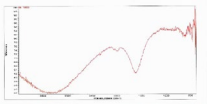
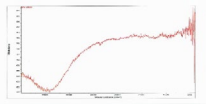
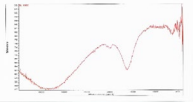
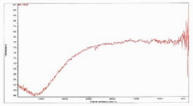
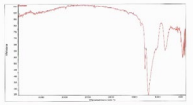
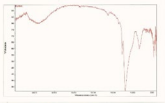
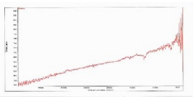
Coating Properties Quick Reference Guide

	Coating						
Coating Property	**Silcolloy**	**SilcoNert 2000**	**SilcoGuard**	**Silcoklean**	**Dursan**	**Dursox**	**Notak**
Coating Structure	Hydrogenated amorphous silicon (a-Si:H)	Functionalized hydrogenated amorphous silicon	Hydrogenated amorphous silicon (a-Si:H)	Functionalized hydrogenated amorphous silicon	Functionalized silica-like coating (a-SiOX:CHY)	Silica-like coating (a-SiOX)	Direct molecular fluorination of base substrate
Deposition Process	Thermal chemical vapor deposition (not plasma-enhanced)	Thermal chemical vapor deposition (not plasma-enhanced)	Thermal chemical vapor deposition (not plasma-enhanced)	Thermal chemical vapor deposition (not plasma-enhanced)	Thermal chemical vapor deposition (not plasma-enhanced)	Thermal chemical vapor deposition (not plasma-enhanced)	Thermal chemical vapor deposition (not plasma-enhanced)
Physical Properties							
Maximum Working Temperature	1410° C (Contact Us for More Information)	450° C (inert atmosphere) 400° C (oxidative)	1410° C (Contact Us for More Information)	450° C (maximum for functionalization) - 1410° C (Contact us)	500° C (inert atmosphere) 450° C (oxidative)	1250° C (Contact Us for More Information)	300° C
Minimum Working Temperature	-210°C	-210°C	-210°C	-210°C	-210°C	-210°C	N/A
Melting Point (°C)	1410	1410	1410	1410	1410	1410	N/A
Allowable Substrates	Stainless steel, exotic alloys, ceramics, aluminum, glass. Any shape, including complex geometries.	Stainless steel, exotic alloys, ceramics, aluminum, glass. Any shape, including complex geometries.	Stainless steel, exotic alloys, ceramics, aluminum, glass. Any shape, including complex geometries.	Stainless steel, exotic alloys, ceramics, aluminum, glass. Any shape, including complex geometries.	ceramics, aluminum, glass. Any shape, including complex geometries, limited tubing ID sizes.	Stainless steel, exotic alloys, ceramics, aluminum, glass. Any shape, including complex geometries.	Stainless steel, Aluminum, Brass, Glass, Ceramics. Contact us for geometry and size information
Typical Coating Thickness	180 - 800 nm	100 - 500 nm	180 - 600 nm	100 - 500 nm	400 - 1600 nm	400 - 1600 nm	No measurable thickness - Up to 30 Angstroms
Hydrophobicity	≥40°	≥65°	≥20°	≥65°	≥81°	≥60°	Water: ≥118°, Hexadecane: ≥65°
Recommended acid/base range (pH)	0-8	0 - 8	0 - 8	0 - 8	0 - 14	0 - 14	Dependent on chemical exposure and substrate material. Contact us.
Adhesion Pull Strength (PSI)	350-450	350-450	350-450	350-450	350-450	350-450	N/A
Coating Hardness (Gpa)	12-13	12-13	12-13	12-13	4.3-4.4	4.3-4.4	N/A
Wear Resistance (x10-5 mm^3/Nm) (stainless steel = 13.810)	N/A	N/A	N/A	N/A	6.129	N/A	N/A
Lubricity, relative to stainless steel (stainless steel = 1.0)	N/A	0.84	N/A	N/A	1.56	N/A	N/A
Impact Resistance (Ft/lbs)	N/A	N/A	N/A	N/A	264	N/A	N/A
Bend / Crush Resistance	Good, bending allowed within specification.	Good, bending allowed within specification.	Good, bending allowed within specification.	Good, bending allowed within specification.	Good, bending allowed within specification.	Good, bending allowed within specification.	Good, bending allowed within specification.
Weld Resistance	Welding will damage coating. Able to coat over weld.	Welding will damage coating. Able to coat over weld.	Welding will damage coating. Able to coat over weld.	Welding will damage coating. Able to coat over weld.	Welding will damage coating. Able to coat over weld.	Welding will damage coating. Able to coat over weld.	Welding will damage coating. Able to coat over weld.
Braze Compatibility	Braze will damage coating. Able to coat over vacuum braze.	Braze will damage coating. Able to coat over vacuum braze.	Braze will damage coating. Able to coat over vacuum braze.	Braze will damage coating. Able to coat over vacuum braze.	Braze will damage coating. Able to coat over vacuum braze.	Braze will damage coating. Able to coat over vacuum braze.	Braze will damage coating. Able to coat over vacuum braze.
Solder Compatibility	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible	Not compatible	N/A
Electrical Properties							
Electrical Bulk Resistivity (Ω.cm)	10^8	N/A	N/A	N/A	10^{12}	N/A	N/A
Relative Permittivity (error)	18.9 (2.3)	N/A	N/A	N/A	6.9 (1.2)	N/A	N/A
Dielectric Loss (tan δ) (error)	0.4 (0.04)	N/A	N/A	N/A	0.6 (0.6)	N/A	N/A
Breakdown Field 1 (MV/cm)	0.09-0.1	N/A	N/A	N/A	N/A	N/A	N/A
Breakdown Field 2 (MV/cm)	0.15-0.2	N/A	N/A	N/A	5.9-9.6	N/A	N/A
Weibull Modulus	4.3	N/A	N/A	N/A	4.6	N/A	N/A
Thermal Properties							
Bulk Modulus (dyn/cm2)	$9.8 \cdot 10^{11}$	$9.8 \cdot 10^{11}$	$9.8 \cdot 10^{11}$	$9.8 \cdot 10^{11}$	N/A	N/A	N/A
Melting Point (°C)	1410	1410	1410	1410	N/A	N/A	N/A
Specific Heat (J g-1°C-1)	0.7	0.7	0.7	0.7	N/A	N/A	N/A
Thermal Conductivity (W cm-1°C-1)	1.3	1.3	1.3	1.3	N/A	N/A	N/A
Thermal Diffusivity (cm2/s)	0.8	0.8	0.8	0.8	N/A	N/A	N/A
Thermal Expansion, Linear (10-6°C -1)	2.6	2.6	2.6	2.6	N/A	N/A	N/A
Steam Resistance	Fair - Good	Good	Good	Good	Good	Good	Excellent
Optical Properties							
Light Transmission (loss, dB) 1500nm wavelength	Approx 0.00104	0.00004-0.00065	N/A	N/A	N/A	N/A	N/A
FTIR Reflectance							
IR Emittance Values							
Solar Absorptance (αs) on elgiloy substrate	0.6712	0.4983 (SN 1000)	N/A	N/A	0.6265	N/A	N/A
Solar Reflectance (ρs) on elgiloy substrate	0.2811	0.5017 (SN 1000)	N/A	N/A	0.3735	N/A	N/A
Hemispherical infrared emittance (ε) on eligloy substraate	0.71	0.159 (SN 1000)	N/A	N/A	0.339	N/A	N/A
Ratio of solar absorptance to emittance on elgiloy substrate	0.945	3.134 (SN 1000)	N/A	N/A	1.848	N/A	N/A
Water Repelling Properties							
Average Water Droplet Contact Angle, Rough Surface (Degrees)	53.5	99.4	Approx 53	N/A	119.3	N/A	146.7
Average Water Droplet Contact Angle, Smooth Surface (Degrees)	29.5	74.1	Approx 29	N/A	86	N/A	112.1
Average Hexadecane Contact Angle, Rough Surface (Degrees)	0	0	0	0	0	0	79
Average Hexadecane Contact Angle, Smooth Surface (Degrees)	0	0	0	0	0	0	53
Icephobicity Relative Effort to Remove Ice (emperical removal effort 1=low force, 10=high force) Uncoated stainless steel coupon = 8	7	N/A	N/A	N/A	6	8	2
Oleophobicity Properties							
10W40 Motor Oil Contact Angle, Rough Surface (Degrees)	0	0	0	0	0	0	82
10W40 Motor Oil Contact Angle, Smooth Surface (Degrees)	0	0	0	0	0	0	63
Chemical and Material Compatibility							
Chemical Compatibility	See Guide	See Guide	See Guide	See Guide	See Guide	See Guide	N/A
Material Compatibility	See Guide	See Guide	See Guide	See Guide	See Guide	See Guide	N/A