

Specialty Metals and National Security

Fiscal Year 2020

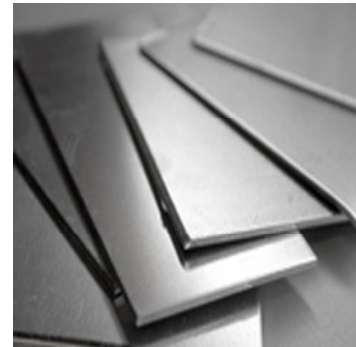
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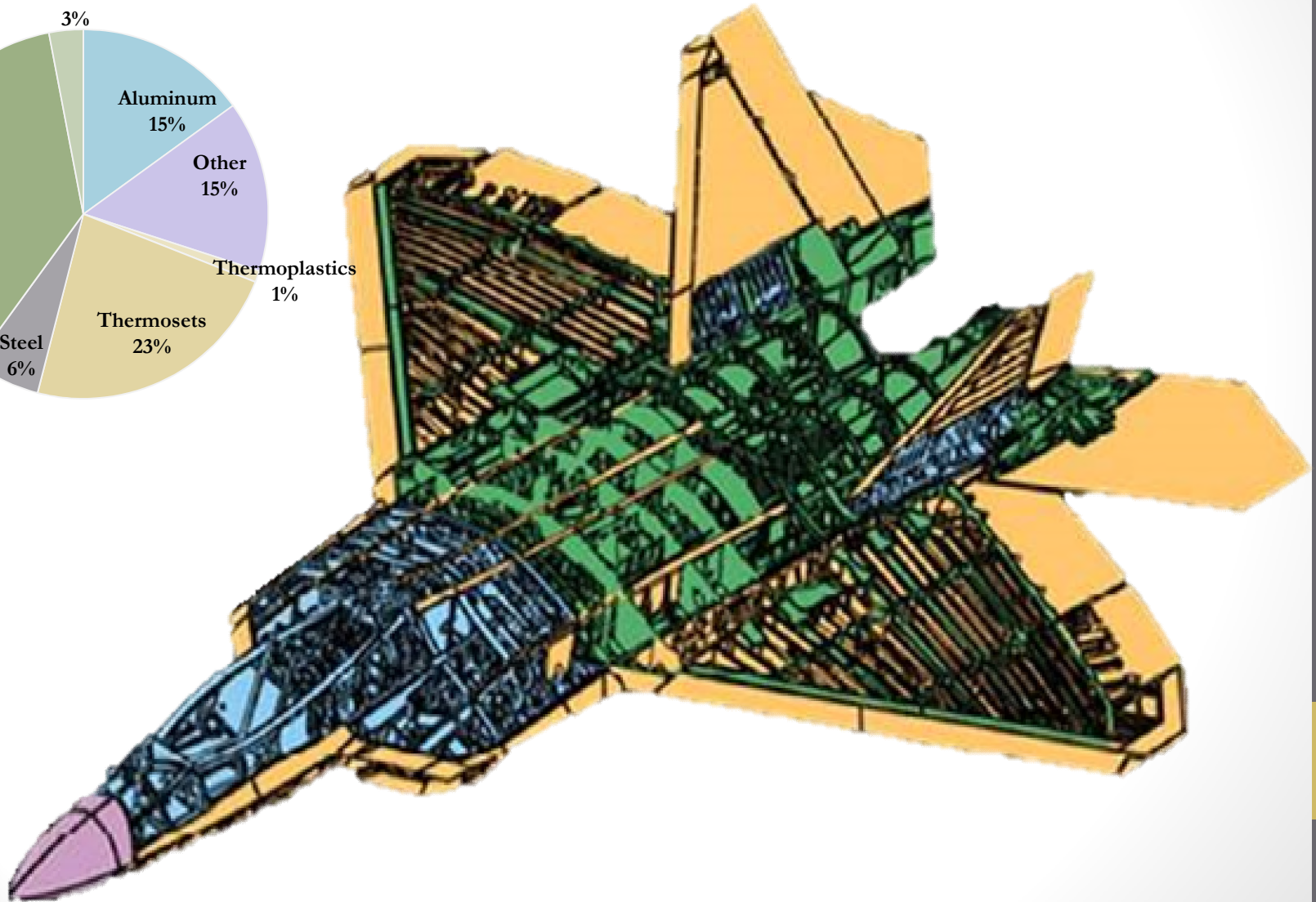
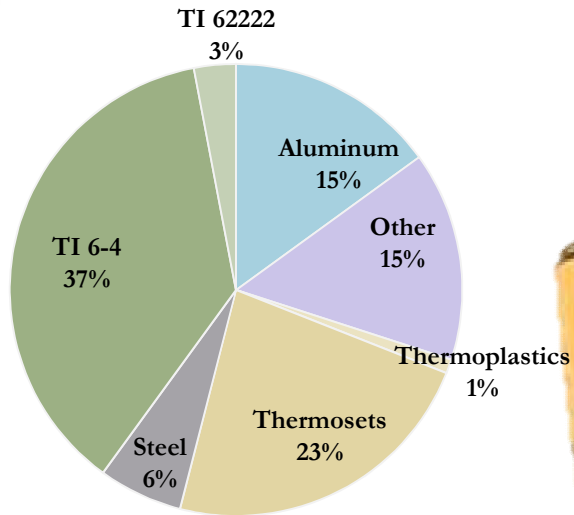
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Importance of Titanium

- High-strength, corrosion-resistant metal
- Important and irreplaceable in military applications
 - Air Force: aircraft, spacecraft, missiles
 - 40% of an F-22 jet; almost 20% of an F-35 (by weight)
 - Navy: ship hulls, propulsion systems and piping
 - Army and Marines: rotor blades, armor
 - Also used in pigments and lower-grade applications
- Three aerospace-grade titanium companies in the U.S.
 - Arconic
 - ATI
 - PCC-Timet

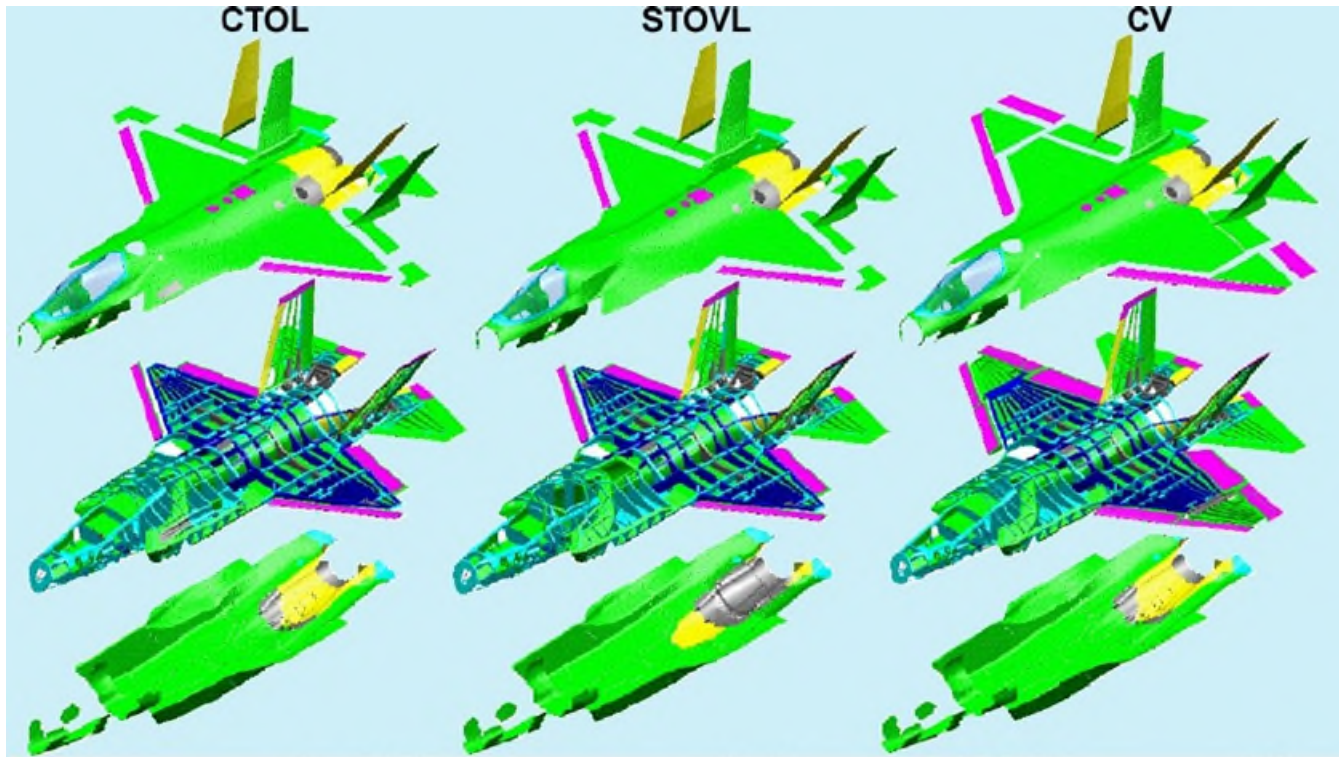









Military Applications (F-22A)



Source: Gonzalez & Perkins, "Application of Structural Titanium Castings on the USAF F-22 Raptor", RTO-MP-069(II)

Military Applications (F-35A/B/C)



	Material	CTOL	STOVL	CV
	Aluminum-Lithium	5.2%	4.9%	3.8%
	Aluminum	17.9%	16.3%	13.9%
	Graphite/Epoxy	32.2%	32.1%	32.8%
	Graphite/BMI	2.4%	2.6%	2.4%
	Titanium	17.0%	18.7%	17.5%
	Steel	11.6%	11.3%	16.9%
	Other	13.6%	14.0%	12.7%

Overseas Competition

- Russia is the largest worldwide producer of aerospace-grade titanium (VSMPO-Avisma)
 - “Titanium Valley” - \$1.29 billion project in Sverdlosk to supply titanium worldwide, including to American aircraft manufacturers
- April 2018 – Russia threatened to stop exports of titanium to the U.S. as retaliation for sanctions
- Japan also produces aerospace-grade titanium
- China appears interested in producing aerospace-grade titanium, though currently only able to produce lower grades



Titanium production at VSMPO-Avisma

Specialty Metals Amendment

- U.S. military purchases of titanium, and titanium-containing items, are governed by 10 U.S.C. 2533b – the “Specialty Metals Amendment”
 - Also governs specialty steels, nickel and cobalt-base alloys, zirconium, and others
- SMA requires purchase from domestic producers
 - With important exceptions: national security needs, domestic nonavailability, commercial items, “market basket,” MOU



Similar Laws

	<u>2533a (Berry)</u>	<u>2533b (Specialty Metals)</u>	<u>2533c (Sensitive Materials)</u>
<i>Applies to...</i>	Food, textiles, hand tools	Titanium, superalloys, cobalt, other metals	Tungsten, rare earth magnets
<i>Domestic only?</i>	Yes	Yes, or MOU	No, just not “covered countries”
<i>Coverage point</i>	Complete supply chain	“Melted or produced”	“Melted or produced”
<i>Commercial exception</i>	No	Yes, complex	Yes, simple
<i>Electronic component exception</i>	No (but not likely applicable)	Yes	Yes
<i>Availability exception</i>	Yes	Yes	Yes
<i>Recycling exception</i>	No	No	Yes
<i>Small purchase exception</i>	Yes	Yes	No
<i>Stockpile sales restriction</i>	No	No	Yes

Competitive U.S. Industry

- Since 2010, U.S. titanium companies have invested more than \$1 billion in capital improvements and research & development
- Titanium industry is strongly supportive of National Network for Manufacturing Innovation (NNMI) projects:
 - National Additive Manufacturing Innovation (NAMI)
 - Lightweight and Modern Metals Manufacturing Innovation (LM3I)
 - Digital Manufacturing & Design Innovation (DMDI)
- The titanium industry is pursuing advanced 3-D printing and laser sintering of complex, low-volume parts to reduce cost supported

Specialty Metals History

- **1941 – 1994:** Berry Amendment introduced, requiring acquisition of certain items from domestic sources; reintroduced in annual defense appropriations bills until made permanent in P.L. 103-139
- **FY1973 Defense Appropriations Act:** specialty metals added to the Berry Amendment; subsequent SECDEF Melvin Laird Memo serves as foundation for today's specialty metals clause

“Rather it is clear that its purpose is to afford reasonable protection to the specialty metals industry to help preserve our domestic production capacity to satisfy mobilization requirements, without forcing a massive disruption of our existing procurement methods and programs.”

- **FY2007 NDAA:** Berry Amendment & Specialty Metals split (10 U.S.C. §2533a & 10 U.S.C. §2533b)
- **FY2008 NDAA:** 2% *de minimis* and COTS exceptions added, National Security waiver added, market basket / co-mingling allowed

Specialty Metals History (cont.)

- **DFARS Final Rule (FR Vol. 74, No. 144; 7/29/2009):** DoD interprets “produce” to include quenching & tempering of armor plate
- **FY2011 NDAA §823:** Congress requires DoD to review its rule, taking into consideration Congressional intent
- **FY2013 NDAA House Report:** requires a GAO report on “Factors Affecting U.S. Titanium Aircraft Component Manufacturers’ Market Share of DoD Business”
- **F-35 National Security Waivers (Nov. 2012):** AT&L issues first waiver for non-compliant Japanese specialty metals based on schedule delay (4 years) and requalification cost (\$6M); 3 domestic / qualified firms currently supply the same specialty metal to DoD
- **F-35 National Security Waivers (Dec. 2012):** AT&L amends first waiver to include non-compliant specialty metals from China

Specialty Metals History (cont.)

- **DFARS Final Rule (FR Vol. 78, No. 60; 3/28/2013):** DoD redefines “produce” as atomization, sputtering, or final consolidation of non-melt derived powders
- **F-35 National Security Waivers (Apr. & Jun. 2013):** AT&L issues second waiver for non-compliant specialty metal of unknown origin and provides a second amendment to the first waiver to cover additional non-compliant specialty metals from China; HASC requires GAO investigation of waivers
- **FY2016 NDAA:** SECDEF provided additional authority to waive acquisition procedures to meet urgent national security requirements
- **August 2016:** Department of Defense amends DFARS to add Japan as a “qualifying country” for specialty metals
- **FY2019 NDAA:** Removal of “notes” to 2533b concerning prior one-time DoD decisions (one-time waiver, definition of “produced”)

Ongoing Concerns

- Continue to show transparency on National Security Waivers, including communication with industry
- Ensure that statutes and regulations concerning commercial and commercial-off-the-shelf provisions do not adversely affect the Specialty Metals Clause
 - 2018 Proposal by the 809 Panel to exempt all commercial and COTS items from Specialty Metals Clause coverage
- Ensure that mid-tier suppliers observe flow-down provisions
- Maintain a competitive and strong domestic industrial base for titanium production to support U.S. military needs

Concluding Observations

- Specialty metals are unique, long lead-time materials that are critical to national security
- §2533b is the result of a healthy paradigm shift among producers of specialty metals, prime contractors, and DoD
- Key acquisition and industrial base offices of OSD have responsibility for ensuring reliable supply of specialty metals
- Transparency is of paramount importance for future national security waivers
- Current regulation of commercial item and commercial-off-the-shelf items provides predictability and stability to industry
- The competitive industry achieved by §2533b ought to be maintained to ensure a vibrant national security industrial base