

Invictus Series

Specifications Sheet

V1.0



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Invictus Series Process Dimensions

	Maximum Uniform Beam Width	Maximum Web Width	Web Entry Height
1190	1,194 mm	1,600 mm	2,190 mm
	47 in	63 in	86 in
1580	1,580 mm	1,980 mm	2,190 mm
	62 in	78 in	86 in
1950	1,955 mm	2,360 mm	2,190 mm
	77 in	93 in	86 in
2320	2,320 mm	2,740 mm	2,190 mm
	91 in	108 in	86 in

Invictus Series Typical Dose Rate Capacities¹ and Power Supply Options

200 kV Operating Voltage

	150 kW, 500 mA Power Supply	300 kW, 1 A Power Supply	600 kW, 2 A Power Supply
1190	6,500 kGy*m/min	13,500 kGy*m/min	18,000 kGy*m/min
1580	5,000 kGy*m/min	10,000 kGy*m/min	18,000 kGy*m/min
1950	4,000 kGy*m/min	8,500 kGy*m/min	17,000 kGy*m/min
2320	3,500 kGy*m/min	7,000 kGy*m/min	14,600 kGy*m/min

¹ The dose rate capacity of a machine is dependent on the operating voltage, which determines electron efficiency. Listed here are the estimated dose rates of three common operating voltages.

Invictus Series Typical Dose Rate Capacities and Power Supply Options Continued

250 kV Operating Voltage

	150 kW, 500 mA Power Supply	300 kW, 1 A Power Supply	600 kW, 2 A Power Supply
1190	6,500 kGy*m/min	13,500 kGy*m/min	14,500 kGy*m/min
1580	5,000 kGy*m/min	10,000 kGy*m/min	14,500 kGy*m/min
1950	4,000 kGy*m/min	8,000 kGy*m/min	14,500 kGy*m/min
2320	3,500 kGy*m/min	7,000 kGy*m/min	14,500 kGy*m/min

300 kV Operating Voltage

	150 kW, 500 mA Power Supply	300 kW, 1 A Power Supply	600 kW, 2 A Power Supply
1190	5,500 kGy*m/min	10,000 kGy*m/min	10,500 kGy*m/min
1580	4,000 kGy*m/min	8,500 kGy*m/min	10,000 kGy*m/min
1950	3,500 kGy*m/min	7,000 kGy*m/min	10,000 kGy*m/min
2320	2,800 kGy*m/min	5,800 kGy*m/min	10,000 kGy*m/min

Performance Specifications

Operating Voltage Range	100 kV to 300 kV
Dose Uniformity	≤ ±8.0% cross web variation
Surface Radiation Specification	1 μSv/hr or less at 100 mm (4 in) from all surfaces and slots
Maximum Production Speed	400 mpm (1,300 fpm)
Maximum Recommended Product Thickness, Including Splices	3 mm (0.125in)
Beam Window Construction	Single solid copper window; drilled holes; internal cooling
Beam Direction	Side fire (horizontal) or down fire
Web Direction as Viewed from Operating Position	Left to right (270°) or right to left (90°) Must be specified at time of order

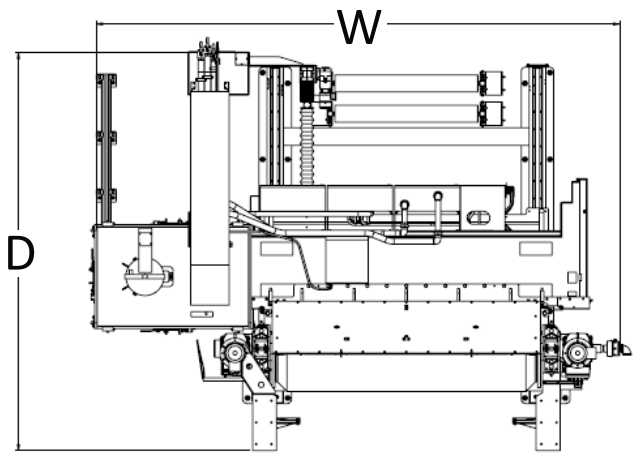
Web Support

Integrated Shield Roll	1 m (39 in) nominal. Carbon steel inner and stainless steel outer shell with 32 RA finish on roll face.
Emergency Stop Time	3 seconds from 400 mpm (1,300 fpm) to stop
Bearing Lubricants	Synthetic, food-machinery grade

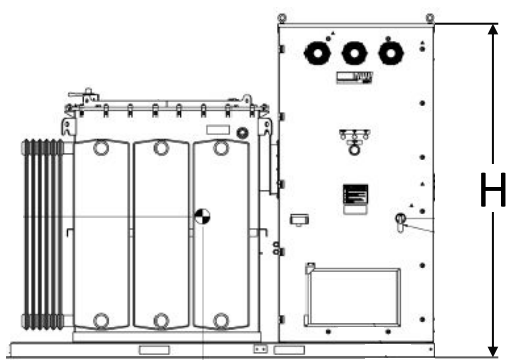
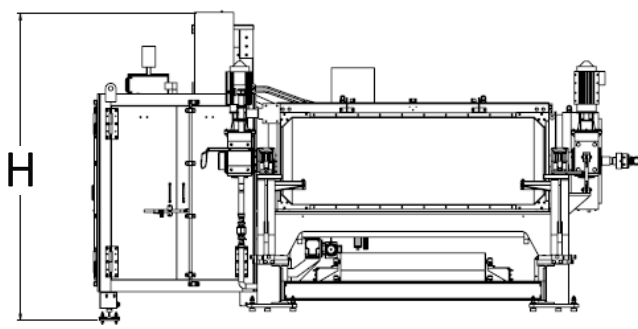
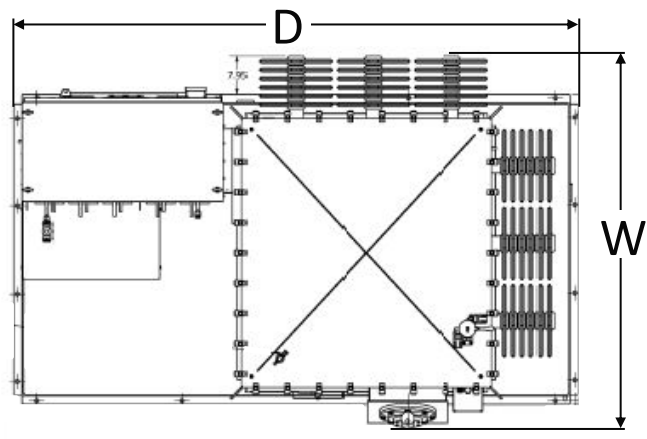
Power Supply and Controls	
High Voltage Power Supply	High frequency IGBT switching design with integrated spark management control; remote mount; oil filled
Maximum High Voltage Power Supply Capacity	150 kW / 300 kV / 500 mA 300 kW / 300 kV / 1 A 600 kW / 300 kV / 2 A
Environment	Indoor rated; 40°C (100°F) maximum ambient temperature.
Insulating Oil	Dow Corning 561 Silicone
High Voltage Cable Length	Up to 30 m (95 ft)
Programmable Logic Controller	Siemens S7 Safety PLC
HMI Device	Siemens Comfort Panel, 380 mm (15 in) touch screen
System Software	Siemens TIA Portal
Communications Network	Profinet

Miscellaneous	
System Color	RAL 9016 white Customized colors available upon request.
Power Supply Color	ANSI 61 Industrial Gray

Ebeam Processor



High Voltage Power Supply



Ebeam Processor Approx. Dimensions (H x W x D) and Weight for Integrated Shield Roll Models

1190	3,700 x 4,700 x 4,300 mm	32,500 kg
	145 x 185 x 170 in	72,000 lbs
1580	3,700 x 5,100 x 4,300 mm	36,500 kg
	145 x 200 x 170 in	80,000 lbs
1950	3,700 x 5,500 x 4,300 mm	40,000 kg
	143 x 215 x 170 in	88,000 lbs
2320	3,700 x 5,900 x 4,300 mm	43,500 kg
	143 x 230 x 170 in	96,000 lbs

High Voltage Power Supply Approximate Dimensions (H x W x D) and Weight

150 kW / 300 kV Power Supply	2,300 x 2,050 x 3,050 mm	4,300 kg
	90 x 80 x 120 in	9,500 lbs
300 kW / 300 kV Power Supply	2,550 x 2,050 x 3,050 mm	4,900 kg
	100 x 80 x 120 in	10,800 lbs
600 kW / 300 kV Power Supply	TBD	TBD
	TBD	TBD

Electrical Requirements

Estimated Power Consumption at Maximum Voltage and Throughput	Specific to system configuration. Consult with manufacturer.
Line Voltage	400 - 480 VAC, \pm 7%, 50/60Hz, 3-phase
Expected Total Line Current	Specific to system configuration. Consult with manufacturer.

Nitrogen Requirements

Inerting Level	200 ppm of O ₂ @ 400 mpm (1310 fpm)
Estimated Flow Required	Specific to system configuration. Consult with manufacturer.
Minimum Supply Pressure at Machine	6.9 bar (100 psig)
Maximum Supply Pressure at Machine	10.3 bar (150 psig)
Nitrogen Quality Requirements	Filtered to 40 μ m 99.999% pure N ₂ (less than 10 ppm of O ₂)

Ozone Requirements

Exhaust Hoods	2 stainless steel exhaust hoods routed to 1 common round duct.
Exhaust Duct Connection	1 round stainless steel flange provided for customer connection. Size is specific to machine configuration. Consult with manufacturer.
Blower, Stack, Damper, Blower Control, and Area Monitor	Customer responsibility (unless other arrangements are made)

Cooling Water Requirements

Total Water Requirement	Specific to system configuration. Consult with manufacturer.
Total Heat Load, Including Cryogenic System	Specific to system configuration. Consult with manufacturer.
Minimum Inlet Temperature	12.7°C (55°F) or 2.7°C (5°F) above dew point, whichever is higher
Maximum Inlet Temperature	29.4°C (85°F)
Minimum Supply Pressure at Machine	The supply pressure must exceed the return pressure by 4.1 bar (60 psi) at the listed flow. <i>Example:</i> If the return line pressure is 2 bar, then the return supply pressure must be no less than 6.1 bar. Also note that adding this flow may further raise the return pressure, which must also be compensated for.
Maximum Pressure at Machine	10.2 bar (150 psig)
Water Quality Requirements	Filtered to 50 µm pH between 7.0 and 8.3 Free of algae and other organics Dissolved mineral content < 75 ppm No zinc coated pipes or fittings at any point in the circuit
Cryogenic Compressor Flow	3.8 LPM (1 gpm)
Cryogenic Compressor Heat Load	3.5 kW (11,945 Btu/hr)