

*The 21. Century Bows*





# *From Passion to Perfection*

You'll probably never forget the first moment you played an Arcus bow. Freedom from gravity with all limits feeling lifted away. It's almost magical how easy a clear and full sound can be drawn. The articulation is crisp and clear and off-string bowings can be played with total ease and control.

But how is this possible? Have we not learned that the old French bows are unsurpassable? Fortunately, the world didn't stop turning and new technologies and materials have become available. More than 20 years of research and development have lead to rather spectacular results, and just as you would probably not want to play on unwound gut strings, or give up your chinrest and finetuners, you will also not want to part with your Arcus bow again.

The only question remaining is which one is the perfect match for you. In this catalogue you'll find the whole range of the Arcus bows explained, including some insight into our research and development.

Yours,

*Bernd Müsing*



# *A Brief History of the Bow*

The invention of the bow can probably be attributed to the Mongols. The strings of their war-bows were made of horse tail hair, covered in resin to protect them against wear and tear. One day such a bow must have come in contact with a stringed instrument, an event that triggered the development of bowed instruments. From China they spread along the Silk Road all the way to medieval Spain where the rebec and fiddle evolved.



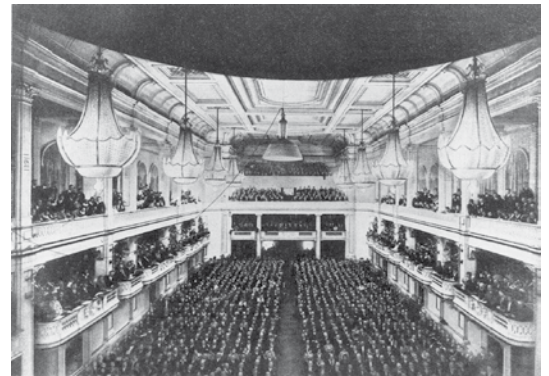
During the Renaissance, the violin family evolved in Northern Italy and was perfected in the Baroque period. The bow of this era was still just a stick crafted from various local woods, strung with horsehair and tightened by clipping in a triangular frog. Tropical hardwoods with high strength and resiliency like snakewood and pernambuco were used more often from the 18<sup>th</sup> century onwards.



Bow with clip in frog (until about 1830)

In the early 19<sup>th</sup> century a longer and heavier Romantic bow evolved. By the end of the century it received a metal winding to bring the balance point further down. At the same time thin high tensile steel wire became available, to be employed immediately as E-strings by concert violinists. When the electrification of the big cities in Europe and America began, copper wire was mass produced and thus became affordable for windings of the lower strings.

These new and heavier strings allowed a much stronger playing style to fill the newly built, often huge, concert halls with sound. This required more stiffer bows, but wooden sticks could be made only slightly more resilient, as they would have become too heavy otherwise.



Concert hall ca. 1900

Around 1830 Vuillaume developed a hollow metal bow with improved resiliency. This was the bow Paganini preferred. But it had a serious disadvantage: because of the extremely thin walls and the low strength of the metal, the sticks were easily dented and many simply folded.



Metal bow by Vuillaume (ca. 1840)

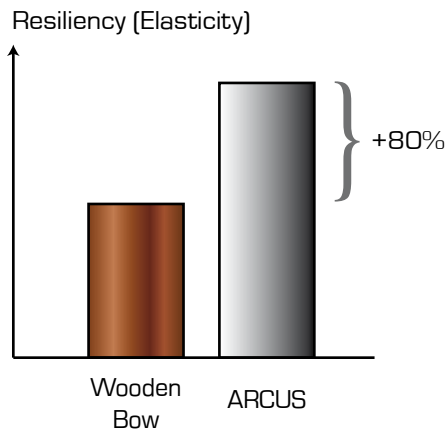
The first carbon fiber bows were made in the 1980's. They offered an improved resiliency, but the large resin content (epoxy) dampened the high frequency overtones so that the sound lost its brilliance.

In 1996 Bernd Müsing devised a completely new bow with a much more resilient stick that would have to be made from high density carbon fiber compounds with an extremely low resin content. After years of research the production of the Arcus bows began in 1999 and they soon began to conquer the concert halls of the world.



Simple carbon bow with high resin content

# The Concept of the Arcus Bows



Average Weight	Baroque	ARCUS	Romantic
Violin	40 g	<b>50 g</b>	60 g
Viola	48 g	<b>58 g</b>	70 g
Cello	58 g	<b>70 g</b>	82 g
Bass French	100 g	<b>110 g</b>	130 g
Bass German	110 g	<b>124 g</b>	140 g

To provide a natural and comfortable feel we match the elasticity of the stick to the tension of the strings. Romantic bows are simply too weak for modern strings. We want to play double stops in fortissimo without the stick bottoming out hard on the strings, which spoils the sound and damages the bow hair.

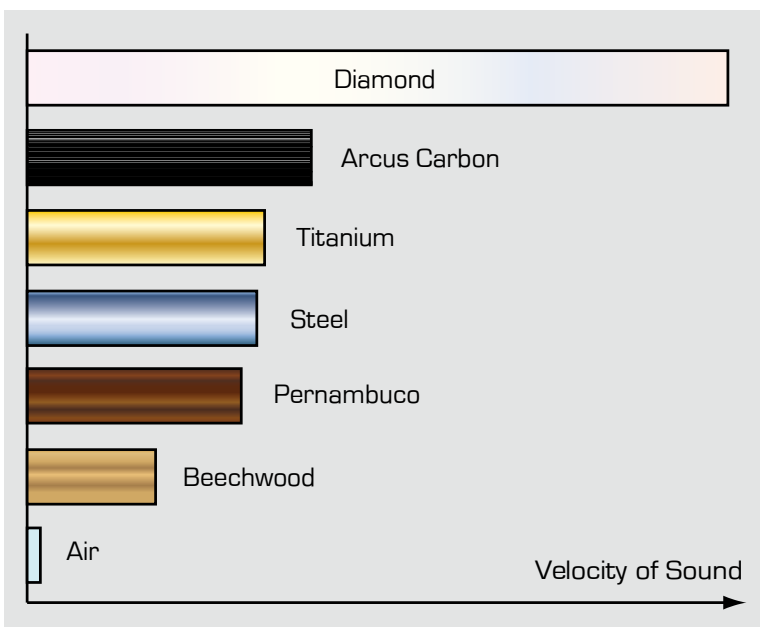
One also wants to reduce the weight of the bow to improve its agility. This allows us to play Baroque and Classical music with perfect subtlety. A weight half way between a Baroque and a Romantic bow makes it possible to play all repertoire properly.

The key problem to overcome is that conventional materials are either too heavy or too soft to make such a bow. It can only be achieved with a hollow stick made from high density carbon fiber composite. This design could also offer superior resonance quality, as hollow objects vibrate much easier than dense, solid bodies.

The especially high velocity of sound of such a composite (7300 m/s) can also improve the sound. High quality pernambuco usually shows values of around 5,500 m/s.

By reducing the weight and increasing the stiffness of the stick the fundamental resonance of the bows will go up. In our violin bows it goes up about one octave, from around 50 Hz to 100 Hz, or from G1 to G2. Interestingly this alone doesn't change the sound colour of the instrument. But as the overtones also increase by one octave, the spectrum is extended out even further, reaching much higher values. The result is a clearer sound with improved projection.

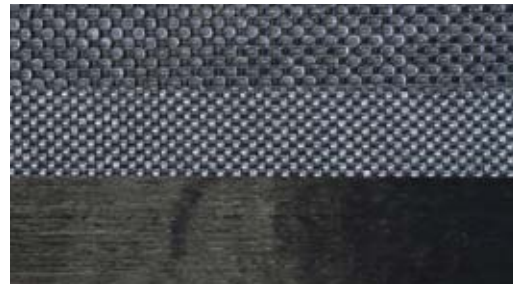
A fascinating and rather unique quality of carbon fibers is that they practically last forever. Every metal and wooden object has a limited lifespan when subjected repeatedly to vibration and stress. A properly made carbon fiber bow on the other hand will last centuries without losing its curve or its elasticity. This is why we grant a 30 year warranty for our sticks. Most likely our bows will still be played centuries from now.



**30 Year Warranty**  
on the stick of all Arcus bows

# Research, Development and Manufacturing

The core material of the Arcus bow sticks are carbon prepregs: thin sheets of carbon fibers impregnated with epoxy resin. Every stick is made from several layers of these prepregs rolled up to a tube. The tip is built from more than a dozen precisely cut pieces. All this is put into a steel mould and heated under high pressure to cure and to squeeze out as much resin as possible. When the mold is cooled down, the raw stick is taken out and will be finished similar to wooden bows.



Carbon Prepregs

One of our specialties is the metal tip plates that we put on all our bows. Not only do they add to the beauty of the bow, but they help to achieve the ideal balance. They are also much more robust than conventional materials like ivory or bone.

Sterling Silver  
Tip Plate



Two metal bearings support the screw, providing an everlasting smooth action.

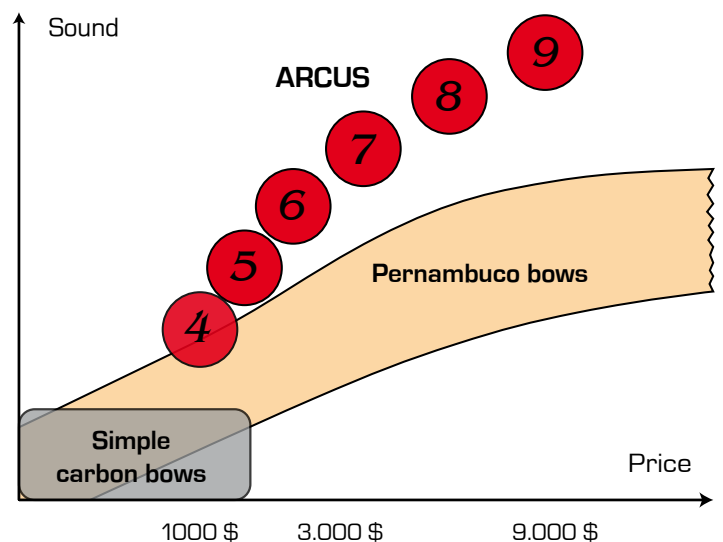
We use only the finest selected bow hair that we fix with traditional, hand cut wooden plugs.

For the different series of our bows we use various thicknesses and varieties of carbon prepregs to achieve the desired resiliency, weight and tone precisely.



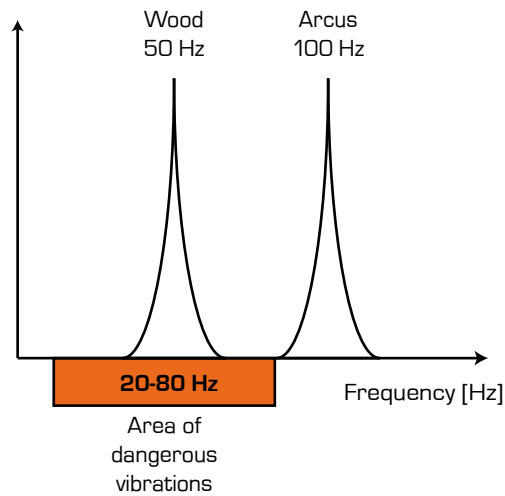
The only thing we really can't control is the variation in the sound quality of each individual stick. This totally depends on the individual skills of each bowmaker and on the good luck of how the fibers arrange themselves during the curing process. Take a close look and you'll discover the individual structure of the fibers in every stick. This is what gives every one of them its distinct playing characteristics and sound.

As the sticks are finished we classify them according to their resonance quality. The grade 4 sticks are a step up from simple carbon bows and lower grade pernambuco bows. Our grade 5 and 6 bows are a match to the finest wooden bows. From grade 7 and up they pull a sound that is richer and stronger than any traditional bow and offer an unmatched range of overtones.



# Free of Pain and Fatigue

Fundamentals of different bows



Most string players regularly experience a tired bow arm after long hours of playing. Many suffer from pain in the thumb, tendons, wrist, elbow or shoulder. Some even have to stop playing altogether because the pain becomes unbearable. We discovered that the root cause of this problem is mostly the low frequency vibrations of traditional bows of about 50 Hz. This is right in the centre of the most dangerous frequency range for our body, which spans from 20 to 80 Hz.

The resonance of the Arcus bows is one octave higher at 100 Hz, clear of the toxic frequency area.

Countless musicians have found that their Arcus bow relieves them of virtually all pain and fatigue in the bow arm. Many experienced a more relaxed shoulder and a more relaxed left arm, which not only improves their comfort but also their playing.

# Endangered Species / Travel and Trade



We don't use any materials that originate from endangered species, like pernambuco, ivory or tortoiseshell.

Because of that you can travel everywhere with your Arcus bow, both now and in the future. Of course we will be happy to provide you with a detailed declaration of materials.

The pernambuco wood that was traditionally used for bowmaking originates in the Mata Atlântica, the rainforest along the Atlantic coast of Brazil. Today about 95% of this forest has been lost due to extensive exploitation and clearing. In 2007 pernambuco was added to the Cites list of endangered species and since then no tree has been permitted to be felled and no wood may be exported.

# *A Wise Investment*

Carbon fibers are thin and long crystals. One of their rather unique qualities is that they don't fatigue like wood or metal. When properly applied like in the Arcus bows they will virtually last forever, unlike wooden bows that will all fail some day as a result of repeated stress and vibration.

Wooden bows are cut straight and are bent under heat. Depending on the quality of the wood and the workmanship they will lose their camber over time. Arcus bows on the other hand are cured with their camber, never to be lost.

Carbon fibers are also extremely hard, which is why co-legno playing doesn't scratch the stick and the fingers won't wear the stick down as it's also completely immune to the acidity of sweat or alcohol.

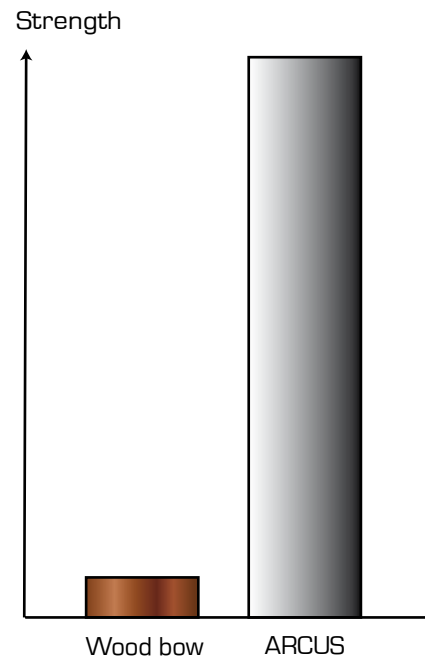
We have chosen snakewood for our frogs not only for its beauty, but for its hardness, durability and resonance quality. The same is true about the metal tip plates and bearings.

Arcus sticks are more than 10 times stronger than that of any wooden bow. In fact, they are pretty much indestructible. They will survive almost any accident in the crowded orchestra pit or during teaching.

An Arcus bow will not only be the best investment for your career as a musician because of its superior sound and playability, but it will also outlive any other bow. It will also retain its value over time and will still fetch a good price, when all wooden bows are long lost. You will find that the vast majority of players just wouldn't part with their Arcus bow while many others would be happy to find an "old" Arcus.



Fatigue fracture of a wooden bow



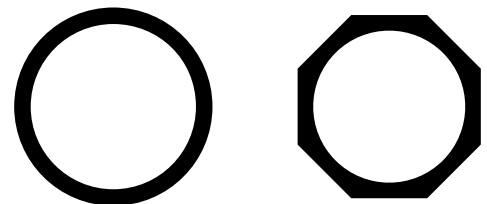
## *Round and Octagonal Sticks*

The bows of the S- and P-series are made with round and octagonal sticks. Both offer a distinctly different feel, especially with off-string bowings.

The round sticks provide plenty of stability and follow the hand precisely. They are the right choice for all players with a lively and maybe nervous hand. The octagonal bows are very agile and bounce almost automatically. They suit all players with a steady right hand that would rather control the bounce than do all the work themselves.

We always recommend trying both versions. The ideal test to find out which one suits you best is a slow spiccato.

The M-bows come with round sticks only. They are somewhat more flexible and their playing is well balanced.





# Initial Playing



Eva Brönnner

Going from a romantic bow to a modern Arcus is similar to switching from viola to violin or from bass to cello. Everything is easier and faster, but it may take a little time to adjust. It can take up to 2 weeks to fully utilize their power and agility, to develop a more relaxed bow hold and to take advantage of its sound potential. Because of the more natural position cellists are usually the quickest with only 2 or 3 days of playing. Violinists normally need 3 to 5 days, violists about a week and bassists up to two weeks. We strongly advise to play the Arcus bows exclusively during this initial learning period. Playing with other bows is counter productive and can easily throw your playing back in the old mold.

Once an Arcus-playing-mode is established it's easy to swap bows and a proper comparison regarding sound and playability can now be made. Still, during the first year of ownership most players continue discovering new possibilities in their playing and their musical expression.

For a full and broad sound play your Arcus with the full hair without tilting the bow. When you play with only a few hairs the sound becomes really light and airy. Initially the sound of an Arcus bow might appear less rich under the ear. It is indeed clearer and more transparent and won't produce the same "cloud" under the ear. But for the listener the effect is quite the opposite: The sound appears richer, fuller and nearer and projects significantly better. A nice side effect is that you will also hear yourself better when playing in the orchestra.



Alexander String Quartet

# Care and Repair

Ideal hair thickness in mm<sup>2</sup>



Even when played powerfully an Arcus bow won't crush the hair between the stick and the strings. That's why the hair lasts much longer than on a traditional bow. It only needs to be rehaired when it's stretched or too many hairs are lost. For the playing qualities of the bow it is of utmost importance that the right quantity of hair is used. Our bows bear an engraving of the ideal hair thickness in mm<sup>2</sup> to the left side of the serial number underneath the frog.



The Arcus hair gauge is a perfect tool to measure the hair thickness and ensure a proper repair.

# Violin Bows

The M-bows have the unique ability to open up the sound of every instrument in a most beautiful way. The sound is perfectly balanced, with plenty of depth combined with a far reaching range of overtones. It is absolutely clear and open, and projects extremely well.

Their playing characteristics are nicely balanced. They are agile but also stable, bounce nicely but instantly recover and run perfectly straight under every circumstance.

In our range of violin bows, the M's feature the most flexible sticks, which makes them the perfect choice for all players who like that extra little give in the stick. They suit every style of music, but are certainly the prime choice when it comes to baroque or classical music.

The P-bows provide an even more powerful play and a choice between round and octagonal sticks. The S-bows draw a more brilliant sound, which works great with many old instruments and ideally suits the demands of most soloists. Please find them on the following pages.



## Violin M-Series

Weight	ca. 51 gram
Shaft	round
Tuning	balanced



Model	~M4~	~M5~	~M6~	~M7~	~M8~	~M9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	clear, full and warm	powerful and rich	on par with the finest old bows	incredible beautiful	unique power and projection	magical

# Violin Bows

The superlight and superstrong bows of the S-series are certainly the stars in our range. Most soloists and concert masters prefer them over any other bow for their sheer power and speed.

They combine strength and lightness in an absolutely unique way. Their sound is perfectly clear and provides a range of overtones that reaches further up than that of any other bow. This allows you to cut through a thick orchestra texture or keep a grand piano in check even when the acoustics are not ideal.

The light weight and instant response of the S-bows also allow you to play orchestral passages with the utmost delicacy.

The S-bows' bright and shining sound is perfect for all dark sounding violins. For a brighter sounding instrument a P-bow is usually a better match and provides the same power. Should you prefer a bow with a softer feel and an especially open sound we'd recommend trying some M-bows.



<b>Violin S-Series</b>	
Weight	ca. 49 gram
Shaft	round / octagonal
Tuning	brilliant



Model	~S4~	~S5~	~S6~	~S7~	~S8~	~S9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	bright and strong	brilliant and complex	colourful, great articulation	surpasses all wooden bows	incredibly beautiful	thrilling

# Violin Bows

The P-bows share many similarities in design with the great bows from the 19th century. They are also perfectly suited to the music of that era, played on modern strings. Their sound is full, rich and warm, and very powerful. You will find it particularly easy to draw a meaty, dense and melancholic sound with them.

In comparison to the S-bows they are a few grams heavier, giving them additional stability on the strings and great traction, but they also bounce and jump with incredible strength and speed when required.

Their darker sound fits all somewhat brighter sounding violins. They pull a warmer and softer sound from the E-string while the G-string sounds deeper and fuller.

If you are looking for a bow with more brilliance to match a dark sounding instrument do try some S-series bows. If you are looking for a more flexible feel and a particularly open sound, we would recommend the M-bows.



## Violin P-Series

Weight	ca. 52 gram
Shaft	round/octagonal
Tuning	balanced



Model	~P4~	~P5~	~P6~	~P7~	~P8~	~P9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	warm and strong	perfect for the orchestra	similar to fine old bows	radiant, full and velvety	very powerful and rich	gigantic

# Viola Bows

Finally here are the bows that pull all the fascinating sounds out of your viola that have been hiding somewhere inside of it all this time. While traditional bows had just been too weak to bring it out, the Arcus viola bows offer all the strength and resonance you have always missed.

These bows grab the C-string effortlessly and all off-string-bowings can be pulled off with perfect ease and precision. They draw a sound that is never nasal but rich and clear with much improved articulation and projection.

Because they are as light as traditional violin bows, they offer unmatched virtuosity. They are also as strong as wooden cello bows, so never again it will be a problem to make yourself heard in the orchestra or when playing chamber music.

The string tension of large violas (16" body length and over) is quite high. For those instruments we have designed the P-series with sticks of especially high resiliency. For smaller violas the more flexible M-bows are perfectly suited, please find them described on the following pages.



## Viola P-Series

Weight	ca. 58 gram
Shaft	round/octagonal
Tuning	balanced





Model	~P4~	~P5~	~P6~	~P7~	~P8~	~P9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	warm and clear	big, clear and full	powerful, warm, round	surpassing traditional bows	great power, sheer beauty	amazing

# Viola Bows

The M-violabows are unique in how they pull a beautiful warm and deep sound out of your smaller viola. The C-string sounds darker and richer and the A-string less sharp, but fuller than with any other bow. The response is quick and difficult bowings are easy to execute as virtually everything is finally in perfect balance.

The elasticity of the M-sticks is designed to match modern strings on violas of roughly 15" in size. Their tension and weight is lower than on larger violas. That is why the M-bows are more flexible than the P-bows. The weight of the Arcus viola bows is similar to romantic violin bows, which provides a unequalled ease of playing and unique comfort.

For larger violas with longer strings the stiffer P-bows will be the perfect match. Please find them on the previous pages.



## Viola M-Series

Weight	ca. 58 gram
Shaft	round
Tuning	warm/dark



Model	~M4~	~M5~	~M6~	~M7~	~M8~	~M9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	round and warm	clear, strong and full	matching fine wooden bows	superior sound and projection	incredibly rich and full bodied	addictive

# Cello Bows

Incredibly powerful and agile, with a crisp articulation and amazing range of sound colors with unmatched clarity. The Arcus S-series bows offer new dimensions in playing the cello, qualities you will never want to be without again.

It's the unique combination of the resiliency of a traditional bass bow and the weight of a normal viola bow that opens new horizons in playability and sound. The S-bows are also extremely comfortable and easy to play with significant reduction of stress in the bow hand, arm and shoulder during extensive playing.

The S-bows draw a sound that is stronger, richer and clearer than that of wooden bows, standing out in the crowd. This becomes perfectly audible in recordings. In a large concert hall you will certainly appreciate their great power and projection.

For the majority of cellos the S-bows are a perfect match. But for smaller instruments with higher arching and/or a brighter sound the darker sounding M-bows can be more suitable. Please see the following pages.



## Cello S-Series

Weight	ca. 68 gram
Shaft	round / octagonal
Tuning	balanced/brilliant



Model	~S4~	~S5~	~S6~	~S7~	~S8~	~S9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	bright and strong	brilliant and complex	colourful, great articulation	surpasses all wooden bows	incredibly beautiful	magnificent

# Cello Bows

Cellos with a smaller body and higher arching tend to have a brighter, more focused sound. For those instruments we have specifically developed the warmer, darker sounding M-series bows.

The sticks of the M-bows are a bit more flexible and heavier than those of the S-bows. This lowers their resonance by about one tone and makes them draw a warmer, deeper sound which is still just as open and clear with the same wide range of overtones.

Their stability supports the development of an especially relaxed bow hold and offers the best comfort you can find in any cello bow. Typical for Arcus bows, you will experience the complete absence of a tired bow arm even after long concerts or recording sessions.

If your instrument sounds a bit too soft and warm with the M-bows, please try some S-bows as described on the previous pages.



## Cello M-Series

Weight	ca. 72 gram
Shaft	round
Tuning	warm/dark



Model	~M4~	~M5~	~M6~	~M7~	~M8~	~M9~
Outfit	stainless steel	sterling silver, snakewood frog			gold 585, snakewood frog	
Lapping	stainless steel	sterling silver	silver/black	sterling silver	gold/black	gold 585
Sound	warm and full	big, round, clear and rich	matching fine old bows	incredibly rich and powerful	a dream come true	magic

# Bass Bows

## German Style

Its sheer size and mass makes playing the double bass quite a challenge. Adding to this challenge are traditional bass bows with a vast array of 'normal' features.

In our most extensive research project ever we discovered not only some rather surprising physics of the bass, but also found out what would make the ideal bass bow and most importantly, how we can actually make them.

The range of bows you see here offer a level of playability and a quality of sound that you have certainly not experienced before. Just imagine rapid response, easy bouncing, a clear and open sound, unlimited power and a perfectly easy handling all combined in one bow.

The frogs of our German bass bows are medium size and fit most hands comfortably. Should you require a smaller or larger frog, please let us know.



<b>Bass German</b>	
Weight	ca. 124 gram
Shaft	round
Tuning	balanced

Model	~S4~	~S5~	~S6~	~S7~	~S8~
Outfit	stainl. steel	sterling silver, snakewood frog			gold 585
Sound	good and strong	full and rich	free and singing	ideal for soloists	incredible





# Bass Bows

## French Style

A really good French bass bow should be able to draw a full sound without applying too much pressure. It should also speak easily and provide ease of control with a nice bounce.

All this you can find right here. An Arcus bow will not only make your bass sing but also bring your playing to a new level of supreme ease and comfort. The lower weight of the bows allows them to be a little longer and still provide improved agility and power.

The Arcus bass bows are great for every style of music, are immune to climate changes and travel the world without restrictions. They are also extremely robust and cast a nice figure under all circumstances.



Nico Catacchio

<b>Bass French</b>	
Weight	ca. 110 gram
Shaft	round
Tuning	balanced

Model	~S4~	~S5~	~S7~	~S8~
Outfit	stainless steel	sterling silver, snakewood frog		gold 585
Lapping	stainless steel	sterling silver		gold/black
Sound	strong and clear	rich and colourful	ideal for soloists	marvellous








[www.arcus-muesing.de](http://www.arcus-muesing.de)



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