



# Crucible AQUAMET® Boat Shafting



## A Complete Family of Stainless Steel Shafting



### Crucible AQUAMET® 17

AQUAMET 17 is a precipitation-hardening, martensitic stainless steel. Because it is hardened by a heat treatment, it provides high strength regardless of the diameter. It also offers good toughness and corrosion resistance. A popular choice, AQUAMET 17 is widely used in pleasure boats, ski boats, work boats, fishing trawlers, and crew boats, as well as pilot and patrol boats.

### Crucible AQUAMET® 18

AQUAMET 18 is an austenitic stainless steel with corrosion resistance comparable to that of Type 304. Its good strength and toughness make it an ideal shafting material for work boats. It provides a stainless alternative to ABS Grade 2 carbon steel shafting, but requires no sleeves nor fiberglass. In certain large diameters, it does offer a strength advantage over AQUAMET 19. (See properties below.) It is frequently used on pusher tugs, tow boats, supply boats and fishing trawlers. NOTE: AQUAMET 18 is currently available by special order on a heat lot basis only.

### Crucible AQUAMET® 19

AQUAMET 19 is a modified Type 304 stainless steel that is fully austenitic and non-magnetic. Strengthened by adding nitrogen to the melt, it has better corrosion resistance than Type 304 stainless. AQUAMET 19 has proven itself in demanding service on shrimpers, crabbers, scallopers, and other fishing boats as well as on pleasure craft. It may be considered as an economical alternative to AQUAMET 22.

### Crucible AQUAMET® 22

AQUAMET 22 is a high-alloy stainless steel with superior corrosion resistance along with excellent toughness and high strength. It has higher strength than AQUAMET 17 in 3/4" to 1-1/4" dia., and it has equivalent in strength in 1-3/8" to 2" dia. Due to its high alloy content, AQUAMET 22 resists pitting and crevice corrosion and is ideal for pleasure boats which are operated infrequently, spending much of their time tied up at docks. AQUAMET 22 H.S. is a high strength version available in 2-1/2" – 6" dia. NOTE: The mechanical properties of AQUAMET 22 H.S. are slightly lower in sizes 5" dia. and over.



# Mechanical Properties

	Tensile Strength	Tensile Strength	Tension	0.2% Yield Strength		Elongation in 2?	Reduction of Area	
	psi	(MPa)	psi	Tension (MPa)	Torsion psi			Torsion (MPa)
<b>AQUAMET 17</b>								
Up to 8?	135,000	(931)	105,000	(724)	70,000	(483)	16	50
Over 8? to 12?	135,000	(931)	105,000	(724)	70,000	(483)	12	35
<b>AQUAMET 18</b>								
Up to 1-3/4?	120,000	(827)	90,000	(620)	60,000	(414)	20	50
Over 1-3/4? to 2-1/2?	110,000	(758)	70,000	(483)	47,000	(324)	35	55
Over 2-1/2? to 5?	105,000	(724)	65,000	(448)	43,000	(296)	40	55
Over 5? to 8?	100,000	(690)	60,000	(414)	40,000	(276)	40	55
Over 8? to 12?	90,000	(620)	50,000	(345)	33,000	(227)	35	45
<b>AQUAMET 19</b>								
Up to 1-1/2?	130,000	(896)	105,000	(724)	70,000	(483)	20	55
Over 1-1/2? to 2?	115,000	(793)	85,000	(586)	57,000	(393)	25	55
Over 2? to 2-1/2?	105,000	(724)	60,000	(414)	40,000	(276)	30	55
Over 2-1/2? to 3?	100,000	(690)	55,000	(379)	36,000	(252)	35	55
Over 3? to 12?	95,000	(655)	50,000	(345)	33,000	(228)	35	55
<b>AQUAMET 22</b>								
3/4? to 1-1/4?	145,000	(1000)	130,000	(896)	86,600	(597)	18	45
Over 1-1/4? to 2?	135,000	(931)	105,000	(724)	70,000	(483)	20	50
Over 2? to 2-1/2?	120,000	(827)	95,000	(655)	63,000	(434)	20	50
Over 2-1/2? to 3?	115,000	(793)	75,000	(517)	50,000	(345)	25	50
Over 3? to 12?	100,000	(689)	55,000	(379)	36,600	(252)	30	50
<b>AQUAMET 22 H.S.</b>								
2-1/2? to 4-3/4?	130,000	(896)	105,000	(724)	70,000	(483)	15	45
5? to 6?	125,000	(862)	90,000	(620)	60,000	(414)	15	45

## Chemical Analysis (%)

Composition	Aquamet 17	Aquamet 18	Aquamet 19	Aquamet 22
Carbon	0.07 max	0.15 max	0.08 max	0.06 max
Manganese	1.00 max	11.00-14.00	2.00 max	4.00-6.00
Silicon	1.00 max	1.00 max	1.00 max	1.00 max
Chromium	14.50-16.50	16.50-19.00	18.00-20.00	20.50-23.50
Nickel	3.00-5.00	0.50-2.50	8.00-10.50	11.50-13.50
Phosphorus	0.04 max	.06 max	0.04 max	0.04 max
Sulfur	0.03 max	0.03 max	0.03 max	0.03 max
Copper	3.00-5.00			
Columbium + Tantalum	0.15-0.45			0.10-0.30
Nitrogen		0.20-0.45	0.20-0.30	0.20-0.40
Molybdenum				1.50-3.00
Vanadium				0.10-0.30
Iron	Balance	Balance	Balance	Balance

## Available Sizes

AQUAMET shafting is stocked ready for machining and installation in popular sizes up to 4" dia. and lengths up to 30 ft. Other diameters and lengths are available. Please inquire.

AQUAMET shafting is precisely manufactured in compliance with the requirements of the American Boat and Yacht Council (ABYC) Standard P-6 and carefully packaged to protect the precision finish and straightness.

## Shaft Diameters

The following equations can be used to compute shaft diameters and safety factors:

$$D = \sqrt[3]{\frac{321,000 \times P \times S.F.}{S_t \times N}} \quad S.F. = \frac{D^3 \times S_t \times N}{321,000 \times P}$$

D = Shaft Diameter (inches)

P = Horsepower

S.F. = Safety Factor

S<sub>t</sub> = Yield Strength, Torsional (lbs./in.<sup>2</sup> = psi)

N = Shaft Speed (RPM)