

Material composition sheet

VariAx

Upper extremities plates	Material	
VariAx Hand	Ti grade 4	See table 1
ProFile Hand	Ti grade 4	See table 1
VariAx 2 Wrist Fusion	Ti grade 2	See table 1
VariAx 2 Distal Radius	Ti grade 2	See table 1
VariAx 2 Compression*	Ti grade 23	See table 1
VariAx 2 Elbow*	Ti grade 23	See table 2
VariAx 2 Clavicle*	Ti grade 23	See table 2

*Screw holes for these plates are made up of Ti grade 2

Foot plates	Material	
VariAx Foot	Ti grade 2 & 5	See table 1
VariAx 2 Fracture	Ti grade 2	See table 1
VariAx 1/3 tubular	Ti grade 2	See table 1
VariAx Fibula	Ti grade 2	See table 1

Material Composition

Pure Titanium

Table 1 ₂		
Element	Grade 2 composition %	Grade 4 composition %
Nitrogen, max	0.03	0.05
Carbon, max	0.08	0.08
Hydrogen max	0.015	0.015
Iron, max	0.3	0.5
Oxygen, max	0.25	0.4
Titanium	Balance	Balance

Titanium Alloy

Table 2 _{1,5}		
Element	Grade 23 Composition %	Grade 5 Composition %
Nitrogen, max	0.05	0.05
Carbon, max	0.08	0.08
Hydrogen max	0.012	0.015
Iron, max	0.25	0.30
Oxygen, max	0.13	0.20
Aluminum	5.5-6.5	5.5-6.75
Vanadium	3.5-4.5	3.5-4.5
Titanium	Balance	Balance
Yttrium, max	N/A	0.005

**As seen above nickel is not shown in the MSDS for these grades of titanium but we must mention that there are potential for trace amounts

Material composition sheet

Pangea 2.7 and 3.5mm Ti

Plates	Material	
Proximal lateral tibia plate	Ti grade 23	See table 2
Partial articular proximal lateral tibia plate	Ti grade 23	See table 2
Proximal medial tibia plate	Ti grade 23	See table 2
Proximal posteromedial tibia plate	Ti grade 23	See table 2
Distal anterolateral tibia plate	Ti grade 23	See table 2
Distal medial tibia plate	Ti grade 23	See table 2
Proximal humerus plate	Ti grade 23	See table 2
Proximal posterior humerus plate	Ti grade 23	See table 2
Extra-articular distal humerus plate	Ti grade 23	See table 2
Distal lateral fibula plate	Ti grade 23	See table 2
Distal posterolateral fibula plate	Ti grade 23	See table 2
Distal posterior fibula plate	Ti grade 23	See table 2
Distal medial femur plate	Ti grade 23	See table 2

Screws	Material	
Pangea 2.7mm locking screw	CoCr	See table 3
Pangea 2.7mm cortex screws	Ti grade 23	See table 2
Pangea 3.5mm locking screw	CoCr	See table 3
Pangea 3.5mm cortex screws	Ti grade 23	See table 2
Pangea 3.5mm cancellous screws	Ti grade 23	See table 2

Titanium Alloy material composition

Table 2 ₁	
Element	Grade 23 composition %
Nitrogen, max	0.05
Carbon, max	0.08
Hydrogen max	0.012
Iron, max	0.25
Oxygen, max	0.13
Aluminum	5.5-6.5
Vanadium	3.5-4.5
Titanium	Balance

Cobalt Chrome material composition

Table 3 _{6,7}	
Element	CoCr composition %
Carbon, max	0.14
Silicone, max	1.00
Manganese, max	1.00
Nitrogen, max	0.25
Cobalt	Balance
Chromium	26.0-30.0
Molybdenum	5.0-7.0
Nickel, max	1.00
Iron, max	0.75

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Material composition sheet

Pangea 5.0mm Ti

Plates	Material	
Distal lateral femur plate	Ti grade 23	See table 2
Distal medial femur plate	Ti grade 23	See table 2
Extra-articular proximal tibia plate	Ti grade 23	See table 2
PeriPRO proximal femur plate	Ti grade 23	See table 2
PeriPRO distal femur plate	Ti grade 23	See table 2
PeriPRO interprosthetic plate	Ti grade 23	See table 2

Screws	Material	
Pangea 5.0mm locking screw	CoCr	See table 3
Pangea 5.0mm cortex screws	Ti grade 23	See table 2
Pangea 4.0mm locking screw	CoCr	See table 3
Pangea 4.5mm cortex screws	Ti grade 23	See table 2
Pangea 6.0mm cancellous screws	Ti grade 23	See table 2

Titanium Alloy material composition

Table 2 ₁	
Element	Grade 23 composition %
Nitrogen, max	0.05
Carbon, max	0.08
Hydrogen max	0.012
Iron, max	0.25
Oxygen, max	0.13
Aluminum	5.5-6.5
Vanadium	3.5-4.5
Titanium	Balance

Cobalt Chrome material composition

Table 3 _{6,7}	
Element	CoCr composition %
Carbon, max	0.14
Silicone, max	1.00
Manganese, max	1.00
Nitrogen, max	0.25
Cobalt	Balance
Chromium	26.0-30.0
Molybdenum	5.0-7.0
Nickel, max	1.00
Iron, max	0.75

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Material composition sheet

AxSOS 3 4.0mm Ti

Plates	Material	
Proximal lateral tibia plate	Ti grade 23	See table 2
Proximal lateral humerus plate	Ti grade 23	See table 2
Distal medial tibia plate	Ti grade 23	See table 2
Proximal medial tibia plate	Ti grade 23	See table 2
Distal anterolateral tibia plate	Ti grade 23	See table 2
4.0mm Locking compression plate	Ti grade 23	See table 2

Screws	Material	
AxSOS 3 4.0mm locking screws	Ti grade 23	See table 2
AxSOS 3 4.0mm cancellous screw	Ti grade 23	See table 2
AxSOS 3 3.5 cortex screws	Ti grade 23	See table 2

Titanium Alloy material composition

Table 2 ₁	
Element	Grade 23 composition %
Nitrogen, max	0.05
Carbon, max	0.08
Hydrogen max	0.012
Iron, max	0.25
Oxygen, max	0.13
Aluminum	5.5-6.5
Vanadium	3.5-4.5
Titanium	Balance

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Material composition sheet

AxSOS 3 5.0mm Ti

Plates	Material	
Distal Lateral Femur Plate	Ti grade 23	See table 2
5.0mm Locking Compression Plate, broad	Ti grade 23	See table 2
5.0mm Locking Compression Plate, narrow	Ti grade 23	See table 2

Screws	Material	
AxSOS 3 5.0mm locking screw	Ti grade 23	See table 2
AxSOS 3 6.0mm cancellous screw	Ti grade 23	See table 2
AxSOS 3 4.5mm cortex screw	Ti grade 23	See table 2

Compatible with Vitallium (cobalt chrome) wires and cables from the Dall Miles system.

Titanium Alloy material composition

Table 2 ₁	
Element	Grade 23 composition %
Nitrogen, max	0.05
Carbon, max	0.08
Hydrogen max	0.012
Iron, max	0.25
Oxygen, max	0.13
Aluminum	5.5-6.5
Vanadium	3.5-4.5
Titanium	Balance

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Material composition sheet

Small fragment set

Plates	Material	
L Plates	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
T plates	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
4.5 Recon plates	Stainless Steel 316LVM	See table 4 for SS
1/3 Tubular	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
T-Plates	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
Compression plates	Stainless Steel 316LVM	See table 4 for SS
Recon plates	Stainless Steel 316LVM	See table 4 for SS
Cloverleaf	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS

Screws	Material	
4.5 Cortical	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
6.5 Cancellous	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
2.7 Cortical	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
3.5 Cortical	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS
4.0 Cancellous	Ti grade 23 or Stainless Steel 316LVM	See table 2 for Ti See table 4 for SS

Titanium Alloy material composition

Table 2 ₁	
Element	Grade 23 composition %
Nitrogen, max	0.05
Carbon, max	0.08
Hydrogen max	0.012
Iron, max	0.25
Oxygen, max	0.13
Aluminum	5.5-6.5
Vanadium	3.5-4.5
Titanium	Balance

**As seen above nickel is not shown in the MSDS for these grades of titanium but we must mention that there are potential for trace amounts

Stainless Steel material composition

Table 4 _{3,4}	
Element	316LVM composition %
Carbon, max	0.030
Silicon, max	0.75
Manganese, max	2.00
Phosphorus, max	0.025
Sulfur, max.	0.010
Chromium	17.00 - 19.00
Nickel	13.00 - 15.00
Copper, max	0.50
Molybdenum	2.25 - 3.00
Nitrogen, max	0.10
Iron	Balance
Cobalt, less than	0.10

Material composition sheet

Pelvis: Matta / PRO material composition

Plates	Material	
Matta Curved Pelvic Plate, radius 88	Stainless Steel 316LVM	See table 3
Matta Curved Pelvic Plate, radius 108	Stainless Steel 316LVM	See table 3
Matta Straight Pelvic Plate	Stainless Steel 316LVM	See table 3
Matta Straight Acetabular Plate (annealed flex plate)*	Stainless Steel 316LVM	See table 3
Matta Pubic Symphysis Plate	Stainless Steel 316LVM	See table 3
PRO Suprapectineal QLS Plate	Stainless Steel 316LVM	See table 3
PRO Infrapectineal QLS Plate	Stainless Steel 316LVM	See table 4

Screws	Material	
Matta 3.5mm cortical screw	Stainless Steel 316LVM	See table 3
Matta 4.5mm cortical screw	Stainless Steel 316LVM	See table 3

Stainless Steel material composition

Table 4 _{3,4}	
Element	316LVM composition %
Carbon, max	0.030
Silicon, max	0.75
Manganese, max	2.00
Phosphorus, max	0.025
Sulfur, max.	0.010
Chromium	17.00 - 19.00
Nickel	13.00 - 15.00
Copper, max	0.50
Molybdenum	2.25 - 3.00
Nitrogen, max	0.10
Iron	Balance
Cobalt, less than	0.10

*annealing is a heat treatment process used mostly to increase the ductility and reduce the hardness of a material.

Material composition sheet

Omega3 Compression hip screws

Plates	Material	
Standard Barrel Hip Plates	Stainless Steel 316LVM	See Table 5
Short Barrel Hip Plates	Stainless Steel 316LVM	See Table 5
Trochanteric Stabilizing Plate	Stainless Steel 316LVM	See Table 5

Screws	Material	
Lag screws	Stainless Steel 316LVM	See Table 5
4.5mm Cortical screws	Stainless Steel 316LVM	See Table 5
5.0mm Locking screws	Stainless Steel 316LVM	See Table 5
6.5mm Cancellous screws	Stainless Steel 316LVM	See Table 5

Stainless Steel material composition

Table 5 _{3,4}	
Element	316VLM Composition %
Carbon, max	0.030
Silicon, max	0.75
Manganese, max	2.0
Phosphorus, max	0.025
Sulfur, max.	0.01
Chromium	17.00 - 19.00
Nickel	13.00 - 15.00
Copper, max	0.50
Molybdenum	2.25 - 3.00
Nitrogen, max	0.10
Iron	Balance
Cobalt, less than	0.10

References:

1. ASTM, F136. Standard Specification for Wrought Titanium-6Aluminum-4Vanadium ELI (Extra Low Interstitial) Alloy for Surgical Implant Applications (UNS R56401). ASTM F136.
2. ASTM International. ASTM F67. Standard Specification for Unalloyed Titanium for Surgical Implant Applications (UNS R50250, UNS R50400, UNS R50550, UNS R50700).
3. ASTM International. ASTM F138. Standard Specification for Wrought 18Chromium-14Nickel-2.5Molybdenum Stainless Steel Bar or Wire for Surgical Implants (UNS S31673)
4. ASTM International. ASTM F139. Standard Specification for Wrought 18Chromium-14Nickel-2.5Molybdenum Stainless Steel Sheet or Strip for Surgical Implants (UNS S31673)
5. ASTM International. ASTM F1472. Standard Specification for Wrought Titanium-6Aluminum-4Vanadium Alloy for Surgical Implant Applications (UNS R56400)
6. ASTM F1537. Standard Specification for Wrought Cobalt-28Chromium-6Molybdenum Alloys for Surgical Implants (UNS R31537, UNS R31538, and UNS R31539). ASTM F1537.
7. ISO 5832-12. Implants for surgery — Metallic materials — Part 12:Wrought cobalt-chromium-molybdenum alloy.

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