

Integrated Arthroscopy

Platform



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Fluid Management

- 6** CrossFlow
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Common Terms

- Distention** — the expansion of the joint space, which creates room for the procedure
- Flow** — delivery of sterile fluid to the joint; removes debris
- Pressure** — distends the joint (managed by flow)
- Extravasation** — over swelling in the joint due to prolonged fluid passage into the joint during surgery
- Tamponade** — cessation of bleeding occurs when pressure within the joint is at or above patient's MAP (mean arterial pressure)



CrossFlow Integrated Arthroscopy Pump
450-000-000

Features and Benefits

- **Easy Setup** — Insert cassettes, select surgeon profile, and prime pump
- **ReconiSense Technology** — While other pumps provide minimal coordination with resection devices,³ CrossFlow provides true integration with Stryker shavers and RF by optimizing the suction rates for each disposable
- **Customizable Settings** — Unique surgeon-profiles can be pre-programmed to control features like: joint pressure & flow, shaver and RF settings, onscreen displays, and footswitch & hand control settings
- **On-Demand Assistance (ODA)** — A built-in intelligence system provides users with “how to” instructions for each console feature and function

Functions

- **Wash** — Allows for a customized, quick increase in pressure and flow to clear debris, control bleeding, and improve visualization in the joint
- **Clear** — Designed for quick dismissal and flushing of debris from the joint; it increases flow only and does not increase pressure
- **Drain** — Removes fluid from the surgical site for 30 seconds or until the user stops the pump
- **Vacuum** — Removes loose tissue, debris, and fluid from the joint while the pump is operating, without activating the shaver

Performance Modes

Dynamic Mode:

Allows the user to run a more consistent pressure setting, while utilizing ReconiSense Technology to provide a “pressure boost” when a resection device is activated to provide optimal distention during resection

- While in Dynamic Mode the pump works to maintain constant pressure at pump until flow limit is hit
 - **Dynamic High**
 - o Used for high flow (low resistance) hardware
 - o Has the lowest pressure buffer
 - o Best for concerns on extravasation
 - o Slightly faster response time compared to Dynamic Medium
 - **Dynamic Medium**
 - o This is the default setting for Knee, Shoulder, and Hip when selecting Dynamic mode as a preference file
 - o Typically, will use when using 5.8, I/O cannulas, and medium sized cutter cannulas and bridges
 - **Dynamic Low**
 - o Used for low flow (high resistance) hardware
 - o Best for small joint procedures
 - o Has the highest pressure buffer and should not be used with medium flow and high flow hardware

Standard Mode:

Calculates actual pressure reading by imputing the exact scope/cannula combo

- Requires intraoperative adjustments

Recommended Settings

Joint	Dynamic Mode	Pressure	Flow
Knee	High	30	60
Shoulder	High	35	60
Hip	Medium	35	60
Small Joint	Low	25	70

CrossFlow Tube Sets

Features and Benefits

- **Dampening Membrane Window** — Used to absorb energy pulses in fluid to provide steady, continuous fluid flow
- **Pressure Sensor Membrane** — Allows for pump to read the pressure within the cassette during use. As pressure increases within the cassette, the silicone membrane expands and compresses the load cell accordingly.
- **RFID Technology** — Programmed to allow the pump to recognize the cassette inserted and if it is expired
- **Outflow Cassettes** — Labeled outflow tubes for Outflow, RF and Shaver. Cassettes have three tube windows which allow for individual tubes within the triple tube to be pinched off.
 - At all times during pump operation, two stepper motors are activated. When the Shaver or RF probe is activated, the respective stepper motor will retract to allow for suction through the corresponding tube. If neither RF or Shaver is activated, the stepper motor for the Outflow tube is retracted to allow suction.



Inflow Cassette Tubing
450-000-100



Outflow Cassette Tubing
450-000-200

Tubing	Part Number	Description
	450-000-100	CrossFlow Inflow Cassette Tubing
	450-000-200	CrossFlow Outflow Cassette Tubing
	450-000-300	CrossFlow Integrated Cassette Tubing

Day-Use Cassettes

- Consists of the inflow cassette, spike tubing and a short tube with connector compatible with Patient-Use Tubing
- Used for up to 24 hours from first use, 8 hours of active use or 10 cases
- Promotes efficient saline usage

Patient-Use Tubing

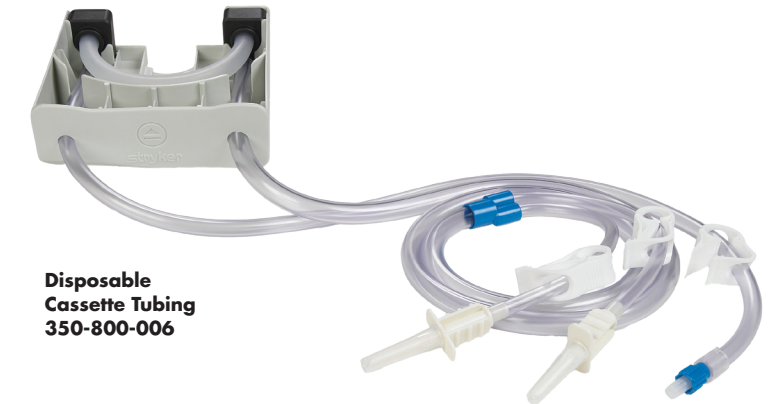
- Consists of single long tube with inflow lure and connector compatible with Day-Use Tubing
- Used for single case only
- After each case, new Patient-Use Tubing attached to reusable Day-Use Tubing
- Backflow Valve
 - Prevents fluid & bacteria backflow

Tubing	450-000-115	Day-Use Tubing
	450-000-125	Patient-Use Tubing

FloSteady



FloSteady Select Arthroscopy Pump
350-800-001



Disposable Cassette Tubing
350-800-006

Features and Benefits

- Battery powered allowing the pump to be used for up to 6 hours
- Space saving, compact, pole mounted design
- Easy to load cassette tubing
- User friendly touch screen interface

Pump	350-800-001	FloSteady Select Arthroscopy Pump
Tubing	350-800-006	Disposable Cassette Tubing (10/box) Used with FloSteady Select Arthroscopy Pump Not made with natural rubber latex

CrossFire

- 12** CrossFire 2
- 14** CrossFire Footswitch
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CrossFire 2 Resection Console

The two-in-one resection platform enables the ability to operate shaver and RF functionality all in one console, thus saving space on the Arthroscopy cart or Video tower in the Operating Room.



CrossFire 2
475-100-000

Features and Benefits

- Saves space in the OR with a **two-in-one** console and footswitch
- **ReconSense** technology allows the CrossFire 2 to integrate with our CrossFlow Arthroscopy Pump, optimizing suction and flow rates per disposable
- The **integrated foot pedal** controls SERFAS Energy Probes, Formula Shaver Handpieces, and CrossFlow functionality

Ability to control CrossFlow functionality

With the CrossFire 2 you can program one button on the Handpiece or Footswitch to control CrossFlow functionality. The most common CrossFlow function programmed is the 'Wash' feature

COAG Improvements

- Increased COAG Power Levels from CrossFire 1

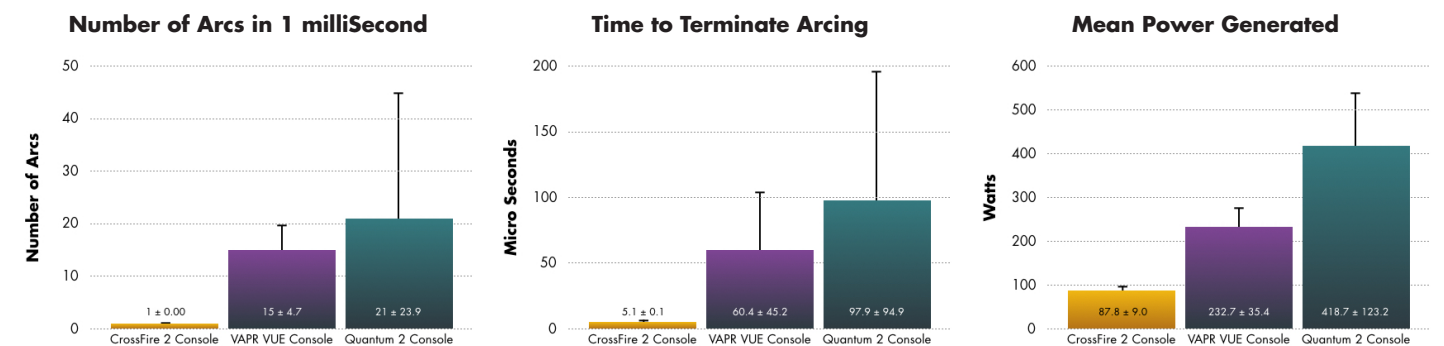
	Power Level	CrossFire 1 Watts	CrossFire 2 Watts
Coagulation	1	17	19
	2	29	44
	3	41	56

- Ability to change COAG intraoperatively

Arc to Scope Detection (scope burns)

When utilizing RF technology, the electrical current from COAG and CUT can burn the distal tip of the arthroscope when the current 'arcs' from the electrode face of the RF probe

- **White paper testing** — We have testing that compared the ability of the Stryker CrossFire 2 and competitive RF generators to detect and terminate arcing
- **Results** — The CrossFire 2 console had significantly fewer arcs in 1 millisecond, took significantly less time to terminate arcing, and generated significantly less power than both the VAPR VUE and the Quantum 2 Consoles⁹
- **Clinical Relevance** — The CrossFire 2 has been shown to detect arcing and limit the current overshoot to protect arthroscopes from damage during RF ablation and coagulation⁹



[Values represent mean ± standard deviation]

In-joint Temperature

Cell necrosis — The unprogrammed death of cells and living tissue (defined by Voss et al as 50 degrees Celsius⁴).

Evidence Matters — We have in-house testing where we ran SERFAS probes and ArthroCare probes under a simulated extreme-use scenario (constant ablation time of 120 seconds at maximum power) to determine whether the Stryker CrossFire or ArthroCare Quantum RF energy systems generated dangerous intra-articular temperatures²

Results — The average intra-articular temperature rose less than 1 degree Celsius during the 120-second maximum-power ablation and all results were well below the dangerous 50 degree Celsius cell-necrosis level indicated by Voss et al⁴

CrossFire Footswitch

The two-in-one footswitch enables the surgeon to control both RF and Shaver functionality. The footswitch is fully customizable and can be adjusted through the Stryker Console Customizer App.



CrossFire Footswitch
475-000-100

Features and Benefits

- **Two-in-one footswitch** — Ability to control both RF and Shaver functionality
- **Save space** — Eliminate the need for a secondary foot pedal
- **Fully customizable** — Programmable button mapping to accommodate surgeon preferences
 - Button II cannot be programmed and is used to toggle between SERFAS and Shaver to control the desired resection device.

Programmable buttons include:

FWD<>REV	Wash
FWD/REV<>OSC	Clear
High<>Low	Drain
Increase Speed	Vacuum
Decrease Speed	Hot Swap
Jog	Decrease Flow Limit
Increase Suction	Increase Flow Limit
Decrease Suction	Disable

Customizer Console Application

Features and Benefits

- Allows the user to work directly with their Stryker Sales Representative to create surgeon profiles containing individualized pump, shaver and RF probe settings directly from their iPad
- Enables users to customize CrossFlow and CrossFire 2 settings like joint pressure/flow, shaver and RF settings, onscreen displays, and footswitch/hand control settings for surgeon profiles
- Nursing staff can select a single surgeon profile at the touch of a button, thereby optimizing surgeon preferences per joint space without having to step individual settings for each case



SERFAS

- 18** SERFAS Radio Frequency Probes
- 20** Recommended Suction Probe Settings
- 21** Recommended Non-Suction Probe Settings
- 22** SERFAS XL Probes

SERFAS Radio Frequency Probes

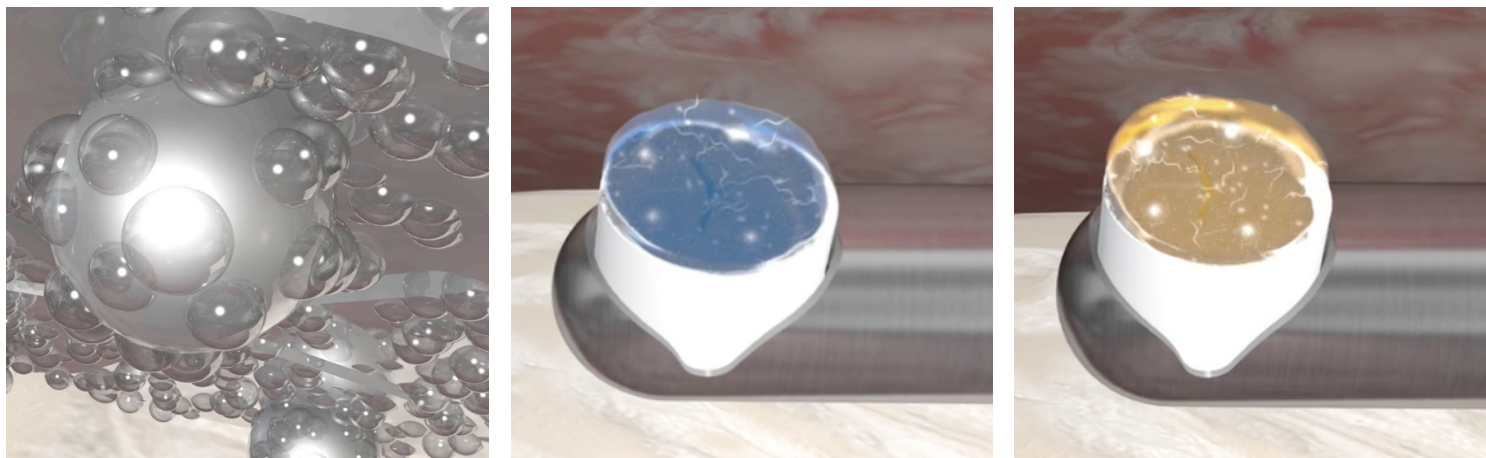
SERFAS Portfolio

Common Terms

Ablation — Occurs when concentrated waveforms generate plasma inside the joint and vaporize the tissue. This requires a conductive medium like normal saline.¹

Return Electrode — An electrical conductor used to make contact with a non-metallic part of a circuit.

Plasma Generation



Maximum allowable wattage sent to electrode

Saline around electrode is boiled

Microbubbles form vapor bubbles which form a vapor layer

Plasma pocket is created – highly charged ions ablate tissue

Stryker offers a variety of suction and non-suction probes to accommodate surgeon and procedural needs. We now offer multiple specialty probes designed to provide improved ablation efficiencies and mass ablation rates.



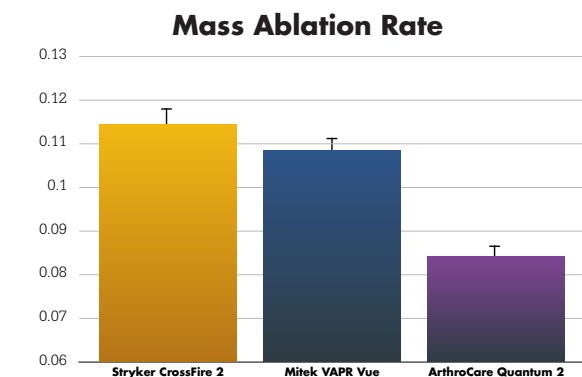
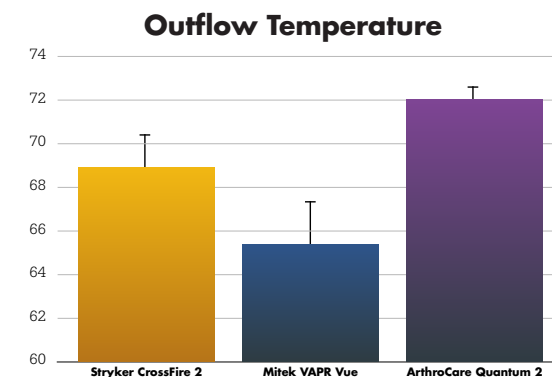
90- S Cruise
4.0mm



90- S Accelerator
4.0mm

90-S Cruise and 90-S Accelerator Features and Benefits

- New distal tip — What does this mean? The 90-S Accelerator and 90-S Cruise were designed with a more rigid distal tip to be more resistant to tip breakages
- New tungsten metal electrode face — The laser cut electrode face utilizes a tungsten sheet metal which is designed to improve quality and probe durability
- Reduced electrode mass — What does this mean? Utilizing a thinner electrode face has been shown to **produce less heat at greater mass ablation rates.**²

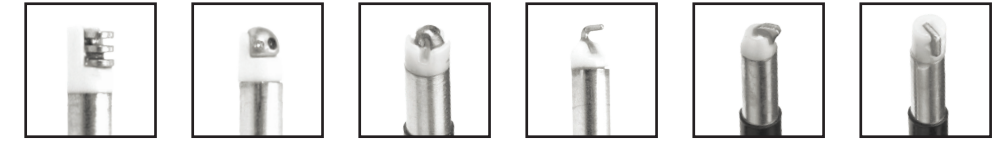


Recommended Suction Probe Settings



Part Number	279-401-200	279-351-400	279-401-100	279-351-100	279-351-250	279-351-230	279-251-101	
Description	90-S Cruise	90-S Accel.	90-S Max	90-S	50-S	30-S	Aardvark	
CUT Default	9	9	9	9	9	9	4	
Knee/Hip	Meniscectomy	8-10	8-10	8-10	8-10	8-10	4-6	
	Posterior Meniscectomy				8-10	8-10	4-6	
	Lateral Release	9-11	9-11	9-11	9-11			
	Soft Tissue Debridement	9-11	9-11	9-11	9-11	8-10	8-10	4-6
	Articular Cartilage Debridement	2-4	2-4	2-4	2-4	2-4	2-4	2-4
Shoulder	Subacromial Decompression	9-11	9-11	9-11	9-11			
	Capsular Release	8-10	8-10	8-10	8-10			
	Tissue Tightening	1-2	1-2	1-2	1-2			
Small Joint	TFCC						4-6	
	Tendon Debridement						4-6	
	Chondroplasty						2-4	
	Tissue Tightening						2-3	

Recommended Non-Suction Probe Settings



Part Number	279-350-201	279-350-301	279-350-401	279-350-501	279-250-101	279-250-201
Description	Lateral	Contour	Direct	Hook	Micro-Claw	Micro-Brush
CUT Default	5	5	5	5	4	4
Knee/Hip	Meniscectomy	5-7		5-7		
	Posterior Meniscectomy			5-7	5-6	
	Lateral Release	5-7			5-7	
	Soft Tissue Debridement	5-7	6-8	5-7	2-4	
	Articular Cartilage Debridement	2-4	2-4	2-4		
Shoulder	Subacromial Decompression	5-7	6-8			
	Capsular Release	5-7			5-7	
	Tissue Tightening	2-3	2-3	2-3		
Small Joint	TFCC				4-6	4-6
	Tendon Debridement				2-3	2-3
	Chondroplasty				2-4	2-4
	Tissue Tightening				2-3	2-3

SERFAS XL Probes

Our SERFAS Energy probes have been lengthened for the hip, allowing for the full range of resection challenges. Our probes are rigid and balanced for hip-joint leverage to ablate and manipulate tissue.

- 180mm working length for optimal hip resection
- Optimized for specific procedures:
 - Hook Probe
 - o Precision cutting for a hip capsulotomy
 - 50-S
 - o Access around the femoral head
 - 90-S
 - o Our most universal tip design is ideal for all ablation and suction requirements



CrossBlade

24 CrossBlade Series Cutters

29 Diamond Burs

CrossBlade Series Cutters

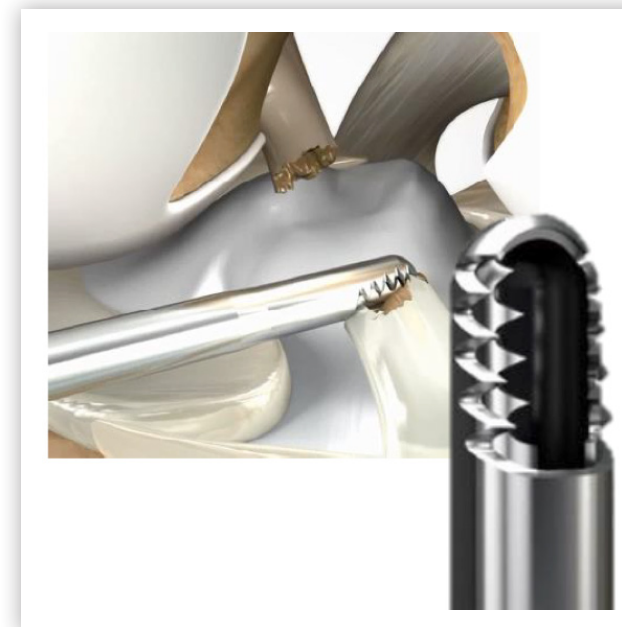
Tomcat HC (4.0, 5.0mm)



Features and Benefits

Stryker has invested in a new, state-of-the-art manufacturing facility that utilizes patented laser cutting technology to provide best in-class shear angled, cutting surfaces designed for a variety of procedures.^{5, 6, 7}

- Maximize cutting performance
- Reduce particle generation
- Increased resistance to cutter clogging
- Redesigned the drive shaft and hub, which provides less flexion at higher torques, increased stiffness, and reduced vibrations
- 20mm laser marking ruler on the distal tip of the housing to help you better navigate joint spaces.



With serrated edges on the inner and outer cutting surfaces, Tomcat is Stryker's most aggressive soft tissue cutter.

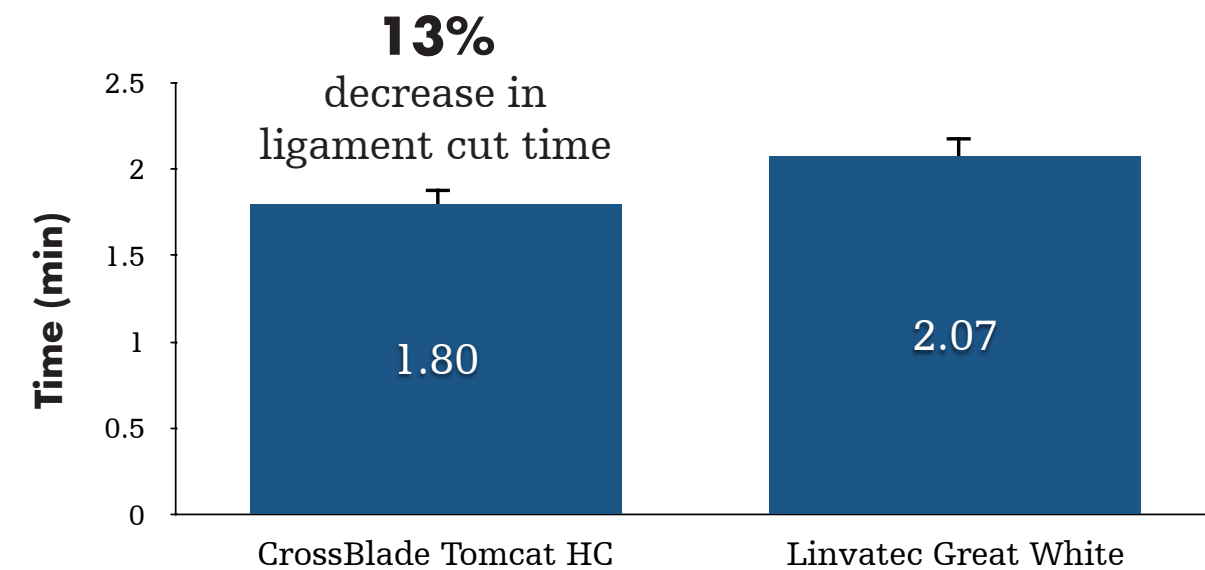
Specialized:

Knee – ACL and ACL stump resection. Great for patients with a lot of scar tissue.

CrossBlade Series Cutters and Diamond Burs

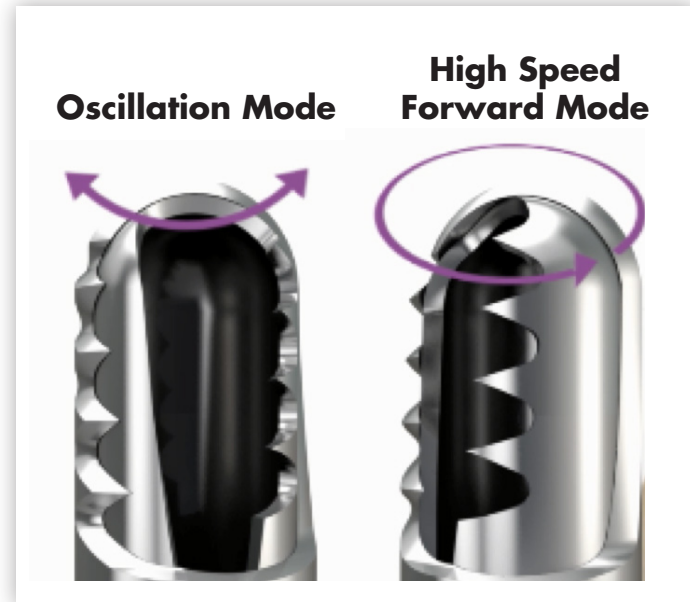
Premium (5/box)

	3.5 mm	4.0 mm	5.0 mm	5.5 mm
Dual Edge	475-331-000	475-341-000	—	475-361-000
Tomcat HC	—	475-345-000	475-355-000	—
Aggressive Max	475-337-000	—	—	—
Smooth Bite	475-333-000	—	—	—
Diamond Bur	—	485-840-000	—	485-860-000



Graph indicates time it takes for ligament resection⁸

Dual Edge (3.5, 4.0, 5.5mm)



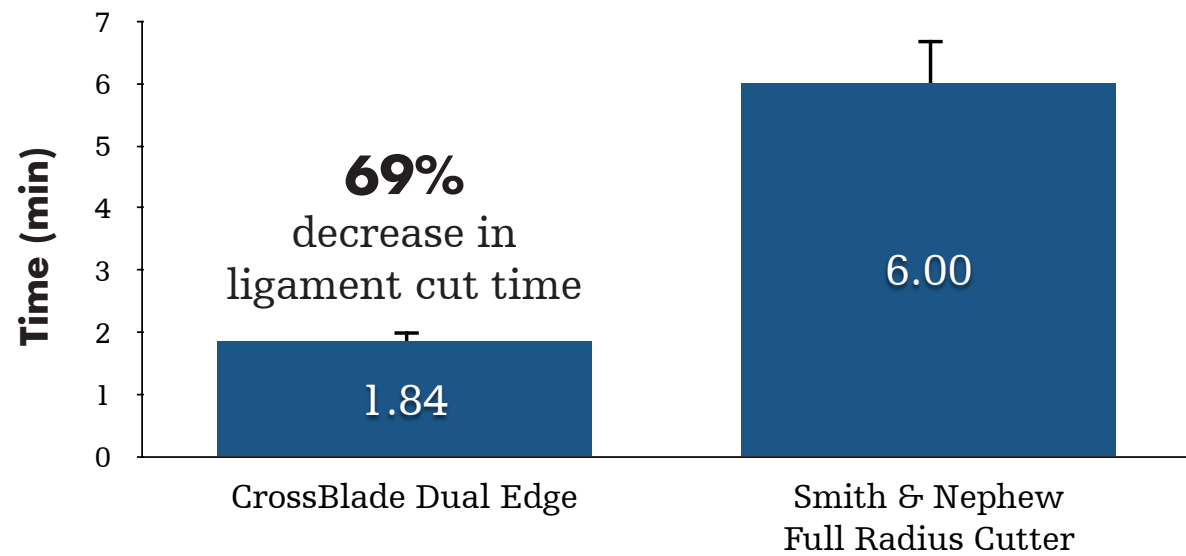
An all-in-one functionality designed to maximize both soft tissue resection and bone debridement. Can be positioned as a cost saver by reducing the need to open a bur.

Specialized:

Shoulder – Rotator cuff and Sub Acromial Decompression (4.0 & 5.5mm)

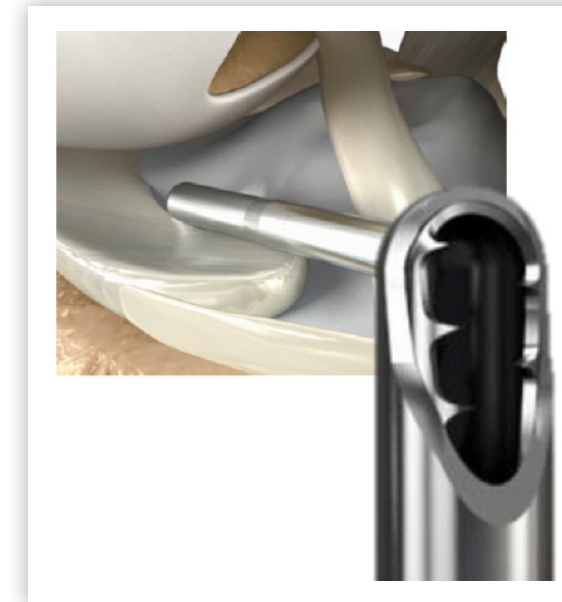
Shoulder – Labral repair and glenoid boney work (3.5mm)

Knee – ACL stump and Notchplasty (5.5mm)



Graph indicates time it takes for ligament resection⁸

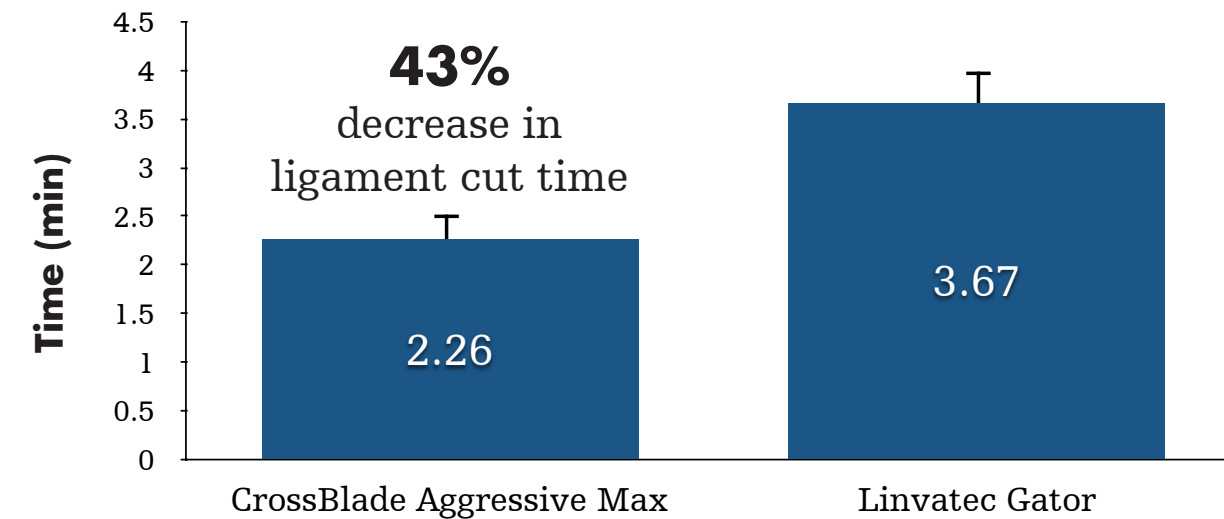
Aggressive Max (3.5mm)



With aggressive teeth on the inner-housing, the smooth edge on the large outer window directs the cutting surface away from articular cartilage and designed to leave a smooth finish.

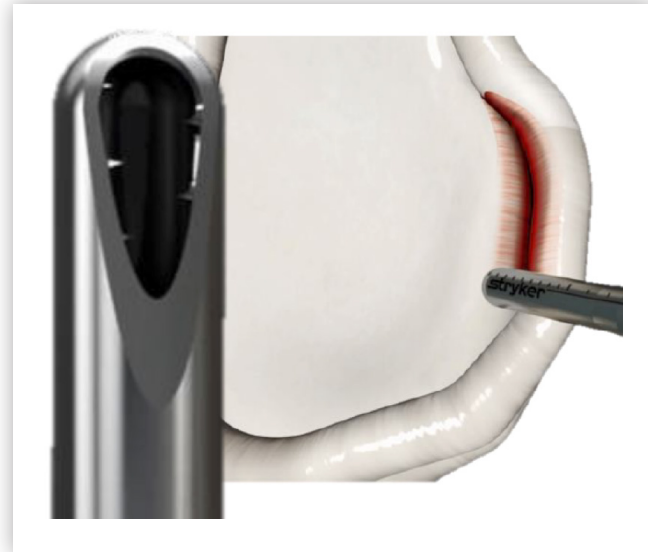
Specialized:

Knee – The large cutting window can aggressively take down the ACL, while also gently clean up the meniscus with the smooth outer housing. The versatility makes it a great option in the Knee.



Graph indicates time it takes for ligament resection⁸

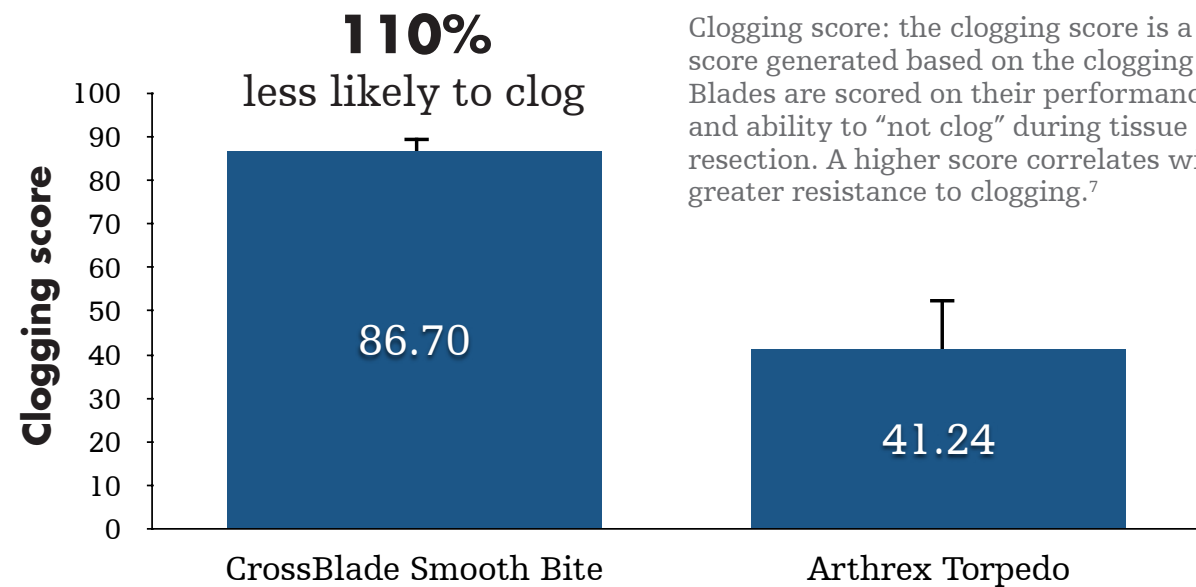
Smooth Bite (3.5mm)



The small and unique window style is designed for cartilage debridement and tissue removal to leave a smooth surface finish.

Specialized:

- Knee** – Gentle on the meniscus and excels in the posterior compartment.
- Shoulder** – Labral repairs.



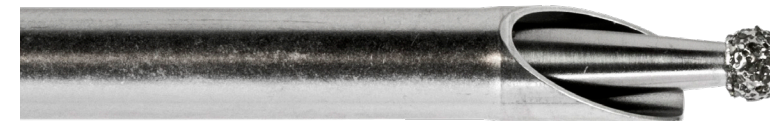
Clogging score: the clogging score is a score generated based on the clogging test. Blades are scored on their performance and ability to “not clog” during tissue resection. A higher score correlates with a greater resistance to clogging.⁷

CrossBlade XL Diamond Burs (4.0, 5.5mm)

Our CrossBlade Series Burs are designed to increase control while debriding bone and to reduce the risk of unintentionally damaging hyaline cartilage.

Features and Benefits

- 71% reduction on average skipping distance⁸
- A high number of small cutting edges are designed to increase control and in return reduce the difficulty in creating the desired bone shape
 - Inherently reduces the risk of unintentionally damaging hyaline cartilage



“The diamond bur gives you the combination of enhanced power and better tactile feedback than any other bur on the market!”

Shane Nho, M.D.*
RUSH University Medical



“The diamond bur is lightyears ahead of traditional burs. The cutting surface increases OR efficiency by reducing osteoplasty time while reducing chatter and improving responsiveness. The diamond bur should be standard for all hip arthroscopies.”

James Genuario, M.D.*
Steadman Hawkins Clinic Denver

Formula

- 32** Formula Series Shavers & Burs
- 33** Top Performers
- 34** Complete Formula Portfolio

Formula Series Shavers & Burs

Features and Benefits

- Ability to run up to 12,000 RPM's
- RFID Chip Technology – each Stryker disposable is individually preprogrammed with optimized settings
- Diverse portfolio
- Straight, Hip, Small-Joint, and Angled offerings
- The 'subchondral drill' is designed for efficient MicroFracture by plugging directly into the Formula Handpiece

Direction	Speed (RPM's)
FWD	12,000
REV	9,000
OSC	3,000
Angled Options	6,000
Small Joint	2.5mm > can run at 6000 2.5mm < 3000



Top Performers



Aggressive Plus (3.5, 4.0, 5.0, 5.5mm)

The #1 Formula seller and great all purpose cutter. The serrated edges on the inner housing and smooth cutting surface on the outer housing are designed to prevent scuffing of cartilage upon on entry, provide a smooth finish on soft tissue, and allow for aggressive resection when needed.

Specialized:

Knee & Shoulder – Meniscus, Cartilage, and Synovium



Resector (3.5, 4.0, 5.0, 5.5mm)

Our most complete non-serrated cutter. The Resector works well as a dual purpose soft tissue and bone cutting shaver.

Specialized:

Knee & Shoulder – Meniscus, Cartilage, Synovium, and bone. Great for Sub-Acromial Decompressions and Notchplasties. Can be positioned as a cost saver for a two in one offering.



Tomcat (3.5, 4.0, 5.0, 5.5mm)

The Formula line's most aggressive cutter with serrated edges on the inner and outer cutting surfaces. Excels in rapid resection of soft tissue.

Specialized:

Knee – ACL and ACL stump resection

Formula Series Shavers & Burs



Formula Series Cutters Standard (5/box)

	3.5 mm	4.0 mm	5.0 mm	5.5 mm
Resector	375-532-000	375-542-000	375-552-000	375-562-000
Aggressive Plus	375-534-000	375-544-000	375-554-000	375-564-000
Tomcat	375-535-000	375-545-000	375-555-000	375-565-000
Scalloped	—	375-546-000	—	—
Cougar End	—	375-541-000	—	—
End	—	375-747-000	—	—
Double Bite	—	375-543-000	—	—
Slotted Whisker	—	375-548-000	—	—
Whisker	—	375-549-000	—	—

Angled (5/box)

	4.0 mm	4.5 mm	5.0 mm
Resector	—	380-542-150	—
Aggressive Plus	380-544-100	380-544-150	380-554-100
Tomcat	380-545-100	380-545-150	380-555-100
Double Bite	—	380-543-150	—

Small Joint

Cutters and burs	Part number	Description
	275-627-000	2.5 mm Small-Joint Full Radius Cutter (5/box)
	275-637-000	3.5 mm Small-Joint Full Radius Cutter (5/box)
	275-628-000	2.5 mm Small-Joint Aggressive Cutter (5/box)
	275-638-000	3.5 mm Small-Joint Aggressive Cutter (5/box)
	275-641-000	2.0 mm Small-Joint Hooded Abrasion Bur (5/box)
	275-647-000	3.0 mm Small-Joint Hooded Abrasion Bur (5/box)



Formula Series Burs Standard (5/box)

	3.5 mm	4.0 mm	5.0 mm	5.5 mm
Standard 12-Flute Barrel	—	375-941-012	375-951-112	375-951-012
Standard 12-Flute Round	—	375-940-012	375-950-112	375-950-012
Aggressive 6-Flute Barrel	—	375-941-000	375-951-100	375-951-000
Aggressive 6-Flute Round	375-930-000	375-940-000	375-950-100	375-950-000
Unhooded 6-Flute Barrel	—	375-941-200	—	375-951-200
Unhooded 6-Flute Round	—	375-940-200	—	375-950-200
Egg Bur 6-Flute	—	—	—	375-952-000

Speciality (5/box)

	Part number	Outer diameter
6-Flute SLAP	375-941-500	4.0 mm
Auger	375-450-500	5.0 mm
Subchondral Drill (1.5 mm Drill Tip)	375-832-000	4.0 mm
6-Flute Left Helix Barrel Bur	375-953-000	5.5 mm
12-Flute Left Helix Barrel Bur	375-953-012	5.5 mm

Formula Series XL Cutters and Burs

Hip Length (5/box)

Cutters	Part number	Description
	385-544-000	4.0 mm Aggressive Plus, Long Hip Cutter
	385-544-100	4.0 mm Angled Aggressive Plus, Long Hip Cutter
	385-545-000	4.0 mm Tomcat, Long Hip Cutter
	385-545-100	4.0 mm Angled Tomcat, Long Hip Cutter
	385-554-000	5.0 mm Straight Aggressive Plus, Long Hip Cutter
	385-552-000	5.0 mm Straight Resector, Long Hip Cutter

Burs	Part number	Description
	385-943-000	4.0 mm Long Hip 8-Flute Pear Bur
	385-953-008	5.5 mm Long Hip 8-Flute Pear Bur
	385-950-008	5.5 mm Long Hip 8-Flute Round Bur
	385-951-008	5.5 mm Long Hip 8-Flute Barrel Bur

References

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6. Ligament Consumption Test: TP11560 Data: TR15927; DHFD11511; DHD13100; TR16038
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A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery.

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