



**SAPIM**<sup>®</sup>

**SPOKES AND NIPPLES**



# Introduction to Sapim

Founded in 1918 by Mr. Herman Schoonhoven, Sapim has been producing spokes and nipples of the highest quality for over a century! This is a significant milestone for which we are all very proud of.

Sapim would not have survived over 100 years if it didn't rely on the best and most motivated people. We are a team of professionals dedicated to bicycle spokes and nipples. Everybody is committed to providing top-notch expertise, experience and advice to customers.

At Sapim, customer has always been central to all our activities. From the beginning, Sapim has strived to maintain a close relationship with its customers. This is utmost important for us and this is where we clearly make a difference. We are open to new ideas and listen to the needs and wishes of all our partners, whether professional or amateur.

We constantly monitor each step of our production process. We offer a wide range of products made from the very best raw materials only. We call on the services of a unique testing facility to test the performance of our products and those of our customers, because wheels are subject to more and more intensive uses, higher pressures and stronger weight requirements.

Today many professionals rely on Sapim products. It is without surprise that Sapim is considered by many professionals as the leader in the design and production of spokes and nipple.

We are proud to bring you this brochure that will help you discover the world of Sapim.

## **Your Sapim team**





**WILRIJK - BELGIUM**

Spokes and nipples

**FEURS - FRANCE**

Spokes

**SZOLNOK - HUNGARY**

Spokes

**OLNEY - USA**

Sales office

**TAICHUNG - TAIWAN**

Sales office

**TAICHUNG - TAIWAN**

Spokes

# Positioning

Sapim is considered by many professionals in the bicycle industry as one of the leading manufacturers of Spokes and Nipples. This has been the core business of Sapim since its start in 1918. It has always been so and will remain so. The strategy of Sapim is organized around three guidelines.

First, we focus on what we do best, the design and manufacturing of high performance spokes and nipples for both amateur and professional use. We do not produce any wheels, nor hubs, nor machines or any other products. Just high performance spokes and nipples.

- Spokes for all types of wheels, made from high-quality inox steel, stainless and zinc materials.
- Nipples in brass and alloy.

Second, we wish our customers and partners to be successful. Sapim only focus on the success of its customers encourage them to launch new products and develop new ideas. Our team is committed to provide the best advice to improve our customers' product range. Therefore, Sapim ambitions to provide its partners not only with high quality products but also with all the support, service and advice they need. Finally, we do not compromise with quality. We use the highest possible grade of material and ensure a perfect traceability of all products it manufactures.

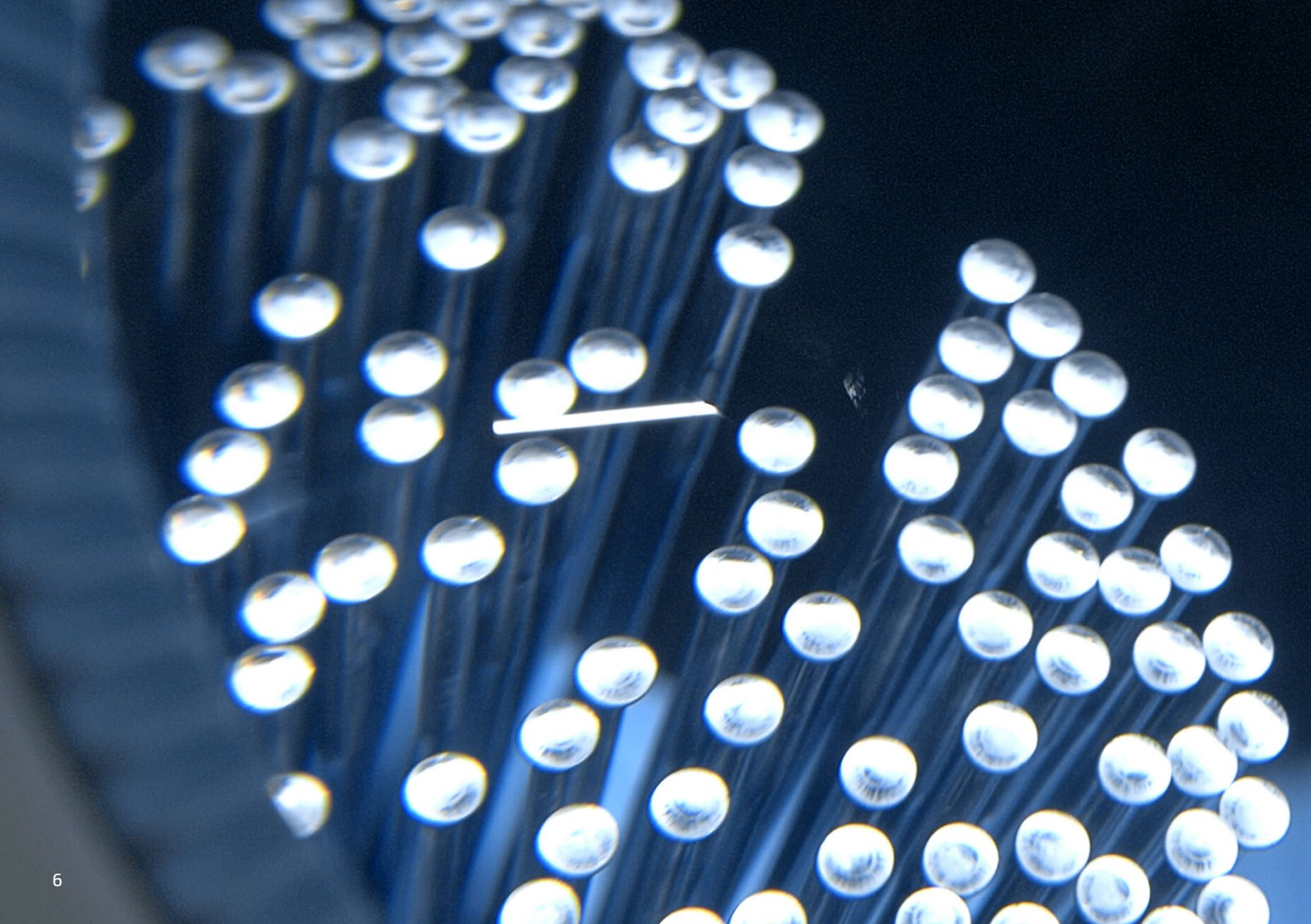
- High tensile, fatigue-resistant spokes following Sapim Forging Technology.
- Large range of spokes and nipples available in many lengths
- 50% of our products are custom-made. We give technical assistance to our customers to always find an optimal solution.



Mr Herman Schoonhoven

# History

- 1918** Foundation by Mr Herman Schoonhoven of Sapim (**Société Anonyme Pour l'Industrie des Métaux**), a company specializing in the production of spokes and nipples
- 1946** Company taken over by the son-in-law of the founder, Mr Florent Lambrechts
- 1995** Development of the Polyax nipples
- 1997** Development of the CX Ray spokes
- 2001** Start of Sapim USA
- 2004** Start of Sapim Asia
- 2005** Acquisition of France Rayon that later became Sapim France
- 2009** Launch of the D-Light spokes
- 2010** Launch of the Super spokes
- 2011** Launch of the CX Super
- 2013** Start of Sapim Hungary
- 2014** Start of production in Taiwan
- 2015** Move to new headquarter
- 2016** Development of the E-bike spokes
- 2018** 100 year milestone



# Spokes

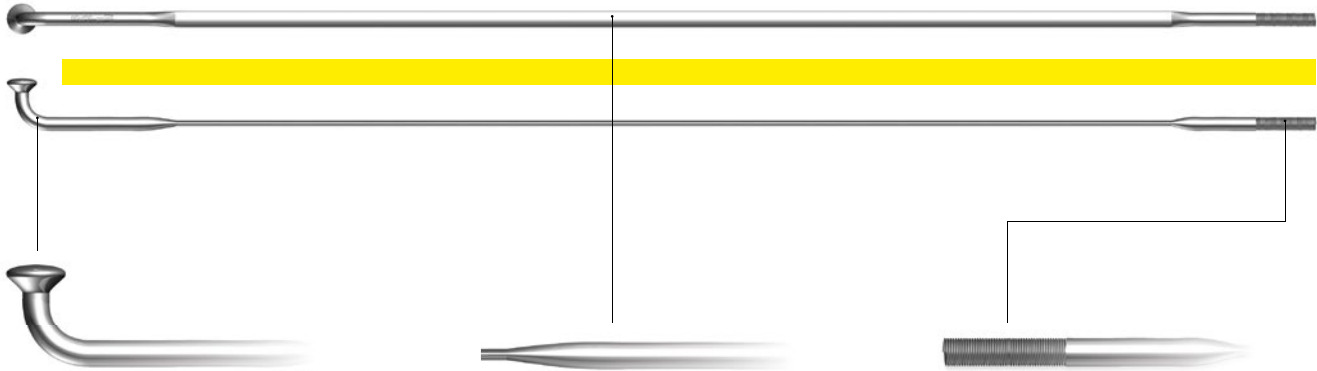
## You can define it in different ways:

A piece of steel, a wire, a spring or, what we like best, the connection between the hub and the rim. Being the link between the hub and the nipple, the spoke has multiple functions:

- **Carry:** spokes carry the weight of the bicycle as well as its load.
- **Absorb:** spokes absorb the irregularities of the road and ensure the comfort of the rider.
- **Transmit:** spokes transmit acceleration and braking effort of the rider.

When you see professional riders coming downhill at close to 90 km/h on their bike, you realize the vital importance to get the best quality of spokes and nipples.

# Small things matter



## Head with bending

Our standard spokes have a bending length of 2,8 mm. This is optimal for at least 90% of the hubs in the market.

But sometimes the standard bendings are wrong. Steel hubs need shorter bend. You can adjust this with our spoke washer (see page 34 for more details).

## Material

Sapim uses only high grade stainless steel specially drawn to our own specification of material and tensile strength. The long term experience and many trials insure that Sapim spokes last long.

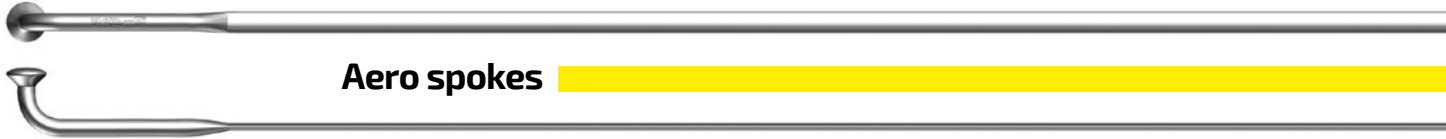
Precise definition and small tolerances are constant point of attention in the production process. This guarantees the highest quality for millions of spokes Sapim produces every year.

## Thread

Spoke thread is rolled and not cut. Rolling the thread improve the strength. The name of the thread on a standard 2mm spoke is called FG 2,3 mm.

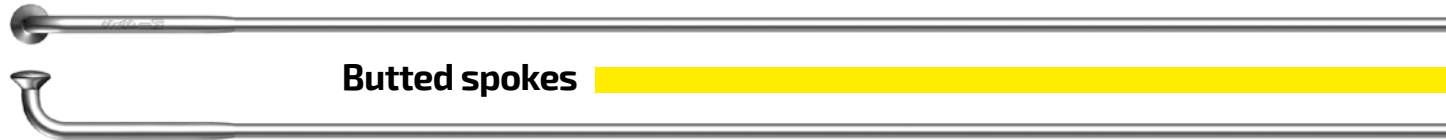


# Sapim's three ranges of spokes



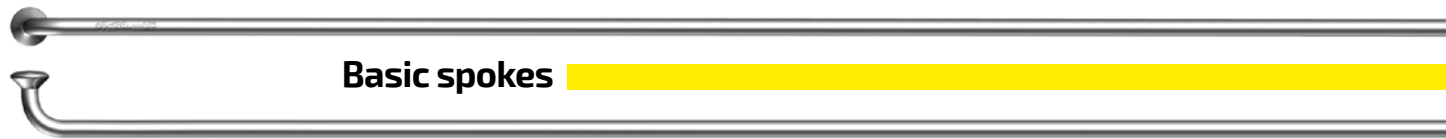
## Aero spokes

Sapim Aero spokes not only give an aerodynamic edge, they also make wheels lighter and stronger. Forging the spoke in one go in elliptical dies give much better aerodynamic characteristics than just flat spokes. The forging process brings additional tensile strength into the spoke.



## Butted spokes

Sapim butted spokes have two major benefits: less weight and more strength! The SCFT-system (Sapim Cold Forging Technology) 'stretches' the spoke while retaining the linear molecular structure of the material, thereby increasing the spoke strength at the middle between 22% - 48% depending on model. The reduced diameter section brings more elasticity and a longer life.



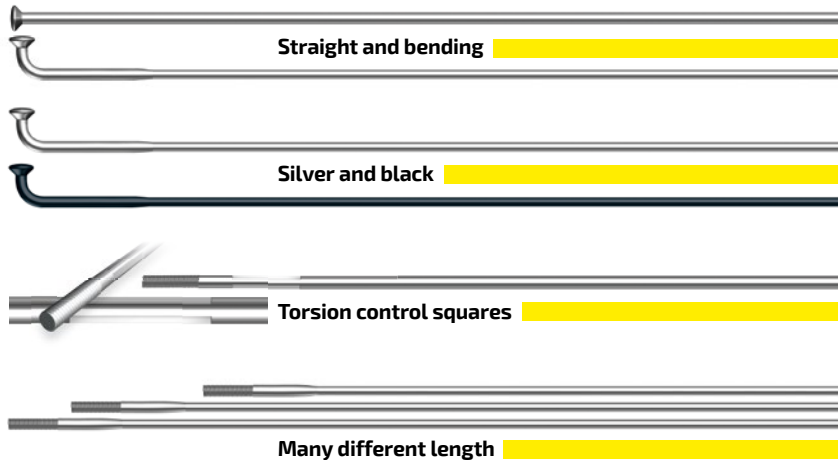
## Basic spokes

Intended for everyday use, Basic spokes are produced using top quality materials. These are made from high-tensile, fatigue-resistant stainless steel conforming to Sapim high quality standard specifications. For higher loads and bigger hub holes bigger diameters are available.

# Options

The world of wheel building and the demand of the market can make spoke different to the standard. For some we have to add anti rotation parts, hammer head, torsion control squares (picture), colors (picture) or different bending length to the spokes (picture). Also a lot more

different spoke models are available only for manufacturers. Our variety insures that you can build up wheels with nearly all available rims and hubs and can repair all standard wheels. For repairs of special branded wheels you should contact your local distributor.



## Surface treatment

**Black oxidation** is a chemical process that transfers the first few micron of the stainless steel surface into a black layer. This method has the advantage of being done in a bulk process, which has a positive effect on the price and capacity (availability and delivery time). This process is performed by high quality minded companies specially selected by Sapim to achieve the highest quality possible.

# Usage of spokes

You can use nearly all kind of spokes for all kind of cycling no matter if you are a road racer or downhill rider. It depends on many different parameters what is the correct spoke for which wheel and rider.

Things you have to take in mind: price, stiffness, rigidity, weight. Nevertheless a small advice can be given.

<b>Race</b>	CX-Ray	CX-Sprint	Race	Laser	
<b>Mountain bike</b>	CX-Ray	CX-Sprint	Race	D-Light	Laser
<b>BMX</b>	CX-Ray	CX-Sprint	Race	Force	D-Light
<b>DH</b>	CX-Ray	CX-Sprint	Race	Force	
<b>Trekking/E-Bike</b>	Force	Strong	Leader	Zinc	
<b>City</b>	Leader	Zinc			



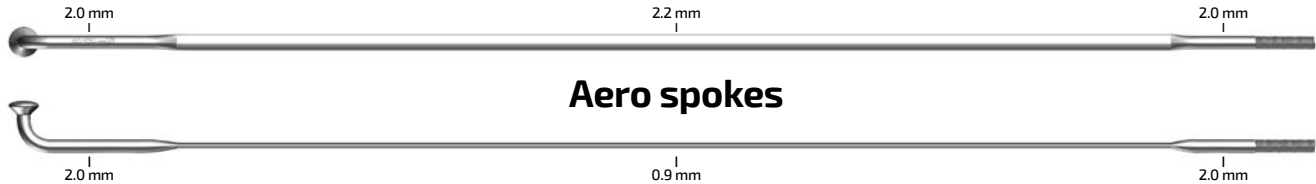
# Aero Spokes

CX-Ray

CX-Sprint



# CX-Ray



## Aero spokes

The CX-Ray still receives one of the best results in fatigue testing of any spoke. Its unique strength and flexibility make the CX-Ray suitable for most bicycle disciplines. The middle section of the spoke is drawn then pressed in a special mold to form its specific profile. CX-Ray spokes are used by top bike racers and triathletes around the world. Even downhillers use them, recognizing their strength and flexibility. Special alloy treatment and sophisticated production make this all possible. The CX-Ray fits in all standard hub holes.

- No extra hub hole design; hub manufacturer's guarantee is unaffected.
- Almost as light as Titanium.
- More long lasting than any other spokes on the market.
- Extremely high fatigue test results.
- Special alloy treatment and sophisticated production.
- The best aerodynamic elliptic spoke available.
- Produced from high-tensile, fatigue-resistant 18/8 stainless steel conforming to the Sapim quality standard specifications.

**Diameter:** 2.0 -  $\ominus$  (2.2 x 0.9) - 2.0

**Length:** 145-310 mm

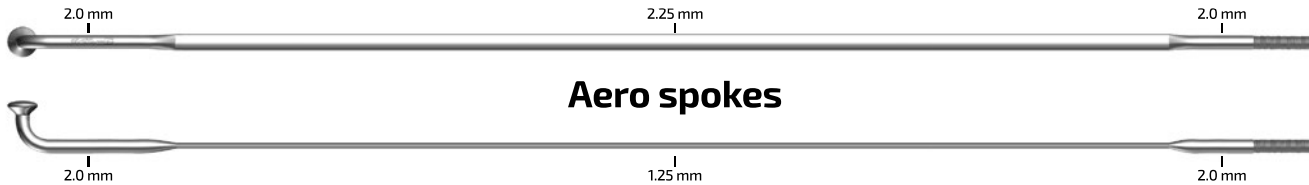
**Weight:** 279 g (64 x 260 mm)

**Strength on middle section:** 1600 N/mm<sup>2</sup>



© COR VOS

# CX-Sprint



## Aero spokes



Similar to the CX-Ray but stiffer. Higher stiffness is due to more material and therefore the spoke is slightly heavier. But still the elliptic shape of 2,3/1,2 fits in all standard hub holes. Some professionals use the CX-Sprint on the drive side and the CX-Ray on the non drive side. This shall bring a more equal stiffness on right and left side in one wheel.

- No more extra hub hole design; the hub manufacturer's guarantee is unaffected.
- Aerodynamic elliptic spoke.
- Produced from high-tensile, fatigue-resistant 18/8 stainless steel conforming to the Sapim quality standard specifications.
- Special alloy treatment and sophisticated production.

**Diameter:** 2.0 -  $\ominus$  (2.25 x 1.25) - 2.0

**Length:** 145-310 mm

**Weight:** 334 g (64 x 260 mm)

**Strength on middle section:** 1430 N/mm<sup>2</sup>





# Butted Spokes

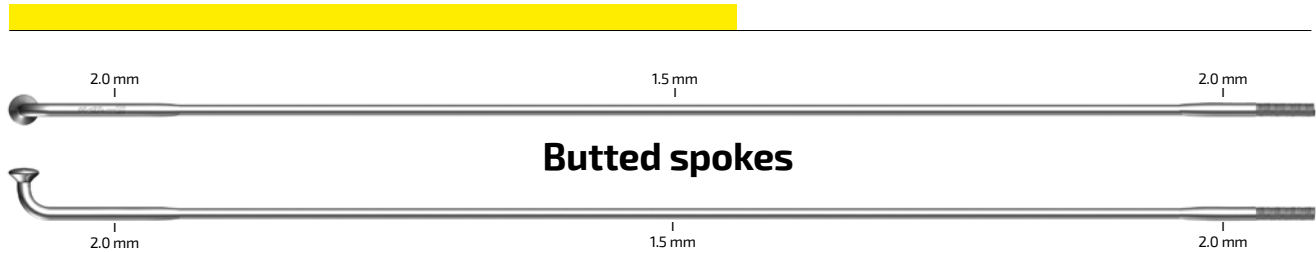
Laser

D-Light

Race

Strong

# Laser



The Laser is a lightweight spoke. The thin middle section of 1,5 mm needs special care while building up the wheel. You may have to use pliers to hold the spoke to prevent the spokes from winding up. Only experienced wheel builders should mount up wheels with this spoke.

- Longlasting
- Highly flexible
- Better shock absorption thanks to the thin middle section

**Diameter:** 2.0 - 1.5 - 2.0

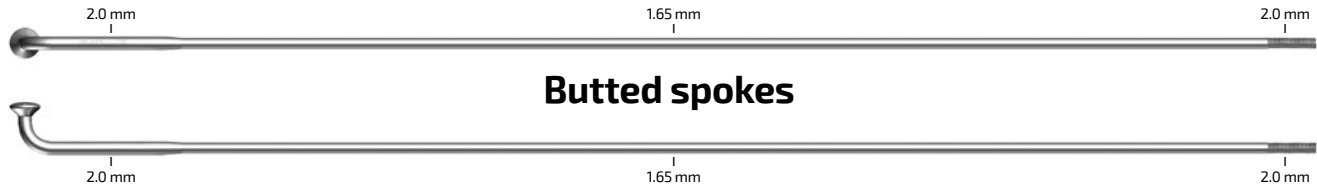
**Length:** 145-310 mm

**Weight:** 283 g (64 x 260 mm)

**Strength on middle section:** 1500 N/mm<sup>2</sup>



# D-Light



## Butted spokes



The short 2 mm section of the D-Light reduces weight especially on the threaded side. The 2 mm section starts just at the beginning of the thread. Therefore, the rotating masses at the end of the spoke are especially reduced. This brings benefits to both the acceleration and braking qualities of the wheel. The use of 14G nipples offers a wide variety of combinations. The middle section is increased to 1,65mm, which makes the spoke much stiffer and brings less torsion during truing than a 1,5 mm middle section. This results in an easier building process of the wheels.

Designed for top quality MTB wheels with:

- Maximum strength
- Minimum weight
- Disc brake approval

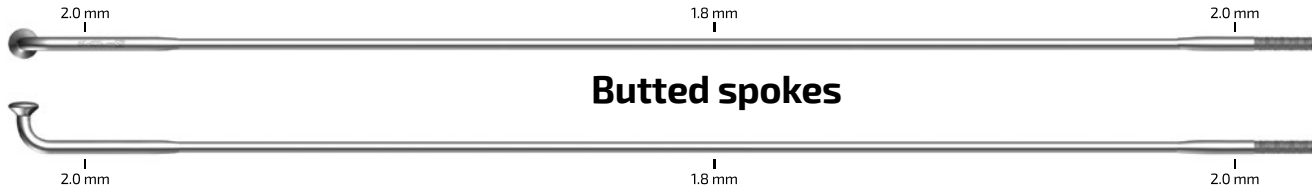
**Diameter:** 2.0 - 1.65 - 2.0 (short butted)

**Length:** 145-310 mm

**Weight:** 307 g (64 x 260 mm)

**Strength on middle section:** 1370 N/mm<sup>2</sup>

# Race



Race is a very popular double butted spoke. Build up tension is easy. Much less torsion and not as elastic as the Laser spokes are the key points. The Race provides a better shock absorption thanks to a thinner middle section than the one of a non-butted spokes. Dealers say about this traditional spoke: "Never change a winning team..."

**Diameter:** 2.0 - 1.8 - 2.0

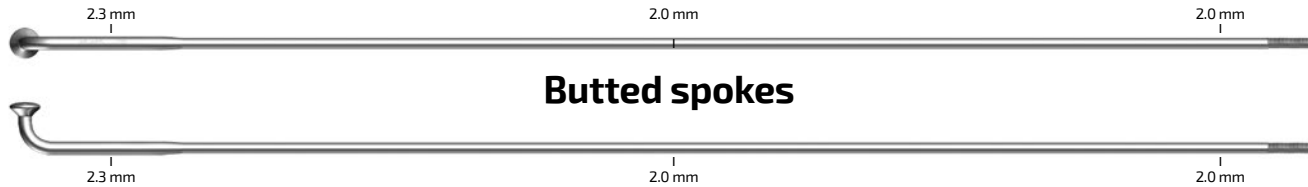
**Length:** 145-310 mm

**Weight:** 363 g (64 x 260 mm)

**Strength on middle section:** 1300 N/mm<sup>2</sup>



# Strong



Like it says, this spoke is very strong.

The Strong is developed for specific and heavy usage such as tandem, e-bikes or heavy load use. In case of large hub holes, the Strong is the recommended choice.

**Diameter:** 2.3 - 2.0

**Length:** 145-310 mm

**Weight:** 446 g (64 x 260 mm)

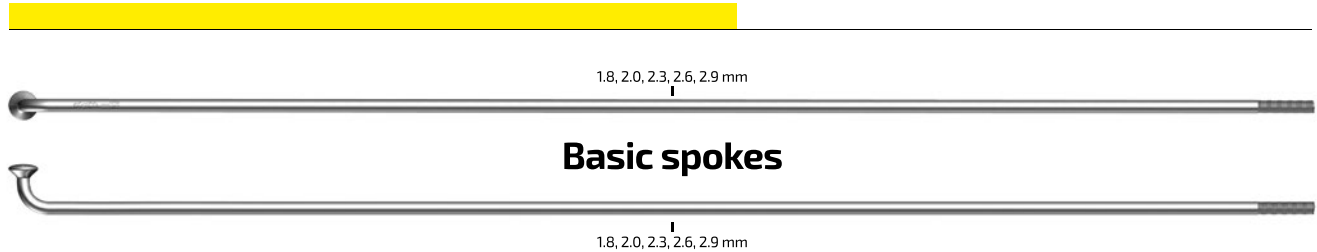
**Strength on middle section:** 1250 N/mm<sup>2</sup>



# Basic Spokes

Leader  
Zinc

# Leader



The Leader is the recommended choice for a day-to-day usage. A big variety of length is available. Diameters up to motorcycle usage can be produced.

**Diameter:** 15G-1.8 mm  
14G-2.0 mm  
13G-2.3 mm  
12G-2.6 mm  
11G-2.9 mm

**Length:** 145-310 mm

**Weight 14G:** 431 g (64 x 260 mm)

**Weight 13G:** 569 g (64 x 260 mm)

**Strength on middle section:** 1080 - 1180 N/mm<sup>2</sup>





1.8, 2.0, 2.3, 2.6, 2.9 mm

## Basic spokes

1.8, 2.0, 2.3, 2.6, 2.9 mm



Another spoke for a day-today usage. Zinc spokes are better than their image. A big variety of length is available.

**Diameter:** 14G-2.0 mm

13G-2.3 mm

12G-2.6 mm

11G-2.9 mm

10G-3.2 mm

**Length:** 145-310 mm

**Weight 14G:** 431 g (64 x 260 mm)

**Weight 13G:** 569 g (64 x 260 mm)

**Strength on middle section:** 1100 - 1200 N/mm<sup>2</sup>





# Nipples

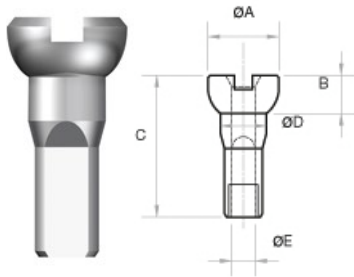
What is a nipple? You could name it differently as well. A piece of metal, a screw nut, or what we prefer to call is the connecting point between the rim and spoke. Demand in the market differs a lot. Different mounting systems, rims and colors as well as weight guide you to a wide range of nipples. Producing on most modern machinery, Sapim ensures highest precision and quality. Sapim nipples are designed and manufactures in Belgium. A perfectly designed and manufactured nipples is a secret of a well mounted wheel.

# How to produce a nipple?

Nipples are made out of high quality brass or aluminium. They are forged and drilled by high precision machines to ensure meticulousness and quality. Specific control machines ensure the quality of each nipple. Surface treatment is done by carefully chosen partners of Sapim.

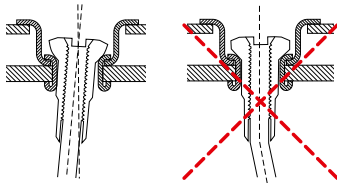
# All sorts of nipples

Impossible to mention all. A lot is made as a special custom design



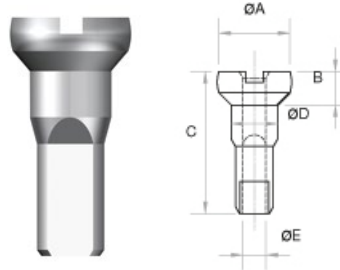
## Polyax

The head is working like a ball joint.  
For a better spoke nipple line.



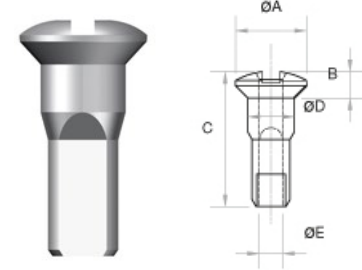
Polyax **GOOD**  
spoke-nipple line

~~Standard **BAD**  
spoke-nipple line~~



## Flat head

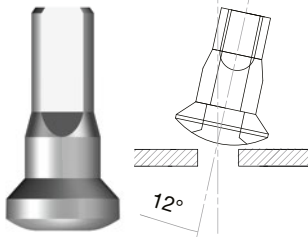
Standard nipple for machine  
build wheels.



## Round head

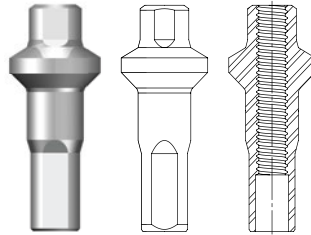
The head made for single wall rims.  
The round shape does not damage  
the rim tape.

# All sorts of nipples



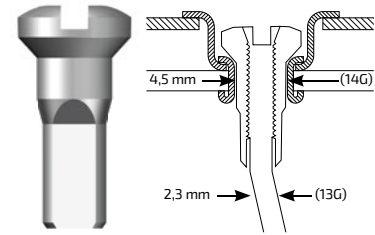
## Up side down

Designed for special rims. Easy to mount with our four span nipple key. This nipple can only be mounted with Sapim's up side down special key.



## Double square

Developed for special truing machines, double square nipples are getting more and more popular. The nipple surface is not getting scratched on visible areas while truing from inside.



## Reduction

14G nipple holes in the rim and 13G spokes anything goes with the right reduction nipple.

## Different length

Depending on rim we offer 12mm, 14mm and 16mm nipples. Please be aware that you cannot adjust too short spokes with longer nipples.



# Secure Lock

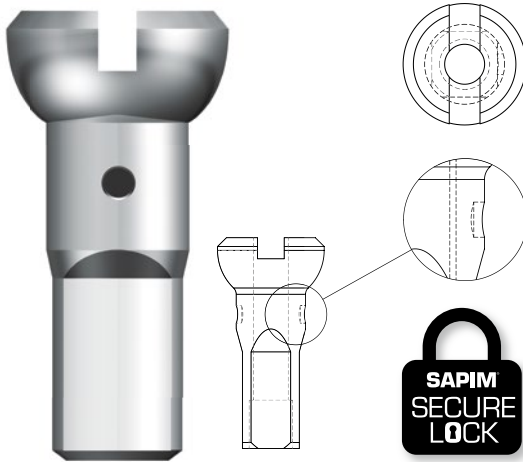
## New nipple locking system (patented)

The patented Secure Lock nipple of Sapim is a locking mechanism that prevents nipples from untightening.

The advantages of this easy locking system are:

- Can be used on truing machine
- No loose function while truing the wheel
- Available on most current Sapim nipples
- Easy to recognize

Highly precise and accurate punching machines are needed to form this type of locking system in order to achieve a stable and well defined deformation on the thread. Each nipple has an additional locking resistance of  $18 \pm 3$  cNm.



# Material

## Brass

Most common material for nipples, brass nipples are generally nickel coated to ensure good corrosion resistance. Most wheel building robots can only work with brass nipples. Sapim offer brass nipples in silver and black.



### Weight

64 pcs weight Polyax 12mm 60.48 g

64 pcs weight Polyax 14mm 68.19 g

64 pcs weight Polyax 16mm 76.42 g

← Available colors



## Aluminium

Aluminum is the material of choice for higher performance. For this purpose, Sapim has chosen the highest aluminum grade possible (7075 T6) for this sort of usage. It combines light weight, strength and corrosion resistance. The anodized surface treatment provides various color possibilities. We offer aluminum nipples in: silver, black, red, orange, gold, blue, green and purple. Sapim's state of the art manufacturing process ensures the best quality available on the market. As a consequence Sapim's Aluminum nipples has become the benchmark in the market.

### Weight

64 pcs weight Polyax Aluminum 12mm 19.30 g

64 pcs weight Polyax Aluminum 14mm 21.82 g

64 pcs weight Polyax Aluminum 16mm 24.80 g



↑ Available colors





# Coating

**Coating is a unique process developed by Sapim to reduce friction on alloy nipples.**

Coating is applied on all aluminium nipples. The coating is applied on the thread and on the nipple. Friction between both spoke and nipple and rim and nipple is significantly reduced. Coating also seals the surface reducing corrosion. This is now standard in Sapim's production.

## **Advantages:**

- Silent, effective truing with no more squeaks.
- Virtually torsion free spokes.
- High tension wheels without problems.
- No over tight nipples on spoke threads.
- No more oily and dirty wheels.
- Just efficient dry working and clean hands.
- No unnecessary cleaning
- Wheels that are easier to true

# Washers

## There are two kinds of washers:

1. **Nipple washers** increase the strength of the rim and reduce friction between the nipple and the rim.

- Oval Washers increase strength of rim
- HM Washers decrease friction of nipple
- MS and MG washers increase strength of rim and decrease friction of nipple
- Round Washers increase strength of rim

Sapim is constantly searching for better washers as the rims are constantly changing.

2. **Spoke washers** help to adjust the bending better to the hub. The usage of spoke washers is recommended on steel flanche hubs. Our spoke washer fits on 2,3 and 2,0mm Spokes.



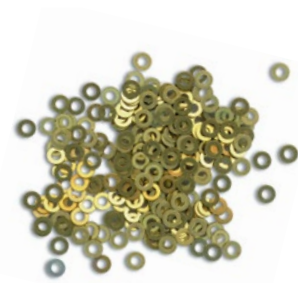
Big and small Oval Nipple Washer



HM Nipple Washer



Round Nipple Washer



Spoke Washer

# Special tools for proper wheel assembly



Sapim is not a tool manufacturer but it would like to support its customers by proposing a set of good tools to be used with its spokes and nipples. Therefore we have been trying nearly all different tools in the market and wanted to share with you the best we found. The tools are mostly made out of existing tools with some slightly different specification. Good tools and good wheel building belong together.



Ruler



Nipple Driver



Special Nipple Key



Nipple Clamping  
Screwdriver



Hexagonal Nipple Key



CX/CX-Ray Key



Nipple Key  
3,45mm, 4,20 mm

# SAPIM®

SPOKES AND NIPPLES

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