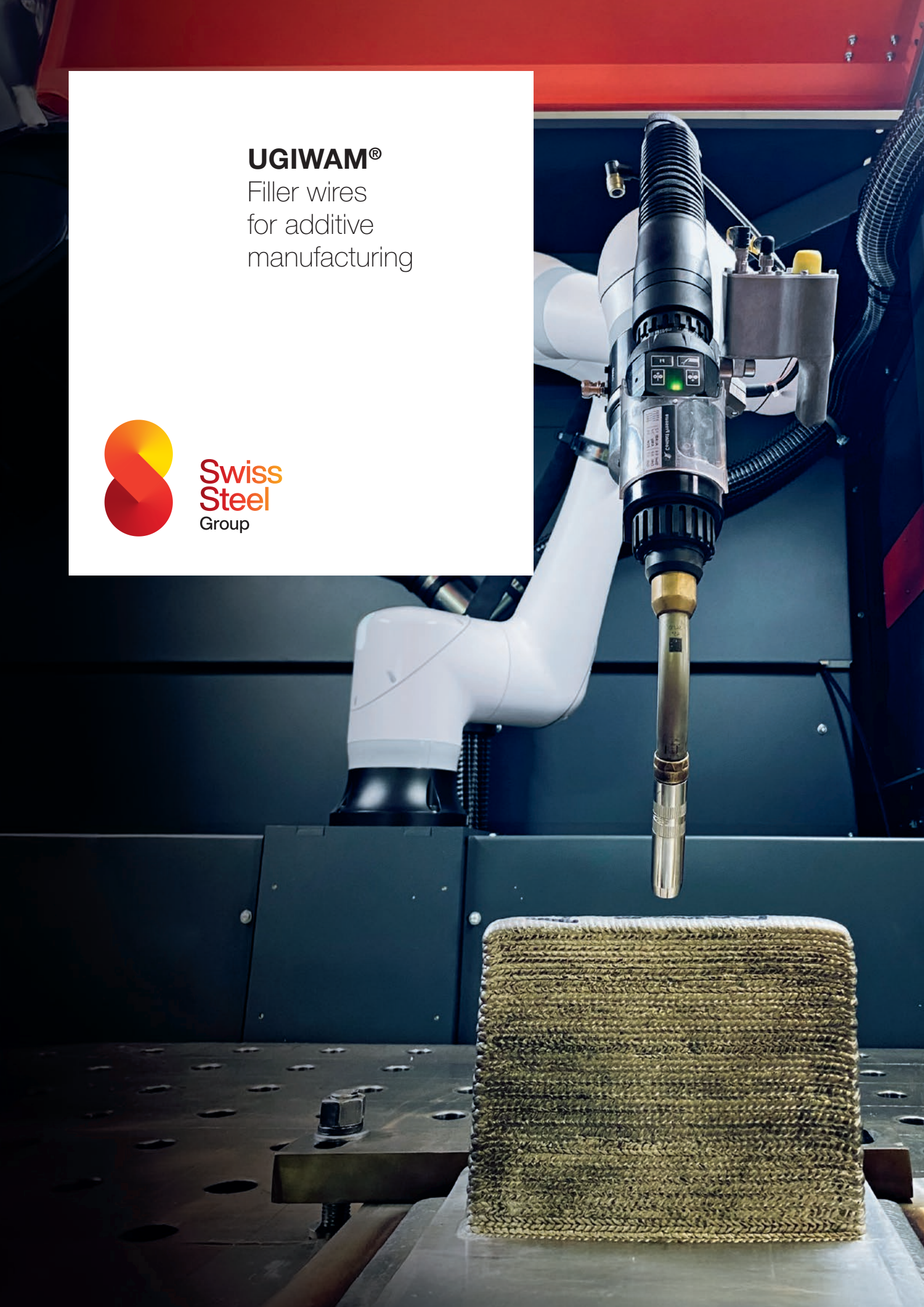
UGIWAM®

Filler wires
for additive
manufacturing



Swiss
Steel
Group

Filler wires for additive manufacturing

With state-of-the-art drawing facilities in Bourg-en-Bresse (Fr) and San Vendemiano (It), supported by fully integrated melting operations, Ugitech member of Swiss Steel Group leverages the strength, scale and technological excellence of a global leader. The company delivers high-performance in long stainless steel products, alloys, engineering steels and tool steels, combining innovation, quality and industrial expertise to meet the most demanding market requirements.

Ugitech ensures complete control over its production process — from liquid metal to the drawing of welding filler metal — using manufacturing capabilities specifically designed to supply wires dedicated to Wire Additive Manufacturing (WAM[1]) technologies:

– WAAM: Wire Arc Additive Manufacturing,
– WLAM: Wire Laser Additive Manufacturing,
– EBAM: Electron Beam Additive Manufacturing.

Ugitech is your partner for all your developments. As a key actor in the field of innovation, thanks to its research and development center and its technical expertise, Ugitech will find the solution to meet your needs!

Ugitech, Swiss Steel Group, has a proven commercial presence in over thirty countries through its international network.

Swiss Steel logo in UGIWAM® 316LSi produced by Axive Additive

WAM, successful technologies!

WAM[1] technologies achieve higher productivity levels than other processes (SLM[2], EBM[3]) up to 5 kg/hour.

Synergies between welding sources and multi-axis robots can be developed to increase workshop working time.

Additive Manufacturing is used to:

- Create large solid components, small production runs, prototypes.
- Add material to large components.
- Add functions – Geometries that cannot be achieved by conventional or subtractive processes.
- Create "Near Net Shape"[4] components that reduce production and material costs.

High-quality services to meet your needs

The welding operations carried out during the WAAM process are particularly long, often in complex positions.

Thanks to our extensive experience in supplying welding filler metals for the most demanding applications (corrosion-resistant cladding or hardfacing), we fully understand the importance of a perfectly clean and lubricated wire.

UGIWAM® 316LSi steel component manufactured by the Institut de Soudure.

Ugitech has implemented, as part of its final wire drawing operations, a double process system enabling complete control over wire cleaning and lubrication:

- First, a specialized wire cleaning process developed specifically for WAM applications.
- Secondly, a drawn wire surface finish featuring lubrication specifically tailored for WAM applications.

Ugitech is actively engaged in the pursuit of operational excellence inspired by the European Foundation for Quality Management (EFQM®) approach and based on the World Class Management (WCM) method.

Ugitech is equipped with the latest control and test technologies.

The raw material is produced and controlled in an ISO 17025 accredited laboratory in Ugine (France).

Reliable Technical Support:

- Our global team of experts is available to help you select the most suitable UGIWAM® grade, with the chemical composition best aligned with your technical requirements (corrosion resistance, service temperature, mechanical properties) to successfully produce your additive manufacturing parts.
- Our experts are also available to support you in defining additive manufacturing parameters for all processes (PAW, GTAW, GMAW, Laser), as well as post-weld heat treatment and machining.

Ugitech also collaborates closely with major international players across industries including Aerospace, Defense, Nuclear, Oil & Gas, and Marine…

1_ Wire Additive Manufacturing
2_ SLM: Selective Laser Melting
3_ EBM: Electron Beam Melting
4_ Near Net Shape: Component close to final size

UGIWAM®, an extensive range of grades

	Chemical composition							
Ugitech grades	**C**	**Si**	**Mn**	**Ni**	**Cr**	**Mo**	**Cu**	**Other elements**
Stainless steel								
UGIWAM® 304L	≤ 0.03	0.65 - 1.0	1.0 - 2.5	9.0 - 11.0	19.5 - 21.0	≤ 0.5	≤ 0.5	
UGIWAM® 316L	≤ 0.03	0.3 - 0.6	1.0 - 2.5	11.0 - 14.0	18.0 - 20.0	2.5 - 3.0	≤ 0.5	
UGIWAM® 316LSi	≤ 0.03	0.65 - 1.0	1.0 - 2.5	11.0 - 14.0	18.0 - 20.0	2.5 - 3.0	≤ 0.5	
UGIWAM® 347	≤ 0.08	0.65 - 1.0	1.0 - 2.5	9.0 - 11.0	19.0 - 21.0	≤ 0.5	≤ 0.5	Nb: 10xC - 1.0
UGIWAM® 4435H2	< 0.03	< 1.0	< 2.0	13.0 - 14.0	17.0 - 18.0	2.5 - 3.0	≤ 0.5	N < 0.1
UGIWAM® 4509	≤ 0.03	≤ 1.5	≤ 1.0	≤ 0.5	17.5 - 19.5	≤ 0.5	≤ 0.5	Nb: 8xC - 0.8 / Ti: 10xC - 0.5
UGIWAM® 410NiMo	≤ 0.05	≤ 0.5	≤ 0.6	4.0 - 5.0	11.0 - 12.5	0.4 - 0.7	≤ 0.5	
UGIWAM® 4418	≤ 0.06	≤ 0.6	≤ 1.0	4.0 - 5.0	15.0 - 16.0	0.8 - 1.1		
UGIWAM® 17-4PH	< 0.05	< 0.5	< 1.0	4.0 - 5.0	15.0 - 16.0	≤ 0.5	3.0 - 4.0	Nb: 5xC - 0.45
UGIWAM® 15-5PH	≤ 0.05	≤ 0.5	≤ 1.0	4.0 - 5.0	14.5 - 15.5	≤ 0.5	2.5 - 3.5	Nb: 5xC - 0.45
UGIWAM® 15-5PR	≤ 0.05	≤ 0.5	≤ 1.0	4.0 - 5.0	14.5 - 15.5	≤ 0.5	2.5 - 3.5	Nb: 5xC - 0.45
UGIWAM®17-7PH	≤ 0.09	≤ 0.7	< 0.9	6.5-7.75	16.0 - 18.0	≤ 0.1	-	Al: 0.75-1.5
UGIWAM® 2205	≤ 0.03	≤ 0.9	0.5 - 2.0	5.0 - 6.0	21.5 - 23.5	2.5 - 3.5	0.5	N: 0.1 - 0.2
UGIWAM® 2209	≤ 0.03	≤ 0.9	0.5 - 2.0	7.5 - 9.5	21.5 - 23.5	2.5 - 3.5	0.5	N: 0.1 - 0.2
UGIWAM® 4410	< 0.03	< 1.0	< 2.0	6.5 - 7.5	25 - 26	3.3 - 4.0	-	N: 0.24 - 0.30
UGIWAM® 2594	< 0.03	< 1.0	< 2.5	8 - 10.5	24 - 27	2.5 - 4.5	< 1.5	N: 0.2 - 0.30 W <1.0
NI alloy								
UGIWAM® 625	≤ 0.03	≤ 0.5	≤ 1.0	≥ 60.0	21.0 - 23.0	8.5 - 9.5	≤ 0.5	Fe: < 1.0 - (Nb + Ta): 3.2 - 4.0
UGIWAM® 718	≤ 0.08	≤ 0.1	≤ 0.35	50 - 55	17 - 21	2.8 - 3.3	≤ 0.3	Al: 0.2 - 0.8 Ti: 0.6 - 1.15 Nb: 4.75 - 5.5 Fe: balance
Tool steel								
UGIWAM® M300	≤ 0.02	≤ 0.1	≤ 0.10	18.0 - 19.0	≤ 0.25	4.5- 6.5	≤ 0.3	Co: 8.5- 9.5 Ti: 0.6-0.8
UGIWAM® H11	0.38	1	-	-	5.3	1.3	-	V: 0.40
Engineering Steel								
UGIWAM® 300M	0.40 - 0.45	1.45 - 1.80	0.65 - 0.90	1.65 - 2.00	0.70 - 0.95	0.35 - 0.80	≤ 0.35	

This list of grades is not exhaustive. Ugitech can develop specific grades to meet our customers' precise needs and applications

Comments
Austenitic grade. Excellent corrosion resistance in the natural and urban environment. Suitable for food contact.
Austenitic grade. Excellent corrosion resistance in the natural, urban and industrial environment, even in the presence of a moderate concentration of chloride, and in a maritime environment. Suitable for food contact. Grades available in low cobalt content version for nuclear application.
Excellent corrosion resistance, even at elevated temperatures (up to 800°C). Chemical composition in accordance with AMS 5646. Suitable for food contact applications.
UGIWAM® 4435H2 is a molybdenum-alloyed austenitic stainless steel belonging to the 316L family. Low carbon content provides good corrosion resistance, including in welded areas. UGI® 4435H2 a highly reliable stainless steel grade for use in high pressure hydrogen gaseous environments. Its high nickel content and stable austenitic microstructure induces a very good resistance to hydrogen embrittlement. This grade exhibits excellent cryogenic properties.
Ferritic grade. Economical corrosion resistant grade. Suitable for food contact. Magnetic grade.
Martensitic grade. Suitable for hardening by heat treatment. Excellent abrasion and wear resistance. Can be used for hardfacing.
Low-carbon super-martensitic grade with the addition of nickel. It combines high mechanical strength with excellent resilience and very good corrosion resistance, considerably higher than those of conventional high-carbon Fe-Cr-C martensitic steels. This grade exhibits excellent cryogenic properties. Chemical composition conform to 1.4418. This grade is comparable to 16-5-1 according to ISO 14343. Grade used for aerospace, cryogenic application and hydraulic turbine.
Precipitation hardening (PH) grade. Multiple mechanical property levels achievable by varying the tempering temperature. Excellent corrosion resistance combined with good toughness. Chemical composition in accordance with AMS 5643.
Precipitation hardening (PH) grade. Multiple mechanical property levels achievable by varying the tempering temperature. Excellent corrosion resistance combined with good toughness up to 310°C. Chemical composition in accordance with AMS 5659.
ESR remelting version of UGIWAM® 15-5PH. Structurally hardened martensitic wire, with chemical composition conform to AMS 5659. Several levels of mechanical properties can be achieved by varying the tempering temperature. Excellent corrosion resistance combined with good tenacity up to 310 °C.
Semi-austenitic precipitation hardening (PH) stainless steel grade offering an alternative to austenitic stainless steels where higher service temperatures are required. UGIWAM® 17-7PH features excellent fatigue resistance, good corrosion resistance and minimal distortion during heat treatment. Chemical composition in accordance with AMS 5644. Similar mechanical properties, higher impact resistance and comparable corrosion resistance can also be achieved with 17-4 PH or 15-5 PH.
Duplex grade suitable for components requiring post-weld heat treatment. Excellent corrosion resistance combined with high mechanical properties.
Duplex grade tailored for additive manufacturing of 22Cr duplex stainless steel parts. Post-weld heat treatment may be avoided depending on technical specifications. Excellent corrosion resistance combined with high mechanical strength.
UGIWAM® 4410 is a superduplex stainless steel designed for applications in highly corrosive environments. It has the following advantages: very high mechanical property, excellent resistance to different types of corrosion in aggressive environments. Chemical analysis conform to UNS S32750.
Superduplex %25Cr welding grade according to ISO and AWS welding standard designed for highly corrosive environments. Very high mechanical properties and excellent resistance to different types of corrosion in aggressive environments.
Nickel-based alloyed grade with Chromium and Molybdenum. Excellent corrosion resistance, even in a highly aggressive environment.
UGIWAM® 718 is an age-hardenable nickel-chromium alloy combining high corrosion resistance with excellent mechanical properties at both high and low temperatures. Exceptional strength after aging treatment is achieved through the addition of Ti, Al, and Nb. The alloy offers excellent creep-rupture strength at elevated temperatures up to approximately 700°C. Chemical composition in accordance with AMS specifications.
Maraging 300, precipitation-hardenable alloy grade with high yield point and tensile strength combined with good toughness. Chemical composition similar to Cryodur® 2709 and AISI 18MAR300. Applications: casings for cold extrusion tools, cutting and punching tools.
Hot work tool steel with high hot tensile strength and toughness. Good thermal conductivity and insusceptibility to hot cracking. Can be water-cooled to a limited extent. Besides applications typical for the area of hot-work steels, this grade is mainly used for ejector pins, toolholders and shrink fit chucks. Chemical composition similar to Thermodur® 2343.
300M grade with VAR remelting. High quality aircraft grade, low alloy Ni-Cr-Mo steel with addition of vanadium and silicon content to achieve even higher strength and higher tempering temperatures. UGIWAM® 300M gives high transverse ductility, toughness and creep properties. Chemical composition according to UNS K44220 and AISI 300M.

Our packagings

UGIWAM® wire feedstock is offered in a comprehensive range of packaging solutions, from standard plastic and metal spools to high-capacity drums and robust metal reels, designed to meet the demands of industrial production. Leveraging decades of expertise in robotic welding, Ugitech delivers welding wire in 250 kg to 500 kg drums with endless solutions that significantly reduce changeovers, minimize downtime, and maximize production efficiency. The 300 kg metal reels further enhance productivity and are particularly well suited for wire diameters above 1.6 mm.

For additive manufacturing manufacturers operating serial production with the highest standards of safety and quality assurance, UGIWAM® wire can also be supplied with RFID (Radio Frequency Identification) tags, enabling secure identification, full traceability and reliable process control throughout the production chain.

MIG Spool

Standard presentation

Black or blue painted wire basket spool BS300 or black plastic spool D300

– Ø 0.80 mm..... 15 kg max

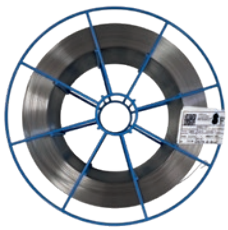
– Ø 1.00 to 1.60 mm.....15 to 18 kg

Other Possibilities

Spool

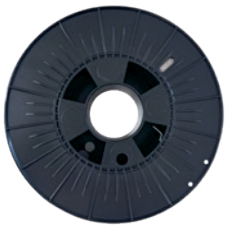
Ø	Wire basket spool BS300	Plastic spool D200	D300	D350
0.80	15 kg			-
1.00		5 kg	15 kg	
1.20	15 – 18 kg			25 – 27 kg
1.60		-	-	

Wire basket



	D	d	F	L
BS300	300	50.5	180	100

Plastic spool



	D	d	F	L
D200	200	50.5	105	55
D300	300	50.5	190	100
D350	350	50.5	212.5	100

Drum

Drum available for Ø between 0.8 to 1.60 mm	
Ø 520 x 790 mm	250 kg drum
Ø 660 x 890 mm	500 kg drum

Swiss Steel Group

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