

# Special steel solutions

for boat shaft  
applications



**Swiss  
Steel**  
Group



# Market description

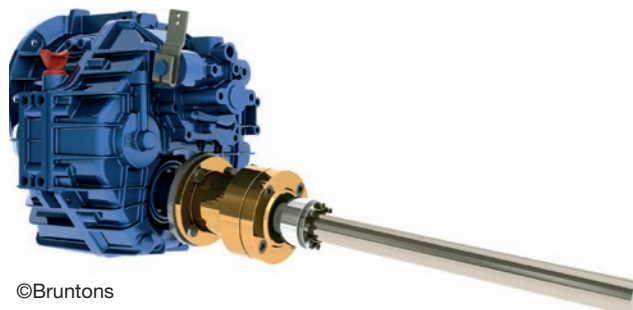
## One of the most challenging and functional component in the shipbuilding industry is the boat shaft.

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)
- shipchangers which repair boats and request a short time delivery in order to reduce dry dock stocks.



### Boat shafts can be supplied in two ways:

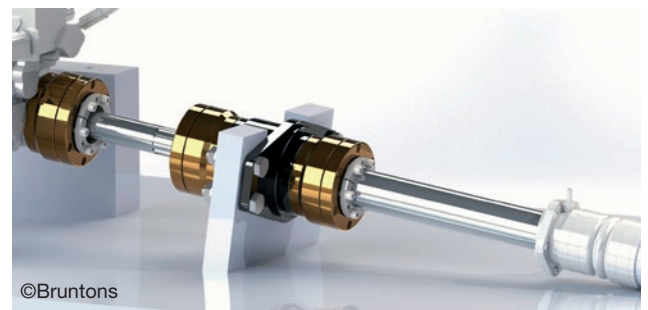
- nearly finished shafts (generally in ground condition). The shipyard only has to machine both bar ends,
- bars near the net finished diameter. The shipyard only does a light machining on the shafts to adjust accurate installation.

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.

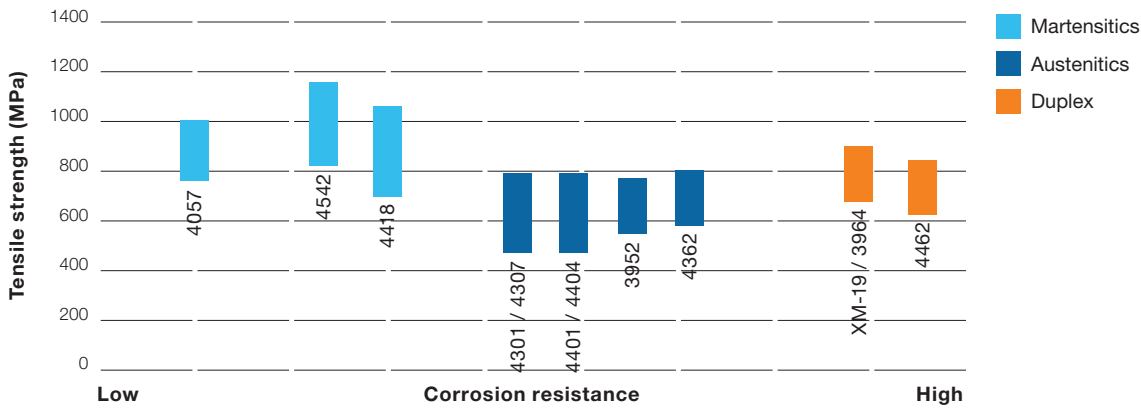
Deutsche Edelstahlwerke and Ugitech are complementary in production capabilities. This, combined with our mill stock facilities, ensures a high degree of security for supply chain management.

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
<b>Austenitics</b>										
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
<b>Martensitics</b>										
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
<b>Duplex</b>										
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 <sub>p0.2</sub> (MPa) (Ksi)	R <sub>m</sub> (MPa) (Ksi)	A (%)	Z (%)	HB	
<b>Austenitics</b>											
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  As rolled		S20910		XM-19	≥ 380 ≥ 55  ≥ 520 ≥ 75	≥ 690 ≥ 100  800 - 950 125 -138	≥ 35  ≥ 30	≥ 55  ≥ 50		L  L

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

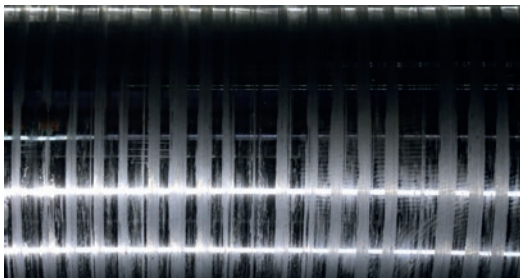


Designation					Mechanical characteristics					Application	
Denomination DEW & Ugitech	Condition	EN	UNS	JIS	AISI, ASTM, others	R <sub>10,2</sub> (MPa) (Ksi)	R <sub>m</sub> (MPa) (Ksi)	A (%)	Z (%)	HB	
<b>Martensitics</b>											
Acidur 4057 UGI® 4057	QT 800 *	1.4057	S43100	SUS 431	431	≥ 620 ≥ 90	800 - 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
Acidur 4542 UGI® 4542	H1150D/ P930	1.4542	S17400	SUS 630	17-4PH 630	≥ 725 ≥ 105	930 - 1100 135 - 160	≥ 16	≥ 50	≤ 311	C
	H1100/ P960					≥ 795 ≥ 115	965 - 1160 140 - 168	≥ 14	≥ 45	≥ 302	C
	H1025/ P1070					≥ 1000 ≥ 145	1070 - 1270 155 - 184	≥ 12	≥ 45	≥ 331	C
<b>Duplex</b>											
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

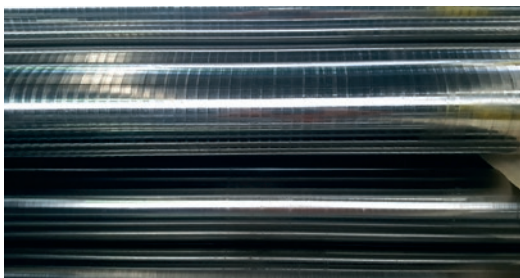
C = Continuous running vessel  
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# Surface finishes & geometrical properties



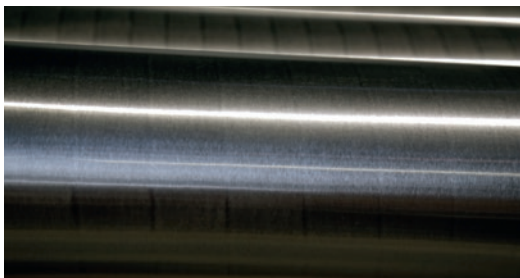
## **Peeled bars**

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



## **Polished bars**

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



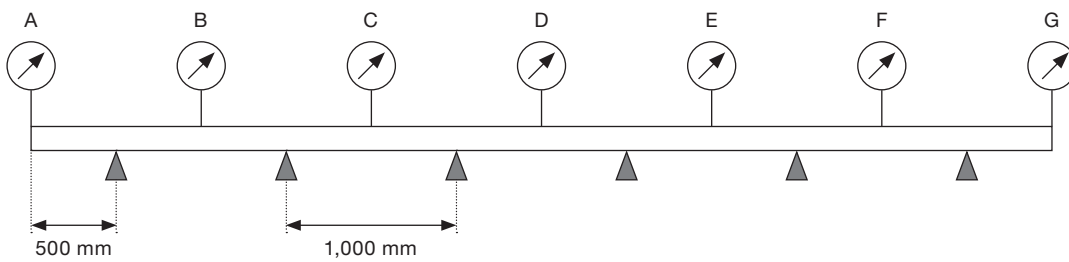
## **Ground bars**

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

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

Diameter (mm)	6000	7000	8000	10000
80	8	7	6	5
90	7	6	5	4
100	5	5	4	3
110	4	4	3	3
120	4	3	3	2
130	3	3	2	2
140				

## Possible limitations depending on:

- material grades
- heat treatment condition
- requested surface quality



# Packaging and test certificates

## Packaging

### Wooden reinforced boxes



### Plastic protection



### Individual protection with plastic rings or with cardboard tubes



## Test certificates

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



## 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



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Sales & Services division

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

**1300** employees

**70** locations

**5** continents

**30** countries

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**Our range of local services includes:**

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



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