

LAMIFIL



SPECIALTY WIRES

Wires for automotive, aviation, aerospace,
power distribution, steel industry and
consumer goods

BRINGING CONNECTIONS TO LIFE

The industries we serve are continuously looking to optimise their production processes to ensure safe, efficient and high-quality production. We see it as our purpose to help industry leaders to create value, progress and wellbeing by bringing connections to life with smart technology.

From the fine copper wires used in harnesses in the automotive industry, to the special aluminium and copper alloys used in consumer applications such as guitar strings and bicycles, and aluminium-based solid conductors used in underground and undersea power cables. Our specialty wires literally connect parts of a whole to create high-quality products and solutions using efficient processes such as cold forming, extrusion, wire drawing and stranding.

With 90 years of experience and craftsmanship in producing copper and aluminium-based wires and cables, we build strong connections with our customers and partners. Together, we create new possibilities to exchange energy and unite people, businesses and things.

Let us show you how.

OUR MISSION

“ We bring connections to life with smart wires forged by technology, innovation and mastery. ”

OUR STRATEGY

We have a clear strategy to deliver on our mission, reach our goals and respond to market and customer challenges. Built on four pillars, it is anchored in a strong and value-driven corporate identity and culture.

CONNECTING WITH OUR ENVIRONMENT

How we engage with our community and contribute to society at large.

CONNECTING WITH EACH OTHER

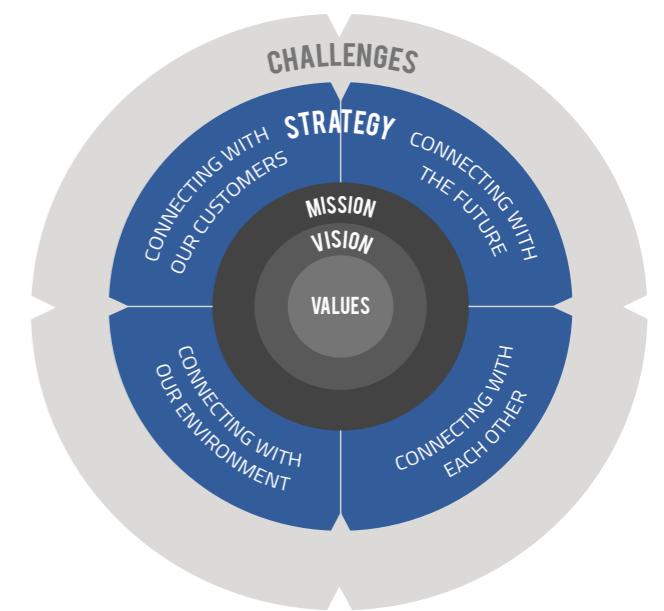
How we work together and with our customers, driven by strong values and a culture of safety, wellbeing and productivity.

CONNECTING WITH THE FUTURE

How we address market and customer needs with innovative products.

CONNECTING WITH OUR CUSTOMERS

How we provide added value and make sure our products answer your needs.



GLOBAL MARKETS

with tailormade solutions

Different industries have different requirements for their end applications. This is exactly why Lamifil designs, tests and produces wires and conductors that are tailored to your specific needs. We use our experience and expertise to help you on the road to excellence.

AUTOMOTIVE, AVIATION AND AEROSPACE

Lamifil has over 10 years of know-how producing aluminium and aluminium alloys for mechanical applications. Whether you are in the automotive, aviation or aerospace industries, you'll be able to use our materials to produce bolts, rivets, nails and many other products that are typically produced via a **cold-forming process**.

Other customers use our aluminium and aluminium alloy wire rod in their **continuous rotary extrusion processes**. Continuous rotary extrusion lines are fed with Lamifil wire rod to extrude solid and hollow products. Extruded sections, tubes or multivoid tubes are often processed in end applications such as industrial cooling systems and HVAC systems used in the automotive sector.

In **copper** the applications are as diverse as those for aluminium. For the automotive market, Lamifil has developed a new kind of CuMg for signalling wire that requires 77% less section than traditional copper cables, drastically reducing weight and volume.

Our ongoing R&D of other copper alloys is expected to result in further savings for the future.

STEEL INDUSTRY

To ensure the required deoxidisation process during your steel production, we supply you with aluminium Desox wire in the quality you require.

We also offer flexible, customised packaging services and a Just-In-Time delivery system to ensure you receive exactly what you need at the very moment you need it.

POWER DISTRIBUTION

Major European producers of power distribution cables rely on us to supply wire for processing into ground wire or optical ground wire for telecommunications, or cables for electrical supply. You can rely on Lamifil whether you need conductors suited to low-voltage, medium-voltage or high-voltage power cables.

Following your request, we will produce solid and stranded round or sector-shaped conductors. Solid conductors can be drawn, extruded or treated according to your needs. We offer stranded conductors that are compacted, or fitted with water-blocking tape, or manufactured to meet any other demand you may have.

For high-voltage overhead lines, we produce several alloys, such as high-temperature zirconium alloys. Furthermore, the quality of our AlMgSi wires has made us the preferred supplier for major OPGW manufacturers.

CONSUMER GOODS

Lamifil produces aluminium and copper wire, as well as their alloys, for an ever-growing variety of consumer products.

This range is extremely diverse:

- > nails, bolts and rivets;
- > assortments of clips;
- > very fine wires;
- > pipes, tubes and welding;
- > materials used in clothing;
- > materials used in household appliances;
- > musical instruments such as guitar strings;
- > ...

Our portfolio is always expanding, so don't hesitate to discuss your project with us. Together with you, we will look at the characteristics of the product you require.

We check the end application and take into consideration the parameters of your process whether it is a cold forming, continuous extrusion, wire drawing or another process. Our R&D engineers will then translate your demand into the most suitable product.



HIGH QUALITY PRODUCTS

in copper and aluminium

The quality of the materials you use determines the quality of your final products. Our engineers are in constant pursuit of solutions that will meet your needs in more cost-effective and ecologically friendly ways. All our products are rigorously tested to ensure they meet your specific standards as well as international norms. We always go the extra step to ensure you receive exactly what you need.



WIRE ROD

Copper and copper alloy wire rod is processed for a variety of different uses. This is why we take a flexible approach to production. We manufacture wire rod in the diameters you require. Upon request, we heat treat it for softness and deliver it to you on pallets, on reels, or following any of our many other options. We offer delivery in weights of up to 2500kg.

For the production of **aluminium and aluminium alloy wire rod**, Lamifil uses a continuous casting and rolling line with twin melting and holding furnaces and a degassing unit. This allows us to manufacture wire rod with a range of alloys and diameters. We deliver it to you in coils on pallets with weights of up to 2200kg.

DRAWN AND EXTRUDED WIRE

Lamifil **draws copper, aluminium and alloy wires** to your exact specifications. With our own wire drawing line and die work shop, we can not only produce round or sector shaped wires but also design and manufacture special profiles. We produce aluminium and aluminium alloy wires with diameters of 1mm to 20mm. Our copper wires range in diameters of 0.5mm to 13mm. All our wires are delivered in packages of up to 2000kg.

Our continuous rotary extrusion line allows us to manufacture **extruded wires** in round and sector-shaped solid aluminium conductors. They are suitable for use in low-voltage, medium-voltage and high-voltage cables up to 2000mm².

BUNCHES AND STRANDED CONDUCTORS

We offer **bunches** made from copper wires and copper alloy wires. Lamifil usually bunches seven wires with diameters of 0.5mm up to 1.0mm, although we will happily customise these to your specifications. Your processed bunches are delivered in packages of 250kg up to 350kg.

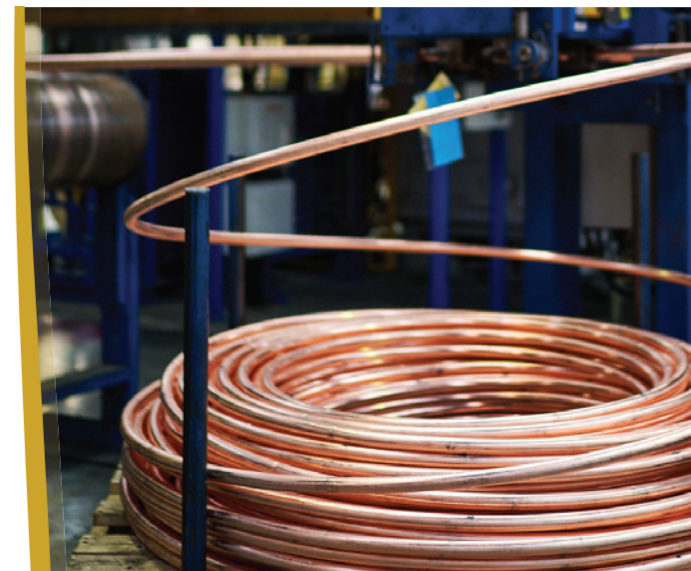
Our round and sector-shaped **stranded conductors** are manufactured with anything from 7 up to 91 strands. Upon request, we compact these conductors, fit them with water blocking tape or apply special finishes.



SURFACE TREATED

The surface finish of a wire often influences performance. If you need optimal wire surface quality, Lamifil will submit your wire to a special treatment process to even out the surface of the wire.

“Lamifil offers continuous heat treatments, artificial aging and protective atmosphere treatments.”



FLEXIBLE SERVICES

made to measure

Lamifil does more than just meet your wire and conductor specifications. The expert engineers in our R&D department help investigate and design products to your demands. We advise you, work with you to develop products tailored to your specifications and rigorously test them in our fully accredited lab at every step in our production process. But our commitment goes beyond the product. You're able to request specific approaches to packaging or transport. It's all part of the service.

“For the automotive market, Lamifil developed an alloy for signalling wire that requires 77% less section than traditional copper cables. This drastically reduced weight and volume.”

CUSTOM DESIGN

Lamifil will take all your specifics and specifications into consideration to produce a wire, cable or conductor tailored to your exact needs. Whether you need lighter or stronger materials, higher conductivity, better resistance to external conditions or have other unique requirements.

We may already have the perfect solution for you. If not, our in-house engineering department will use their expertise and experience to develop a new alloy tailored to your demands.

CONSTANT INNOVATION

We constantly innovate at Lamifil. On a yearly basis we invest between 6% and 10% of our yearly GVA in operational and improvements projects in our production facilities.

By continuously increasing our metallurgical knowledge and processing abilities, we are able to stay at the forefront in the metallurgical industry and provide you with the experience and expertise that results in superior products.

CUSTOMER FOCUS

With more than 85 years of experience, we have everything required to offer you a level of excellence you can rely on. Our commitment to total customer satisfaction has led to the implementation of a quality management system based on ISO.

PACKAGING

Efficient packaging reduces weight, volume and transportation costs. And by packing orders in units optimal to your processing needs, we are able to offer you another increase in efficiency. You have a choice of receiving your order on coils, metal or wooden reels or with other packaging possibilities such as pallets or octabins. We even pack your order in different weight increments up to a total weight of 5 tons.

Our location near the Antwerp docks gives us easy access to the rest of the world for speedy delivery. For certain destinations, we offer Just-In-Time delivery services to ease your mind.

ACCREDITED LAB

Lamifil offers you an independent testing service. Our fully accredited lab is fitted with up-to-date equipment and staffed with professionals. All Lamifil products are tested at every step in their production processes to ensure they meet or surpass international standards. If you are developing your own materials or products, our lab will happily run any tests for you independently.

Rely on us for:

- > factory acceptance tests;
- > metallurgical assessment;
- > audits;
- > other tailored services.



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494-TEST



COPPER ALLOYS

Lamifil has experience in casting copper alloys. We began on an industrial scale in the 90s, developing insight and expertise. Today we are still expanding our portfolio. The tensile strength, elongation possibilities and electrical conductivity, as well as the resistance to bending, vibration and movement, vary across our copper product range. We assist you in determining the ideal material for your needs.

PRODUCT RANGE

The following copper alloys are currently in our range:

- > Copper
- > Oxygen-free copper
- > Copper cadmium alloys
- > Copper cadmium tin alloys
- > Copper tin alloys
- > Copper magnesium alloys
- > Copper phosphor alloys
- > Copper silver alloys

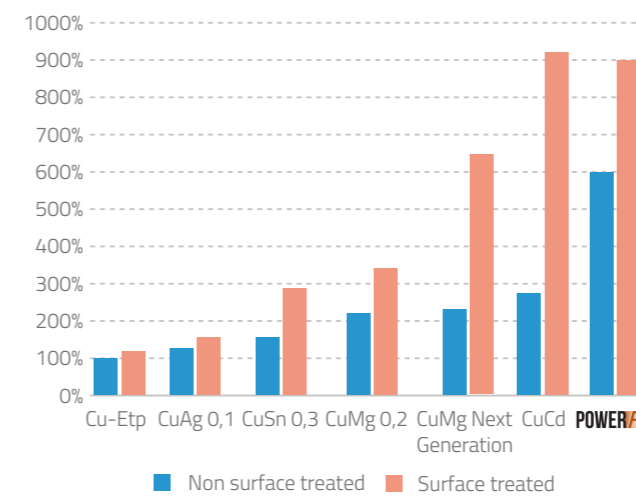
As a general rule, all our copper alloys are used in wires where high-tensile strength and good flexibility are necessities and where electrical conductivity needs to remain high. If you don't see what you need, don't hesitate to speak to our R&D team. They will happily join you in the search for the perfect solution.

In 1998, Lamifil began producing CuMg as an environmentally friendly alternative to CuCd. Both CuMg and CuCd are alloys with high strength, high conductivity and superior flexlife.

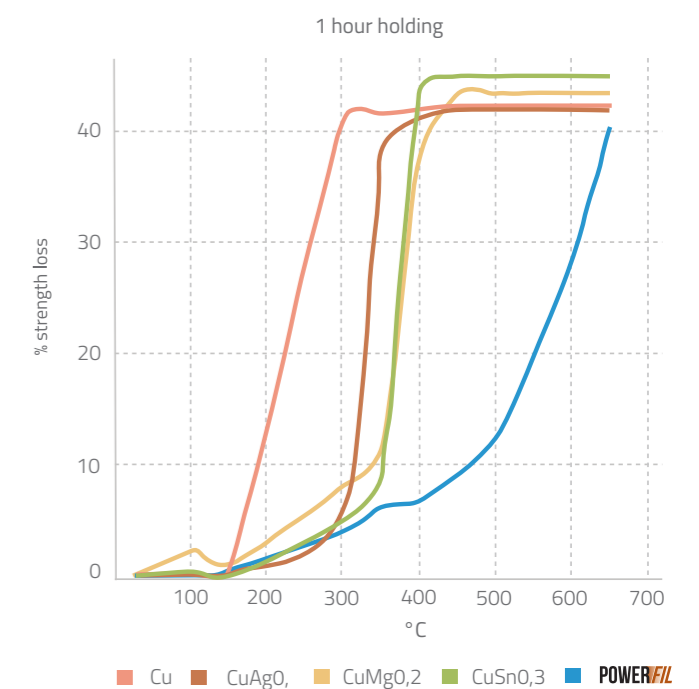
Automotive for instance is a market where the increased tensile strength and high conductivity have allowed to replace Cu-Etp for specific applications. The result for these wires is the reduction of copper by more than 50%, resulting in volume, weight and cost reductions to the OEMs.

The new CuMg NG has a flexlife that is approximately six times greater than that of Cu-Etp. Our latest innovation includes PowerFil, a high performance, RoHS and ASTM B 624 compliant alloy combining high conductivity with a flexlife approximately nine times that of Cu-Etp.

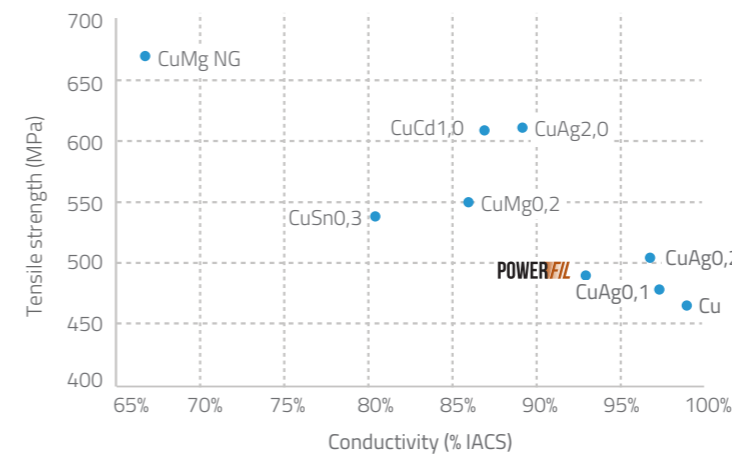
COMPARISON OF THE FLEXLIFE



ANNEALING CURVE



TENSILE STRENGTH VS IACS



“PowerFil is a high performance, RoHS and ASTM B 624 compliant alloy combining high conductivity with an excellent flexlife.”

PowerFil values may differ depending on the diameter and/or type of the wire.

ALUMINIUM ALLOYS FOR ELECTRICAL APPLICATIONS

ALLOYS

At Lamifil we develop and manufacture a broad range of alloys. The tabel below shows some typical values but we could also produce according various international standards like EN573-3 or others such as AA, GOST, JIS, Did you not find the alloy you are looking for? Contact us so we can see how we can support you.

CHEMICAL COMPOSITION EN 573-3													
	Si	Fe	Cu	Mn	Mg	Cr	Zn	V	Ti	B	Other		All
											each	total	
1XXX SERIES													
EN AW-1350	0,1	0,4	0,05	0,01	-	0,01	0,05	Sum 0,02		0,05	0,03	0,1	≥ 99,5
EN AW-1370	0,1	0,25	0,02	0,01	0,02	0,01	0,04	Sum 0,02		0,02	0,02	0,1	≥ 99,7
5XXX SERIES													
EN AW-5005	0,30	0,70	0,20	0,20	0,5 - 1,1	0,10	0,25	-	-	-	0,05	0,15	Remainder
EN AW-5154 *	0,5	0,5	0,1	0,5	3,1 - 3,9	0,25	0,2	-	0,2	-	0,05	0,15	Remainder
6XXX SERIES													
EN AW-6101	0,3 - 0,7	0,5	0,1	0,03	0,35 - 0,8	0,03	0,1	-	-	0,06	0,03	0,1	Remainder
EN AW-6201	0,5 - 0,9	0,5	0,1	0,03	0,6 - 0,9	0,03	0,1	-	-	0,06	0,03	0,1	Remainder

TYPICAL MECHANICAL AND ELECTRICAL PROPERTIES					
Temper	Tensile strength (Mpa)		Elongation %	Resistivity nOhm.m	Conductivity %IACS
	min.	max.			
H15	125	140	5 - 15	28,01	61,5
H14	115	130	5 - 15	28,01	61,5
H13	105	120	7 - 20	28,01	61,5
H12	95	110	10 - 30	28,01	61,5
H11	80	95	15 - 35	27,85	61,9
O	60	80	30 - 50	27,35	63
H16	165	205	20	33,10	52,0
F	210	280	16	52,00	33,1
O	210	275	20	51,00	33,8
O3	210	260	25	51,00	33,8
T1	Lamifil offers different subtypes. Values on request				
T4					
T1					
T4					

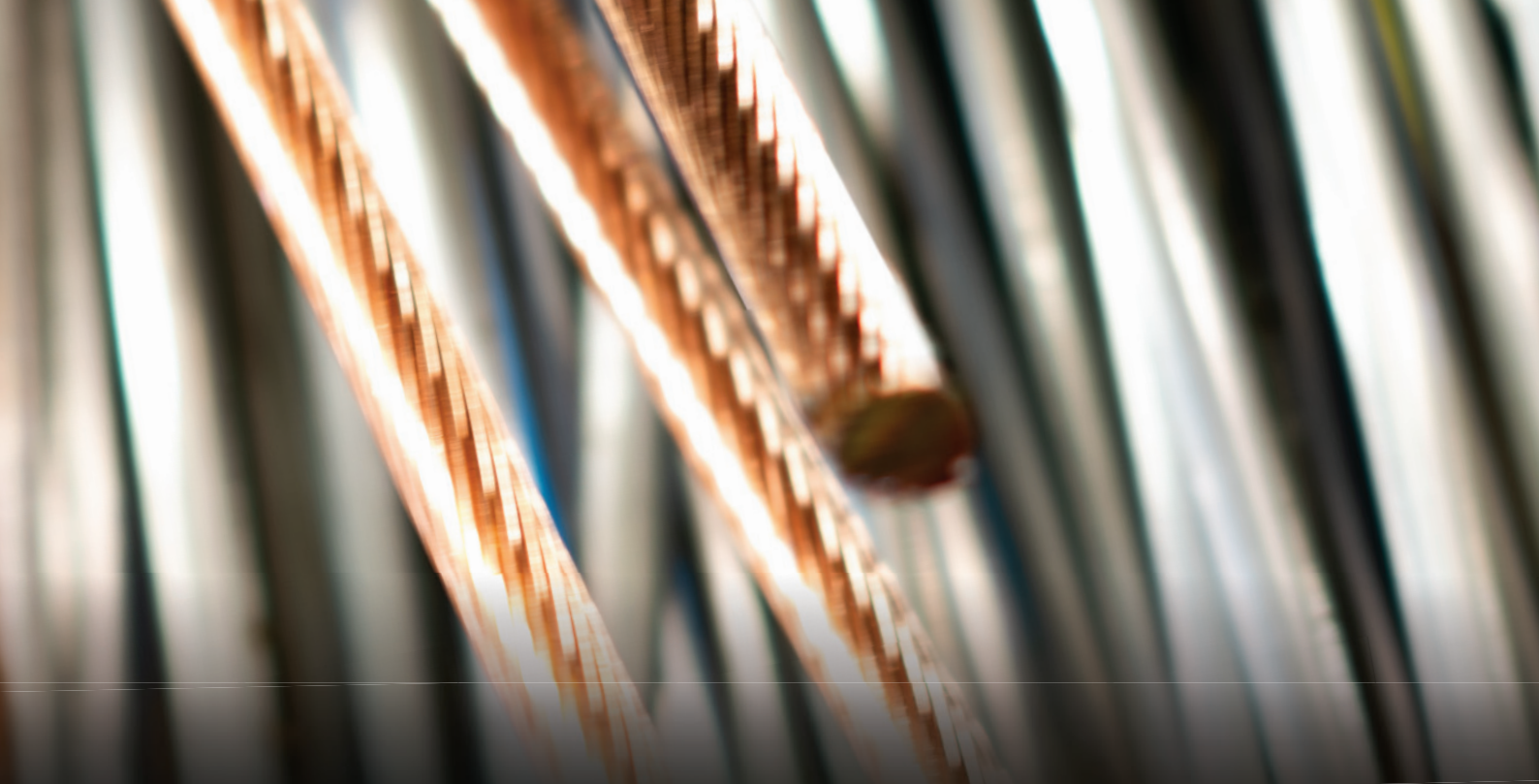
AL59	TENSILE STRENGTH (MPA)		ELONGATION TYPICAL %	RESISTIVITY nOhm.m	CONDUCTIVITY %IACS
	min.	max.			
AS 1531	165	185	8	29,05	59,3
&SS 424 08 13					
& SS 424 08 14					

ALZR		TENSILE STRENGTH (MPA)		ELONGATION %	RESISTIVITY nOhm.m	CONDUCTIVITY %IACS	MAX. OP. TEMP. °C
		min.	max.				
ASTM B-941-05	AT1, TAL	110	130	>8	28,50	60,50	150
IEC 62004	AT2, KTAL	185	-	>3	30,65	56,30	150
	AT3, ZTAL	125	160	>8	28,50	60,50	210
	AT4, XTAL	Not available as wire rod, only as final diameter					230

ALUMINIUM ALLOYS FOR MECHANICAL APPLICATIONS

CHEMICAL COMPOSITION (EN 573-3)														
	Si	Fe	Cu	Mn	Mg	Cr	Zn	V	Ti	B	Other		Al	Remarks
											each	total		
1XXX SERIES														
EN AW-1050	0,25	0,4	0,05	0,05	0,05	-	0,07	-	0,05	-	0,03	-	99,5	-
EN AW-1070	0,2	0,25	0,03	0,03	0,03	-	0,07	-	0,03	-	0,03	-	99,7	-
EN AW-1100	0,95 Si + Fe		0,05 - 0,2	0,05	-	-	0,1	-	-	-	0,05	0,15	99	Be 0,0003
Aluminium rod for desox wire in following qualities: min. 98,5%, 99%, 99,2%, 99,5%, 99,7% Al														
3XXX SERIES														
EN AW-3003	0,6	0,7	0,05-0,20	1,0-1,5	-	-	0,1	-	-	-	0,05	0,15	Remainder	-
EN AW-3103	0,5	0,7	0,1	0,9-1,5	0,3	0,1	0,2	-			0,05	0,15	Remainder	0,10 Zr+Ti
5XXX SERIES														
EN AW-5005(A)	0,3	0,45	0,05	0,15	0,7-1,1	0,1	0,25	-	-	-	0,05	0,15	Remainder	-
EN AW-5019	0,4	0,5	0,1	0,10-0,6	4,5-5,6	0,2	0,2	-	0,2	-	0,05	0,15	Remainder	0,10-0,6 Mn+Cr
EN AW-5050	0,4	0,7	0,2	0,1	1,1-1,8	0,1	0,25	-	-	-	0,05	0,15	Remainder	-
EN AW-5051	0,3	0,45	0,05	0,25	1,4-2,1	0,3	0,2	-	0,1	-	0,05	0,15	Remainder	-
EN AW-5052	0,25	0,4	0,1	0,1	2,2-2,8	0,15-0,35	0,1	-	-	-	0,05	0,15	Remainder	-
EN AW-5154	0,5	0,5	0,1	0,5	3,1-3,9	0,25	0,2	-	0,2	-	0,05	0,15	Remainder	0,10-0,5 Mn+Cr
EN AW-5251	0,4	0,5	0,15	0,10-0,50	1,7-2,4	0,15	0,15	-	0,15	-	0,05	0,15	Remainder	-
EN AW-5356	0,25	0,4	0,1	0,05-0,20	4,5-5,5	0,05-0,20	0,1	-	0,06-0,2	-	0,05	0,15	Remainder	0,0005 Be
EN AW-5754	0,4	0,4	0,1	0,5	2,6-3,6	0,3	0,2	-	0,15	-	0,05	0,15	Remainder	0,10-0,6 Mn+Cr
6XXX SERIES														
EN AW-6056	0,7-1,3	0,5	0,5-1,1	0,40-1,0	0,6-1,2	0,25	0,10-0,7	-	0,20 Zr+Ti	-	0,05	0,15	Remainder	0,20 Zr+Ti
EN AW-6060	0,3-0,6	0,1-0,3	0,1	0,1	0,35-0,6	0,05	0,15	-	0,1	-	0,05	0,15	Remainder	-
EN AW-6061	0,4-0,8	0,7	0,15-0,4	0,15	0,8-1,2	0,04-0,35	0,25	-	0,15	-	0,05	0,15	Remainder	-
EN AW-6063	0,2-0,6	0,35	0,1	0,1	0,45-0,9	0,1	0,1	-	0,1	-	0,05	0,15	Remainder	-
EN AW-6082	0,7-1,3	0,5	0,1	0,4-1,0	0,6-1,2	0,25	0,2	-	0,1	-	0,05	0,15	Remainder	0,003 Pb
EN AW-6101	0,3-0,7	0,5	0,1	0,03	0,35-0,8	0,03	0,1	-	-	0,06	0,03	0,1	Remainder	-

TYPICAL MECHANICAL PROPERTIES		
Temper	Tensile strength (Mpa)	
	min.	max.
1XXX SERIES		
F	80	130
O	60	80
F	80	110
O	60	75
F	100	140
3XXX SERIES		
F	120	220
O3	95	120
F	120	220
O3	90	115
5XXX SERIES		
F	140	180
O3	110	140
F	250	320
O3	250	310
F	160	200
O3	130	170
F	170	220
O3	135	190
F	180	260
O3	165	260
F	210	290
O3	200	250
F	170	230
F	300	360
O3	260	310
F	200	260
O3	170	250
6XXX SERIES		
F	180	280
O3	140	180
T4	300	380
F	120	190
T4	155	210
F	120	200
T1	220	280
T4	160	220
F	130	220
O3	100	190
T4	230	290
F	130	175
T1/T4	Values on request	



Bringing connections to life

LAMIFIL



At Lamifil, 90 years of technology, innovation and mastery are forged into smart wires that bring connections to life. Today, Lamifil is one of the world's leading manufacturers of high-end cables, wires and wire-based products in copper, aluminium and their alloys. We help supply energy to millions of people with high-tech overhead conductors. Our catenary wires make trains run more efficiently in dozens of countries. Our innovative alloys are used in superior semi-finished products for the steel, automotive, aviation, aerospace and consumer products industry. Lamifil has its production site in Hemiksem (Belgium), close to the port of Antwerp.

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