

Special steel solutions

for boat shaft
applications



**Swiss
Steel**
Group



Market description

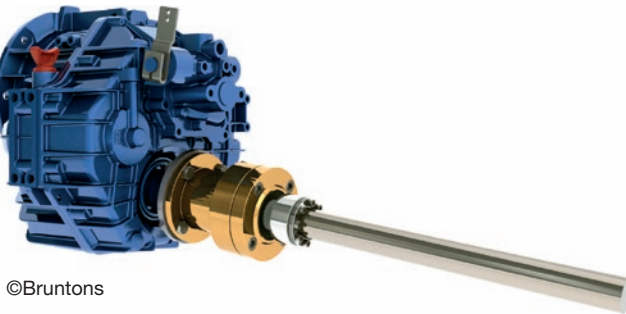
One of the most challenging and functional component in the shipbuilding industry is the boat shaft.

There is an important demand for high-quality, peeled, polished or precision-ground steel bars, especially in construction of passenger ships, yachts and tugboats.

For reliable use in seawater, high corrosion resistance is essential to withstand the high processing loads during propulsion of the propeller. Excellent toughness and strength are required.

Deutsche Edelstahlwerke (DEW) and Ugitech supply

- shipyards which build new ships (long term needs for boat shafts)
- shipchandlers which repair boats and request a short time delivery in order to reduce dry dock stocks.



Boat shafts can be supplied in two ways:

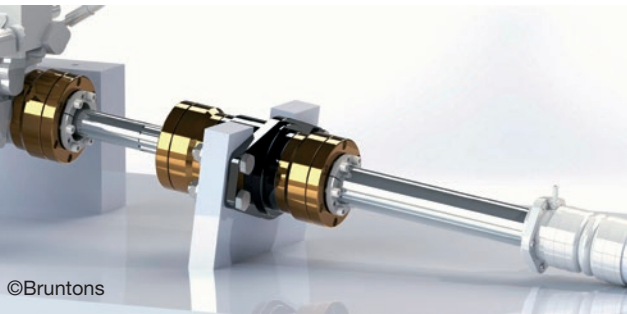
- nearly finished shafts (generally in ground condition). The shipyard only has to machine both bar ends,
- bars near the net finished diameter. The shipyard only does a light machining on the shafts to adjust accurate installation.

The combination of modern production facilities, a wide product range, the host of mill and product approvals have resulted in Deutsche Edelstahlwerke and Ugitech becoming suppliers of steels for boat shafts.

As producers with more than 160 years of experience, we work to continuously improve our product range to propose the best solution for increasing demands of the shipbuilding industry.

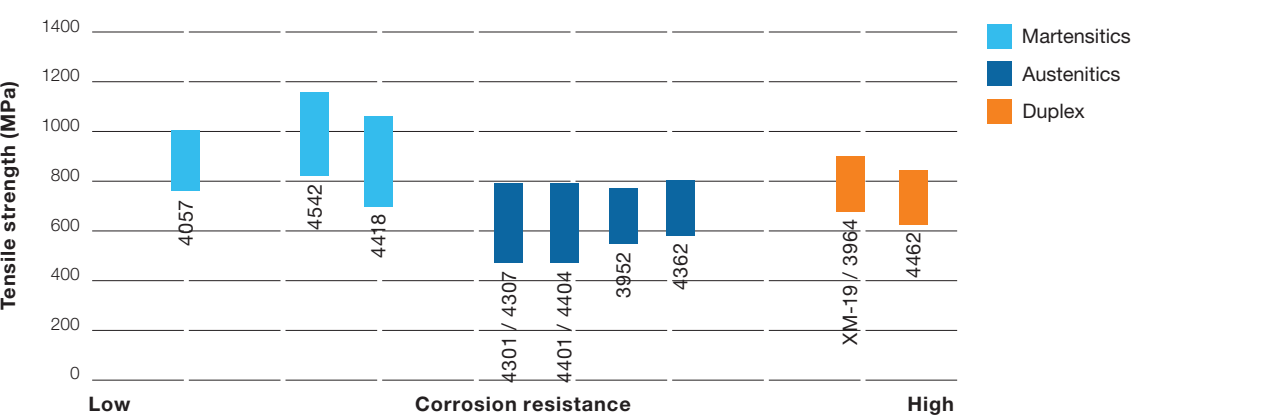
Deutsche Edelstahlwerke and Ugitech are complementary in production capabilities. This, combined with our mill stock facilities, ensures a high degree of security for supply chain management.

Together we can deliver the common steels for boat shaft applications to fulfil your requirements.



Grades

The right boat shaft material depends on the requirements



Boat shaft materials

Designation		Chemical composition in weight-%								
Denomination DEW & oUgitech	EN	UNS	JIS	AISI, ASTM, others	C	Ni	Cr	Mo	S	Other elements
Austenitics										
Acidur 4301	1.4301	S30400	SUS 304	304	≤ 0.07	8.0 - 10.5	17.5 - 19.5	-	≤ 0.015	Mn ≤ 2.0; Si ≤ 1.0
Acidur 4307 UGI® 4307	1.4307	S30403	SUS 304L	304	≤ 0.03	8.0 - 10.5	17.5 - 19.5	-	≤ 0.015	Mn ≤ 2.0; Si ≤ 1.0
Acidur 4401	1.4401	S31600	SUS 316	316	≤ 0.07	10.0 - 13.0	16.5 - 18.5	2.0 - 2.5	≤ 0.03	Mn ≤ 2.0; Si ≤ 1.0
Acidur 4404 UGI® 4404	1.4404	S31600	SUS 316L	316L	≤ 0.03	10.0 - 13.0	16.5 - 18.5	2.0 - 2.5	≤ 0.03	Mn ≤ 2.0; Si ≤ 1.0
Magnadur 3952	1.3952				≤ 0.03	13.0 - 15.0	16.5 - 18.5	2.5 - 3.0	≤ 0.015	Mn ≤ 2.0; Si ≤ 1.0; N 0.15 - 0.25
Magnadur 3964 Mod UGI® 209		S20910		XM-19	≤ 0.06	11.5 - 13.5	20.5 - 23.5	1.5 - 3.0	≤ 0.03	Mn 4.0 - 6.0; N 0.2 - 0.4 Nb 0.1 - 0.3; V 0.1 - 0.3
Martensitics										
Acidur 4057 UGI® 4057	1.4057	S43100	SUS 431	431	0.17 - 0.20	2.0 - 2.5	15 - 16.5	-	≤ 0.03	Mn ≤ 1.0; Si ≤ 0.8
Acidur 4418 UGI® 4418	1.4418				≤ 0.06	4.0 - 6.0	15.0 - 17.0	0.8 - 1.5	≤ 0.03	Mn ≤ 1.5
Acidur 4542 UGI® 4542	1.4542	S17400	SUS 630	17-4PH 630	≤ 0.07	3.5 - 5.0	15.0 - 17.0	≤ 0.6	≤ 0.03	Nb 0.05 - 0.45 Cu 3 - 5; Si ≤ 0.7
Duplex										
Acidur 4362 UGI® 4362	1.4362	S32304			≤ 0.03	3.5 - 5.5	22.0 - 24.5	0.1 - 0.6	≤ 0.015	Cu 0.1 - 0.6 N 0.05 - 0.02
Acidur 4462 UGI® 4462	1.4462	S32205 S31803	SUS 329J3L	F51 F60	≤ 0.03	4.5 - 6.5	21.0 - 23.0	2.5 - 3.5	≤ 0.015	Mn ≤ 2.0; Si ≤ 1.0 N 0.10 - 0.22

Mechanical characteristics

Designation		Mechanical characteristics									Application
Denomination DEW & Ugitech	Condition	EN	UNS	JIS	AISI, ASTM, others	R _{p0.2} (MPa) (Ksi)	R _m (MPa) (Ksi)	A (%)	Z (%)	HB	
Austenitics											
Acidur 4301	A	1.4301	S30400	SUS 304	304	≥ 205 ≥ 30	≥ 515 ≥ 75	≥ 30	≥ 40	≤ 215	S
Acidur 4307	A	1.4307	S30403	SUS 304L	304 L	≥ 205 ≥ 30	≥ 515 ≥ 75	≥ 30	≥ 40	≤ 215	S
Acidur 4401	A	1.4401	S31600	SUS 316	316	≥ 200 ≥ 29	500 - 700 73 - 102	≥ 40	≥ 50	≤ 215	S
Acidur 4404 UGI® 4404	A	1.4404	S31600	SUS 316L	316L	≥ 200 ≥ 29	500 - 700 73 - 102	≥ 40	≥ 50	≤ 215	S
Magnadur 3952	A As rolled	1.3952				≥ 295 ≥ 43	580 - 800 84 - 116	≥ 40			L
Magnadur 3964 Mod UGI® 209	A		S20910		XM-19	≥ 380 ≥ 55	≥ 690 ≥ 100	≥ 35	≥ 55		L
	As rolled					≥ 520 ≥ 75	800 - 950 125 -138	≥ 30	≥ 50		L

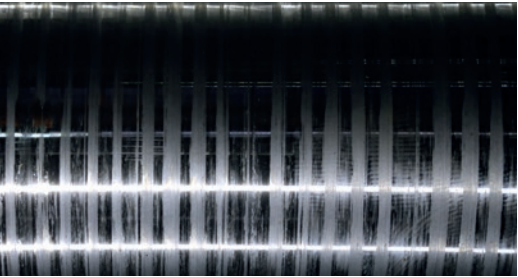
C = Continuous running vessel
L = Luxury boats and high speed boats
S = Sailing and low power boats

Designation		Mechanical characteristics									Application
Denomination DEW & Ugitech	Condition	EN	UNS	JIS	AISI, ASTM, others	R _{p0.2} (MPa) (Ksi)	R _m (MPa) (Ksi)	A (%)	Z (%)	HB	
Martensitics											
Acidur 4057 UGI® 4057	QT 800 *	1.4057	S43100	SUS 431	431	≥ 620 ≥ 90	800 - 950 116 -138	≥ 15	≥ 45	≤ 321	C
Acidur 4418 UGI® 4418	QT 900 *	1.4418				≥ 700 ≥ 102	900 - 1000 131 - 160	≥ 16			C
	H1150M/ P800					≥ 520 ≥ 75	800 - 950 125 - 138	≥ 18	≥ 55	≥ 255	C
	H1150/ P930					≥ 725 ≥ 105	930 - 1100 135 - 160	≥ 16	≥ 50	≥ 277	C
	H1150D/ P930	1.4542	S17400	SUS 630	17-4PH 630	≥ 725 ≥ 105	930 - 1100 135 - 160	≥ 16	≥ 50	≤ 311	C
Acidur 4542 UGI® 4542	H1100/ P960					≥ 795 ≥ 115	965 - 1160 140 - 168	≥ 14	≥ 45	≥ 302	C
	H1025/ P1070					≥ 1000 ≥ 145	1070 - 1270 155 - 184	≥ 12	≥ 45	≥ 331	C
Duplex											
UGI® 4362	A	1.4362	S32304			≥ 400	600 - 830	≥ 25	≥ 45	≤ 260	L
Acidur 4462 UGI® 4462 UGI® 4462P	A	1.4462	S32205 S31803	SUS 329J3L	F51 F60	≥ 450 ≥ 102	650 - 880 94 - 128	≥ 25	≥ 55	≤ 270	L

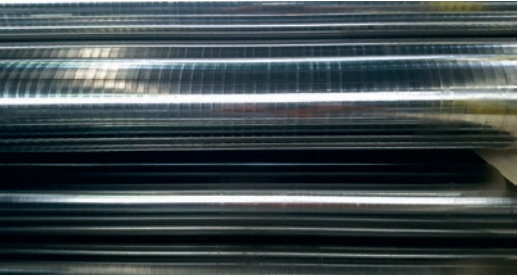
* According to EN 10088-3
General figures depend on dimensions
which are not contractual

C = Continuous running vessel
L = Luxury boats and high speed boats
S = Sailing and low power boats

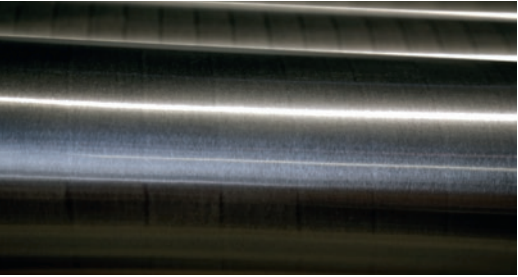
Surface finishes & geometrical properties



Peeled bars		
Dimensions	$d \leq 400$ mm round	
Diameter tolerance	ISO 10 - 13	
Short bars	0%	
Ovalisation	$\leq 1/2$ tolerance	
Roughness	$Ra = 1.25\text{ }\mu\text{m}$	



Polished bars		
Dimensions	$d \leq 325$ mm round	
Diameter tolerance	ISO 10 - 13	
Short bars	0%	
Ovalisation	$\leq 1/2$ tolerance	
Roughness	$Ra = 1,25\text{ }\mu\text{m}$	

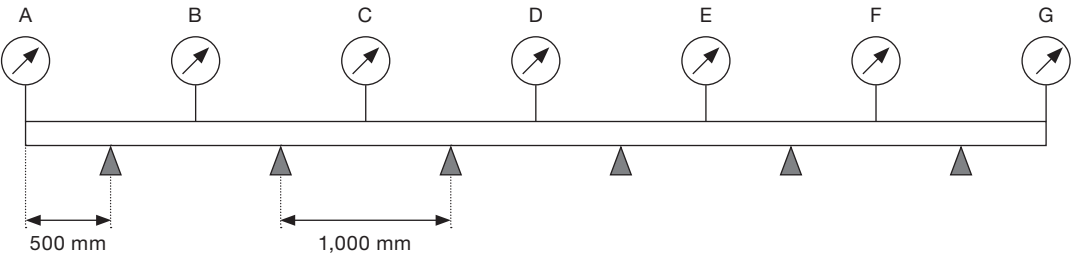


Ground bars		
Dimensions	$d \leq 250$ mm round	
Diameter tolerance	ISO 7 - 9	
Short bars	0%	
Ovalisation	$\leq 1/3$ tolerance	
Roughness	$Ra = 0.65\text{ }\mu\text{m}$	

Depending on diameter, length, surface finish. Possible limitations.

Straightness

2 mm/m	Standard, available in full dimension range
1 mm/m	Straightened by reeling, available up to 130 mm
0.5 mm/m	Straightened by high performance straightening press, available from 90 mm to 250 mm
0.2 mm /m	Straightened by high performance straightening press, available from 25 mm to 130 mm
5 mm/on total length	Straightened on total wobble, possible up to a length of 26 meters



Measurement of total deviation of comparators at each point (A, B, C to G).

Straightness is the maximal value of all deviations divided by two.

Dimensions and quantities

Dimensions available

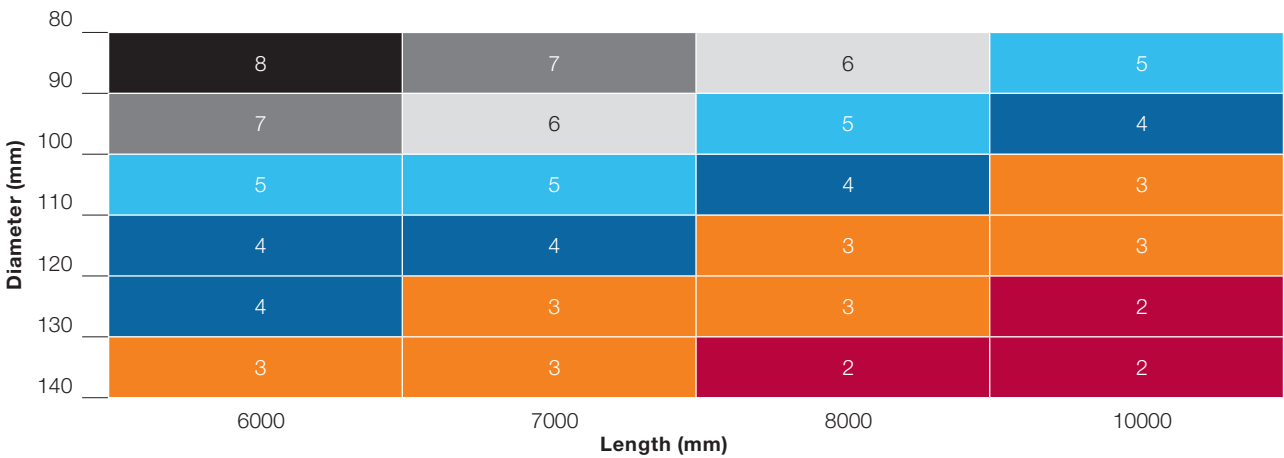
Diameter		Length	
20 - 50	mm	3 - 10	m
50 - 290	mm	3 - 26	m

Minimum order quantity (MOQ)

- 20 < Ø < 76 mm 1000 kg +/- 15%
- 80 < Ø < 130 mm 2000 kg +/- 15%
- > 130 mm 4000 kg +/- 15%

The MOQ depends on format and the requested dimension (from 3500 kg up to 8000 kg).

Minimum number of bars for a MOQ of 2 T. Indicative figures



Possible limitations depending on:

- material grades
- heat treatment condition
- requested surface quality

Packaging and test certificates

Packaging

Wooden reinforced boxes



Test certificates

- 3.2 on demand according to EN 10204
- 3rd party inspection
 - ABS
 - BV
 - DNV-GL
 - LR
 - RINA
 - KRS

Plastic protection



Individual protection with plastic rings or with cardboard tubes





Swiss Steel Group

Production

ASCOMETAL
DEUTSCHE EDELSTAHLWERKE
FINKL STEEL
STEELTEC
UGITECH

Sales & Services

Swiss Steel International
More than 70 locations
in over 30 countries worldwide

 Sales & Services | Production

Sales & Services division

From semi-finished products to ready-to-use components at your door, worldwide.

1300 employees

70 locations

5 continents

30 countries

Our range of local services includes:

- Local supply chain services
- Just in time deliveries
- Cutting
- Chamfering
- Technical support



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The information and data presented here in are typical or average values and are not a guarantee of maximum or minimum values. Only the information reported on our material certificates is to be considered as relevant.

Applications specifically suggested for material described herein are made for the purpose of illustration only to enable the reader to make its own evaluation and are not intended as warranties, either express or implied, of fitness for any purposes.