

BD Atomic Edge™

Sharpness Redefined



Helping all people
live healthy lives





BD's first silicon ophthalmic blade available designed to combine diamond-like performance with single-use safety.

Envision the technology

// Surgeons can now look forward to an alternative that cuts similar in fashion to a diamond blade. //

— John Marshall, PhD

What Would the Ideal Ophthalmic Blade be Like?

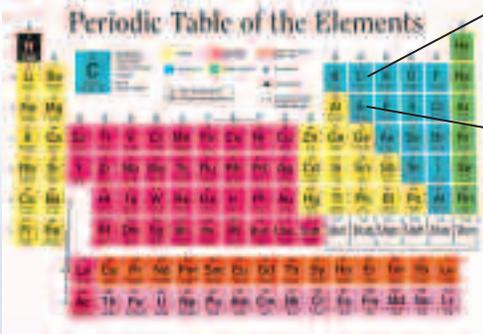
Imagine a clean-sheet solution. Exactly how sharp would it be? Precisely what dimensions? Specifically how would it handle and perform? What drawbacks would it eliminate? What would it cost?

With that ideal in mind, we worked with leading surgeons to design an entirely new blade. From there, all it took was a manufacturing revolution. The result is BD Atomic Edge™.

The Material: Silicon

The ideal blade material: pure, plentiful, and able to be fashioned into a blade with the desired sharpness and blade dimensions. Silicon was the potential answer. Silicon is as abundant as diamonds are rare, yet both are Group IV elements and close neighbors on the periodic table. They share the same diamond-cubic crystalline structure, and thus have similar material characteristics. But could silicon be made into an ophthalmic blade?

Similar to a diamond blade in character and design



A periodic table of elements with Carbon (C) and Silicon (Si) highlighted in blue. Carbon is located in Group 14, Period 2, and Silicon is in Group 14, Period 3. Arrows point from the text labels to these elements.

Carbon
(Diamond)

Silicon

silicon

the process

The Process: Semiconductor Wafer Slicing

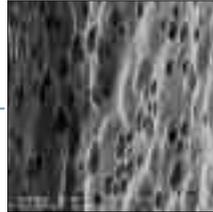
The solution lay in semiconductor manufacturing. BD's pioneering process uses silicon wafer-slicing technology to produce a high-purity silicon blade.

The BD Atomic Edge micromanufacture process is designed to ensure a high degree of uniformity and consistency. The wafer-fabrication process eliminates the typical grinding process used to manufacture some metal blades.

Blade Edge Radius

Scanning Electron Microscopy (SEM) photos at 10,000x magnification

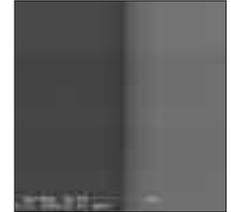
Metal



Atomic Edge



Diamond

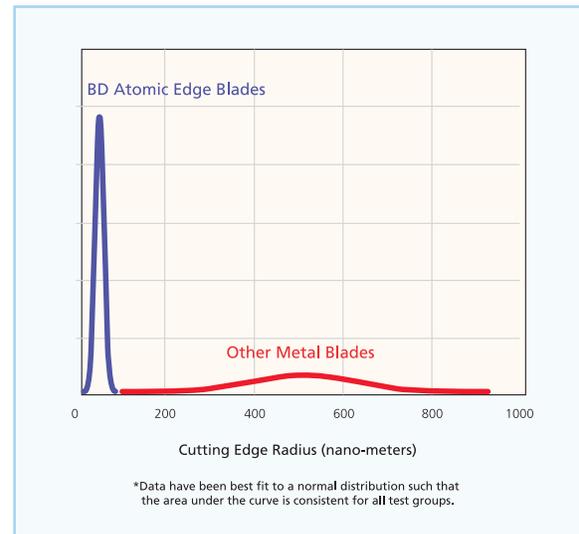


How Do You Measure Success?

Creating a better steel blade is easy — we know what to measure and what to compare the results to. But how do you measure success where no one has had any, such as with a silicon blade?

You start with surgeon surveys and interviews. You take the parameters they believe are important and create new testing methods to measure them. You test yourself against the rest of the industry — but then you set the bar higher and test yourself to a new standard for the new technology you created.

Cutting Edge Radius (nm)*



Single-use Design

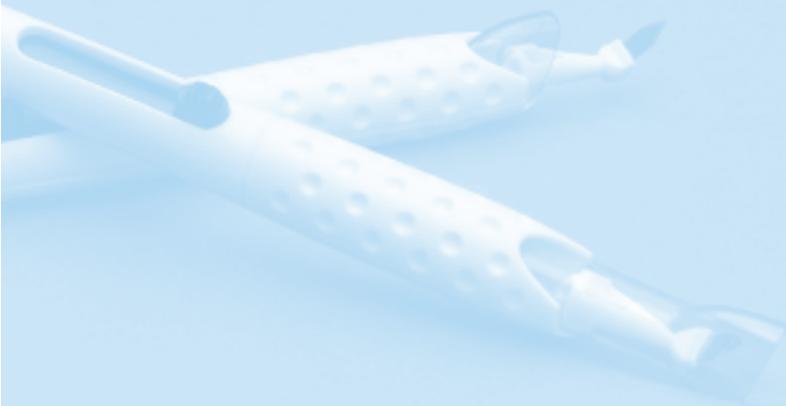
The System: Safety-Engineered, Disposable

Atomic Edge incorporates BD's industry-leading safety features, and meets all NIOSH guidelines for safe disposal and sharps-injury prevention.

A new design feature, a non-autoclavable handle, discourages the blade's reuse.

Non-autoclavable handle

Integrated retractable blade shield



// This blade may revolutionize the way cataract surgeons think of disposable blades, as well as reduce the risk of sharps injuries in the operating room. In my opinion, these blades are clinically indistinguishable from diamond blades in incision quality and are available at a lower cost. Furthermore, with the risk of deadly blood borne pathogens including hepatitis C, HIV and CJD, the safety feature is a welcome addition to disposable blades. //

— Francis Mah, MD

// In my experience, the BD Atomic Edge blades are comparable to diamond blades — so much so that it was hard to tell the difference. This new blade technology, combined with the retractable safety shield and the advantages of a single-use blade, will let me create the best possible incisions while protecting my staff from the risks of sharps injuries and eliminating the maintenance burden that comes with multiple use products. //

— Randall Olson, MD
Consultant for BD



Atomic Edge Performance

Correct, consistent and predictable incision architecture is vital in an ophthalmic blade, and the first step is sharpness. BD Atomic Edge features an edge radius of approximately 40 nm, versus 20 nm for the typical diamond blade and approximately 600 nm for metal.

The blade's total shape is designed for incision control. The double-bevel design may assist in ensuring a vertical penetration. (Single-bevel blades tend to shift trajectory.) Non-sharpened sides minimize the possibility of side-cutting. The tip angle has been designed to produce the correct penetration depth, resisting over-penetration.

Atomic Edge Protection

Single use promotes safety by reducing the instrument's handling to a minimum, as well as by minimizing the potential for transmitting disease to the patient. The BD Atomic Edge knife incorporates a new handle, manufactured from non-autoclavable material, which discourages reuse.

The Atomic Edge system incorporates BD's well-known safety innovations. The blade shield's slider mechanism is thumb or finger-operated, positive-lock, and designed to be intuitive to use. No one but the surgeon need ever handle the instrument with the blade exposed.

Atomic Edge Simplicity

Single-use puts an end to off-site sharpening and maintenance of diamond knives, simplifying sharps administration.

Protection | Performance | Simplicity

Meeting the Specific Needs of Ophthalmic Surgery



// The BD Atomic Edge Blade may satisfy the cataract surgeon's desire for the quality of a diamond knife combined with disposability and a lower cost. Disposable instrumentation no longer means a compromise in performance, and it has the added advantage of avoiding the possible transmission of disease due to reuse. //

— Romesh Angunawela, MD, MRCOphth

Technology

The BD Atomic Edge blade's total shape is designed for maximum incision control. The double bevel design is utilized to promote a more vertical penetration plane, as opposed to single bevel blades which can shift in their trajectory depending on the bevel orientation. The tip angle has been designed to promote proper penetration depth and resist over penetration into the anterior chamber. Non-sharpened sides reduce the potential for side-cutting and inadvertent wound enlargement.

To promote clean incisions and decrease resistance during incision creation, the BD Atomic Edge blades are designed to have the smoothest non-diamond surface in the industry.

Protection | Performance | Simplicity



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