

COMMITTEE F04.12 ON METALLURGICAL MATERIALS

MATERIALS

Specialty steels

Material Designation	Common name Trade name	ASTM Standard	Description	UNS Designation	ISO Standard
Fe-18Cr-14Ni-2.5Mo	316 L Stainless Steel	F138	Standard Specification for Wrought 18 Chromium - 14 Nickel - 2.5 Molybdenum Stainless Steel Bar and Wire for Surgical Implants	S31673	ISO 5832-1
Fe-18Cr-12.5Ni-2.5Mo, Cast	316 L Stainless Steel	F745	Standard Specification for 18 Chromium - 12.5 Nickel - 2.5 Molybdenum Stainless Steel for Cast and Solution-Annealed Surgical Implant Applications	Unassigned	...
Fe-21Cr-10Ni-3.5Mn-2.5Mo	"REX 734"	F1586	Standard Specification for Wrought Nitrogen Strengthened 21 Chromium - 10Nickel - 3 Manganese - 2.5 Molybdenum Stainless Steel Alloy Bar for Surgical Implants	S31675	ISO 5832-9
Fe-22Cr-12.5Ni-5Mn-2.5Mo	"XM-19"	F1314	Standard Specification for Wrought Nitrogen Strengthened 22Chromium - 13Nickel - 5 Manganese - 2.5 Molybdenum Stainless Steel Alloy Bar and Wire for Surgical Implants	S20910	...
Fe-23Mn-21Cr-1Mo-1N	"108"	F2229	Standard Specification for Wrought, Nitrogen Strengthened 23 Manganese - 21 Chromium - 1 Molybdenum Low-Nickel Stainless Steel Alloy Bar and Wire for Surgical Implants	S29108	...

		F139-08	Standard Specification for Wrought 18 Chromium - 14 Nickel - 2.5 Molybdenum Stainless Steel Sheet and Strip for Surgical Implants	S31673	
		F621-08	Standard Specification for Stainless Steel Forgings for Surgical Implant		
		F1350-08	Standard Specification for Wrought 18 Chromium - 14 Nickel - 2.5 Molybdenum Stainless Steel Surgical Fixation Wire	S31673	
		F2181-09	Standard Specification for Wrought Seamless Stainless Steel Tubing for Surgical Implants		
		F2257-09	Standard Specification for Wrought Seamless or Welded and Drawn 18 Chromium - 14 Nickel - 2.5 Molybdenum Stainless Steel Small Diameter Tubing for Surgical Implants	S31673	
		F2581-07	Standard Specification for Wrought Nitrogen Strengthened 11 Manganese - 17 Chromium - 3 Molybdenum Low-Nickel Stainless Steel Alloy Bar and Wire for Surgical Implants	S29225	
<b>Cobalt base alloys</b>					
<b>Material Designation</b>	<b>Common name Trade name</b>	<b>ASTM Standard</b>	<b>Description</b>	<b>UNS Designation</b>	<b>ISO Standard</b>
Co-28Cr-6Mo Casting Alloy	Cast CoCrMo	F75	Standard Specification for Cobalt - 28 Chromium - 6 Molybdenum Alloy Castings and Casting Alloy for Surgical Implants	R30075	ISO 5832-4

Co-28Cr-6Mo Wrought Alloy #1	Wrought CoCrMo, Alloy 1	F1537	Standard Specification for Wrought Cobalt - 28 Chromium - 6 Molybdenum Alloys for Surgical Implants	R31537	ISO 5832-12
Co-28Cr-6Mo Wrought Alloy #2	Wrought CoCrMo, Alloy 2			R31538	ISO 5832-12
Co-28Cr-6Mo Wrought Alloy #3	Wrought CoCrMo, "GADS"			R31539	...
Co-20Cr-15W-10Ni-1.5Mn	"L-605"	F90	Standard Specification for Wrought Cobalt - 20 Chromium - 15 Tungsten - 10 Nickel Alloy for Surgical Implant Applications	R30605	ISO 5832-5
Co-20Ni-20Cr-5Fe-3.5Mo-3.5W-2Ti	"Syncoben"	F563		R30563	ISO 5832-8
Co-19Cr-17Ni-14Fe-7Mo-1.5Mn	Grade 2 "Phynox"	F1058	Standard Specification for Wrought 40 Cobalt - 20 Chromium - 16 Iron - 15 Nickel - 7 Molybdenum Alloy Wire and Strip for Surgical Implant Applications	R30008	ISO 5832-7
Co-20Cr-15Ni-15Fe-7Mo-2Mn	Grade 1 "Elgiloy"			R30003	ISO 5832-7
Co-35Ni-20Cr-10Mo	"35N"	F562-07	Standard Specification for Wrought 35 Cobalt - 35 Nickel - 20 Chromium - 10 Molybdenum Alloy for Surgical Implant Applications	R30035	ISO 5832-6

F688-10	Standard Specification for Wrought Cobalt - 35 Nickel - 20 Chromium - 10 Molybdenum Alloy Plate, Sheet, and Foil for Surgical Implants	R30035	
F799-11	Standard Specification for Cobalt - 28 Chromium - 6 Molybdenum Alloy Forgings for Surgical Implants	R31537 R31538 R31539	
F961-08	Standard Specification for 35 Cobalt - 35 Nickel - 20 Chromium - 10 Molybdenum Alloy Forgings for Surgical Implants	R30035	
F1091-08	Standard Specification for Wrought Cobalt - 20 Chromium - 15 Tungsten - 10 Nickel Alloy Surgical Fixation Wire	R30605	
F1377-08	Standard Specification for Cobalt - 28 Chromium - 6 Molybdenum Powder for Coating of Orthopedic Implants	R30075	
F2527-10	Standard Specification for Wrought Seamless and Welded and Drawn Cobalt Alloy Small Diameter Tubing for Surgical Implants	R30003 R30008 R30035 R30605 R31537	
F2886-10	Standard Specification for Metal Injection Molded Cobalt - 28 Chromium - 6 Molybdenum Components for Surgical Implant Applications		

		<b>WK36456</b>	<b>New Specification for Wrought 35 Cobalt - 35 Nickel - 20 Chromium - 10 Molybdenum Alloy for Surgical Implant Applications</b>		<b>R30035</b>	
Titanium and titanium alloys						
Material Designation	Common name Trade name	ASTM Standard	Description		UNS Designation	ISO Standard
Ti CP-1	CP-1 (Alpha)		Standard Specification for Unalloyed Titanium, for Surgical Implant Applications		R50250	ISO 5832-2
Ti CP-2	CP-2 (Alpha)	F67				
Ti CP-3	CP-3 (Alpha)					
Ti CP-4	CP-4 (Alpha)					
Ti-3Al-2.5V	Ti-3Al-2.5V (Alpha/Beta)	F2146	Standard Specification for Wrought Titanium - 3 Aluminum - 2.5 Vanadium Alloy Seamless Tubing for Surgical Implant Applications		R56320	...
Ti-5Al-2.5Fe	Ti-5Al-2.5Fe (Alpha/Beta)	...			Unassigned	ISO 5832-10
Ti-6Al-4V	Ti-6Al-4V (Alpha/Beta)	F1472	Standard Specification for Wrought Titanium - 6 Aluminum - 4 Vanadium Alloy for Surgical Implant Applications		R56400	ISO 5832-3

Ti-6Al-4V, Cast	Ti-6Al-4V (Alpha/Beta)	F1108	Standard Specification for Titanium - 6 Aluminum - 4 Vanadium Alloy Castings for Surgical Implants	R56406	...
Ti-6Al-4V ELI	Ti-6Al-4V ELI (Alpha/Beta)	F136-11	Standard Specification for Wrought Titanium - 6 Aluminum - 4 Vanadium ELI (Extra Low Interstitial) Alloy for Surgical Implant Applications	R56401	ISO 5832-3
Ti-6Al-7Nb	Ti-6Al-7Nb (Alpha/Beta)	F1295	Standard Specification for Wrought Titanium - 6 Aluminum - 7 Niobium Alloy for Surgical Implant Applications	R56700	ISO 5832-11
Ti-15Mo	Ti-15Mo (Metastable Beta)	F2066	Standard Specification for Wrought Titanium - 15 Molybdenum Alloy for Surgical Implant Applications	R58150	...
Ti-12Mo-6Zr-2Fe	"TMZF" (Metastable Beta)	F1813	Standard Specification for Wrought Titanium - 12 Molybdenum - 6 Zirconium - 2 Iron Alloy for Surgical Implant	R58120	...
Ti-11.5Mo-6Zr-4.5Sn	"Beta 3" (Metastable Beta)	AMS-T-9046		R58030	...
Ti-15Mo-5Zr-3Al	Ti-15Mo-5Zr-3Al (Metastable Beta)	...		Unassigned	ISO 5832-14

Ti-13Nb-13Zr	Ti-13Nb-13Zr (Metastable Beta)	F1713	Standard Specification for Wrought Titanium - 13 Niobium - 13 Zirconium Alloy for Surgical Implant Applications	R58130	...
Ti-45Nb	Ti-45Nb (Metastable Beta)	B348		R58450	...
Ti-35Nb-7Zr-5Ta	"TiOsteum" (Metastable Beta)	F-04.12.23		R58350	...
		F620-11	Standard Specification for Titanium Alloy Forgings for Surgical Implants in the Alpha Plus Beta Condition		
		F1580-12	Standard Specification for Titanium and Titanium - 6 Aluminum - 4 Vanadium Alloy Powders for Coatings of Surgical Implants		
		F2885-11	Standard Specification for Metal Injection Molded Titanium - 6 Aluminum - 4 Vanadium Components for Surgical Implant Applications		
		<b>WK34079</b>	<b>New Specification for Wrought Titanium - 3 Aluminum - 2.5 Vanadium Alloy for Surgical Implant Applications</b>	<b>R56320</b>	
		<b>WK26721</b>	<b>New Specification for Metal Injection Molded Titanium - 6 Aluminum - 4 Vanadium Net or Near Net Parts for Surgical Implant Applications.</b>		

			<b>WK35394</b>	<b>New Specification for Standard Specification for Metal Injection Molded Commercially Pure Titanium Components for Surgical Implant Applications</b>			
			<b>WK35963</b>	<b>New Specification for Standard Specification for Wrought Stainless Steels for Surgical Instruments</b>			
			<b>WK35966</b>	<b>New Specification for Standard Specification for Titanium and Titanium - 6 Aluminum - 4 Vanadium Alloy Powders for Coatings of Surgical Implants</b>			
<b>Specialty metallic biomaterials</b>							
<b>Material Designation</b>	<b>Common name Trade name</b>	<b>ASTM Standard</b>	<b>Description</b>	<b>UNS Designation</b>	<b>ISO Standard</b>		
Ta, Unalloyed, Cast	Unalloyed Tantalum (Alpha)	F560	Standard Specification for Unalloyed Tantalum for Surgical Implant Applications	R05200 R05400	...		
Zr-2.5Nb	"Zircadyne" 705	F2384	Standard Specification for Wrought Zirconium - 2.5 Niobium Alloy for Surgical Implant Applications	R60901	...		
Ni-45Ti	Nitinol (Intermetallic)	F2063	Standard Specification for Wrought Nickel-Titanium Shape Memory Alloys for Medical Devices and Surgical Implants	N01555	...		
		F2005-05(2010)	Standard Terminology for Nickel-Titanium Shape Memory Alloys				



		F2633-07	Standard Specification for Wrought Seamless Nickel-Titanium Shape Memory Alloy Tube for Medical Devices and Surgical Implants			
<b>TESTING METHODS</b>						
Material Designation	Common name Trade name	ASTM Standard	Description	UNS Designation	ISO Standard	
		F86-04(2009)	Standard Practice for Surface Preparation and Marking of Metallic Surgical Implants			
		F601-03(2008)	Standard Practice for Fluorescent Penetrant Inspection of Metallic Surgical Implants			
		F629-11	Standard Practice for Radiography of Cast Metallic Surgical Implants			
		F2895-10	Standard Practice for Digital Radiography of Cast Metallic Implants			
		<b>WK26606</b>	<b>New Test Method for Digital radiography for medical implants</b>			