

FRONT VIEW



SIDE VIEW



MarkForged Printers

FX20



PRODUCT SPECIFICATIONS

FX20

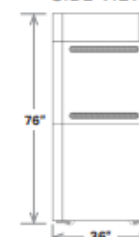
FX20 is the biggest, fastest, smartest printer in the MarkForged lineup. Engineered to deliver strength, accuracy, and consistency, FX20 produces mission-critical parts for the most demanding applications, from the factory floor to the skies and beyond. Replace long lead-time metals with high-temperature thermoplastics and continuous fiber reinforced composites—with FX20 and the cloud-connected, continuously learning Digital Forge platform, globally distributed production at the click of a button is now a reality.

Printer Properties	Process	Fused Filament Fabrication, Continuous Fiber Reinforcement
	Build Volume	Single-nozzle builds: 525 x 400 x 400 mm (20.6 x 15.7 x 15.7 in) Multi-nozzle builds: 500 x 400 x 400 mm (19.7 x 15.7 x 15.7 in)
	Weight	530 kg (1 170 lbs)
	Machine Footprint	1325 x 900 x 1925 mm (52.2 x 35.5 x 75.75 in)
	Temperature Control	Up to 200°C steady-state
	Print System	Direct-drive print head with three nozzles (two plastic, one fiber)
	Power	200-240 VAC 2W+PE 40A // 200-240 VAC 3Ø+PE 24A // 347-415 VAC 3Ø+N+PE 14A; 50-60 Hz
	Safety	IEC/UL/CSA 62368-1 certified, CE Marked, EU Machinery Directive compliant
Materials	Plastics	Vega™, ULTEM™ 9085 filament, Onyx®, Onyx FR
	Continuous Fibers	Carbon Fiber, Fiberglass*, Aramid Fiber (Kevlar®)*, High Temperature Carbon Fiber, Carbon Fiber FR
Part Properties	Layer Height	50 µm minimum, 250 µm maximum
	Accuracy	+/- 125 µm or +/- 0.0015 mm per mm (whichever is greater)
Software	Eiger	Secure digital library, powerful slicer, and printer management (premium options available at cost)
	Security	Two-factor authentication, org admin access, single sign-on, MFP print files encrypted by default and tamper resistant
	Connectivity	Eiger connection and over-the-air updates via Ethernet

FRONT VIEW



SIDE VIEW



MarkForged Printers

MarkTwo Gen2



PRODUCT SPECIFICATIONS

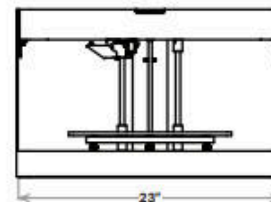


Mark Two (Gen 2)

Replace machined aluminum tooling—jigs, jaws, and fixtures—with stronger parts for a fraction of the price. The Mark Two combines our unique continuous carbon fiber reinforcement with workhorse reliability for versatile parts with 26x the strength of ABS, ready same-day for use straight off the printer.

Printer Properties	Process	Fused filament fabrication, Continuous Filament Fabrication
	Build Volume	320 x 132 x 154 mm (12.6 x 5.2 x 6 in)
	Weight	16 kg (35 lbs)
	Machine Footprint	584 x 330 x 355 mm (23 x 13 x 14 in)
	Print Bed	Kinematic coupling — flat to within 160 µm
	Extrusion System	Second-generation extruder, out-of-plastic detection
	Power	100–240 VAC, 150 W (2 A peak)
Materials	RF Module	Operating Band 2.4 GHz Wi-Fi Standards 802.11 b/g/n
	Plastics Available	Onyx, Nylon White, Precise PLA, Smooth TPU
	Fibers Available	Carbon Fiber, Fiberglass, Aramid Fiber (Kevlar®), HSHT Fiberglass
	Tensile Strength	800 MPa (25.8x ABS, 2.6x 6061-T6 Aluminum) *
	Tensile Modulus	60 GPa (26.9x ABS, 0.87x 6061-T6 Aluminum) *
Part Properties	Layer Height	100 µm default, 250 µm maximum
	Infill	Closed cell infill, multiple geometries available
Software	Supplied Software	Eiger Cloud (Other options available at cost)
	Security	Two-factor authentication, org admin access, single sign-on

FRONT VIEW



SIDE VIEW



MarkForged Materials

Composites

MATERIAL DATASHEET



Composites

Composite Base	Test (ASTM)	Onyx	Onyx FR	Onyx ESD	Nylon
Tensile Modulus (GPa)	D638	2.4	3.0	4.2	1.7
Tensile Stress at Yield (MPa)	D638	40	41	52	51
Tensile Stress at Break (MPa)	D638	37	40	50	36
Tensile Strain at Break (%)	D638	25	18	25	150
Flexural Strength (MPa)	D790 ²	71	71	83	50
Flexural Modulus (GPa)	D790 ²	3.0	3.6	3.7	1.4
Heat Deflection Temp (°C)	D648 B	145	145	138	41
Flame Resistance	UL94	—	V-0 ²	—	—
Izod Impact - notched (J/m)	D256-10 A	330	—	44	110
Surface Resistance (Ω)	ANSI/ESD STM11.11 ¹	—	—	10 ⁶ - 10 ⁷	—
Density (g/cm ³)	—	1.2	1.2	1.2	1.1

Markforged parts are primarily composed of Composite Base materials. Users may reinforce parts with one type of Continuous Fiber.

Dimensions and construction of test specimens:

- Tensile: ASTM D638 type I or IV beams
- Flexural: 3-pt. Bending, 4.5 in (L) x 0.4 in (W) x 0.12 in (H)
- Heat-deflection temperature at 0.45 MPa, 66 psi (ASTM D648-07 Method B)

1. Measured by a method similar to ASTM D790. Composite Base-only parts do not break before end of flexural test.

2. Onyx FR is UL 94 V-0 Blue Card certified down to a thickness of 3mm.

3. Surface resistance measured on multiple part surfaces using recommended print settings by an accredited third party test facility. See Onyx ESD technical data sheet for more details.

Continuous Fiber	Test (ASTM)	Carbon	Carbon FR	Kevlar®	Fiberglass	HSHT FG
Tensile Strength (MPa)	D3039	800	760	610	590	600
Tensile Modulus (GPa)	D3039	60	57	27	21	21
Tensile Strain at Break (%)	D3039	1.5	1.6	2.7	3.8	3.9
Flexural Strength (MPa)	D790 ²	540	540	240	200	420
Flexural Modulus (GPa)	D790 ²	51	50	26	22	21
Flexural Strain at Break (%)	D790 ²	1.2	1.6	2.1	1.1	2.2
Compressive Strength (MPa)	D6641	420	300	130	180	216
Compressive Modulus (GPa)	D6641	62	59	25	24	21
Compressive Strain at Break (%)	D6641	0.7	0.5	1.5	—	0.8
Heat Deflection Temp (°C)	D648 B	105	105	105	105	150
Izod Impact - notched (J/m)	D256-10 A	950	810	2000	2600	3100
Density (g/cm ³)	—	1.4	1.4	1.2	1.5	1.5

Dimensions and Construction of Fiber Composite Test Specimens:

- Test plaques used in these data are fiber reinforced unidirectionally (0° Plies)
- Tensile test specimens: 9.8 in (L) x 0.5 in (H) x 0.048 in (W) (CF composite), 9.8 in (L) x 0.5 in (H) x 0.08 in (W) (GF and Kevlar® composite)
- Compressive test specimens: 5.5 in (L) x 0.5 in (H) x 0.085 in (W) (CF composite), 5.5 in (L) x 0.5 in (H) x 0.12 in (H) (Kevlar® and FO composite)
- Flexural test specimens: 3-pt. Bending, 4.5 in (L) x 0.4 in (W) x 0.12 in (H)
- Heat-deflection temperature at 0.45 MPa, 66 psi (ASTM D648-07 Method B)

Tensile, Compressive, Strain at Break, and Heat Deflection Temperature data were provided by an accredited 3rd party test facility. Flexural data was prepared by Markforged, Inc. These represent typical values.

Markforged test plaques are uniquely designed to maximize test performance. Fiber test plaques are fully filled with unidirectional fiber and printed without walls. Plastic test plaques are printed with full ribs. To learn more about specific testing conditions or to request test parts for internal testing, contact a Markforged representative. All customer parts should be tested in accordance to customer's specifications.

Part and material performance will vary by fiber layout design, part

design, specific load conditions, test conditions, build conditions, and the like.

This representative data were tested, measured, or calculated using standard methods and are subject to change without notice. Markforged makes no warranties of any kind, express or implied, including, but not limited to, the warranties of merchantability, fitness for a particular use, or warranty against patent infringement, and assumes no liability in connection with the use of this information. The data listed here should not be used to establish design, quality control, or specification limits, and are not intended to substitute for your own testing to determine suitability for your particular application. Nothing in this sheet is to be construed as a license to operate under or a recommendation to infringe upon any intellectual property right.

MarkForged Materials

Composites

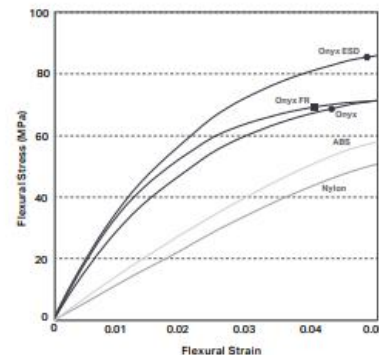
MATERIAL DATASHEET



Markforged composite printers are capable of Continuous Fiber Reinforcement (CFR) — a unique process that reinforces FFF parts with high-strength continuous fibers. A CFR capable machine uses two extrusion systems: one that extrudes Composite Base material in a standard FFF process, and a second for long strand continuous fibers that are laid down in-layer, replacing FFF infill.

Composite Base

Markforged Composite Base materials print like conventional FFF thermoplastics. They can be printed by themselves, or reinforced with any of our continuous fibers, including Carbon Fiber, Kevlar, and Fiberglass.



● Onyx Flexural Strength: 71 MPa

Onyx is a micro carbon fiber filled nylon. It's 1.4 times stronger and stiffer than ABS and can be reinforced with any continuous fiber. Onyx sets the bar for surface finish, chemical resistivity, and heat tolerance.

■ Onyx FR Flexural Strength: 71 MPa

Onyx FR is a Blue Card certified UL94 V-0 material that possesses similar mechanical properties to Onyx. It's best for applications in which flame retardancy, light weight, and strength are required.

● Onyx ESD Flexural Strength: 83 MPa

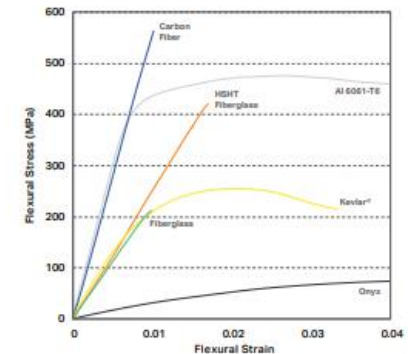
Onyx ESD is a static dissipative safe variant of Onyx — meeting stringent ESD safety requirements while offering excellent strength, stiffness, and surface finish. It's best used in applications that require ESD safe materials.

● Nylon Flexural Strength: 50 MPa

Nylon White parts are smooth, non-abrasive, and easily painted. They can be reinforced with any continuous fiber and work best for non-marring work holding, repeated handling, and cosmetic parts.

Continuous Fiber

Continuous Fibers are laid down on the inside of parts through a second fiber nozzle. They cannot be printed by themselves — instead, they are used to reinforce parts printed out of a composite base material like Onyx.



● Carbon Fiber Flexural Strength: 540 MPa

Carbon Fiber has the highest strength-to-weight ratio of our reinforcing fibers. Six times stronger and eighteen times stiffer than Onyx, Carbon Fiber reinforcement is commonly used for parts that replace machined aluminum.

● Fiberglass Flexural Strength: 200 MPa

Fiberglass is our entry level continuous fiber, providing high strength at an accessible price. 2.5 times stronger and eight times stiffer than Onyx, Fiberglass reinforcement results in strong, robust tools.

● Kevlar® Flexural Strength: 240 MPa

Kevlar® possesses excellent durability, making it optimal for parts that experience repeated and sudden loading. As stiff as fiberglass and much more ductile, it can be used for a wide variety of applications.

● HSHT Fiberglass Flexural Strength: 420 MPa

High Strength High Temperature (HSHT) Fiberglass exhibits aluminum strength and high heat tolerance. Five times as strong and seven times as stiff as Onyx, it's best used for parts loaded in high operating temperatures.

MarkForged Materials

Composites

Onyx FR-A

CF FR-A



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Onyx FR-A and Carbon Fiber FR-A

Aerospace-Ready Materials



Overview

Onyx FR is a flame-retardant short carbon fiber filled nylon designed for use in applications where parts must resist burning. The material earned a UL Blue Card, and is considered V-0 (self-extinguishing) at thicknesses greater than or equal to 3mm. It can be reinforced with any Continuous Fiber and is compatible with industrial composite 3D printers.

Carbon Fiber FR is a flame-retardant variant of MarkForged's unique, ultra-high-strength Continuous Carbon Fiber — when used to reinforce a Composite Base material like Onyx FR, it can yield parts as strong as 6061-T6 Aluminum. It's extremely stiff and strong, and can be precisely laid down in a wide variety of geometries. Programmatically trace curved features, reinforce holes, and mimic unidirectional fiber layouts — all within a few clicks.

Onyx FR-A and Carbon Fiber FR-A are purpose-built for the requirements of the aerospace, transportation and automotive industries. FR-A materials establish lot-level material traceability and pass the test suite necessary for qualification under 14 CFR 25.853 for most 3D-printable parts. Onyx FR-A and Carbon Fiber FR-A as printed on the MarkForged X7 are undergoing qualification through the NCAMP process.

For specific inquiries please contact aerospace@markforged.com

MarkForged Materials

Composites Onyx FR-A CF FR-A

markforged.com

Material Performance

The FR-A variants of Onyx and Carbon Fiber are used in a similar manner to their standard counterparts. Carbon Fiber FR-A can enhance the mechanical properties of Onyx FR-A parts. The rule of mixtures can be used to approximate bulk mechanical properties of printed composites. Your results may vary based on a number of factors including environmental conditions, feature geometry, print orientation, and loading conditions.

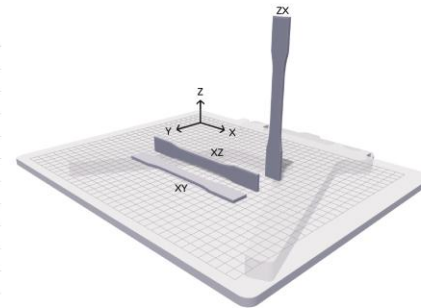
Mechanical Properties

Property	Unit	Test (ASTM)	Onyx FR-A	Test (ASTM)	CF FR-A
Tensile strength	MPa (ksi)	D638	40 (5.8)	D3039	760 (110)
Tensile modulus	GPa (ksi)	D638	3 (440)	D3039	57 (8280)
Tensile strain at break	%	D638	18	D3039	1.6
Flexural strength	MPa (ksi)	D790	71 (10.3)	D790	540 (78.32)
Flexural modulus	GPa (ksi)	D790	3.6 (520)	D790	50 (7250)
Flexural strain at break	%	—	—	D790	1.6
Izod Impact - notched	J/m (ft-lb/in)	D256-10 A	—	D256-10 A	810 (15.2)
Density	g/cm ³	—	1.2	—	1.2
Heat Deflection Temp	deg C (deg F)	D648 B	145 (293)	D648 B	105 (221)
Mean XY CTE, 25-145 °C	µm/(m·°C)	—	30	—	—

Directional Mechanical Properties of Onyx FR

The mechanical properties of 3D printed materials may vary with print orientation. In tension, most parts are strongest when the print orientation and loading direction are parallel, and weakest when the print orientation and loading direction are perpendicular.

Property	Print orientation	Average	St. Dev.
Yield Strength* (MPa)	XY	46.6	0.16
	ZX	15.7	0.9
	XZ	40.6	0.6
Tensile strength (MPa)	XY	46.7	0.3
	ZX	16.2	0.8
	XZ	40.3	1.2
Tensile modulus (GPa)	XY	3.27	0.08
	ZX	1.05	0.08
	XZ	2.94	0.11
Elongation at break (%)	XY	14.0	0.4
	ZX	3.9	0.4
	XZ	25.5	7.6



MarkForged Materials

Composites Onyx FR-A CF FR-A

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Flame, Smoke, and Toxicity (FST) Performance

Onyx FR-A alone and Onyx FR-A with Carbon Fiber FR-A reinforcement have demonstrated Flammability test performance that passes CFR 25.853 specifications at 3.7mm thickness with the exception of Heat Release. For information on how this limits potential applications see PS-ANM-25.853-01-R2. Smoke test performance passed CFR 25.853 specifications at 3.7mm thickness, but not at 2mm thickness. Combustion toxicity test

performance passed Boeing BSS 7239 Flaming specifications at 2mm thickness. Generally thinner specimens have greater difficulty passing testing. Performance of the thinnest specimens that passed testing (and Heat Release at the thickest tested specimen, which did not pass) are shown below. All samples were printed with solid fill.

Test Category	Test Detail	Specification	Thickness	Continuous Fiber Loading	Test	Passing Criteria	Test Result	Outcome
Flammability	Vertical (60 sec)	FAR 25.853 Appendix F, Part I (a) (i) (i)	2mm	None	Burn Time Burn Length Longest Burning	≤ 15 sec ≤ 6 in ≤ 3 sec	9 sec 4.1 in None	Pass
			2mm	Full	Burn Time Burn Length Longest Burning	≤ 15 sec ≤ 6 in ≤ 3 sec	9 sec 4.3 in None	Pass
	Vertical (12 sec)	FAR 25.853 Appendix F, Part I (a) (i) (ii)	2mm	None	Burn Time Burn Length Longest Burning	≤ 15 sec ≤ 8 in ≤ 5 sec	2 sec 1.0 in None	Pass
			2mm	Full	Burn Time Burn Length Longest Burning	≤ 15 sec ≤ 8 in ≤ 5 sec	0 sec 1.3 in None	Pass
	Horizontal (15 sec)	FAR 25.853 Appendix F, Part I (a) (i) (iv)	2mm	None	Avg. Burn Rate	≤ 2.5 in/min	0 in/min	Pass
			2mm	Full	Avg. Burn Rate	≤ 2.5 in/min	0 in/min	Pass
	Heat Release*	FAR 25.853 Appendix F, Part IV	3.7mm	None	Avg. Max. Avg. 2-min total	≤ 65 kW/m2 ≤ 65 kW-min/m2	196 kW/m2 158 kW-min/m2	Not Pass
			3.7mm	Full	Avg. Max. Avg. 2-min total	≤ 65 kW/m2 ≤ 65 kW-min/m2	97 kW/m2 114 kW-min/m2	Not Pass
Smoke	Smoke Density - flaming mode	FAR 25.853 Appendix F, Part V	3.7mm	None	Ds	≤ 200	191	Pass
			3.7mm	Partial**	Ds	≤ 200	139	Pass
			3.7mm	Full	Ds	≤ 200	115	Pass
Toxicity	Combustion Toxicity	BSS 7239	2mm	None	HCN CO NO / NO2 SO2 HF HCL	≤ 150 PPM ≤ 3500 PPM ≤ 100 PPM ≤ 100 PPM ≤ 200 PPM ≤ 500 PPM	— / — 351 / 368 20 / 34 7 / 9 <1 / <1 15 / 25	Pass
			2mm	Full	HCN CO NO / NO2 SO2 HF HCL	≤ 150 PPM ≤ 3500 PPM ≤ 100 PPM ≤ 100 PPM ≤ 200 PPM ≤ 500 PPM	35 / 40 81 / 49 5 / 3 6 / 0 <1 / <1 25 / 30	Pass

*Per PS-ANM-25.853-01-R2, the Heat Release test is not required for most interior-facing parts printable on the X7, as they have exposed-surface area below the specified threshold for cabin components.

**Partial sample produced as a 2-layer sandwich panel

MarkForged Materials

Composites Onyx FR-A CF FR-A

markforged.com

Printer & Material Compatibility

Onyx FR-A

Available for use on all MarkForged Industrial Series 3D printers (X7, X5, X3).

Can be reinforced with available continuous fibers.

Carbon Fiber FR-A

Available for use on the X7.

Only compatible as a reinforcement for Onyx FR-A.

Printer	Composite Base	Continuous Fiber
X7	Onyx FR-A	Carbon Fiber FR-A Carbon Fiber HSHT Fiberglass Kevlar Fiberglass No Reinforcement
X5	Onyx FR-A	Fiberglass No Reinforcement
X3	Onyx FR-A	No Reinforcement

Future Data

Onyx FR-A and Carbon Fiber FR-A are currently undergoing NCAMP qualification, which will provide additional results after completion, including:

Expanded directional mechanical data

Environmental mechanical data

Glass transition temperature

Coefficient of thermal expansion (CTE)

UV exposure

Fluid sensitivity to common aerospace fluids including fuels, lubricants, and cleaning agents



To learn more about specific testing conditions or to request test parts for internal testing, contact a MarkForged representative. All customer parts should be tested in accordance to customer's specifications.

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MarkForged Materials

Composites ULTEM 9085

MATERIAL DATASHEET



ULTEM™ 9085 Filament and Carbon Fiber for ULTEM™ Filament

AEROSPACE-READY MATERIALS

ULTEM™ 9085 Filament is a high performance thermoplastic that exhibits excellent flame, smoke, and toxicity (FST) characteristics. Optimized for production aerospace applications, ULTEM™ Filament brings Markforged's CFR technology to a new realm of parts. ULTEM™ Filament is available in Markforged's new 3200cc XL spool — four times larger than our standard spools.

Carbon Fiber for ULTEM™ Filament is a specialized variant of Markforged's Continuous Carbon Fiber designed for use with ULTEM™ Filament. Capable of yielding aluminum strength parts, it can be precisely laid down in a wide variety of geometries. Users can trace curved features, reinforce holes, and mimic unidirectional fiber layouts — all within a few clicks.

ULTEM™ 9085 Filament and Carbon Fiber for ULTEM™ Filament are only printed on the Markforged FX20. ULTEM™ 9085 Filament parts are compatible with Support for ULTEM™ Filament, a dedicated support material printed out of a second nozzle.



Physical Properties	Unit	Test	Utem 9085™ Filament XZ Orientation	Test	Carbon Fiber for Utem 9085™ Filament
Tensile strength	MPa (ksi)	D638	68 (9.9)	D3039	760 (110)
Tensile modulus	GPa (ksi)	D638	2.52 (365)	D3039	67 (8280)
Tensile strain at break	%	D638	5.5	D3039	1.6
Flexural strength	MPa (ksi)	D790	105 (15.2)	D790	540 (78.3)
Flexural modulus	GPa (ksi)	D790	2.45 (355)	D790	50 (7250)
Flexural strain at break	%	D790	—	D790	1.6
Compressive strength	MPa (ksi)	D695	—	D695	300 (43.5)
Compressive modulus	GPa (ksi)	D695	—	D695	59 (8557)
Izod Impact - notched	J/m (ft-lb/in)	D256-10 A	70 (1.3)	D256-10 A	810 (16.2)
Density	g/cm³	—	1.27	—	1.2
HDT (66 psi)	deg C (deg F)	D648 B	175 (347)	D648 B	190 (374)
HDT (264 psi)	deg C (deg F)	D648 B	173 (346)	D648 B	190 (374)

These representative data were tested, measured, or calculated using standard methods and are subject to change without notice. Markforged makes no warranties of any kind, express or implied, including, but not limited to, the warranties of merchantability, fitness for a particular use, or warranty against patent infringement; and assumes no liability in connection with the use of this information. The data listed here should not be used to establish design, quality control, or specification limits, and are not intended to substitute for your own testing to determine suitability for your particular application. Nothing in this sheet is to be construed as a license to operate under or a recommendation to infringe upon any intellectual property right.

MarkForged Materials

Composites ULTEM 9085

Printer & Material Compatibility

ULTEM™ 9085 Filament

Available for use on the FX20 and compatible with Support for ULTEM™ Filament.

Can only be reinforced with Carbon Fiber for ULTEM™ Filament.

Carbon Fiber for ULTEM™ Filament

Available for use on the FX20.

Only compatible as a reinforcement for ULTEM™ 9085 Filament.

Future Data

ULTEM™ 9085 Filament and Carbon Fiber for ULTEM™ Filament are undergoing more tests which will provide additional results after completion, including:

Full mechanical data

Glass transition temperature

Coefficient of thermal expansion (CTE)

UV exposure

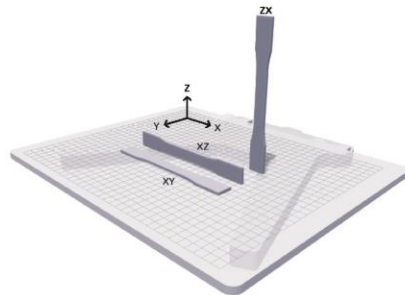
Fluid sensitivity to common aerospace fluids including fuels, lubricants, and cleaning agents

ULTEM™ 9085
Filament

Carbon Fiber for
ULTEM™ Filament

Directional Mechanical Properties of ULTEM™ 9085 Filament

The mechanical properties of 3D printed materials may vary with print orientation. In tension, most parts are strongest when the print orientation and loading direction are parallel, and weakest when the print orientation and loading direction are perpendicular.



Property	Print orientation	Average
Yield Strength (MPa)	XY	62
	XZ	68
	ZX	48
Tensile strength (MPa)	XY	61
	XZ	67
	ZX	48
Tensile modulus (GPa)	XY	2.32
	XZ	2.52
	ZX	2.11
Elongation at break (%)	XY	5.3
	XZ	5.6
	ZX	2.1

*The ULTEM™ and 9085 trademarks are used under license from SABIC, its affiliates or subsidiaries.

To learn more about specific testing conditions or to request test parts for internal testing, contact a MarkForged representative. All customer parts should be tested in accordance to customer's specifications. This data sheet is preliminary and includes some estimated values. Values will be updated when full material testing is complete.

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MarkForged Materials

Composites Vega

COMPOSITE MATERIAL DATASHEET



Vega™

CARBON FIBER FILLED PEKK MATERIAL

Vega is an ultra high-performance carbon fiber filled PEKK for 3D printing critical aerospace parts on the FX20. Formulated by Markforged engineers and material scientists, it exhibits a smooth matte black surface finish that is excellent for production parts. Vega can be reinforced with continuous fiber to achieve aluminum strength for aerospace components.

High Temperature Carbon Fiber (CF-HT) is a specialized variant of Markforged's continuous Carbon Fiber designed for use with Vega and ULTEM™ 9085 Filament*. Capable of yielding aluminum strength parts, it can be precisely laid down in a wide variety of geometries.



Features and benefits
High heat and FST resistance
Chemical and solvent resistance
Low outgassing
Matte surface finish
High strength with CF-HT reinforcement

Physical Properties	Unit	Test (ASTM)	Vega XZ Orientation	Test	High Temperature Carbon Fiber (CFR)
Tensile Strength	MPa (ksi)	D638	88 (13)	D3039	700 (110)
Tensile Modulus	GPa (ksi)	D638	5.2 (725)	D3039	57 (8280)
Elongation at Break	%	D638	3	D3039	1.6
Flexural Strength	MPa (ksi)	D790	140 (20)	D790	540 (78.3)
Flexural Modulus	GPa (ksi)	D790	4.7 (681)	D790	50 (7250)
Flexural Extension at Break	%	D790	5.2	D790	1.6
Compressive Strength	MPa	D695	221	D695	300 (43.5)
Compressive Modulus	GPa	D695	4.1	D695	59 (8557)
Notched Izod Impact Resistance	J/m	D256	48	D256	810
Density	g/cm³	–	1.27	–	1.2
HDT (1.8 MPa)	deg C (deg F)	D648	157 (315)	–	–
HDT (0.45 MPa)	deg C (Deg F)	D648	164 (327)	–	–

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MarkForged Materials

Composites Vega

Outgassing

Vega exhibits low outgassing, ensuring suitability for critical aerospace applications.

Property	Test (ASTM)	TML (%)	CVCM (%)	WVR (%)
Outgassing	E595-15	0.47	<0.01	0.21

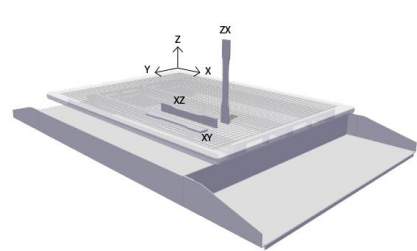
Chemical Resistance

Property	Vega
37% Hydrochloric Acid	A
80% Phosphoric Acid	A
49% Hydrogen Fluoride	A
50% Potassium Hydroxide	A
50% Hydrogen Peroxide	A
Ethanol	A
Jet A	A
Skydrol	A
Toluene	B
MEK	B
Trichlorethane	C
Dichloromethane	C

Legend
A - Little / no effect
B - Small / moderate effect
C - Significant effect

Directional Mechanical Properties of Vega

The mechanical properties of 3D printed materials may vary with print orientation. In tension, most parts are strongest when the print orientation and loading direction are parallel, and weakest when the print orientation and loading direction are perpendicular.



Property	Print orientation	Average
Tensile strength (MPa)	XY	65
	XZ	88
	ZX	48
Tensile modulus (GPa)	XY	4.0
	XZ	5.2
	ZX	3.3
Elongation at break (%)	XY	3.9
	XZ	3.0
	ZX	2.5

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MarkForged Materials

Composites Vega

Flame, Smoke, and Toxicity (FST) Performance

Vega alone and with Carbon Fiber reinforcement have demonstrated Flammability test performance that passes CFR 25.853 specifications at 2mm thickness. For information on how this limits potential applications see PS-ANM-25.853-01-R2. Smoke test performance passed CFR 25.853 specifications at 2mm thickness. Combustion toxicity test performance passed Boeing BSS 7239 Flaming specifications at 2mm thickness. Generally thinner specimens have greater difficulty passing testing. Performance of the thinnest specimens that passed testing are shown below.

Test Category	Test Detail	Specification	Thickness	Continuous Fiber Loading	Test	Passing Criteria	Test Result	Outcome
Flammability	Vertical (60 seg.)	FAR 25.853 Appendix F, Part I (a) (1) (i)	2 mm	None	Burn Time	≤ 15 sec	0 sec	Pass
					Burn Length	≤ 6 in	3.3 in	
					Longest Burning	≤ 3 sec	None	
			2 mm	Full	Burn Time	≤ 15 sec	0 sec	Pass
					Burn Length	≤ 6 in	3.1 in	
					Longest Burning	≤ 3 sec	None	
	Vertical (12 seg.)	FAR 25.853 Appendix F, Part I (a) (1) (ii)	2 mm	None	Burn Time	≤ 15 sec	2 sec	Pass
					Burn Length	≤ 8 in	0.9 in	
					Longest Burning	≤ 5 sec	None	
			2.0 mm	Full	Burn Time	≤ 15 sec	0 sec	Pass
					Burn Length	≤ 8 in	0.4 in	
					Longest Burning	≤ 5 sec	None	
Heat release*	Horizontal (15 seg.)	FAR 25.853 Appendix F, Part I (a) (1) (iv)	2.0 mm	None	Avg. Burn Length	≤ 2.5 in/min	0 in/min	Pass
			2.0 mm	Full	Avg. Burn Length	≤ 2.5 in/min	0 in/min	Pass
	Heat release*	FAR 25.853 Appendix F, Part IV	2.0 mm	None	Avg. Max	≤ 65 kW/m2	40.4 kW/m2	Pass
					Avg. 2-min total	≤ 65 kW-min/m2	6.9 kW-min/m2	
			2.0 mm	Full	Avg. Max	≤ 65 kW/m2	34.1 kW/m2	Pass
					Avg. 2-min total	≤ 65 kW-min/m2	9.3 kW-min/m2	
Smoke	Smoke Density - Flaming Mode	BSS 7238	2.0 mm	None	De Max	≤ 200	1	Pass
	Smoke Density - Non Flaming Mode	BSS 7238	2.0 mm	Full	De Max	≤ 200	0	Pass
Toxicity	Toxicity Flaming	BSS 7239	2.0 mm	None	HCN	≤ 150 PPM	<1 / <1	Pass
					CO	≤ 3500 PPM	29 / 30	
					NO / NO2	≤ 100 PPM	1 / 1	
					SO2	≤ 100 PPM	0 / 0	
				Full	HCN	≤ 150 PPM	<1 / <1	Pass
					CO	≤ 3500 PPM	39 / 26	
Toxicity Non Flaming			2.0 mm	None	NO / NO2	≤ 100 PPM	3 / 2	
					SO2	≤ 100 PPM	0 / 0	
					HF	≤ 200 PPM	<1 / <1	
					HCL	≤ 500 PPM	<1 / <1	
				Full	HCN	≤ 150 PPM	<1 / <1	Pass
					CO	≤ 3500 PPM	<1 / 6	

* Per PS-ANM-25.853-01-R2, the Heat Release test is not required for most interior-facing parts printable on the X7, as they have exposed surface area below the specified threshold for cabin components.

** Partial sample produced as a 2-layer sandwich panel
Full fiber specimens are produced using the striped fiber configuration with the maximum fiber usage.

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MarkForged FFF Printers comparison



FFF Printer Comparison



Desktop

Reliable entry-level machines. Accurate parts with good surface finish. Prints with standard materials.



Industrial

Industrial-grade machines with large build envelope and in-chamber sensors for optimized performance. Superior accuracy, resolution, and speed. Full industrial material portfolio.



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	Onyx Pro™	Mark Two™	X7™	FX10™	FX20™
Process					
Fused Filament Fabrication	Thermoplastic-based filaments are heated and extruded through a nozzle in discrete layers				
Continuous Fiber Reinforcement	Continuous fibers laid down in-layer, reinforcing FFF infill to aluminum-strength				
Engineering Thermoplastics ¹					
Onyx™ (Micro carbon fiber filled nylon)	x	x	x	x	x
Onyx ESD™			x		x
Onyx FR™ ²			x		x
Nylon		x	x	x	
Precise PLA	x	x	x		
Smooth TPU 95A	x	x			
ULTEM™ 9085 Filament ³					x
Vega™ (Micro carbon fiber filled PEKK)					x
Continuous Fibers ³					
Continuous Fiberglass	x	x	x		x
Continuous Carbon Fiber		x	x	x	x
Continuous Carbon Fiber FR ²			x		x
High Temperature Carbon Fiber ¹					x
Continuous HSHF Fiberglass		x	x		
Continuous Aramid Fiber (Kevlar®) ⁴		x	x		x
Advanced Features					
Out-of-Plastic Detection	x	x	x	x	x
Out-of-Fiber Detection			x	x	x
Fiber Jam Detection	x	x	x	x	x
Adaptive Bed Leveling			x	x	x
Automated Bed Leveling				x	x
Micron Precision Linear Encoders					x
Print Speed (default Z resolution)	1x	1x	1x	3x	3x
Turbo Print Speed	4x	4x	4x	8x	8x
Inspection (compatible)			x	x	
Hardware					
Build Volume	320 x 132 x 154 mm, 6.5 L (12.6 x 5.2 x 6.0 in)		330 x 270 x 200 mm, 17.8 L (13.0 x 10.6 x 7.9 in)		375 x 300 x 300, 33.8 L (14.8 x 11.8 x 11.8 in)
Print Bed	Flat to within 160 µm; Kinematic coupling Manual shim leveling		Flat to within 80 µm; Kinematic coupling Manual laser-assisted leveling		Heated, Precision-ground aluminum vacuum bed, Auto leveling
Z Resolution Range	100 - 250 µm		50 - 250 µm		125-250 µm
Build Chamber	Not heated				Heated up to 60°C
Material Storage	Outboard dry box		Inboard dry box		Humidity controlled material drawer, 4 spool bays
	800cc spool		800cc spool		800cc spools
Supports	Same material breakaway supports				800cc or 3200cc spools
Infill	Closed-cell infill; Multiple geometries available				
Specifications					
Storage	Cloud included; Offline available				
Power	100-240 VAC, 150W (2A peak)			100-120 VAC, 12A or 200-240 VAC, 6A	
Weight	16 kg (35 lb)		48 kg (106 lb)		109 kg (240 lb)
Footprint	584 x 330 x 355 mm (23 x 13 x 14 in)		584 x 483 x 914 mm (23 x 19 x 36 in)		760 x 640 x 1200 mm (30in x 25in x 46in)
					1325 x 900 x 1925 mm (52 x 36 x 76 in)

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²Available in A version with traceability.

³Support for all MarkForged plastic and fiber materials on the FX20 and FX30 will be added over time, although not every combination.

⁴Dupont™ and Kevlar® are trademarks and registered trademarks of E. I. du Pont de Nemours and Company.

REV 7A -10/08/24 - en-US

MarkForged FFF Printers comparison



FFF Printer Comparison



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Continuous Fiber Reinforcement	Continuous fibers laid down in-layer, reinforcing FFF infill to aluminum-strength				
Engineering Thermoplastics ¹					
Onyx™ (Micro carbon fiber filled nylon)	x	x	x	x	x
Onyx ESD™			x		x
Onyx FR™ ²			x		x
Nylon		x	x	x	
Precise PLA	x	x	x		
Smooth TPU 95A	x	x			
ULTEM™ 9085 Filament ³					x
Vega™ (Micro carbon fiber filled PEKK)					x
Continuous Fibers ³					
Continuous Fiberglass	x	x	x		x
Continuous Carbon Fiber		x	x	x	x
Continuous Carbon Fiber FR ²			x		x
High Temperature Carbon Fiber ¹					x
Continuous HSHF Fiberglass		x	x		
Continuous Aramid Fiber (Kevlar®) ⁴		x	x		x
Advanced Features					
Out-of-Plastic Detection	x	x	x	x	x
Out-of-Fiber Detection			x	x	x
Fiber Jam Detection	x	x	x	x	x
Adaptive Bed Leveling			x	x	x
Automated Bed Leveling				x	x
Micron Precision Linear Encoders					x
Print Speed (default Z resolution)	1x	1x	1x	3x	3x
Turbo Print Speed	4x	4x	4x	8x	8x
Inspection (compatible)			x	x	
Hardware					
Build Volume	320 x 132 x 154 mm, 6.5 L (12.6 x 5.2 x 6.0 in)		330 x 270 x 200 mm, 17.8 L (13.0 x 10.6 x 7.9 in)		375 x 300 x 300, 33.8 L (14.8 x 11.8 x 11.8 in)
Print Bed	Flat to within 160 µm; Kinematic coupling Manual shim leveling		Flat to within 80 µm; Kinematic coupling Manual laser-assisted leveling		Heated, Precision-ground aluminum vacuum bed, Auto leveling
Z Resolution Range	100 - 250 µm		50 - 250 µm		125-250 µm
Build Chamber	Not heated				Heated up to 60°C
Material Storage	Outboard dry box		Inboard dry box		Humidity controlled material drawer, 4 spool bays
	800cc spool		800cc spool		800cc spools
Supports	Same material breakaway supports				800cc or 3200cc spools
Infill	Closed-cell infill; Multiple geometries available				
Specifications					
Storage	Cloud included; Offline available				
Power	100-240 VAC, 150W (2A peak)			100-120 VAC, 12A or 200-240 VAC, 6A	
Weight	16 kg (35 lb)		48 kg (106 lb)		109 kg (240 lb)
Footprint	584 x 330 x 355 mm (23 x 13 x 14 in)		584 x 483 x 914 mm (23 x 19 x 36 in)		760 x 640 x 1200 mm (30in x 25in x 46in)
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Who We Represent

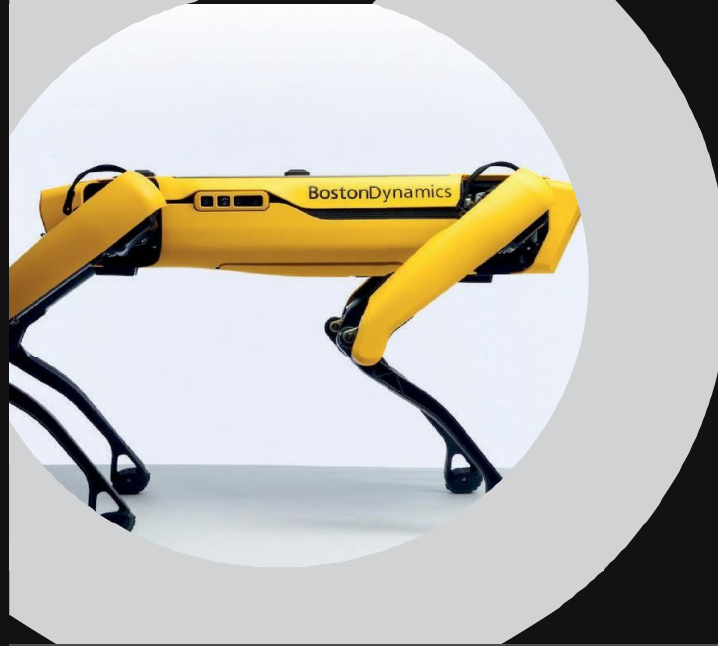
2 – TaleMate

TaleMate Robotics is an innovative robotics company focused on developing intelligent automation solutions designed to enhance operational efficiency and human-robot collaboration. Specializing in mobile robots and AI-powered systems, TaleMate Robotics delivers products that streamline logistics, manufacturing, and service operations. Their technologies integrate advanced navigation, perception, and machine learning to enable robots to operate autonomously in dynamic environments. With a commitment to reliability, safety, and ease of integration, TaleMate Robotics is shaping the future of robotics by making smart automation accessible and adaptable across a wide range of industries

Who We Represent

1 – TaleMate

The new spot of SPOT®



Who is SPOT®?



Spot® is an agile mobile robot that navigates terrain with unprecedented mobility, allowing you to automate routine inspection tasks and data capture safely, accurately, and frequently.

The results? Safer, more efficient and more predictable operations.

ENHANCED CAPABILITIES

Spot's® base platform provides advanced mobility and perception to navigate stairs, gravel, and rough terrain while collecting 2D and 3D information with on board-sensors. Add payloads or third-parties to enhance Spot's® sensing and data processing capabilities



SPOT® ARM

SPOT® CORE



SPOT® CAM

SPOT® EAP

AND MORE...

Diverse INDUSTRIES

CONSTRUCTION

Inspect progress on construction sites, create digital twins, and compare as-built conditions to Building Information Modeling (BIM) autonomously with Spot®.



OIL & GAS

Create autonomous routes or drive the robot to remotely inspect facilities and improve awareness of plant operations.



UTILITIES

Create autonomous routes or drive the robot to remotely perform inspections in electrified or radiation dense areas.



PUBLIC SAFETY

Drive Spot® remotely to get eyes on dangerous situations or inspect hazardous packages from afar.





COVID

The robot Spot® is suitable to mount extra fixtures on top of his back. Here we mount a device to disinfect different rooms with a spray.



HEALTHCARE

Use Spot® to triage patients, deliver food and medicine, or disinfect rooms from afar.



ENTERTAINMENT

Program dynamic movements and expressive poses through the API or drive the robot in real-time as part of a performance.

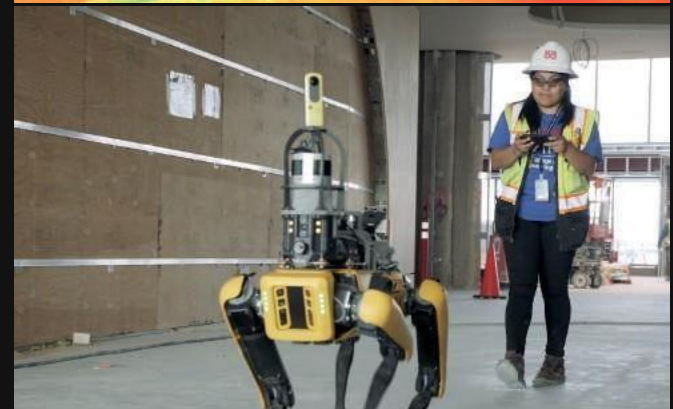


RESEARCH

Integrate Spot® with sensors and software to develop applications with industry partners.

Versatile APPLICATIONS

- **Site documentation:** Integrate Spot® with a 360° camera and site documentation software to reduce time required to capture data and enhance employee productivity in documenting and managing site progress.
- **Leak detection:** Add processing to visuals collected by the Spot® CAM payload to detect water and steam leaks around plants and note equipment with degraded performance.
- **Thermal inspection:** Equip Spot® with a thermal camera to detect issue- indicating hot spots on machines or electrical conductors.
- **Gas detection:** Equip Spot® with a gas sensor to detect dangerous leaks earlier without risk to humans or animals.
- **Search and alert:** Use Spot® to remotely search and scan hazardous environments or disaster areas.
- **Telemedicine:** Conduct virtual patient interviews or deliver medicine and food by mounting a tablet and other equipment on Spot®.
- And more...



SPECIFICATIONS?

Strong: Carry and power up to 14kg of inspection equipment.

360° perception: use 360° perception to map terrain and avoid obstacles as they appear.



mart Program repeatable autonomous missions to gather consistent data

Mobile: Cruise over loose gravel, grass, curbs and stairs.

SPOT® Hardware Spec

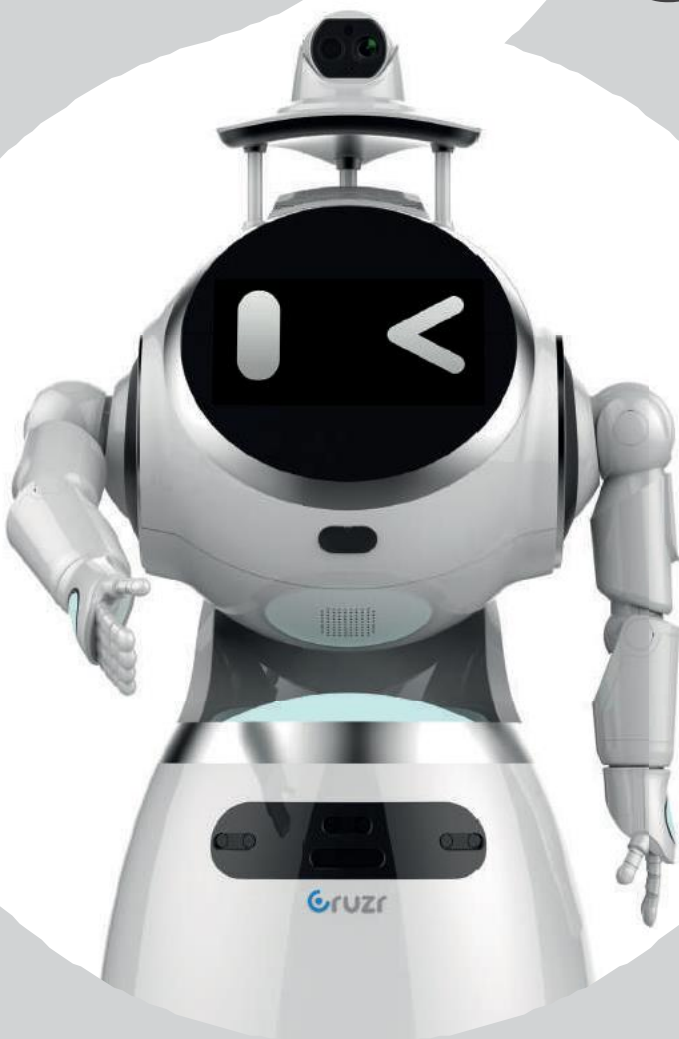
Product Name	SPOT®
Color	Yellow/ Black
Size	H 840 x W 500 x L 1100 (mm)
Weight	Approx. 32,5kg
Max speed	1,6m/s
Typical runtime	90 min.
Standby time	180 min.

And Many Other Robots, Medical Robots, Serving, Industrial, Manufacturing and so on.

Also VR and AR Services that are top tier



Meet the anti- epidemic **CRUZR**





Who is the Anti-epidemic **CRUZR** ?

Your patrol robot to keep the virus away.
One robot to perform many tasks.

TEMPERATURE MEASUREMENT

REDUCE THE RISK
OF CROSS INFECTION

Thanks to its wide range of visibility, CRUZR can measure body temperature of a large number of people at one time. No contact needed for more safety, and less discomfort. Alerts when abnormal high temperature are detected.

REGISTRATION CONTACT TRACING

Cruzr can easily scan your passport or a personalized QR code.

COUNTING PEOPLE

The robot can scan the environment and can count people to provide an exact number of people present in the building.

MASK IDENTIFY

The robot can identify people who are wearing a mask and help them wearing it the right way.

**Alert
Prevent
Check**

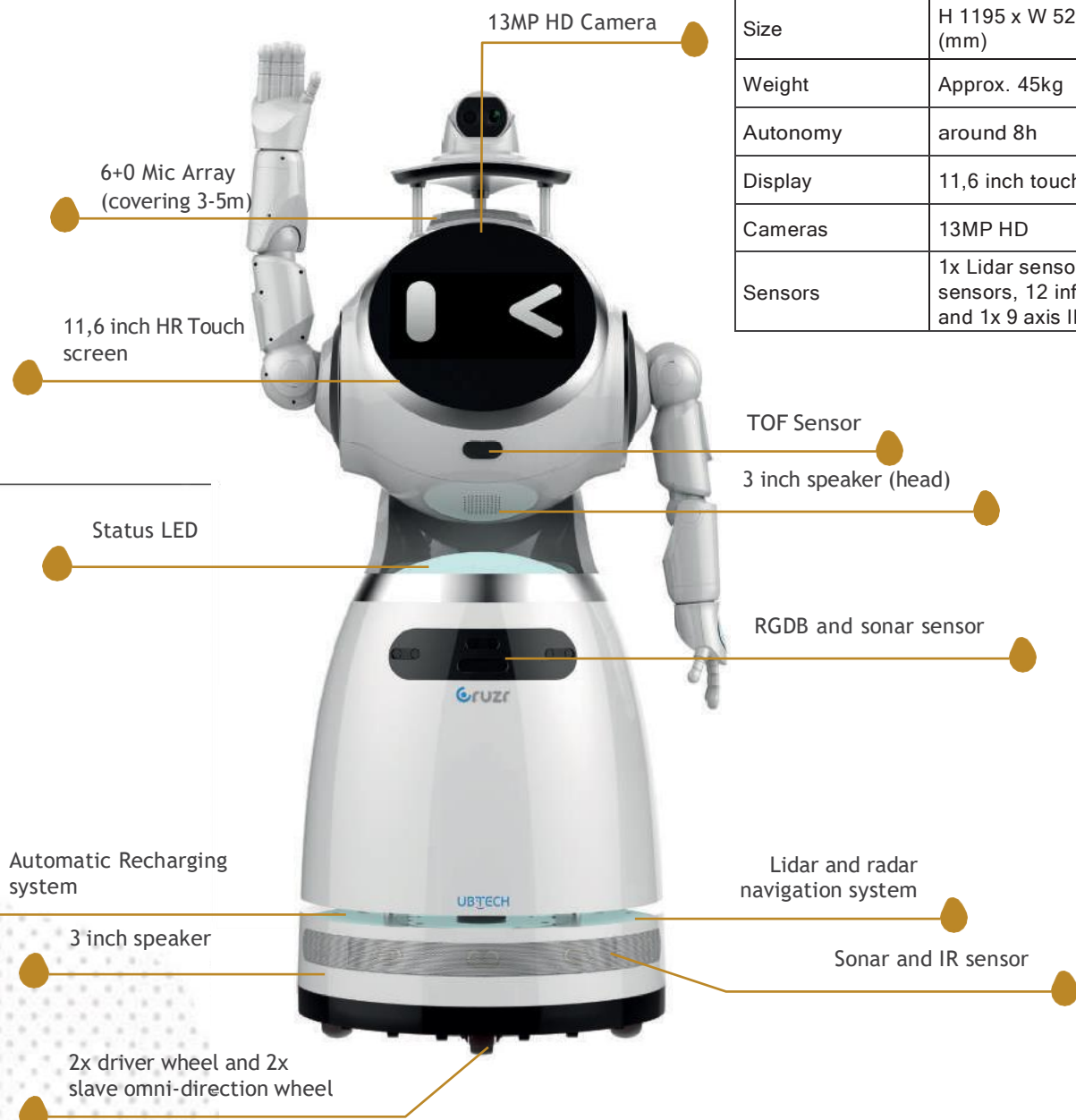




My SPECIFICATIONS?

Cruze's Hardware Spec

Product Name	Cruze
Color	White/ Silver
Size	H 1195 x W 521 x D 516 (mm)
Weight	Approx. 45kg
Autonomy	around 8h
Display	11,6 inch touch screen
Cameras	13MP HD
Sensors	1x Lidar sensor, 6 sonar sensors, 12 infrared sensors and 1x 9 axis IMU in chassis





Meet **CRUZR**





Who is **CRUZR** ?

He knows every detail of your business, your services and your products. He scans every product and can tell you anything about it. With his detailed map, he leads you and your clients to your goals.



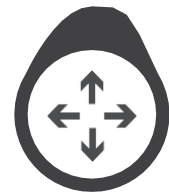
Recognition

Create unique personalized experiences with Cruzr's facial recognition technology. Cruzr can remember users and recommend relevant products and services based on past behaviors.



Experience

In hotels, hospitals, retail, airports,... everywhere you can use Cruzr. Guide and inform customers via the robot. A unique customer experience completes your concept. Operate several robots at the same time and patrol through your building.



Navigation

Adapt to route environments, real-time positioning and mapping to avoid obstacles. Arrive at any location with precision.





Discover Cruzr's CAPABILITIES

Cruzr, the intelligent Service robot. Designed to empower the most tech-savvy households and businesses, Cruzr provides service applications for the future.

BIG DATA ANALYSIS

Data acquisition, storage and analysis. Discover effective information to obtain better business value.

- High-efficiency acquisition
- Security storage
- Intelligent analysis

SUPERIOR, SAFE AND SECURE

Thanks to its 360° movement and cameras, it keeps an eye everywhere. With the ZBOS software it is possible to monitor multiple Cruzr's at the same time.

ENTERTAINING

Bring fun and originality on all your events. Personalize amazing behaviors to entertain your visitors.

AN ASSISTANT FOR:

- Retail (sales assistant)
- Enterprises (concierge)
- Transportation (flight consultant, direction guidance and entertainment,...)
- Reception (receptionist)
- Education (learning assistant)
- Health (provider for healthcare, wellness coach,...)





My SPECIFICATIONS?

Cruze's Hardware Spec

Product Name	Cruze
Color	White/ Silver
Size	H 1195 x W 521 x D 516 (mm)
Weight	Approx. 45kg
Autonomy	around 8h
Display	11,6 inch touch screen
Cameras	13MP HD
Sensors	1x Lidar sensor, 6 sonar sensors, 12 infrared sensors and 1x 9 axis IMU in chassis

6+0 Mic Array
(covering 3-5m)

13MP HD Camera

11,6 inch HR Touch
screen

Status LED

3 inch speaker (head)

RGDB and sonar sensor

Automatic Recharging
system

3 inch speaker

Lidar and radar
navigation system

2x driver wheel and 2x
slave omni-direction wheel

Sonar and IR sensor

SPECIFICATIONS?

Strong: Carry and power up to 14kg of inspection equipment.

360° perception: use 360° perception to map terrain and avoid obstacles as they appear.



mart Program repeatable autonomous missions to gather consistent data

SPOT® Hardware Spec

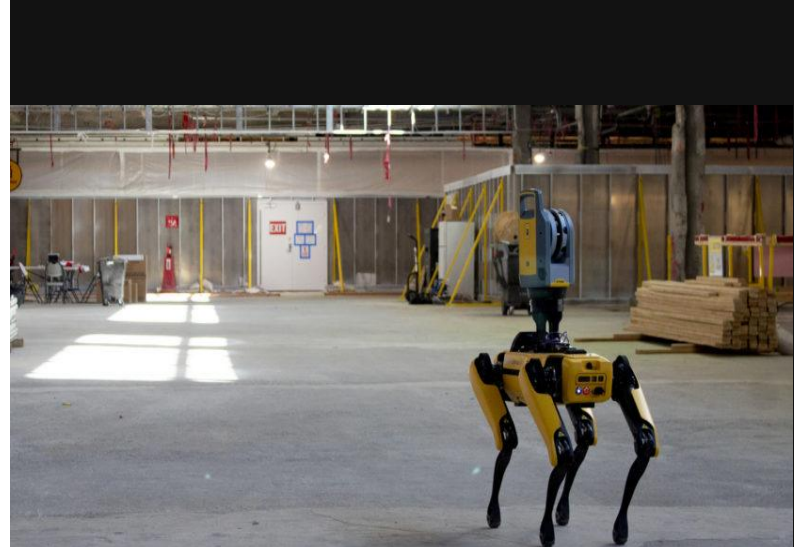
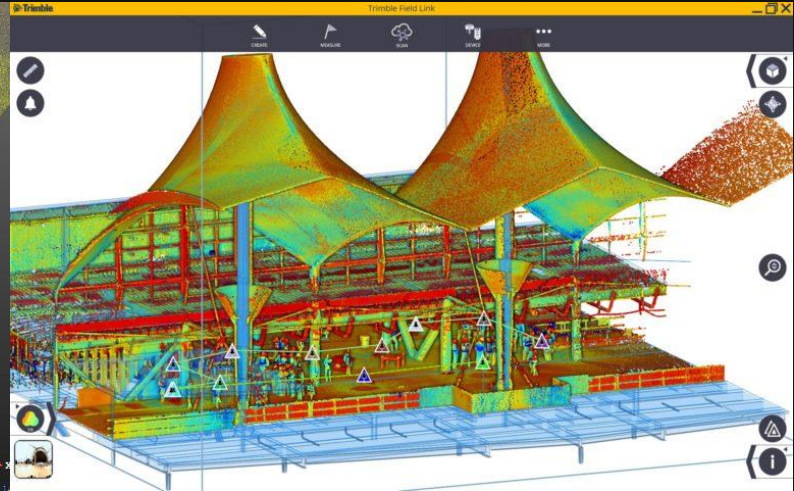
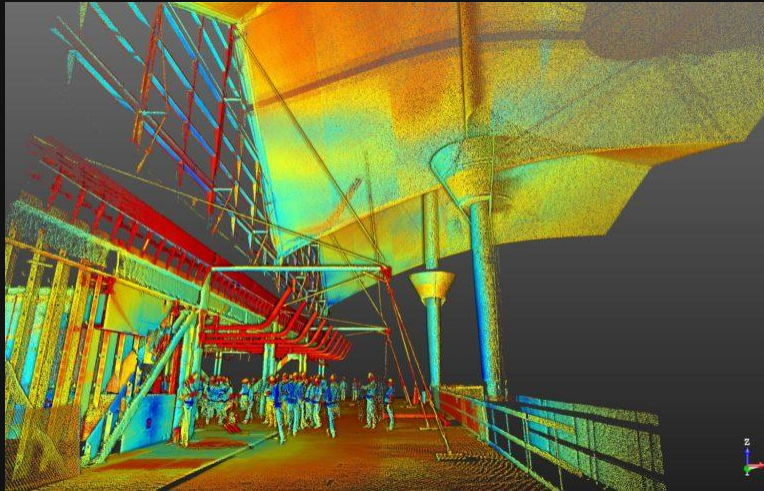
Product Name	SPOT®
Color	Yellow/ Black
Size	H 840 x W 500 x L 1100 (mm)
Weight	Approx. 32,5kg
Max speed	1,6m/s
Typical runtime	90 min.
Standby time	180 min.

Mobile: Cruise over loose gravel, grass, curbs and stairs.

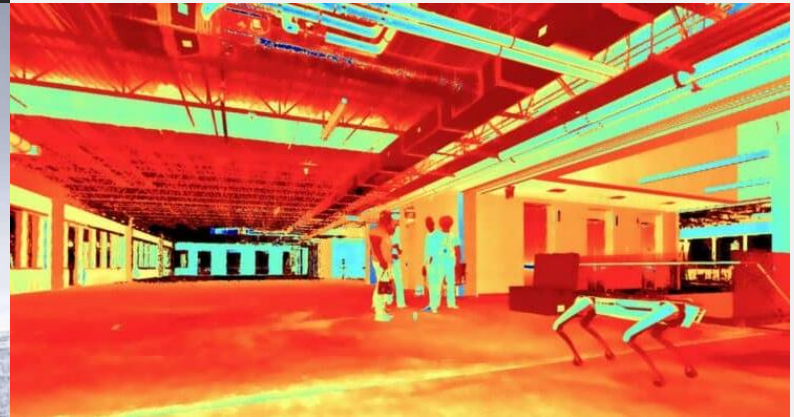
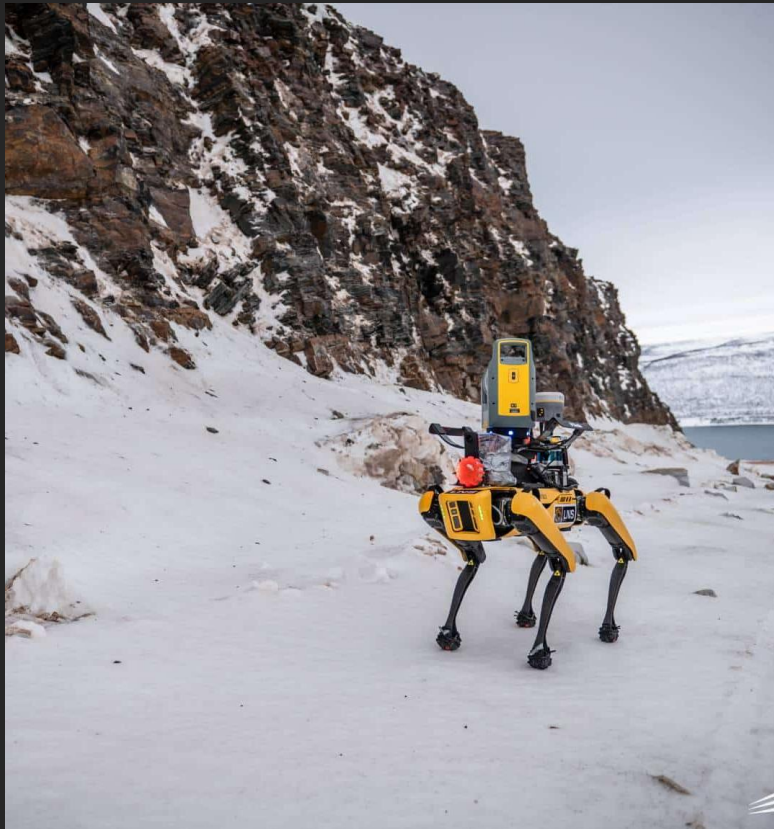
And Many Other Robots, Medical Robots, Serving, Industrial, Manufacturing and so on.

Also VR and AR Services that are top tier

Projects that used Spot for scanning



Projects that used Spot for scanning



Who We Represent

3 – DevTac

is a Japan-based defense manufacturer founded in 2011 by Wesley Shibata. This company specializes in advanced tactical gear, most notably the Devtac Ronin helmet. The Ronin is a full-face ballistic helmet designed to offer superior protection and functionality. It features a modular design with detachable cheek plates, a built-in defogging system, and compatibility with accessories like night vision goggles and heads-up displays. The helmet is constructed from lightweight ballistic materials, providing up to 90% head coverage and meeting NIJ Level IIIA standards, capable of stopping .357 SIG and .44 Magnum rounds .

DEVELOPING THE **FUTURE OF TACTICS**

DEVTAC IS A JAPANESE-BASED COMPANY THAT STARTED IN APRIL OF 2011
OUT OF DESPERATE NEED FOR A MULTI-FUNCTIONAL, STATE-OF-THE-ART,
TACTICAL EQUIPMENT THAT HAS LONG BEEN OVERDUE.

OUR MISSION IS SIMPLE:
THE PURSUIT OF REMARKETABILITY.
TO PROVIDE OUR CLIENTS REMARKABLE, TACTICAL ADVANTAGE THAT IS
BEYOND THE STATUS QUO.



GENERAL SPECIFICATION AND CONTENTS

- Ballistic Kevlar, Full 80% Protection
- Weight 2.2 kg - 2.7 kg
- 7mm ballistic Kevlar shell frames, lightweight with vents
- Micro jet fan defogging system built in the lens frames
- ANSI 2871 lenses
- Slide-in lenses for quick replacement
- Nylon 3D air mesh linings for comfort and breathability
- Flextech foam cushion for shock absorption. Made in USA.
- Quick release magnetized cheek plates for better cheek weld
- Two main parts - the mask and the back helmet
- The back helmet has a forehead strap that serves as a harness for blunt force
- The mask is attached to the back helmet by a latch, 5 magnets and 2 pins for quick release

Options

- Picattiny rails
- NVG mount
- Head ventilation system
- Full piece mandible
- HUD clamp for Snow 2
- Digital communication system

Comes in four sizes



Large,
long



Regular,
long



Large,
short



Regular,
short



The **DEVTAC Ronin** is a full ballistic helmet made of kevlar (not limited to) that weighs about 4.8 lbs. with 80% protection to the head.



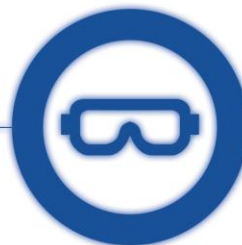
The **Ronin** helmet has detachable plates switchable to different ballistic levels, function and design. The plates are attached by bolts or Velcro. Each of the plates are 7mm thick with 1.5mm sheet of rubber foam for suspension shock absorption. The plates are designed to be separate to lessen the kinetic energy from bullet impacts.



The **Ronin** helmet frame is lightweight and semi-flexible for impact suspension. It is made of Kevlar and weighs about 1 kg. It is what makes the Ronin so special as it acts as a chassis and we can install almost about anything on it.



DEVTAC DEFOGGING SYSTEM



The **lens frame** is the main feature of DEVTAC Technology. A 10mm fan with a micro motor is installed inside the ventilation tube. The fan is placed right next to the lenses and slantedly fanning the surface of the inner lens. When air from outside blows air onto the lenses, it helps **evaporate the condensation** on the lens for **better visibility**.

The lens is slide in from the side for **quick replacement**.



The fans are **powered by 2 AAA batteries** housed inside the mask. Operation time is 4 hours on low



Reverse and forward switch for the fans to either blow in air into the lenses for defogging or expelling out humid air.



Speed dial to regulate the speed of the fans. Max speed has a decibel of 70

THE LENS FRAME TECHNOLOGY



Slide-in Lens



Lenses



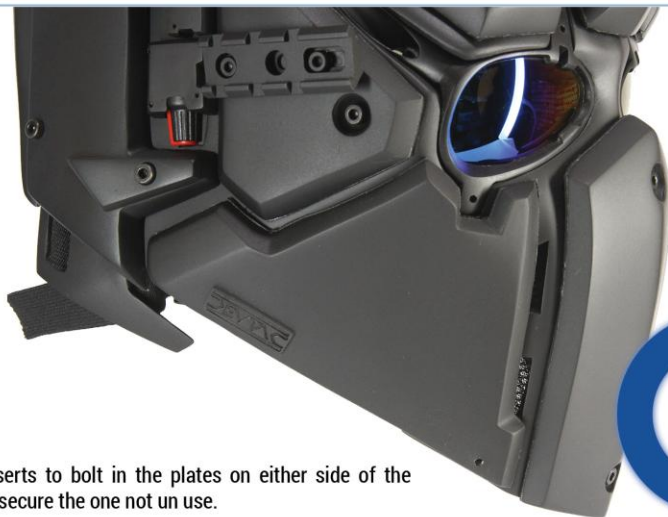
1.7v 10mm Fan



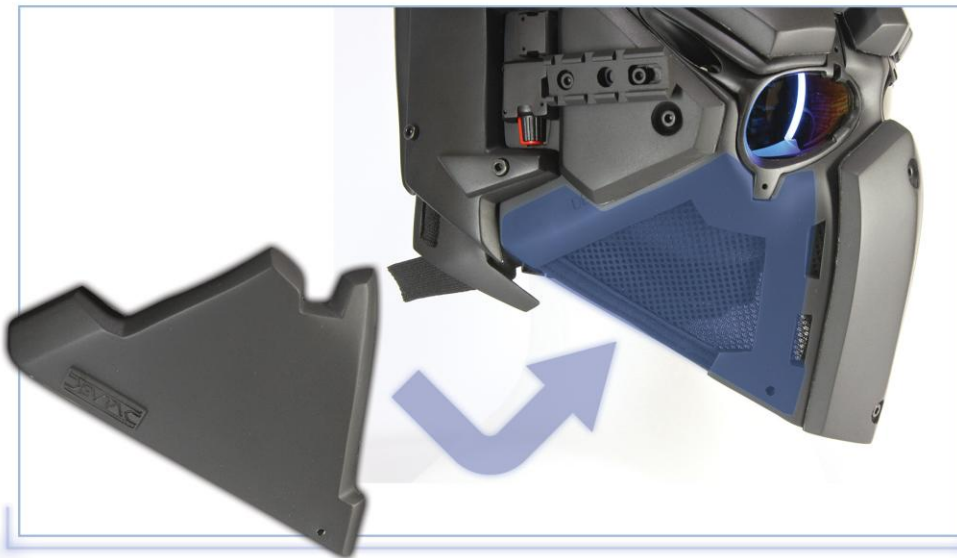
The lens frame is housed on the mask for quick detachment for replacing the lens and fans. It is secured in place with adhesive double-sided tape.

The lens frame has been carefully designed, figuring out the best size and shape for the fans. By blowing enough air on low speed setting, onto the lens to get the most of the **Coandă effect** (/ˈkwɑːndə/ or /ˈkwæ-/) is the tendency of a fluid jet to stay attached to a convex surface. Dryer air from outside is reducing the the humidity on the surface of the lens.

CHEEK WELD



Thread inserts to bolt in the plates on either side of the cheeks to secure the one not in use.



Look through your sights without having to bend your neck too much. The **DEVTAC Ronin** is the first full ballistic helmet capable of resting your cheek on the stock for better aiming.

1

Quick release, magnetized cheek plates for better cheek weld on looking down the sights.

2

Each cheek plate has 3 strong N52 Neodymium magnets. Each magnet can hold up to 1.5kg.

3

The entire helmet is lined with washable Nylon honeycomb 3D airmesh for breathability, airflow and comfort.

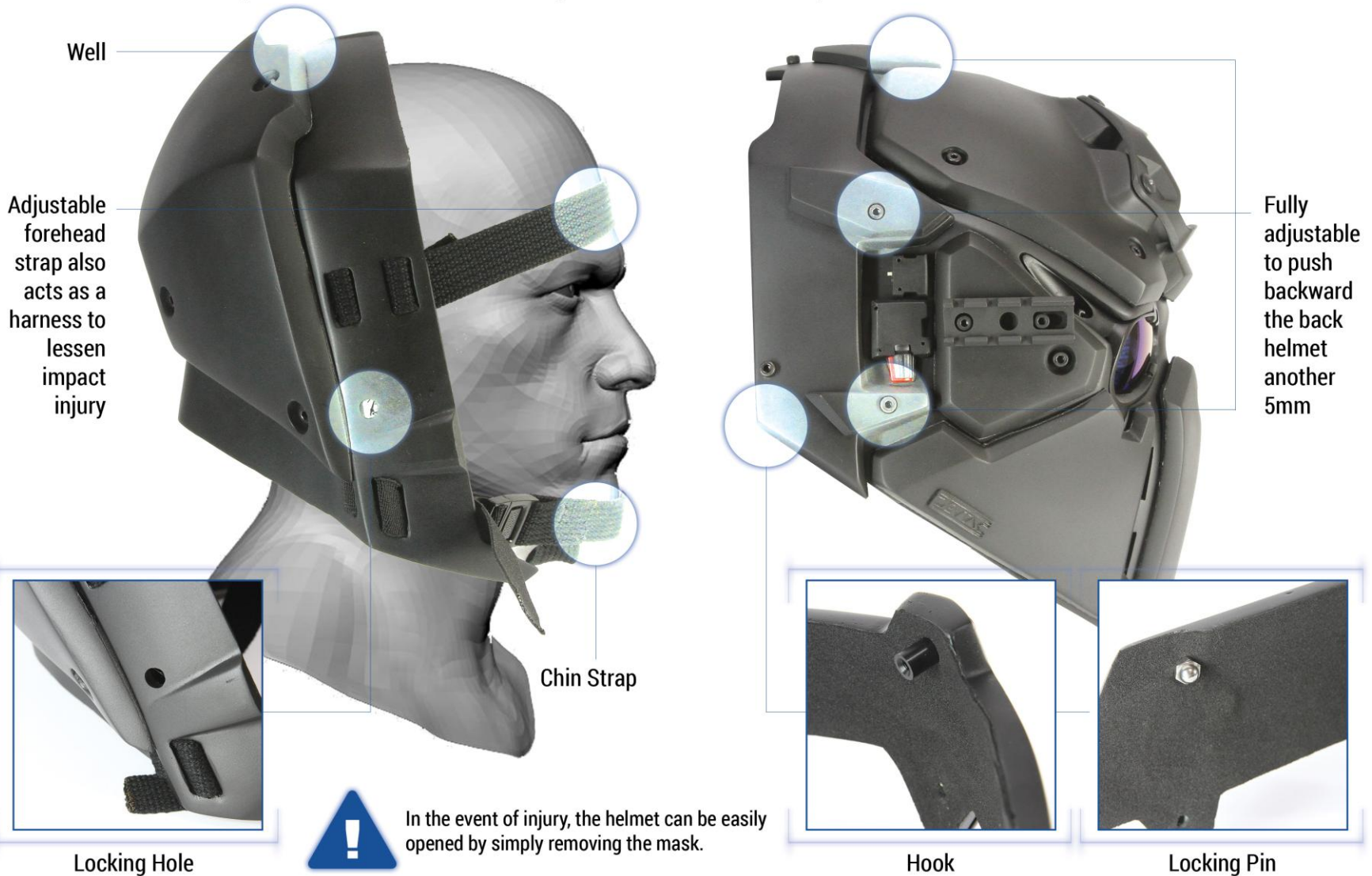
4

The mask's frame itself has 6 built-in N52 Neodymium magnets to attach to the plates



THE BACK HELMET AND THE MASK

The RONIN has two main parts. The helmet sections is designed to lessen the kinetic impact distribution to the whole helmet.



DEVTAC MASK

The **Ronin** can also be worn as a mask only.

Weight: 1.2kg (Front heavy)
Purpose: Breaching, quick wear



The extender is removable



Customized buckle
for weight
distribution



6-point bungee
strap is attached
to use it as a mask



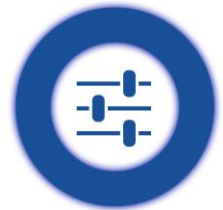
5MM IMPACT ABSORBING FOAM

Ultra Lightweight
by
flextechfoam.com



Spacer is included to accommodate smaller sizes.

Objective: To push the head closer to the mask for better FOV (Field Of Vision).



Additional foams are inserted behind the flextech foam to make it thicker for size adjustment

DEVTAC OPTIONS



Top head fans



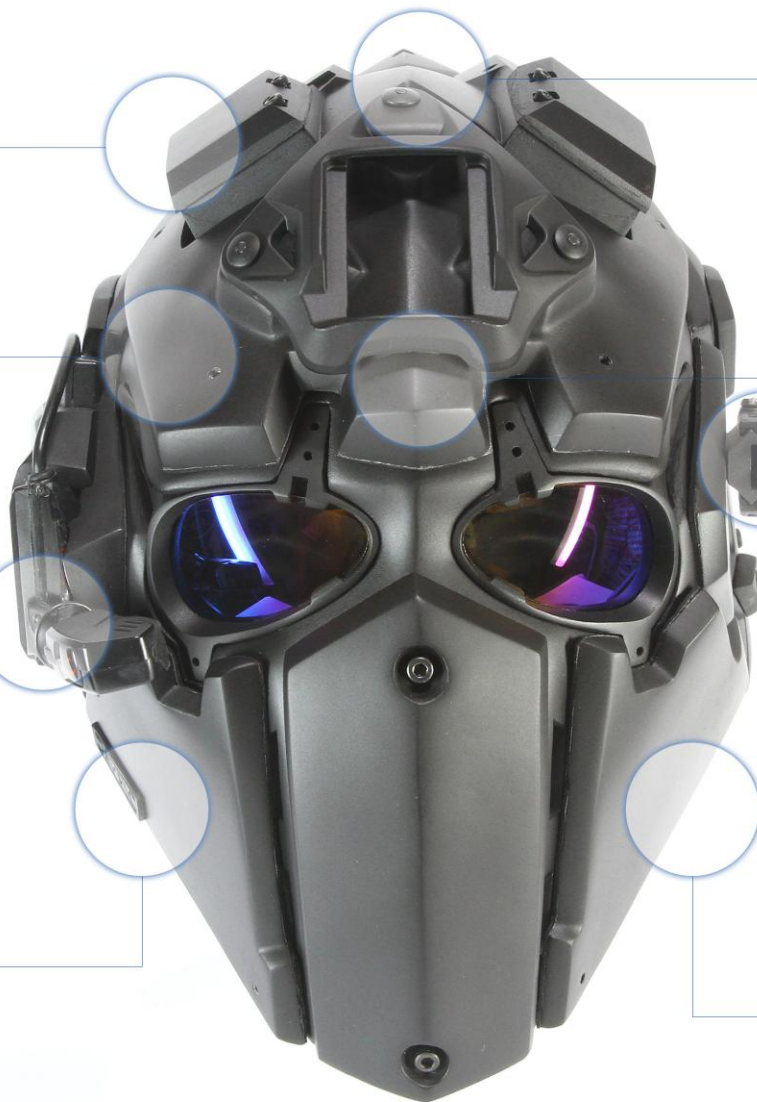
Forehead plate with NVG Shroud



Heads-up display clamp for Recon Snow 2 (not included)



Magnetized, detachable



Smooth top



Norotos NVG Shroud



20mm Picatinny rail for left and right side



Full piece mandible

OPTION: FOREHEAD FAN

Ventilation opening on the mask



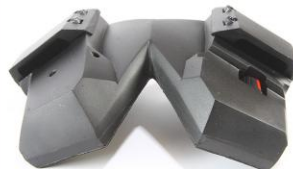
The forehead has 2 main parts - the ballistic plate that surrounds it **will give ballistic protection**



The plate is made of ballistic kevlar and **can stop handgun rounds**



It is powered by a 9v battery and operated by a speed dial from high to low



The air ducts go from the back and the covers can be opened as well



Made of ballistic resin and can stop 12 gauge bird shots.

It has two 20mm fans that can be put in different positions to either blow in air or out

KEY ADVANTAGE: COOLER AIR CIRCULATION

COMPATIBILITY

DEVTAC RONIN Heads-Up Display Recon Instruments



Recon Snow 2 clamp by DEVTAC



BAE SYSTEMS

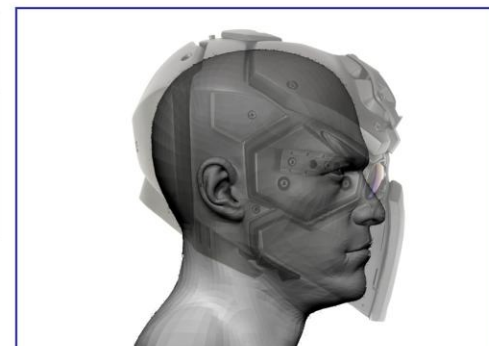
INSPIRED WORK



PERSONALIZED RONIN SIZES

The **DEVTEC Ronin** comes in four sizes

Size	Weight (Kevlar)	Dimensions (Height)	Width	Maximum Head Circumference	Height From Eye To Chin	Length
Large Long	2-7 kg with NVG Shroud and Rails	Outside 23cm / 31cm Inside 20cm / 30cm	Outside 21cm Inside 17.5cm with foam 19cm max	Max 70cm w/o foams 65cm w/ foams	17cm	Outside 28cm Inside 24cm
Large Short	2-6 kg with NVG Shroud and Rails	Outside 23cm / 29cm	Outside 21cm Inside 17.5cm with foam 19cm max	Max 70cm w/o foams 65cm w/ foams	15.5cm	Outside 28cm Inside 24cm
Regular Long	2-4 kg with NVG Shroud and Rails	Outside 23cm / 29.5cm Inside 22cm / 29cm	Outside 19cm Inside 17cm with foam 18cm max	Max 58cm w/o foams 56cm w/ foams	16cm	Outside 27cm Inside 23.5cm
Regular Short	2-3 kg with NVG Shroud and Rails	Outside 23cm / 28cm Inside 22cm / 27cm	Outside 19cm Inside 17cm with foam 18cm max	Max 58cm w/o foams 56cm w/ foams	15cm	Outside 27cm Inside 23.5cm



Wearer's Body Type



Large Long

Max height
200cm
Max weight
300kg
Head circumference
67cm



Large Short

Max height
175cm
Max weight
300kg
Head circumference
67cm



Regular Long

Max height
195cm
Max weight
180kg
Head circumference
58cm



Regular Short

Max height
175cm
Max weight
80kg
Head circumference
58cm

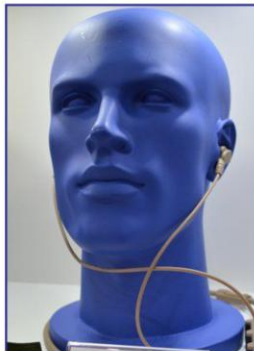
COMMUNICATIONS COMPATIBILITY

In a versatile world and a continuous demand for the highest and most advanced technology, the **DEVTAC Ronin** is compatible with the leading low profile communications systems out there. These products allow you to communicate with absolute clarity, hear your surroundings and at the same time protect your ear from loud noise and blasts.

Esterline

Racal Acoustics RA7000

ELITE Hearing Protection System
Multi-channel communications and hearing protection system with quick-connect headset and calling for efficient operation.



Claru Pro

Provides active hearing protection (NRR25). Hear-thru capability for situational awareness and cellphone/mobile audio connectivity



INVISIO[®]

NO NOISE. ONLY YOUR VOICE.

The US Army's Tactical
Communication and Protective
System



BALLISTICS REPORT & CAPABILITIES

NATIONAL TECHNICAL SYSTEMS MODIFIED/ABBREVIATED NIJ 0106.01 HELMET: BACKFACE DEFORMATION TEST

Date Received: 11/14/16
Via: USPS
Returned Via: UPS

Record No.: DEV16001-2A
Test Date: 11/18/16
Customer: DEVTAC

Test Conditions

Temperature: 70 °F
Humidity: 55 %
Test Standard: Modified/Abbreviated NIJ Standard 0106.01 for Ballistic Helmets
December 1981
IAW Customer Specified Test Instructions
Ammunition: ICW NIJ Standard 0101.04, Level II and IIA
September 2001
Threat Level: II and IIA
Conditioning: Dry

Range 4

Muzzle to Screen 1: 5.00 ft.
Screen 1 - 2: 5.00 ft.
Screen 2 - Target: 6.40 ft.
Midpoint to Target: 8.90 ft.
Target to Witness: 0 ft.
Headform Size: 7 1/4
Witness Plate: NIJ Clay Headform
Barrel Length: 10 in.

Conditioning: Dry			Test / Ammunition Description					Chronograph		Test Results
Model No.	Sample No.	Weight (lbs.)	Shot No. / (Overall)	Impact Location	Degree Obliquity	Caliber	Bullet Weight (gr.) / Type	TIME ss-5	VELOCITY ft/s	BFD (mm) Penetration
DEVATC	2	6.04	1	Right Side Forehead	0°	.357 Mag.	158 / JSP	342.2	1461	25.23
DEVATC	2	6.04	2	Back Plate	0°	.357 Mag.	158 / JSP	354.4	1411	8.96
DEVATC	2	6.04	3	Left Side Forehead	0°	.40 S&W	180 / FMJ FN	467.4	1070	9.38
DEVATC	2	6.04	4	Right Side Forehead	0°	.40 S&W	180 / FMJ FN	465.2	1075	7.98

This test was performed in accordance with the specification requirements and the results properly reflect the ballistic performance of the listed sample.

National Technical Systems, Inc.
7447 W. 33rd St. N.
Wichita, KS 67205 U.S.A.

Phone: 316-832-1600
Fax: 316-832-1602
Email: ustl@nts.com

REMARKS / NOTES:

*Helmet tested as a finished shell with pads, suspension/retention system and chin strap
*Helmet secured to NIJ clay filled headform using suspension/retention system chin strap
*NIJ Clay Filled Headform IAW the dimensions and sizes per Section 5.1.5 and Figure 4.
*See attached digital video of all (4) shots as requested.

Sample Tested:

Manufacturer: DEVTAC
Model No.: DEVTAC
Sample No.: 2
Weight (lbs.): 6.04
Threat Level: TBD

Test Rounds Used:

Shots 1-2: Remington .357 Magnum 158 gr. JSP (22847) @ NIJ 0101.04 Level II velocity of 1430 +/- 30 ft/s
Shots 3-4: Remington .40 S&W 180 gr. FMJ FN (23686) @ NIJ 0101.04 Level IIA velocity of 1055 +/- 30 ft/s

Impact Locations (IAW Customer Specified Locations):

Penetration Test Headform (Clay Filled)

Shot No. 1 (II): Right Side Forehead Plate: Impact on right side forehead plate 1.25" from closest edge of plate
Shot No. 2 (II): Back Plate: Impact centered on back helmet vertical apex ridge; 1.25" from top edge "V" cut
Shot No. 3 (IIA): Left Side Forehead Plate: Impact on left side forehead plate; 2.0" from Shot No. 5; 1.50" from closest edge
Shot No. 4 (IIA): Right Side Forehead Plate: Impact on right side forehead plate; 2.75" from Shot No. 4 & Shot No. 1; 2.0" from closest edge

Test Results:

NIJ 0101.04 Level II - .357 Magnum 158 gr. JSP
Shot No. 1: Bullet stopped in helmet
Shot No. 2: Bullet stopped in helmet

Test Results:

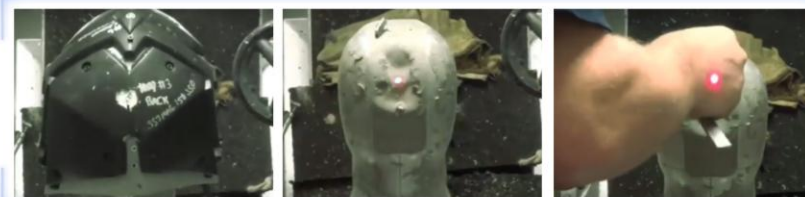
NIJ 0101.04 Level IIA - .40 S&W 180 gr. FMJ FN
Shot No. 3: Bullet stopped in helmet
Shot No. 4: Bullet stopped in helmet

Crawford/Nguyen

DEVTAC RONIN backface signature from .357 Magnum is 8.96mm

NIJ standard allowable back face signature is 18mm.

Because of the separate plates, the helmet is able to reduce the kinetic energy for the whole head.



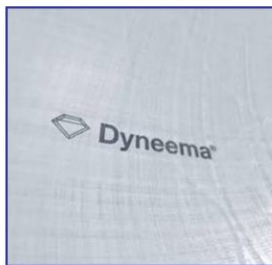
Other available ballistic helmets out there:



BALLISTICS REPORT & CAPABILITIES



The **DEVTAC Ronin** is designed as a plate carrier and the plates materials and ballistic level can vary.



Dyneema



Polyethelene



Cer`amics

Fear is inevitable, courage is achievable, but only when we have the right tools is when we can be courageous.

DO YOU HAVE THE RIGHT TOOLS TO BE EFFECTIVE IN YOUR MISSION?

With the **Devtac Ronin**, we minimize the concerns and provide you with better confidence and ergonomics that has been long over due in breaching missions.

We have created the first full cover helmet that supports cheek weld, defogging system, quick release and access, 80% protection, light weight, impact mitigation, and compatibility with the highest technologies that is 10 years ahead of its time.

At **DEVTAC**, we thinks outside the box because life is priceless.

ADVANCED BALLISTIC HELMET

DEVTAC
RONIN
BREACHER

DEVTAC
RONIN
RESPIRATOR

DEVTAAC

Fear is inevitable, courage is achievable but only when we have the right tools is when we can be courageous.

DO YOU HAVE THE RIGHT TOOLS TO BE EFFECTIVE IN YOUR MISSION?

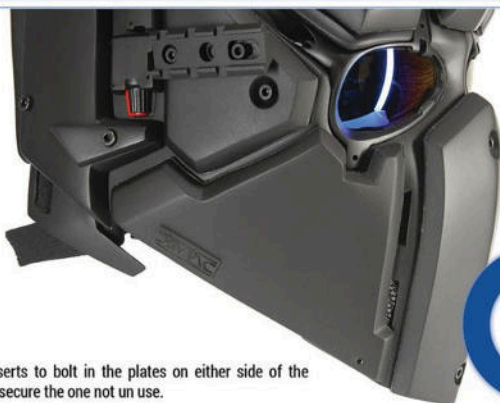
With the **Devtac Ronin**, we minimize the concerns and provide you with better confidence and ergonomics that has been long over due in breaching missions.

We have created the first full cover helmet that supports cheek weld, defogging system, quick release and access, 90% protection, light weight, impact mitigation and compability with the highest technologies that is 10 years ahead of its time.

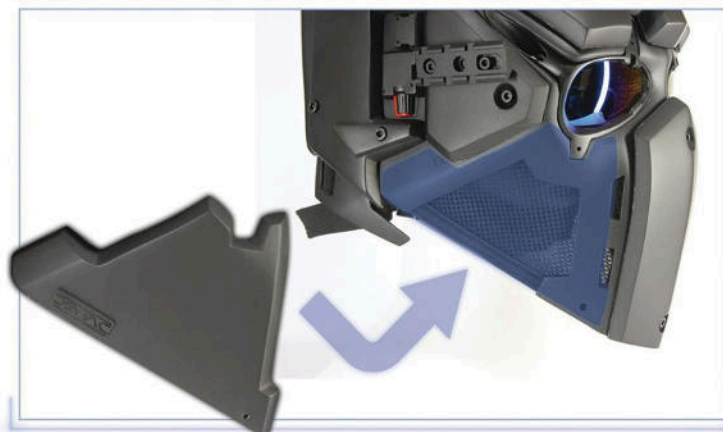


MODEL	BREACHER	RESPIRATOR
		
PURPOSE	Full 90% protection to the head, suspension shock absorption to lessen the kinetic energy from bullet impacts, breaching and room clearing, rappelling, CQB/CQC.	
		Prevents injuries from smoke inhalation, carbon dioxide, harmful chemicals and lung irritation from tear gas.
MATERIAL	- Ballistic Aramid fabric - Nylon 3D air mesh linings for comfort and breathability - Flextech foam cushion for shock absorption	
BALLISTIC LEVEL	NIJ Level 3A.357 SIG FMJ NIJ 0106.01 (modified) aluminium witness (upgradable to level 3)	
WEIGHT	2.5kg – 2.7kg	
SIZE	4 sizes (Adjustable) Large Long, Large Short, Regular Long, Regular Short - Low profile at 20% smaller than traditional helmets	
LENSES	- ANSI Z87.1 lenses - Slide-in lenses for quick replacement - Electronically operated ventilation system for air circulation and micro jet defogging system	
CHEEK PANELS	- Each cheek panel has 3 strong N52 Neodymium magnets. Each magnet can hold up to 1.5kg. - Magnetized detachable cheek panels for Cheek Weld (Allow to aim through your sights with minimal discomfort). Both panels can be removed and also be secure with 4mm bolt	
HELMET	- Has 2 fully adjustable main parts – The mask & the back helmet - Collapsible helmet system for easy access to the face when injured - Ballistic panels Break away system for lessening kinetic energy when struck - Can be converted into just a mask without the back helmet, the mask frame has 6 built-in N52 Neodymium magnets - Heads up display mountable (Optional) - Picatinny rails (Optional) - Night vision & thermal devices mountable (Optional)	
FIRE PROTECTION	100% Fireproof up to 1000c	
MODULARITY	Ambidextrous use	
RESPIRATOR SYSTEM	NO	YES

MAGNETIZED DETACHABLE CHEEK PANELS



Thread inserts to bolt in the plates on either side of the cheeks to secure the one not in use.



Look through your sights without having to bend your neck too much. The DEVTAC Ronin is the first full ballistics helmet capable of resting your cheek on the stock for better aiming.

1

Quick release, magnetized cheek panels for better cheek weld on looking down the sights.

2

Each cheek panel has 3 strong N52 Neodymium magnets. Each magnet can hold up to 1.5kg.

3

The entire helmet is lined with washable Nylon honeycomb 3D airmesh for breathability, airflow and comfort.

4

The mask's frame itself has 6 built-in N52 Neodymium magnets to attach to the panels.



Detachable cheek panels allows easier cheek weld and looking through gun optics with less discomfort. Both panels can be removed and can also be tightly secured with a 4mm bolt.



DEVTAC OPTIONAL ACCESSORIES



OPTION: RESPIRATOR SYSTEM

Mira Safety / AVEC TAPR

Is a tactical use respirator system that allows use of several types of filters, communication system and a voice amplifier.



Honeywell



3M Half Mask



Other compatible respirators that are available to the civilian market.

OPTION: COMMUNICATIONS SYSTEM

In a versatile world and a continuous demand for the highest and most advanced technology, the **DEVTAC Ronin** is compatible with the leading low profile communications systems out there. These products allow you to communicate with absolute clarity, hear your surroundings and at the same time protect your ear from loud noise and blasts.



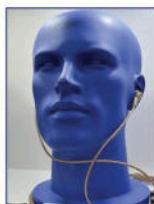
Claru Pro

Provides active hearing protection (NRR25). Hear-thru capability for situational awareness and cellphone/mobile audio connectivity



Racal Acoustics RA7000

ELITE Hearing Protection System
Multi-channel communications and hearing protection system with quick-connect headset and calling for efficient operation.



NO NOISE. ONLY YOUR VOICE.

The US Army's Tactical
Communication and Protective
System



GENERAL COMPARISON

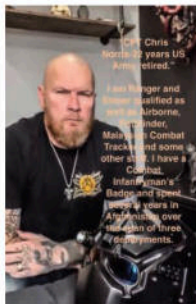
	Helmets	Ballistic Protection Coverage	Weight	Ventilation	Modularity and Capabilities	Cheek Weld	Balance of Weight Distribution	Respirator Capable
	DEV TAC	90%	2.5 - 2.7kg	Electronic ventilation & defogging system	- Heads up display - NVG	YES	YES	YES
	Revision Batlskin	70%	2kg	NONE	NVG	Needs Optic Risers	Needs Counter Weight	Needs to Remove Face Shield
	Ulbrichts	100%	3.5KG	NONE	NONE	NO	YES	Needs to Lift Face Shield
	Team Wendy Exfil	70%	1.8kg	NONE	NVG	Needs Optic Risers	Needs Counter Weight	Needs to Remove Face Shield
	Opscore with Ballistic Mandible	70%	1.8kg	NONE	NVG	Needs Optic Risers	Needs Counter Weight	Needs to Remove Face Shield

REVIEW



Chris Costa

Tactical Instructor
US Coast Guard



Cpt. Chris Norris

22 years US Army
Ranger VETERAN



SSG. Joab Costa

French Foreign
Legion Veteran



WEBSITE



YOUTUBE



INSTAGRAM



www.devtacdesigns.com