MODELING UNSTRUCTURED, NON-GEOMETRIC INFORMATION FOR THE DIGITAL THREAD

PLM Road Map™ & PDT North America 2019

PLM for Professionals – Product Lifecycle Innovation

CIMdata®

May 29-30, Tysons Corner, VA

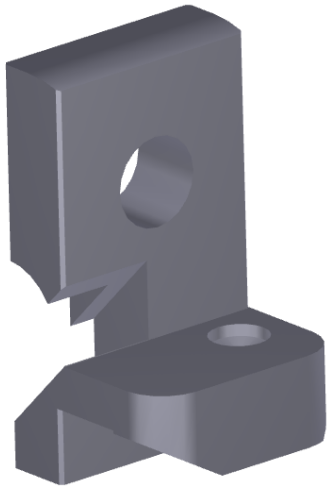
eurostep

What is Unstructured, Non-geometric Information?

NOTES:

1. SPEC MIL-W-13855 AWS ANSI Y14.5M-1982 APPLY.
2. MATERIAL: STEEL, BAR, ALLOY 4320 OR 8620. — 402 Y — MATERIAL
3. UNLESS OTHERWISE SPECIFIED, ALL EXTERNAL SHARP EDGES SHALL BE BROKEN 0.05 TO 0.25; INTERNAL EDGES R0.2 MAX.
4. UNLESS OTHERWISE SPECIFIED, ALL SURFACE FINISH IS 3.2
5. PROTECTIVE FINISH: FINISH 5.3.1.1 OR 5.3.2.1 OF MIL-STD-171. — 402 Y — PROTECTIVE FINISH
6. QUALITY ASSURANCE PROVISION REQUIREMENTS PER DRAWING 12993884 APPLY.
7. APPLY CONTRACTORS CAGE CODE THIS AREA, MIL-STD-130 APPLIES.

- 106 III C — HARDNESS
- 205 II V — Rs 16 SURFACE ROUGHNESS
- 206 II V — PROTECTIVE FINISH
- 207 II V — WORKMANSHIP PER MIL-W-63150
- 502 Z — SALT SPRAY TEST
- 503 Z — COATING WEIGHT
- 504 Z — SUPPLEMENTAL OIL SALT SPRAY TEST
- 505 Z — CASE DEPTH HARDNESS



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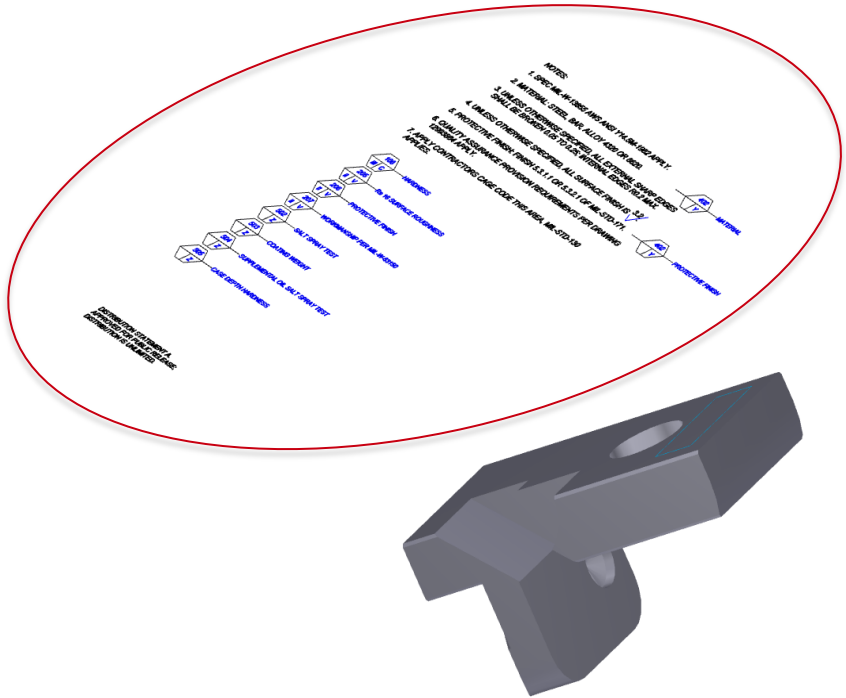
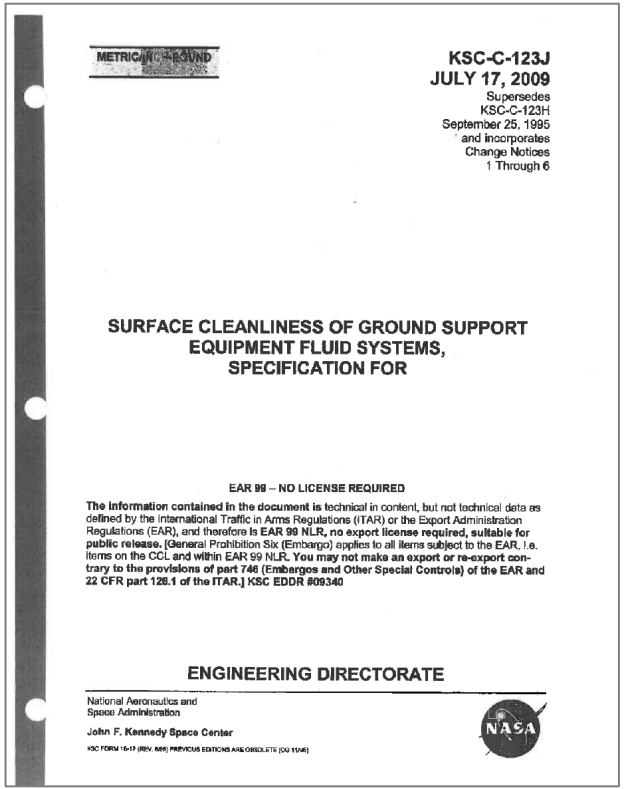


How About This?



METRICATION BOUND

KSC-C-123J
JULY 17, 2009
Supersedes
KSC-C-123H
September 25, 1995
and incorporates
Change Notices
1 Through 6

SURFACE CLEANLINESS OF GROUND SUPPORT EQUIPMENT FLUID SYSTEMS, SPECIFICATION FOR

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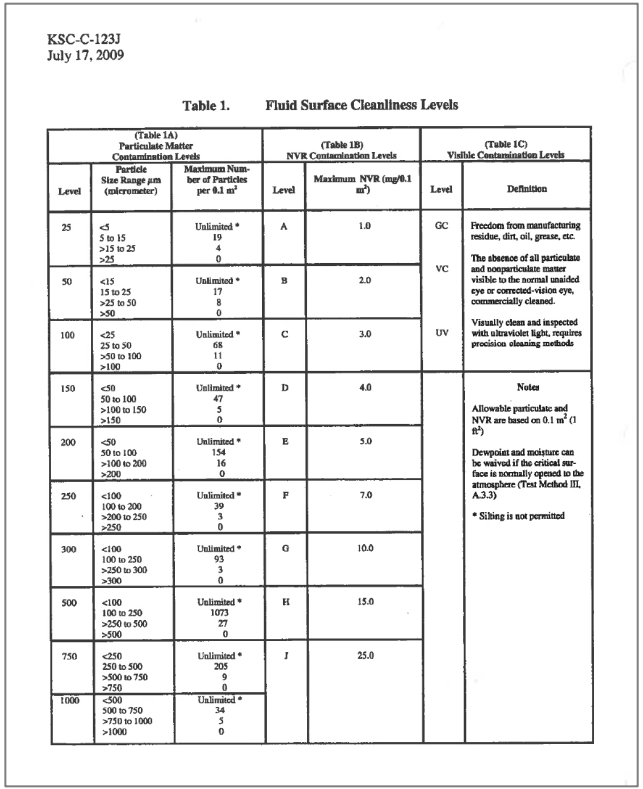
ENGINEERING DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center

KSC FORM 16-17 (REV. 6/99) PREVIOUS EDITIONS ARE OBSOLETE (OQ 11/06)



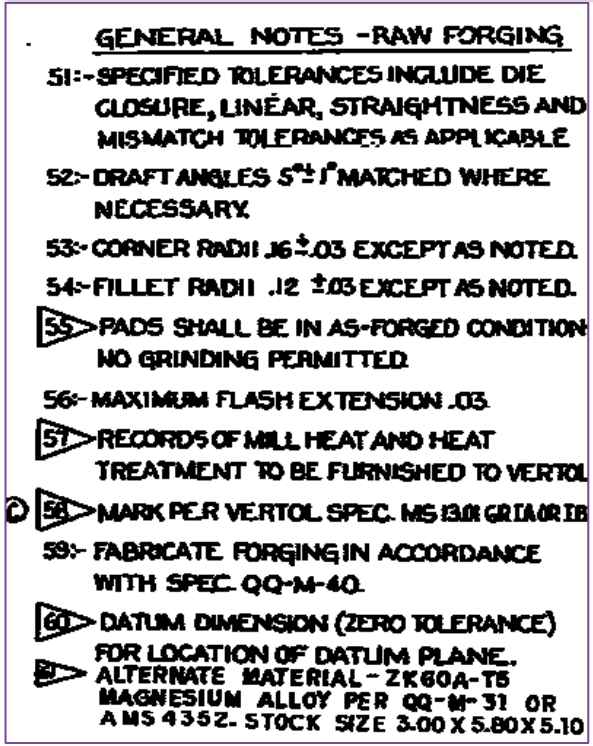
KSC-C-123J
July 17, 2009

Table 1. Fluid Surface Cleanliness Levels

(Table 1A) Particulate Matter Contamination Levels			(Table 1B) NVR Contamination Levels		(Table 1C) Visible Contamination Levels	
Level	Particle Size Range µm (micrometer)	Maximum Number of Particles per 0.1 m²	Level	Maximum NVR (mg/0.1 m²)	Level	Definition
25	<5 5 to 15 >15 to 25 >25	Unlimited * 19 4 0	A	1.0	GC	Freedom from manufacturing residue, dirt, oil, grease, etc.
50	<15 15 to 25 >25 to 50 >50	Unlimited * 17 8 0	B	2.0	VC	The absence of all particulate and nonparticulate matter visible to the normal unaided eye or corrected-vision eye, commercially cleaned.
100	<25 25 to 50 >50 to 100 >100	Unlimited * 68 11 0	C	3.0	UV	Visually clean and inspected with ultraviolet light, requires precision cleaning methods
150	<50 50 to 100 >100 to 150 >150	Unlimited * 47 5 0	D	4.0		Notes Allowable particulate and NVR are based on 0.1 m² (1 ft²) Dewpoint and moisture can be waived if the critical surface is normally opened to the atmosphere (Test Method III, A.3.3) * Silting is not permitted
200	<50 50 to 100 >100 to 200 >200	Unlimited * 154 16 0	E	5.0		
250	<100 100 to 200 >200 to 250 >250	Unlimited * 39 3 0	F	7.0		
300	<100 100 to 250 >250 to 300 >300	Unlimited * 93 3 0	G	10.0		
500	<100 100 to 250 >250 to 500 >500	Unlimited * 1073 27 0	H	15.0		
750	<250 250 to 500 >500 to 750 >750	Unlimited * 205 9 0	J	25.0		
1000	<500 500 to 750 >750 to 1000 >1000	Unlimited * 34 5 0				

Or This?

Original Drawing Notes



GENERAL NOTES -RAW FORGING

51:- SPECIFIED TOLERANCES INCLUDE DIE CLOSURE, LINEAR, STRAIGHTNESS AND MISMATCH TOLERANCES AS APPLICABLE

52:- DRAFT ANGLES 5° ± 1° MATCHED WHERE NECESSARY.

53:- CORNER RADII .16 ±.03 EXCEPT AS NOTED.

54:- FILLET RADII .12 ±.03 EXCEPT AS NOTED.

55> PADS SHALL BE IN AS-FORGED CONDITION NO GRINDING PERMITTED.

56:- MAXIMUM FLASH EXTENSION .03.

57> RECORDS OF MILL HEAT AND HEAT TREATMENT TO BE FURNISHED TO VERTOL

58> MARK PER VERTOL SPEC. MS 1301 GRADE IB

59:- FABRICATE FORGING IN ACCORDANCE WITH SPEC. QQ-M-40.

60> DATUM DIMENSION (ZERO TOLERANCE) FOR LOCATION OF DATUM PLANE.

61> ALTERNATE MATERIAL - ZK60A-T5 MAGNESIUM ALLOY PER QQ-M-31 OR AMS 4352. STOCK SIZE 3.00 X 5.80 X 5.10

SWISS Conversion to Text and Data

GENERAL NOTES - RAW FORGING

51- SPECIFIED TO
STRAIGHTNESS A

52 - DRAFT ANGL

53 - CORNER RADII 0.16 +
AS NOTED.

54 - FILLET RADII 0.12 +/-
EXCEPT AS NOTED.

55 – PADS SHA
PERMITTED.

56 - MAXIMUM

57 - RECORDS OF MILL H
T TREATMENT TO BE FURNISHED TO VERTOL

58 - MARK PER VERTOL SP
MS 1301

59 - FABRICATE FORGING IN ACCORDANCE WITH SPEC. QQ-M-40.

60 – DATUM DIMENSIONS (ZERO TOLERANCE) FOR LOCATION OF DATUM PLANE.

61 - ALTERNATE MATERIAL~ ZK60A-T5
MAGNESIUM ALLOY PER GQ-4-31 OR AMS 4352.

MATERIAL : MAGNESIUM
PROCESS : FORGING
STATE : CANCELLED

FORGING IN ACCORDANCE WITH SPEC. QQ-M-40

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SWISS

Emergence of SWISS

- In 2014, major A&D OEMs and XSB form a SWISS Government-Industry working group
- Manufacturers, DoD, Standards Development Organizations, and XSB brainstorm "Standards as Data":

  A Model-Based approach using AI and modern knowledge representation to convert concepts in documents to actionable assets using ontologies and linked data model standards from the W3C

Transforms static engineering documents into intelligent, interoperable, and reusable digital models that improve productivity, reduce time to market, and minimize risk in the project lifecycle.

XSB

SWISS™

Engineering Data is Locked in Static Formats

Company Specs

Industry Standards

Govt Specs

Customer Requirements

Work Instructions

Technical Data Packages

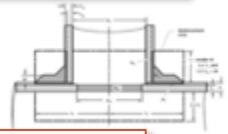
Change Orders

Regs

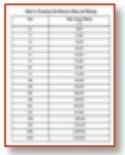
"…must withstand 800psi at 900C."

$$W_2 = \frac{aS_y}{4}\left[1 - \frac{S_y}{4n\pi^2 E}\left(\frac{l}{r}\right)^2\right]$$

"Refer to AGMA 1010-E95."



"See LMCO MAP 2104."



"Must comply with ASTM B104."

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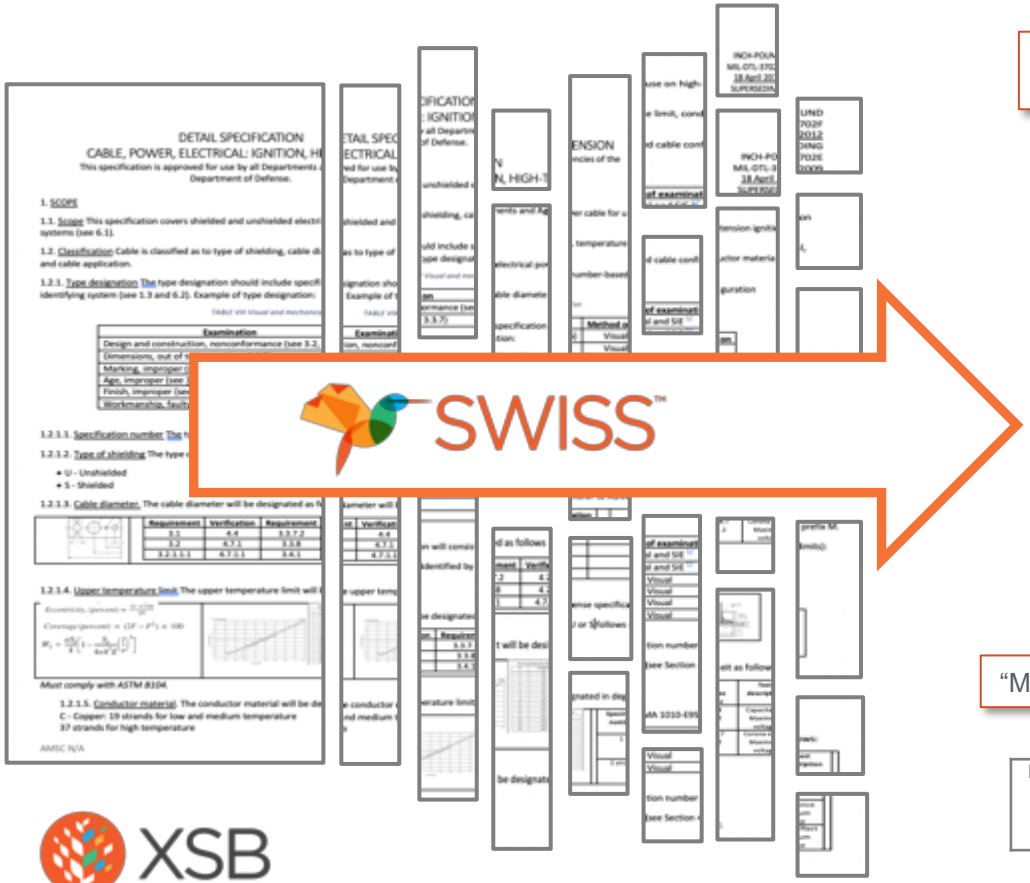
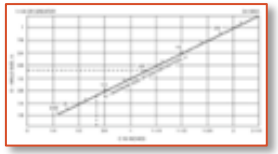
SWISS Turns Documents Into Change-Aware Digital Models for use Throughout the Product Lifecycle



1.2. Tank wall pressure must withstand 800psi at 900C.

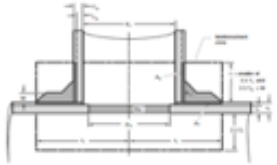


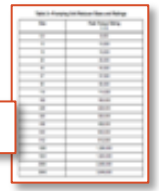
$$W_2 = \frac{aS_y}{4}\left[1 - \frac{S_y}{4n\pi^2 E}\left(\frac{l}{r}\right)^2\right]$$

1.2.1.1. Specification number The type designation will consist of the defense specification number with the prefix M. Use LMCO H404 for additional markings.

4.5.3 “Refer to AGMA 1010-E95.”

$$Coverage\,(percent) = (2F - F^2) \times 100$$





“Must comply with ASTM B104.”

Requirement	Verification	Requirement	Verification
3.1	4.4	3.3.7.2	4.7.2
3.2	4.7.1	3.3.8	4.7.1
3.2.1.1.1	4.7.1.1	3.4.1	4.7.3.1

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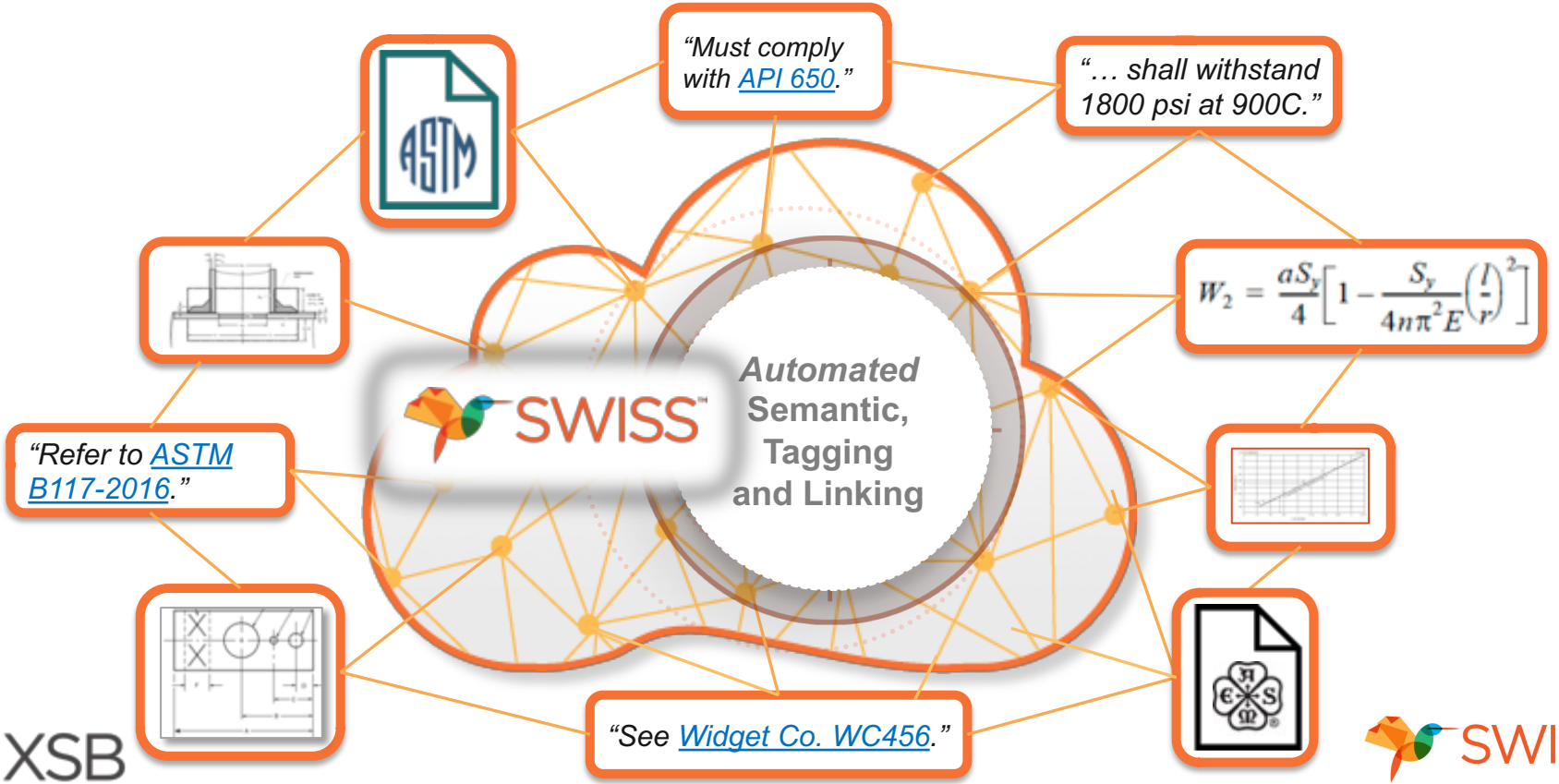
SWISS

SWISS Makes Data Contextual, Connected, and Interoperable

Every data element knows its meaning, its status, and its relationship with every other piece of data.



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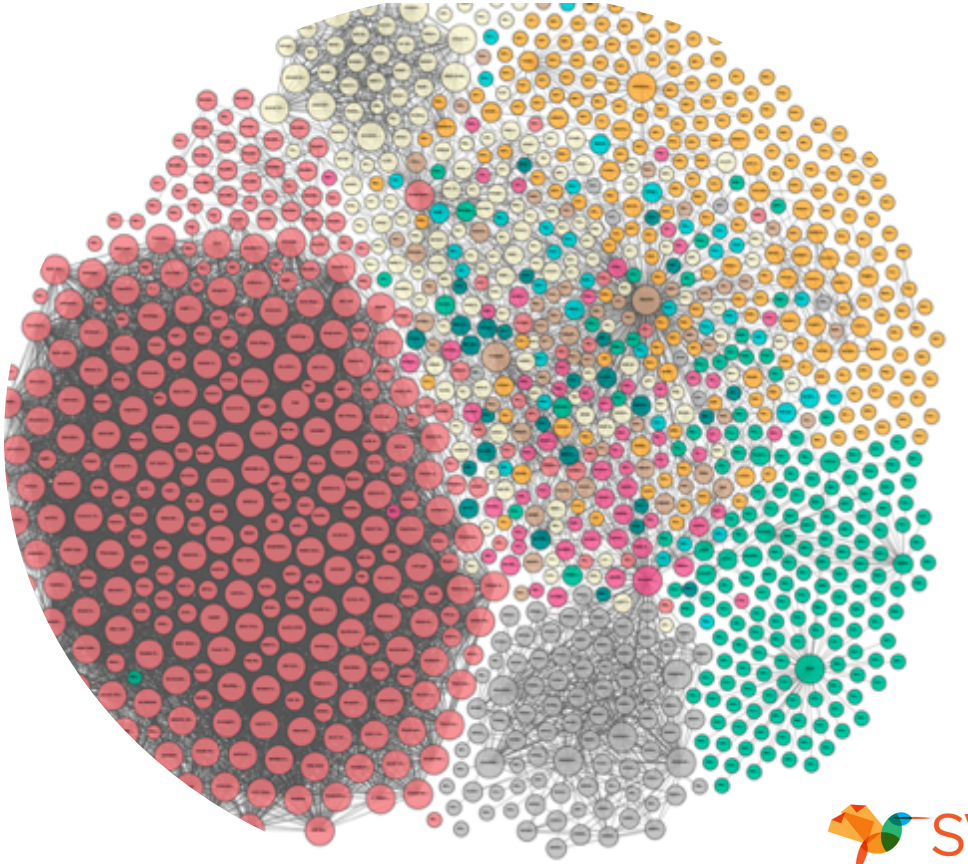
The SWISS Knowledge Graph: Large and Growing

600M Connections

and counting…

- ASTM, ASME, AWS, IPC
- Most common government specs
- Collaborating with every major SDO
- Proprietary corporate specs (with appropriate security)



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SWISS API Delivers Data to the Apps You Already Use

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Too Much Time Spent On Tedious, Non-Value Added Tasks

On average, per week, each engineer spends…

- **21.3 hours creating drawings**
- **6.4 hours answering questions or clarifying drawings**
- **5.5 hours generating additional drawing documentation**

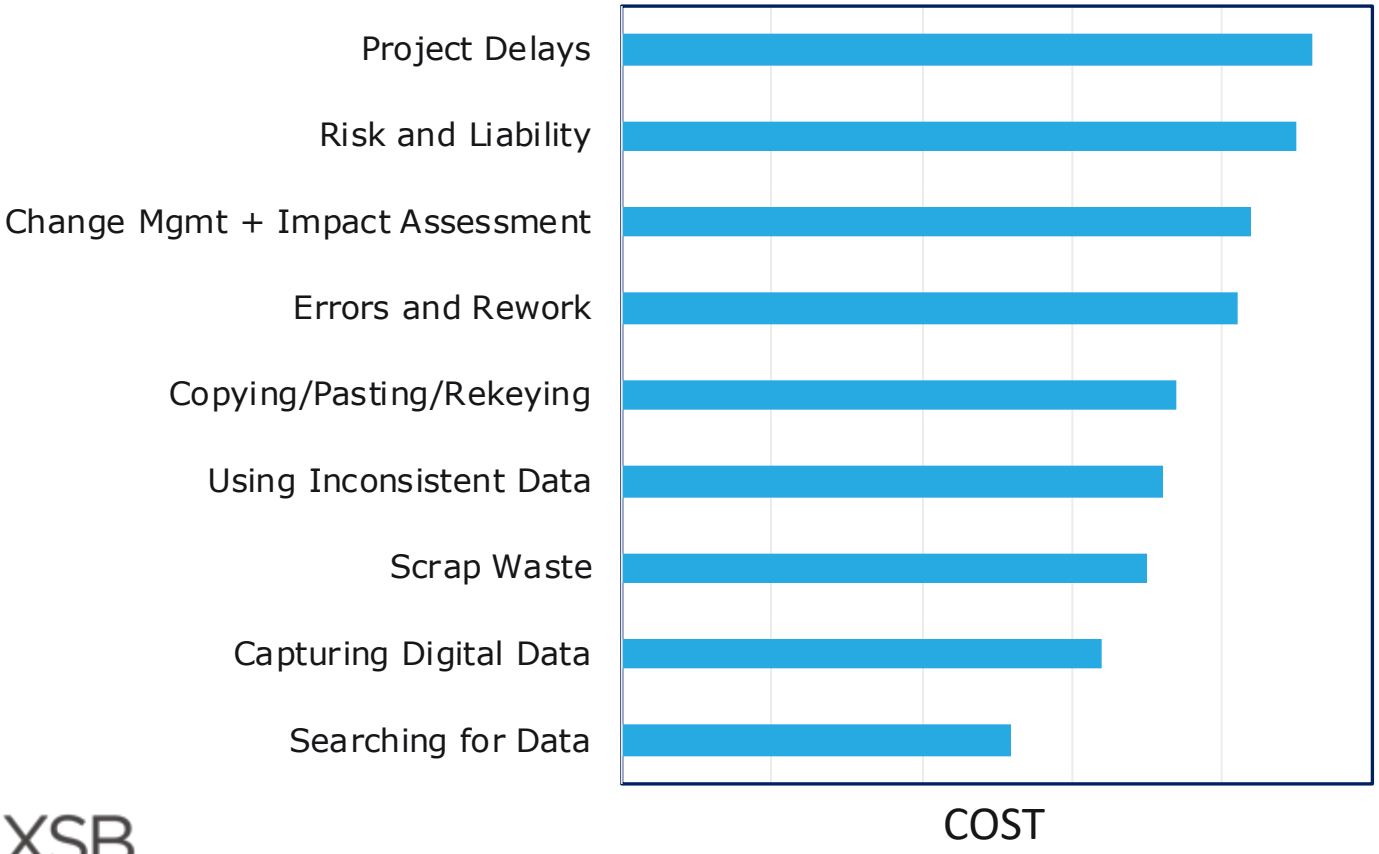
On average, per week, each machinist spends…

- **8.3 hours creating manufacturing or quality documentation**
- **4.7 hours answering questions or clarifying documents**
- **4.1 hours generating additional documentation**

ALSO: 51% of suppliers request clarification of documentation, and 39% experience scrap or rework due to misinterpretation of documentation or using non-compliant specs.

Source: Siemens and Lifecycle Insights "State of Model Based Enterprise Report"

Tangible Costs and Inefficiencies



Five SWISS Game Changers

INTEROPERABILITY

Move effortlessly between concepts, work instructions, and industry specs using digital models instead of documents.

AUTHORITATIVE LINKING

Every concept is connected to its authoritative source.
Increases accuracy, reduces errors and risk, maximizes compliance.

CHANGE AWARE

Exact changes in tech data are communicated to every viewer in real-time.
Reduces change management time and cost,and shortens time to market.

PLM AND OFFICE 365 INTEGRATION

Break down silos, keep workers in familiar tools. Improves productivity.

PLATFORM AND API MODEL

Dev-friendly, build your own apps, and more. Sustainable for the long-term.

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Summary

- Engineering-intensive organizations are moving GD&T data into digital models
- The same companies are drowning in static engineering documents that are not part of the digital thread:
  - Standards, work instructions, notes on drawings, tech data packages, etc.
- SWISS brings non-GD&T data into the digital thread
- Drives savings in document creation, change management, fewer errors and rework, faster time to market

Questions?

Visit us in the PLM Collaboration Café
Or online at: www.xsb.com or www.swiss.io

Rupert Hopkins, CEO
r.hopkins@xsb.com

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