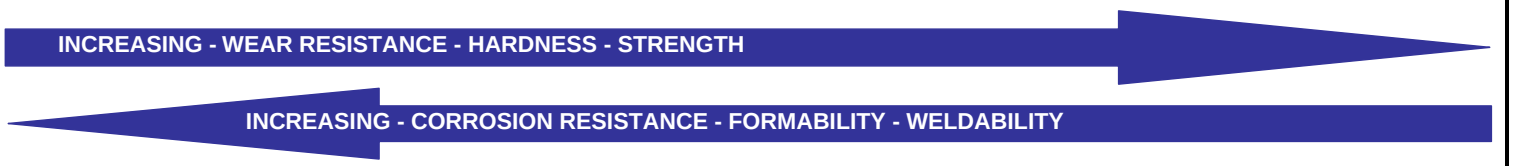
Material Properties to Consider

When choosing optimum material for your incisional component, consider the following properties:

- Corrosion Resistance
- Shape Control during Heat Treat
- Wear Resistance
- Influence on Edge or Point Characteristics
- Cost
- Toughness or Shock Resistance
- Availability
- Size and finish

FAMILY	AUSTENITIC STAINLESS STEELS						HEAT TREATED STAINLESS STEELS (MARTENSITIC)					ZIRCONIA CERAMIC
STEEL TYPE	304	316	301	17-4 PH	17-7 PH	17-7 PH	410	420	CUTLERY	RAZOR	440C	N/A
	STAINLESS	STAINLESS	EXTRA HIGH YIELD STR.	CONDITION H 900	CONDITION CH 900	CONDITION RH 950	STAINLESS	STAINLESS	GRADE STAINLESS STEEL	BLADE STAINLESS STEEL	STAINLESS	
APPROXIMATE CHEMICAL ANALYSIS: (%)												
CARBON (C)	.07 MAX	.07 MAX	.15 MAX	.07 MAX	.09 MAX	.09 MAX	.15 MAX	.15 MIN	.18 - .43	0.65	1.05	TYPICAL HARDNESS
MANGANESE (Mn)	2.0 MAX	2.0 MAX	2.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	.20 - .65	0.65	1.0 MAX	~ 1300 Vickers
SILICON (Si)	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	1.0 MAX	.20 - .55	0.40	1.0 MAX	
CHROMIUM (Cr)	18.0	17.5	17.0	17.0	17.0	17.0	12.5	12 - 14	12.8 - 14.0	13.0	17.0	DENSITY
PHOSPHOROUS (P)	0.045 MAX	0.045 MAX	0.045 MAX					0.04 MAX	0.04 MAX			6.06 TO 6.07 gm/cc
SULFUR (S)	0.03 MAX	0.03 MAX	0.03 MAX					0.03 MAX	0.03 MAX			
NICKEL (Ni)	9.5	12.0	7.0	4.0	7.0	7.0						
MOLYBDENUM (Mo)		2.25							1.35 MAX			
OTHER	0.1 N MAX	0.1 N MAX		4.0 Cu	.75/1.50 Al	.75/1.50 Al						
TYPICAL HARDNESS, Rc EQUIVALENT	< 40	< 40	**50**	45	50	46	40-45	50	**47-55**	**57-59**	57-60	~ 75
	LOW	LOW	LOW	LOW - MOD	LOW - MOD	LOW	VERY LOW	LOW	LOW	MOD	HIGH	EXTR HIGH
WEAR INDEX ESTIMATE	<1	<1	<1	1	1	1	<1	1	2	6	15	2000
TOUGHNESS / SHOCK RESISTANCE	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	VERY HIGH	VERY HIGH	VERY HIGH	MOD	LOW	VERY LOW
MATERIAL COST	MOD	MOD	MOD	MOD	HIGH	MOD	LOW	MOD	MOD	LOW	MOD	EXTR HIGH
FABRICATION COST	LOW - MOD	LOW - MOD	LOW - MOD	MOD	LOW - MOD	MOD	LOW	LOW	LOW	LOW	MOD	VERY HIGH
AVAILABILITY	GOOD	GOOD	LIMITED	LTD - GOOD	LTD - GOOD	LTD - GOOD	GOOD	LTD	GOOD	VERY GOOD	LTD - GOOD	LIMITED
THICKNESS RANGE	<.030	<.030	<.030	.015-.125+	.005-.050	.008-.125+	<.025	<.062	<.062	.004-.062	.062 - .125+	.010 - .125+
CORROSION RESISTANCE	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	VERY GOOD	VERY GOOD	VERY GOOD	VERY GOOD	VERY GOOD	EXCELLENT



Please Note: This data is provided at no charge for the intended purpose of providing material application options to potential blade users. It is offered subject to the usual disclaimer that we have used sources and estimates believed to be reliable in the development of this information, but do not guarantee its accuracy in specific applications. Please note that the chemical elements noted by % are believed to be the major elements affecting performance. Other trace levels of elements may be found depending on supplier and heat number. This data should not be relied on in lieu of application -specific testing. Further, if you see data in these charts that you do not believe is accurate, we would appreciate your calling us with that information at 800-213-7809

Some notes about our most popular materials:

"Razor Blade Stainless"

This is our most widely used grade and is very similar to 440A. The only difference in the metallurgy is this "modified" version has a little less Chromium (13.5% instead of 17% that comes in straight 440A). This intentional reduction in Chromium creates a much finer grain structure that reduces the potential for nicks and/or pull-outs along the keen cutting edges. There is no difference in finish or color when using this grade of material vs straight 440A stainless.

Our "Razor Blade Stainless" is used by major shaving blade companies instead of straight 440A. It is available from multiple steel companies (like Hitachi, Uddeholm, and Sandvik).

"Cutlery Grade Stainless"

This material is also referred to as "stainless spring steel" and is very similar to 420 stainless. The AISI requirements of Min and Max allow for large differences in the actual composition of straight 420 from lot to lot and supplier to supplier. However, the chemical properties for this "cutlery" grade are more tightly controlled than the standard AISI 420 specifications. Using this grade also yields a higher carbon content (.18% to .43% vs. .15% max) for higher bulk hardness properties. There is no difference in finish or color when using this grade of material vs straight 420 stainless.

Our "Cutlery Grade Stainless" is used by major cutlery companies instead of straight 420. It is also available from multiple steel companies (like Hitachi, Uddeholm, and Sandvik).

"301 Extra High Yield"

This material is preferred over softer, less hard, versions of 301. The "Extra High Yield" condition is created through additional rolling during the manufacturing process at the steel mill. This results in a material that has higher tensile strength and bulk hardness properties than the other 301 options (like ¼ hard, ½ hard or full hard)

304 and 316 Stainless

These are the most common grades of steel tubing materials used in surgical devices. These materials are preferred in a spring temper or full hard condition when available as this condition results in higher tensile strength and bulk hardness properties.

Also of note is that there are often "L" versions available (304L and 316L) that have lower carbon which improves weldability.