

HAYER & BOECKER



Information



**Materials
for Woven Wire Cloth**

Material No.		<i>Unalloyed Steels</i> Alloy Composition (Melt Analysis) – Percentage per Mass								
EN 10016	Short Term	C	Si	Mn	Fe	Cr	Cu	Mo	Ni	Others
1.0300	C4D	0.06	0.30	0.3-0.6	Rest	0.20	0.30	0.05	0.25	Al 0.01
1.0304	C9D	0.10	0.30	0.60	Rest	0.20	0.35	0.08	0.25	–
1.0586	C50D NIA	0.48-0.53	0.1-0.3	0.5-0.8	Rest	0.15	0.25	0.05	0.20	Al 0.01

Material No.		<i>Ferritic Stainless Steel</i> Alloy Composition (Melt Analysis) – Percentage per Mass								
EN 10088	AISI ⁽¹⁾	C	Si	Mn	N	Cr	Cu	Mo	Ni	Others
1.4016	430	0.08	1.0	1.0	–	15.5-17.5	–	–	–	–

Material No.		<i>Martensitic and Precipitation-hardening Stainless Steel</i> Alloy Composition (Melt Analysis) – Percentage per Mass								
EN 10088	AISI ⁽¹⁾	C	Si	Mn	N	Cr	Cu	Mo	Ni	Others
1.4006	410	0.03-0.12	1.0	1.0	–	12.0-14.0	–	–	–	–
1.4034	–	0.43-0.50	1.0	1.0	–	12.5-14.5	–	–	–	–

Material No.		<i>Austenitic Stainless Steel</i> Alloy Composition (Melt Analysis) – Percentage per Mass								
EN 10088	AISI ⁽¹⁾	C	Si	Mn	N	Cr	Cu	Mo	Ni	Others
1.4301	304	0.07	1.0	2.0	0.11	17.5-19.5	–	–	8.0-10.5	–
1.4306	304L	0.03	1.0	2.0	0.11	18.0-20.0	–	–	10.0-12.0	–
1.4310	301	0.05-0.15	2.0	2.0	0.11	16.0-19.0	–	0.8	6.0-9.5	–
1.4401	316	0.07	1.0	2.0	0.11	16.5-18.5	–	2.0-2.5	10.0-13.0	–
1.4404	316L	0.03	1.0	2.0	0.11	16.5-18.5	–	2.0-2.5	10.0-13.0	–
1.4435	–	0.03	1.0	2.0	0.11	17.0-19.0	–	2.0-3.0	12.5-15.0	–
1.4439	317LN	0.03	1.0	2.0	0.12-0.22	16.5-18.5	–	4.0-5.0	12.5-14.5	–
1.4539	904L	0.02	0.7	2.0	0.15	19.0-21.0	1.20-2.00	4.0-5.0	24.0-26.0	–
1.4571	316 Ti	0.08	1.0	2.0	–	16.5-18.5	–	2.0-2.5	10.0-13.0	Ti = 5 X C to 0.7

Material No.		<i>Austenitic-Ferritic Stainless Steels</i> Alloy Composition (Melt Analysis) – Percentage per Mass								
EN 10088	AISI ⁽¹⁾	C	Si	Mn	N	Cr	Cu	Mo	Ni	Others
1.4462	318LN	0.03	1.0	2.0	0.10-0.22	21.0-23.0	–	2.5-3.5	4.50-6.50	–

Material No.	Standard	<i>Heat Resisting Steels⁽²⁾ and Heat Conducting Alloys⁽³⁾</i> Alloy Composition (Melt Analysis) – Percentage per Mass								
		C	Si	Mn	N	Cr	Cu	Fe	Ni	Others
1.4742 ⁽²⁾	DIN 43720	0.12	0.7-1.4	1.0	–	17.0-19.0	–	–	–	Al = 0.7-1.2
1.4841 ⁽²⁾	DIN 43720	0.20	1.5-2.5	2.0	0.11	24.0-26.0	–	–	19.0-22.0	–
1.4864 ⁽²⁾	AISI 330	0.08	0.75-1.50	2.0	–	17.0-20.0	–	–	34.0-37.0	–
1.4893 ⁽²⁾	–	0.10	1.7	–	0.17	21.0	–	–	11.0	Ce = 0.05
1.4725 ⁽³⁾	DIN 17470	0.10	0.5	1.0	–	13.0-15.0	–	–	–	Al = 3.5-5.0
1.4765 ⁽³⁾	DIN 17470	0.10	1.0	0.6	–	22.0-25.0	–	–	–	Al = 4.5-6.0
1.4767 ⁽³⁾	DIN 17470	0.10	1.0	1.0	–	19.0-22.0	–	–	–	Al = 4.0-5.5
2.4869 ⁽³⁾	DIN 17470	0.15	0.5-2.0	1.0	–	19.0-21.0	0.5	1.0	75.0	Al 0.30

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(1) Parts of the melt analysis do not correspond to EN 10088-3:08-1999. The given AISI-designations are general recommendations

(2) Heat resisting steels

(3) Heat conducting alloys

(4) Brands or registered trade names

(5) 1 = resistant; 2 = largely resistant; 3 = resistant with some conditions; 4 = little resistant; 5 = poor resistant

(6) At the atmosphere (round values)

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
		Atmosphere	Seawater	Lyes	Acids			
EN 10016	kg/dm ³					MPa	W / K m	mm ² /m
1.0300	7.85	5	5	2-4	4-5	250-450	81	0.13
1.0304	7.85	5	5	2-4	4-5	300-500	–	–
1.0586	7.85	5	5	2-4	4-5	1000-2000	–	–

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
		Atmosphere	Seawater	Lyes	Acids			
EN 10088	kg/dm ³					MPa	W / K m	mm ² /m
1.4016	7.70	2	4	2	3	450-600		

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
		Atmosphere	Seawater	Lyes	Acids			
EN 10088	kg/dm ³					MPa	W / K m	mm ² /m
1.4006	7.70	2	4	2	3-4	450-600	30	0.60
1.4034	7.70	2	4	2	3	450-800	30	0.55

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Temperature Resistance ⁶
		Atmosphere	Seawater	Lyes	Acids			
EN 10088	kg/dm ³					MPa	W / K m	°C
1.4301	7.90	1	3	1-2	2-4	500-700	15	450
1.4306	7.90	1	3	1-2	2-4	460-680	15	450
1.4310	7.90	1	3	2	2-4	750-900	15	450
1.4401	7.90	1	2-3	2	2-3	550-710	15	450
1.4404	7.90	1	2-3	2	2-3	490-690	15	450
1.4435	8.00	1	2-3	2	2-3	490-690	15	450
1.4439	8.00	1	1	1-3	2	580-800	14	450
1.4539	8.00	1	1	2	2-3	520-720	12	500
1.4571	8.00	1	1	2	2-3	500-730	19	500

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
		Atmosphere	Seawater	Lyes	Acids			
EN 10088	kg/dm ³					MPa	W / K m	mm ² /m
1.4462	7.80	1	1	2-4	2-4	680-880	15	0.8

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Maximum ⁽⁶⁾ Application Temperature	
		Atmosphere	Seawater	Lyes	Acids		° C	°F
1.4742 ⁽²⁾	7.70	1	4	2-5	2-5	500-700	1000	1830
1.4841 ⁽²⁾	7.90	1	3	2-3	2-4	550-800	1150	2100
1.4864 ⁽²⁾	8.00	1	2-3	2-3	3	550-800	1100	2010
1.4893 ⁽²⁾	7.80	1	2	1-2	2-3	650-850	1150	2100
1.4725 ⁽³⁾	7.30	1	4	2-3	2-4	600-800	1000	1830
1.4765 ⁽³⁾	7.10	1	3-4	2-3	2-4	600-800	1300	2370
1.4767 ⁽³⁾	7.20	1	3-4	2-3	2-4	600-800	1200	2190
2.4869 ⁽³⁾	8.30	1	4	2-3	2-4	650-850	1200	2190

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Material No.	Standard	Short Term	<i>Copper and Copper based Alloys</i> Alloy Composition (Melt Analysis) – Percentage per Mass							
			Fe	Ni	Pb	Al	Cu	Zn	Sn	Others
2.0065	DIN 1708	E-Cu58	–	–	–	–	99.9	–	–	O = 0.005-0.04
2.0040	DIN 1708	OF-Cu	–	–	–	–	99.99	–	–	–
2.0321	DIN 17660	CuZn37	0.10	0.3	0.10	0.03	62.0-64.0	Rest	0.10	–
2.0250	DIN 17660	CuZn20	0.05	0.2	0.05	0.02	79.0-81.0	Rest	0.05	–
2.1020	DIN 17662	CuSn6	0.1	0.3	0.05	–	Rest	0.3	5.5-7.0	0.2
2.0872	DIN 17664	CuNi 90/10	1.3-1.8	10.0-11.0	–	–	Rest	–	–	C 0.05; Mn 0.5-1.0

Material No.	Standard	Alloy ⁽⁴⁾	<i>Nickel and Nickel based Alloys</i> Alloy Composition (Melt Analysis) – Percentage per Mass							
			C	Si	Mn	Cr	Cu	Mo	Ni	Others
2.4060	DIN 17740	200	0.08	0.10	0.3	–	0.10	–	99.6	Mg 0.15; Ti 0.1; Fe 0.2
2.4066	DIN 17740	200	0.08	0.10	0.3	–	0.25	–	99.2	Mg 0.15; Ti 0.1; Fe 0.4
2.4360	DIN 17743	400	0.15	0.5	2.0	–	28.0-34.0	–	63.0	Al 0.50; Ti 0.3; Fe 1.0-2.5
2.4602	N 06022	C22	0.01	0.08	0.5	20.0-22.5	–	12.5-14.5	Rest/Bal.	V 0.35; W 2.5-3.5; Co 2.5; Fe 2.0-6.0
2.4605	N 06059	59	0.01	0.10	0.5	22.0-24.0	–	15.0-16.5	Rest/Bal.	Co 0.3; Fe 1.5; Al 0.1-0.4
2.4610	DIN 17744	C4	0.01	0.08	1.0	14.0-18.0	0.50	14.0-18.0	Rest/Bal.	Co 2.0; Fe 3.0; Ti 0.7
2.4816	DIN 17742	600	0.01	0.5	1.0	14.0-17.0	0.50	–	72.0	Ti 0.3; B 0.006; Fe 6.0-10.0
2.4819	DIN 17744	C276	0.015	0.08	1.0	14.5-16.5	0.50	–	Rest/Bal.	Co 2.5; Fe 4.0-7.0; W 3.0-4.5
2.4851	DIN 17742	601	0.10	0.5	1.0	21.0-25.0	0.50	–	58.0-63.0	Al 1.0-1.7; Bi 0.006; Fe 18.0
2.4858	DIN 17744	825	0.025	0.5	1.0	19.5-23.5	1.5-3.0	2.5-3.5	38.0-46.0	Ti 0.6-1.2; Al 0.2; Fe Rest/Bal.; Co 1.0

Material No.	Standard	Short Term (Int. Alloy Registr. No.)	<i>Titan- and Aluminium based Alloys</i> Alloy Composition (Melt Analysis) – Percentage per Mass							
			Fe	Si	Mn	Al	Mg	Ti	Zn	Cu
3.0205	DIN 1712	Al99	Fe + Si 1.0		0.05	99	0.05	0.05	0.10	0.05
3.3535	DIN 1725	AlMg3 (5754)	0.40	0.40	–	Rest	2.6-3.6	0.15	0.20	0.10
3.3555	DIN 1725	AlMg5 (5056A)	0.40	0.50	0.10-0.60	Rest	4.5-5.4	0.20	0.20	0.10
			Fe	O	N	H	C	Ti	Zn	Others
3.7025	DIN 17850	Ti1	0.15	0.12	0.05	0.013	0.06	Rest	–	0.4
3.7035	DIN 17850	Ti2	0.20	0.18	0.05	0.013	0.06	Rest	–	0.4

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(6) At the atmosphere (round values)

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
	kg/dm ³	Atmosphere	Seawater	Lyes	Acids	MPa	W / K m	mm ² /m
2.0065	8.94	1	2	1-3	3-5	200-250	393	0.017
2.0040	8.94	1	2	1-3	3-5	200-300	393	0.017
2.0321	8.44	5	5	3	4-5	490-590	120	0.067
2.0250	8.70	4	4	2	2-5	450-550	142	0.053
2.1020	8.82	1	2	3	2-5	480-650	75	0.111
2.0872	8.90	1	1	1-5	2-5	300-400	59	0.150

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
	kg/dm ³	Atmosphere	Seawater	Lyes	Acids	MPa	W / K m	mm ² /m
2.4060	8.40	1	2	1-3	3-5	340-440	79	0.095
2.4066	8.40	1	2-3	1-2	3-5	370-470	71	0.090
2.4360	8.80	1	1	2-3	1-5	450-550	26	0.513
2.4602	8.70	1	1	1-2	1-2	690-890	9	0.114
2.4605	8.50	1	1	1-2	1-2	690-890	10	0.125
2.4610	8.60	1	1	1-3	1-3	700-900	10	0.124
2.4816	8.40	1	2-3	1-2	2-5	550-750	15	0.103
2.4819	8.70	1	1	1-3	1-3	750-950	11	0.125
2.4851	8.10	1	2-3	1-3	1-5	650-850	11	0.119
2.4858	8.10	1	1	1-3	1-2	550-750	11	0.112

Material No.	Density	Resistance ⁽⁵⁾				Tensile Strength	Heat Conducting Capacity	Electrical Resistance
	kg/dm ³	Atmosphere	Seawater	Lyes	Acids	MPa	W / K m	mm ² /m
3.0205	2.70	2-3	4	4-5	3-5	75-140	204	0.028
3.3535	2.66	2-3	4	4-5	3-5	230-260	140	0.050
3.3555	2.64	2-3	4	4-5	3-5	310-340	116	0.061
3.7025	4.50	2	1-2	3-5	1-4	290-340	17	0.500
3.7035	4.50	2	1-2	3-5	1-4	390-440	17	0.500

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(6) At the atmosphere (round values)

<i>Plastics</i>									
Material		Density kg/dm ³	Resistance ⁽⁵⁾				Tensile Strength MPa	Max. Service Temperature	
			Atmos- phere	Seawater	Lyes	Acids		° C	° F
PE	Polyäthylen	0.950	4	2	2	2-5	350-400	80	176
PP	Polypropylen	0.910	4	2	2-3	2-5	385-420	100	210
PA	Polyamid	1.140	2	2	2-3	4-5	160-300	100	210
PES	Polyester	1.300	1	2	3-4	2-3	385-420	125	250
PVDC	Polyvinylidenchlorid	1.630	1	2	3	2-4	25-110	80	140

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Price Indexes for Weaving Wires (lin.m) ISO 4782
Base 1.4301 = 100
Prices in EURO / kg, January 2001

Material No.	Material	Diameter in mm					
		0.8	0.4	0.2	0.1	0.05	0.025
1.0304	C9D	25	27	41	102	–	–
1.0586	C50D HAVER NIA-Steel	55	64	93	124	–	–
1.4016	AISI 430	107	109	110	132	122	–
1.4034		159	161	147	118	–	–
1.4301	AISI 304	100	100	100	100	100	100
1.4306	AISI 304L	103	102	102	101	100	100
1.4310	AISI 301	116	116	116	140	117	113
1.4401	AISI 316	126	122	118	116	109	102
1.4404	AISI 316L	126	122	118	116	109	102
1.4539	AISI 904L	249	238	282	234	301	–
1.4571	AISI 316 Ti	128	129	141	177	428	–
1.4841	DIN 43720	151	152	160	152	133	–
1.4864	AISI 330	265	272	289	222	158	–
1.4725	DIN 17470	475	504	547	–	–	–
1.4767	DIN 17470	517	475	400	294	503	–
2.4869	DIN 17470	570	593	642	617	451	310
2.0065	DIN 1708	130	125	119	108	121	181
2.0321	DIN 17660	143	129	115	100	133	–
2.1020	DIN 17662	178	159	139	123	150	212
2.4066	DIN 17740	490	448	428	293	223	–
2.4360	DIN 17743	387	367	381	267	212	–
2.4602	N 06022	1797	1741	1807	1358	977	752
2.4605	N 06059	1615	1628	1424	1502	1047	808
2.4610	DIN 17744	1566	1588	1394	1379	985	745
2.4816	DIN 17742	488	436	400	469	353	–
2.4819	DIN 17744	1543	1571	1382	1471	1023	791
3.0205	DIN 1712	40	39	67	–	–	–
3.3555	DIN 1725	42	42	67	121	125	–
3.7025	DIN 17650	2185	2342	5031	13502	–	–
PE	Polyäthylen	11	8	8	11	–	–
PP	Polypropylen	11	8	8	11	–	–
PA	Polyamid	22	17	16	17	–	–
PES	Polyester	20	15	14	17	–	–
PVDC	Polyvinylidenchlorid	45	36	18	–	–	–

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Steel

Plain, low carbon steel (iron) with little resistance to corrosion under "normal" environmental conditions. HAVER & BOECKER therefore offers woven wire cloth made from plain steel in galvanized, tinned or lacquered finish.

HAVER NIA-Steel

This is a spring steel with high carbon content and manganese elements. It is extremely resistant to abrasion and vibration and – at the same time – it is elastic. Therefore it is especially suitable for industrial screens.

Martensitic and Precipitation-hardening Stainless Steels

The materials named in the table show a ferritic microstructure and are magnetic. Using special heat treatment they can be hardened in order to achieve a higher wear resistance and stability. The chromium content of the alloy results in good corrosion resistance to "normal" environment conditions.

Austenitic Stainless Steels

Stainless Steel is the most widely used material for our woven wire, covering most applications. These alloys show very good resistance to corrosion under atmospheric conditions. In cases where comparable corrosion properties are required with a higher strength, we recommend the material No. 1.4310. If the material is to be welded, we recommend austenitic stainless steels with a low carbon content or the material No. 1.4571, stabilized with titanium. Both show a sufficient resistance to intercrystalline corrosion. The material group 1.44... contains molybdenum and has a higher resistance to chlorous media than the material group 1.43...

Austenitic stainless steels are not resistant to high-temperature-oxidation. For high-temperature applications, when some discoloration of the surface can appear, i.e. over 450°C (842°F), heat resisting steels should preferably be used.

Austenitic-Ferritic Stainless Steels

So-called compound steels with very good corrosion resistance to sea-water. The alloy constituent molybdenum makes them resistant against pitting or selective corrosion. Compared to the austenitic alloys they have a high tensile strength, making them particularly suitable for applications of the chemical or petrochemical industry.

Heat Resisting Steels and Heat Conducting Alloys

These steels are resistant to temperatures of up to 1,300°C (2,375°F) in air and show a good resistance to possible

heat waste. The coat of aluminium-oxide that forms on the wire surface makes them especially suitable for applications in air. The use of ferritic steels in aggressive or sulphurous surroundings is not recommended. For such applications austenitic heat resisting steels should be used as they show a better resistance to high-temperature-corrosion.

Copper and Copper based Alloys

Copper displays good conducting properties for heat and electricity. It is highly resistant in the atmosphere as well as in sea-water. The corrosion resistance to cyanides, halogenides and ammonia however is poor.

Copper-tin alloys (Phosphor Bronze) are largely wear and tear resistant and show good emergency running properties. This property is important in bearings.

Copper-zinc alloys (Brass) are particularly suitable for sieving and filtration purposes. It is important that the material does not come into contact with ammonia (NH₃), because it may be destroyed by crevice corrosion.

Nickel and Nickel based Alloys

Nickel is resistant to a number of corroding media such as halogenides, caustic alkalines and many organic compounds. It shows good magnetic-, electrical- and heat conducting properties.

Woven wire cloth made from a nickel based alloy is produced to meet certain criteria. Special alloy constituents combine a high corrosion resistance to acids and lyes with temperature resistance. Alloy 59 offers a large application field in alkalines and acids.

Titanium and Aluminium based Alloys

Aluminium is a very soft and light material with good corrosion resistance. As for the austenitic materials the corrosion resistance results from a passivation coating that is formed in the air. ALMg3 and ALMg5 are alloyed with magnesium and have a higher tensile strength than high-grade aluminium (coat).

Titanium is a material with very good corrosion resistance to a number of aggressive media. It is used in the air-, space- and medical industries. The excellent relationship between tensile strength and density is comparable to austenitic materials.

Plastics

Wire cloth is also woven from round monofilament threads, for example Polyethylene, Polyester or Polyamide. Plastics absorb moisture and are extremely temperature sensitive. They should be limited to applications up to 60° - 80°C (140° - 176°F). Plastics are frequently used for filtration purposes, but very seldom for sieving since accuracy of openings cannot be ensured with tensioned screens because of the mechanical stress and vibration.

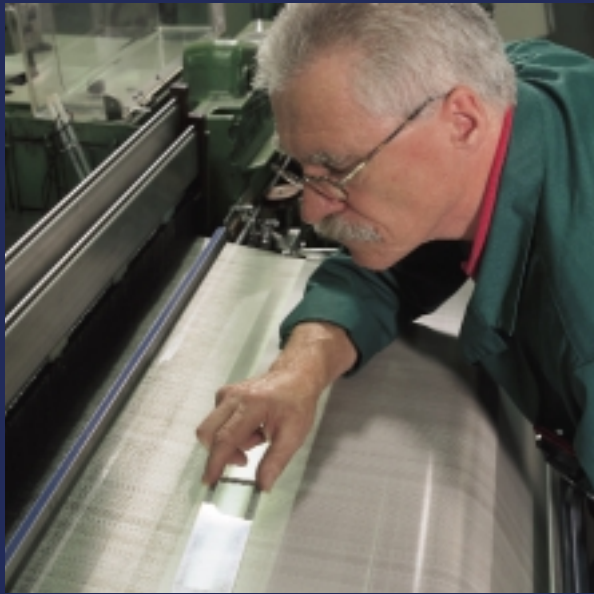
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Spools of wire



Preparation of warp drum



Quality control during the weaving of fine mesh cloth



Welding of POROSTAR® filter candles

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