AMERICAN-MARSH PUMPS

Material	Designation	Approximate Chemical Analysis		Approximate Physical Properties	Application & Remarks
Leaded Red Brass	SAE 40 ASTM B584 Alloy 836 UNS C83600	Copper Tin Lead Zinc Iron Nickel Antimony	85.00 4.50 4.50 4.50 0.25 0.75 0.25	**Tensile Strength** 30,000 PSI **Brinell Hardness** 50	Because of its excellent castings & machine characteristic, this alloy is the most commonly used bronze alloy. It is used for a wide variety of parts such as impellers, tube bearings, shaft sleeves, glands, water slingers, etc.
Leaded Tin Bronze	SAE 621 ASTM B143 Alloy 923 UNS C92300	Copper Tin Lead Zinc Nickel	86.00 8.00 1.00 4.00 1.00	**Tensile Strength** 36,000 PSI **Brinell Hardness** 72	Where impeller vanes are such that a metal easy to cast is required, SAE 621 is used.
Aluminum Bronze	SAE J461 ASTM B148 Alloy 955 UNS C95500	Copper Aluminum Iron Manganese Nickel	78.00 10.00 - 11.00 3.00 - 5.00 3.50 3.00 - 5.00	**Tensile Strength** 90,000 PSI **Brinell Hardness** 190	Good corrosion resistance and high strength. More difficult to machine than other bronzes.
Nickel Aluminum Bronze	ASTM B148 Alloy 958 UNS C95800	Copper Aluminum Iron Nickel Manganese	81.50 9.00 4.00 4.50 1.00	**Tensile Strength** 100,000 PSI **Brinell Hardness** 179	A high strength, ductile, extra tough corrosion and cavitation resisting material. Expecially well suited for marine and sea water applications.
Zincless Bronze	SAE 63 ASTM B505 Alloy 927 UNS C92700	Copper Tin Lead Zinc	87.50 9.50 1.50 0.75	**Tensile Strength** 35,000 PSI **Brinell Hardness** 65	This bronze has its greatest application on bowl and impreller castings where a corrosive such as acid mine water or salt water is being pumped. It is not used unless specifically required for a job.
High Leaded Tin Bronze	SAE 64 ASTM B584 Alloy 932 UNS C93200	Copper Tin Lead Zinc Nickel Antimony	79.00 9.50 9.50 0.75 0.75 0.55	**Tensile Strength** 25,000 PSI **Brinell Hardness** 55	Because of its excellent anti-friction properties this bronze alloy commonly used for bearings & wear rings.
High Leaded Tin Bronze **Bearing Bronze**	SAE 60 ASTM B584 Alloy 932 UNS C93200	Copper Tin Lead Zinc	83.00 7.00 7.00 3.00	**Tensile Strength** 30,000 PSI **Brinell Hardness** 58	The excellent anti-frictional and corrosion resistant properties of this bronze make it well suited for general purpose bearing applications.
Babbitt **Nickel Babbitt**	ASTM B-23 Alloy 2	Tin Antimony Copper Nickel Lead	88.50 7.50 3.50 0.50 0.10	**Tensile Strength** 11,200 PSI **Brinell Hardness** 25	Used as a sleeve bearing material and expecially applicable where corrosion is a problem such as acid mine water.
Navy G **Tin Bronze**	SAE 620 ASTM B584 Alloy 903 UNS C90300	Copper Tin Zinc	88.00 8.00 4.00	**Tensile Strength** **Brinell Hardness**	
Manganese Bronze	SAE 43 ASTM B584 Alloy 865 UNS C86500	Copper Tin Zinc Aluminum Iron	58.00 0.50 39.50 1.00 1.00	**Tensile Strength** **Brinell Hardness**	
Cast Iron	ASTM A-48 CL30 UNS F12101 CL40 UNS F12801 CL50 UNS F13501	Rarely if ever classified by chemical analysis		**Class 30 Tensile Strength** 30,000 PSI **Class 40 Tensile Strength** 40,000 PSI **Class 50 Tensile Strength** 50,000 PSI	Most commonly used general purpose pump casting materials. Easy to cast and good machinability. Although used rarely if there is a corrosion problem, has been successfully used in salt water, dry cholorine and other fluids. Class 30 used most often. Other classes available if higher strength and wear
Ductile Iron	ASTM A536 Grade 80-55-06 UNS F33800	Rarely if ever classified by chemical analysis		**Tensile Strength** 80,000 PSI **Yield Strength** 55,000 PSI	Most commonly used for castings.
Carbon Steel **Shafting**	AISI-C1045 ASTM A576 SAE 1045 UNS G104500	Carbon Manganese Phosphorous Sulfur	0.43 - 0.50 0.60 - 0.90 0.04 0.05	**Tensile Strength** 95,000 PSI **Brinell Hardness** 150	This carbon steel alloy is the standard material for turbine pump lineshaft.

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Cast Steel	AISI 1030 ASTM A-16 Grade WCB UNS J03002	Carbon Manganese Phosphorous Sulfur Silicon	0.30 1.00 0.04 0.05 0.60	**Tensile Strength** 70,000 PSI	This alloy is used on application where the strength of cast iron is insufficient.
Carbon Steel **Column Pipe**	ASTM A536 Grade B UNS K03005	Carbon Manganese Phosphorous Sulfur	0.30 1.20 0.05 0.06	**Tensile Strength** 60,000 PSI	Used for deepwell turbine column pipe. In general has poor corrosion resistance properties.
Carbon Steel **Plate**	ATSM A36 UNS K02600	Carbon Manganese Sulfur Silicon	0.25 - 0.27 0.80 - 1.20 0.05 0.15 - .04	**Tensile Strength** 58,000 PSI **Yield Strength** 36,000 PSI	Used in column flanges, base plates and sole plates. In general has poor corrosion resistance properties.
Stainless Steel **11.5% - 13.5% Chromium**	AISI 410 ASTM A-743 Grade CA-15 UNS J91150	Chromium Silicon Manganese Carbon Molybdenum Sulfur Iron	12.50 1.00 1.00 0.15 0.39 0.022 85.00	**Tensile Strength** 90,000 PSI	One of the least corrosion resistant stainless steels, this alloy has excellent high strength physical properties which are obtained by heat treatment. It has excellent corrosion resistance to atmospheric corrosion. Abailable in cast and wrought form.
Stainless Steel **12% - 14% Chrome**	AISI 416 ASTM B582 Condition A SAE 51416 UNS S41600	Chromium Silicon Manganese Carbon Sulfur Phosphorous	13.00 1.00 1.25 0.15 0.25 0.06 Max.	**Tensile Strength** 100,000 PSI	The addition of sulfur makes alloy highly machinable. Like AISI-410 its corrosion resistance is superior to mild steel but in general but in general does not compare favorably with the 18-8 type stainless steel. Type 416 has excellent mechanical properties obtained by heat treatment and is used almost
Stainless Steel **Type 18-8 Barstock**	AISI 303 ASTM B582 Condition A UNS S30300	Chromium Nickel Manganese Silicon Carbon Sulfur	18.00 9.00 2.00 1.00 0.20 0.27	**Tensile Strength** 75,000 PSI	Has excellent corrosion resistance to a wide variety of substances which would attack cast iron and bronze alloys. Strength cannot be increased by heat treatment. Available in cast and wrough form.
Stainless Steel **Type 18-8 Casting**	AISI 304 ASTM A743 Grade CF-8 UNS J92600	Chromium Nickel Manganese Silicon Carbon	18.00 10.00 1.50 2.00 0.08 Max.	**Tensile Strength** 65,000 PSI	Due to slightly different chemical analysis this alloy is less susceptible to loss of corrosion resistance resulting from welding than type 302. Strength cannot be increased by heat treatment. It is available in cast and wrought form.
Stainless Steel **Type 304 Barstock**	ASTM A276 AISI 304 SAE 30304 UNS S30400	Chromium Nickel Silicon Carbon Manganese Phosphorous Sulfur	18.00 - 20.00 8.00 - 12.00 1.00 0.08 Max. 2.00 0.045 0.03	**Tensile Strength** 85,000 PSI	Type 304 is comparable to type 302, but is less susceptible to loss of corrosion resistance resulting from welding. Can be cold worked to greater tensile strength and hardness.
Stainless Steel **Type 18-8 Casting**	AISI 316 ASTM A743 Grade CF-8M UNS J92900	Chromium Nickel Manganese Molybdenum Carbon Silicon	18.00 10.50 1.50 2.00 0.08 2.00	**Tensile Strength** 70,000 PSI	The addition of molybdenum makes 316 more resistant to corrosive attack for some applications than the other 18-8 steels. Strength cannot be increased by heat treatment. It is available in cast and wrought form.
Stainless Steel **Type 316 Barstock**	ASTM A276 Condition A AISI 316 SAE 30316 UNS S31600	Chromium Nickel Silicon Carbon Manganese Phosphorous Sulfur Molybdenum	16.00 - 18.00 10.00 - 14.00 1.00 0.08 Max. 2.00 0.045 0.03 2.00	**Tensile Strength** 75,000 PSI	used for shafting where good corrosion resistance is required. Type 316 has superior corrosion resistance to other chromium nickel steels when exposed to sea water and many types of chemicals.
Stainless Steel **Type 17-4 PH**	ASTM A564 Type 630 Condition H-1150 UNS S17400	Chromium Nickel Copper Carbon Sulfur Manganese Silicon	15.00 - 17.50 3.00 - 5.00 3.00 - 5.00 0.07 Max. 0.03 Max. 1.00 1.00	**Tensile Strength** 110,000 PSI **Brinell Hardness** 297	Used on pump shaft requiring high strength and corrosion resistance. Corrosion resistance is similar to 304 stainless steel.

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Material	Designation	Approximate Chemical Analysis		Approximate Physical Properties	Application & Remarks
Stainless Steel Alloy 20	ASTM A743 Grade CN-7M UNS J95150	Chromium Nickel Molybdenum Copper Silicon Manganese	20.00 29.00 2.00 3.00 1.50 1.50	**Tensile Strength** 62,500 PSI **Brinell Hardness** 130	Completely corrosion resistant to acids.
Monel Alloy Type K-500	FED QQ-N-286 AMS 476 UNS N05500	Nickel Copper Iron Manganese Aluminum	65.00 29.50 1.00 0.60 2.80	**Tensile Strength** 100,000 PSI **Brinell Hardness** 160	In addition to having corrosion resistance equal to that of monel, this alloy can be heat treated to obtain better mechanical properties. It is available in wrought form only.
Inconel Alloy Type 600	ASTM B166 UNS N06600	Nickel Chromium Iron Carbon Manganese Copper	72.00 15.80 7.20 0.04 0.20 0.10	**Tensile Strength** 90,000 PSI **Brinell Hardness** 145	Has a wide range of corrosion resistance to many acids and alkalies. Inconel does not respond to head treatment. It is available in cat and wrought form including spring temper.
Ni-Resist Type I	ASTM A436 UNS F41000	Chromium Nickel Carbon Silicon Copper Manganese	2.00 13.50 - 17.50 3.00 1.00 - 2.50 5.50 - 7.50 1.00 - 1.50	**Tensile Strength** 25,000 - 30,000 PSI **Brinell Hardness** 130 - 160	Substitute Ni-resist Type II for Ni-resist Type I.
Ni-Resist Type II	ASTM A-436 UNS F41002	Chromium Nickel Carbon Silicon Copper Manganese	1.75 - 2.50 18.00 - 22.00 3.00 1.00 - 2.80 0.50 0.80 - 1.50	**Tensile Strength** 25,000 - 30,000 PSI **Brinell Hardness** 130 - 160	Ni-resist is a comparatively moderately priced alloy which finds application in many corrosive media which do not permit use of standard materials, yet do not require use of the expensive high alloy materials. Available in cast form only.
Ni-Resist, Ductile Type D-2C	ASTM A439 Type D-2C UNS F53002	Chromium Molybdenum Nickel Silicon Carbon	0.50 1.80 - 2.40 21.00 - 24.00 2.00 - 3.00 2.90	**Tensile Strength** 55,000 - 60,000 PSI **Brinell Hardness** 130 - 170	Better corrosion resistance than standard ni-resist. Good machinability. Non magnetic. Available in cast form only.
Stellite #1		Chromium Tungsten Carbon Cobalt	30.00 12.00 2.50 53.50	**Tensile Strength** 47,000 PSI **Brinell Hardness** 534	Used in similar applications as stellite #6. Main difference is that #1 alloy is harder and less resistant to shock loads. Used mostly in form of weld rod to deposit hard faces.
Stellite #6		Chromium Tungsten Carbon Cobalt	28.00 4.00 1.00 67.00	**Tensile Strength** 105,000 PSI **Brinell Hardness** 370	Excellent resistance to abrasive wear. Used for hard facing on wearing surfaces. Also has good corrosion resistance to many acids. Used mostly in form of weld rod to deposit hard faces.
Colmonoy #6		Nickel Chromium Boron Iron Silicon Carbon	65.00 - 75.00 13.00 - 20.00 2.75 - 4.75 10.00 Max. 10.00 Max. 10.00 Max.	**Rockwell Hardness** **C Scale** 56 - 62	Excellent resistance to abrasive wear. Used for hard facing on wearing surfaces. Also has good corrosion resistance to many acids.