

**STI – Standardization Initiative
SIRIUS Masterclass – SSV Conference
5.4.2017**

EPIM members (Exploration & Production Information Management)



Method for Standardization and Working Groups

One Working Group focusing **Multidiscipline co-ordination** across working groups to ensure consistence

Working Group 1, e.g. Instrument. (One Working Group per competence area)

Establishing common **document requirements** in working groups only staffed with discipline professionals

vi. **Digitally through information objects define content**
(e.g. design objects to appear on a drawing)

v. **Justification** towards directives, standards and work processes

iv. Discipline engineers discussing, focusing and concluding **sufficient, but required information and documentation** for use during projects and operations

iii. **Identify** relevant **document types**, and establishing dictionary between standards and companies

ii. **Identify** relevant **equipment types**, and establishing dictionary between standards and companies

i. **Establish Working Group with Discipline Professionals**

Manufacturer

Suppliers

Contractors

Operators

Establishing common **property requirements** in working groups only staffed with discipline professionals

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(e.g. design objects to appear on a drawing)

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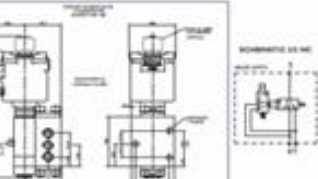
STI objectives

- Objectives for the STI project is to identify unified requirements enabling cost reductions in project execution and operations. This includes reduced and more efficient review processes for information and documentation from suppliers.

Standard information and documentation to be delivered with the physical equipment

FP15 (51, 52 & 53)

Dimensional Drawing




FP15 Selection Chart - Ordering Example

51	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
52	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
53	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
54	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
55	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
56	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
57	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
58	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
59	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
60	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
61	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
62	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
63	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
64	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
65	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
66	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
67	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
68	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
69	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
70	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
71	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
72	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
73	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
74	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
75	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
76	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
77	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
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79	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
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83	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
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85	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
86	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
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88	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
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94	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
95	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
96	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
97	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
98	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
99	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE
100	141 bar / 2050 psi	High Pressure, Pilot Stage Solenoid Valves	FP15C CODE

TRANSMITTER

Rosemount 3051C Coplanar™ Pressure Transmitter



Power Advisory can proactively detect degraded electrical loop integrity issues (Option Code DAS)

Local Operator Interface with straightflow and menu and built-in configuration buttons (Option Code M4)

Safety Certification (Option Code QT)

See Specifications and options for more details on each configuration. Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See page 54 for more information on Material Selection.

Additional information:
 Specifications: page 45
 Certifications: page 56
 Dimensional Drawings: page 56

Table 1. 3051C Coplanar Pressure Transmitters Ordering Information

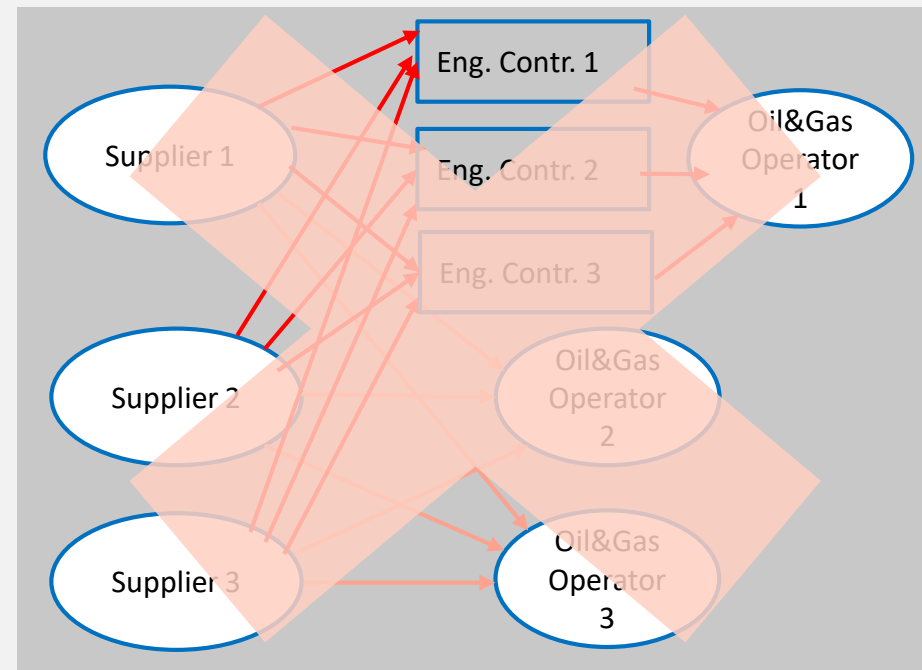
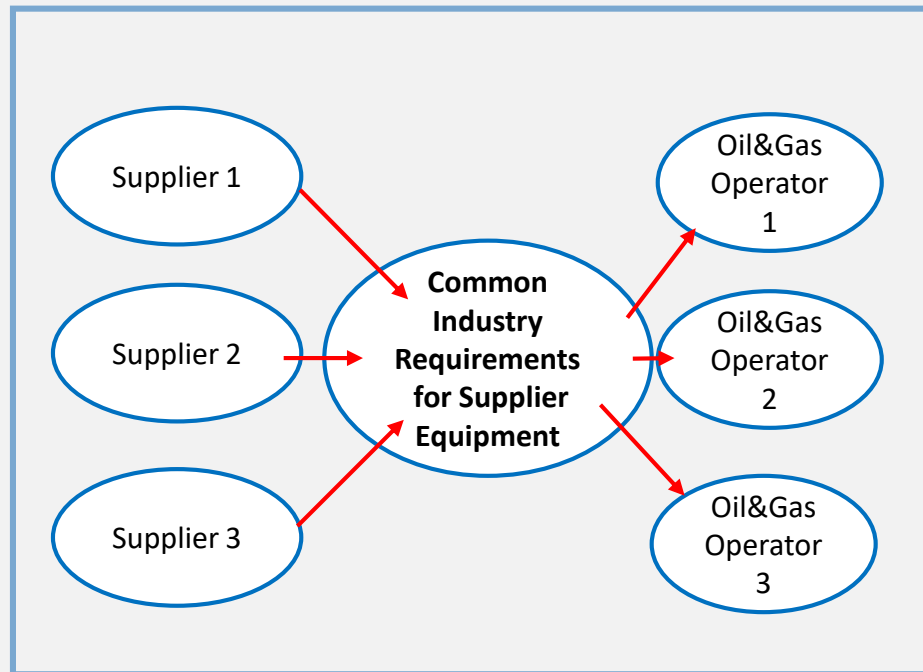
• The Standard offering represents the most common options. The starred options (*) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Transmitter type
3051C (*)	Coplanar Pressure Transmitter

Measurement type	
D	Differential
G	Gage
A71	Absolute

Pressure range	Differential (3051CD)	Gage (3051CG)	Absolute (3051CA)
1	-25 to 25 mbar (0.42, 16 to 62, 16 mbar)	-25 to 25 mbar (0.42, 16 to 62, 16 mbar)	0 to 30 psia (0 to 2,08 bar)
2	-250 to 250 mbar (0.42, 16 to 62, 16 mbar)	-250 to 250 mbar (0.42, 16 to 62, 16 mbar)	0 to 150 psia (0 to 10,34 bar)
3	-1000 to 1000 mbar (0.42, 16 to 62, 16 mbar)	-1000 to 1000 mbar (0.42, 16 to 62, 16 mbar)	0 to 500 psia (0 to 34,47 bar)
4	-300 to 300 psi (20,68 to 20,68 bar)	-14,2 to 300 psi (

Concept: STI – Standard information and documentation for equipment



i) STI: Dictionary alignment for traceability

Product (equipment type) ISO 15926		IEC 61987	NORSOK I-001
Designation	Review notes	Name	Name
POSITIVE DISPLACEMENT FLOW METER		Positive displacement flow transmitter/gauge	TURBINE AND POSITIVE DISPLACEMENT FLOW METER
TURBINE FLOW METER		Turbine/propeller/Woltmann flow transmitter/gauge	TURBINE AND POSITIVE DISPLACEMENT FLOW METER
ULTRASONIC FLOW METER		Ultrasonic flow transmitter	ULTRASONIC AND VORTEX FLOW METER
ELECTROMAGNETIC FLOW METER		Electromagnetic flow transmitter	MAGNETIC FLOW METER
VARIABLE AREA FLOW METER		Variable area flow transmitter/gauge	VARIABLE AREA FLOW METER
CORIOUS MASS FLOW METER		Coriolis mass flow transmitter	MASS FLOW METER
PITOT TUBE			PITOT TUBE AND ANNUBAR
DIFFERENTIAL PRESSURE FLOW METER		Orifice/differential pressure flow transmitter	ORIFICE FLANGES AND PLATES
VENTURI TUBE			VENTURI FLOW ELEMENT
SWIRL FLOW METER		Swirl flow transmitter	VORTEX FLOWMETER
VORTEX FLOW METER		Vortex flow transmitter	VORTEX FLOWMETER
MAGNETIC LEVEL GAUGE		Magnetic level gauge	LEVEL INSTRUMENT MAGNETIC
LASER LEVEL TRANSMITTER		Laser level transmitter	LEVEL INSTRUMENT ULTRASONIC/MICROWAVE
RADAR LEVEL TRANSMITTER		Free-space radar level transmitter	LEVEL INSTRUMENT ULTRASONIC/MICROWAVE
ULTRASONIC LEVEL TRANSMITTER		Ultrasonic level transmitter	LEVEL INSTRUMENT ULTRASONIC/MICROWAVE
DISPLACER LEVEL SWITCH		Displacer level transmitter/switch	LEVEL INSTRUMENT DISPLACER/FLOAT
LEVEL FLOAT TRANSMITTER			LEVEL INSTRUMENT DISPLACER/FLOAT
CAPACITIVE LEVEL TRANSMITTER		Capacitance level transmitter/switch	LEVEL INSTRUMENT CAPACITIVE/CONDUCTIVE
LEVEL GAUGE		Sight level gauge	LEVEL GLASS/GAUGE
LEVEL SWITCH		Level switch	LEVEL SWITCH VIBRATING FORK
ULTRASONIC LEVEL SWITCH		Ultrasonic level switch	LEVEL SWITCH VIBRATING FORK
NUCLEONIC LEVEL TRANSMITTER		Nuclear level transmitter/switch	LEVEL INSTRUMENT NUCLEONIC
ABSOLUTE PRESSURE TRANSMITTER			PRESSURE INSTRUMENT ELECTRIC
DIFFERENTIAL PRESSURE LEVEL TRANSMITTER			PRESSURE INSTRUMENT ELECTRIC
DIFFERENTIAL PRESSURE TRANSMITTER		Differential pressure transmitter	PRESSURE INSTRUMENT ELECTRIC
GAUGE PRESSURE TRANSMITTER		Absolute/gauge pressure transmitter	PRESSURE INSTRUMENT ELECTRIC
REMOTE/CHEMICAL SEAL		Remote seal	PRESSURE INSTRUMENT ELECTRIC
DIFFERENTIAL PRESSURE GAUGE		Differential pressure gauge	PRESSURE INDICATOR
ORIFICE PLATE		Orifice/differential pressure flow transmitter	ORIFICE FLANGES AND PLATES
PRESSURE GAUGE		Absolute/gauge pressure gauge	PRESSURE INDICATOR
FIRE DETECTOR			FIRE AND GAS DETECTOR

ii) STI final review WG1-Instrument: Delivery of document requirements covering 47 equipment types

[illegible]

iii) STI: Justification (towards requirements and work processes)

B		C		D		H		I	J	K	L
Document - ISO 15926						JUSTIFICATION					
						National requirements or standards Acts, PTIL regulatives or NORSOK standards		International requirements or standards EU directives or ISO standards	Governing		Project Execution
Name	Document Functionality Definition	Document Content Definition	Desc. ACTS		Desc. SPEC.						
Material Certificates	This document shall support verification of compliance	This document shall include material certificates	NORSOK L-001, NORSOK L-004, NORSOK M-630, NORSOK M-650, NORSOK I-001, NORSOK I-001/4.11.2, NORSOK I-001/4.4, NORSOK L-005/4.2 (referred in I-001)			Rammeforskriften krever nødvendig og tilstrekkelig dokumentasjon for materialer EU directive regulating manufacture info towards authorities	Verification of compliance	Verification of compliance (B,C)			
Pressure Test Certificate	This document shall support verification of compliance	This document shall include test certificates	NORSOK L-004, NORSOK I-001, NORSOK I-001/4.11.2, NORSOK L-005/4.7 (referred in I-001), NORSOK I-001/4.4, NORSOK L-002 (referred in I-001) Check 4.17 1st paragraph			Rammeforskriften krever nødvendig og tilstrekkelig dokumentasjon for materialer EU directive regulating manufacture info towards authorities	Verification of compliance	Verification of compliance (B)			
Welding procedure qualification (WPQ)	This document shall support verification of compliance	This document shall include welding procedure qualifications	NORSOK L-004, NORSOK M-601, NORSOK I-001/4.12.2			Rammeforskriften krever nødvendig og tilstrekkelig dokumentasjon for materialer	Verification of compliance	Verification of compliance (B,C)			
General Arrangement Drawing	This document shall provide information regarding main dimensions and weight.	The manufacturer's standard general arrangement drawing shall be delivered. Typical information may be: • Main dimensions • Interface/piping connections • Weight • Center of gravity	NORSOK S-001/4.8, NORSOK S-002/4.3		Not required	Rammeforskriften krever nødvendig og tilstrekkelig dokumentasjon for materialer EU directive regulating manufacture info towards authorities	Component location and verification of dimensions, space (envelopes) and interfaces	Component location and verification of dimension interfaces (A, B, D)			
Detail cross sectional drawings with parts list	This document shall support verification of supplier's design with regards to functionality and material selection.	The manufacturer's standard detail cross sectional drawing shall be delivered. Typical information may be: • Items list with reference to supplier's part number. • Material definition with reference to	NORSOK S-001/4.8, NORSOK S-002/4.3				Component location and verification of parts and materials	Component location and verification of parts and materials			
Installation, Operation and Maintenance (IOM) manual	This document shall provide sufficient information to install, operate and maintain the equipment	The manufacturer's standard IOM manual shall be delivered.	NORSOK Z-018, NORSOK S-001/4.8/12/13/17, NORSOK S-002/4.3				Required for installation and commissioning	Required for installation, commissioning, maintenance (A, B, D)			
Electrical connection and wiring diagram - instrument (int/ext)	This document shall provide input to electrical hook-up with respect to power, input/output signals and communication.	The supplier standard drawing to be delivered. Typical information may be: • Cable entries and termination • Terminal details including marking					Required for loop and cable design	Required for loop and cable design (B)			
Explosion Protection Certificates (ATEX)	This document shall provide information required to safe system design. E.g. input to IS-calculations, special requirements for safe use	The equipment's ATEX certificate shall be delivered.	NORSOK I-001/4.5		Directive 2014/34/EU	IEC 60079	Verification of compliance. Required for IS calculations and special conditions for safe use	Verification of compliance. Required for IS calculations and special conditions (A, B, C)			
Product Dictionary	Document Dictionary	Prod Doc Spec	Prod Doc Overview	Prod Prop Spec	Prod Prop Overview	Sheet1					

Requirements Management

Requirements Management today: 1000s of (electronic) requirement documents



Various requirements for Supplier Deliverables and other deliverables from Operators

Requirements
from
Operator 1

Requirements
from
Operator 2

Requirements
from
Operator 3

Requirements
from
Operator 4

Requirements
from
Operator n

Requirements Management

Requirements Management, enabling to **provide only relevant requirements**



NORSOK standard I-001

Edition 4, January 2010

4.12 Flow measurements

4.12.2 Flow orifice plates, nozzles, pitot- and venturi tubes

Flow orifice plates, nozzles, pitot- and venturi tubes shall be calculated, manufactured and installed according to ISO 5167 (all parts) or manufacturers recommendation.

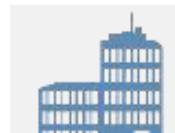
Structured - Harmonized,
Common Requirements,
e.g. for Supplier Deliverables (STI)

Item	Req. No.	Req. Text	Category	Priority	Status	Owner	Due Date	Comments
Material Certificate	1.1	Material Certificate	1.1	High	Open	Supplier	2010-01-15	
Pressure Test Certificate	1.2	Pressure Test Certificate	1.2	High	Open	Supplier	2010-01-15	
Welding Documentation	1.3	Welding Documentation	1.3	High	Open	Supplier	2010-01-15	
Planning Procedure	1.4	Planning Procedure	1.4	High	Open	Supplier	2010-01-15	
Planning Report	1.5	Planning Report	1.5	High	Open	Supplier	2010-01-15	
General Arrangement Drawing	1.6	General Arrangement Drawing	1.6	High	Open	Supplier	2010-01-15	
Overall view sectional drawing with parts list	1.7	Overall view sectional drawing with parts list	1.7	High	Open	Supplier	2010-01-15	
Installation, Operation and Performance (IOP) manual	1.8	Installation, Operation and Performance (IOP) manual	1.8	High	Open	Supplier	2010-01-15	
Electrical connection and wiring diagram - instrument (indist)	1.9	Electrical connection and wiring diagram - instrument (indist)	1.9	High	Open	Supplier	2010-01-15	
Explosion Protection Certificate (ATEX)	1.10	Explosion Protection Certificate (ATEX)	1.10	High	Open	Supplier	2010-01-15	
Calibration Certificate	1.11	Calibration Certificate	1.11	High	Open	Supplier	2010-01-15	
Insulation Calculations	1.12	Insulation Calculations	1.12	High	Open	Supplier	2010-01-15	
Space Parts Interchangeability Register (SPIR)	1.13	Space Parts Interchangeability Register (SPIR)	1.13	High	Open	Supplier	2010-01-15	
Safety documentation (incl. SIL, PSAT)	1.14	Safety documentation (incl. SIL, PSAT)	1.14	High	Open	Supplier	2010-01-15	
Documentation Storage and Preservation	1.15	Documentation Storage and Preservation	1.15	High	Open	Supplier	2010-01-15	
Certificate of Compliance	1.16	Certificate of Compliance	1.16	High	Open	Supplier	2010-01-15	

Various Tools and Methods



Supplier/
Manufacturer



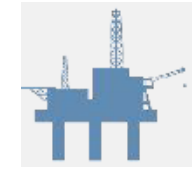
Contractor



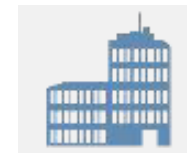
Operator



**Use of Correct
Requirements in the
Value Chain**



Operator

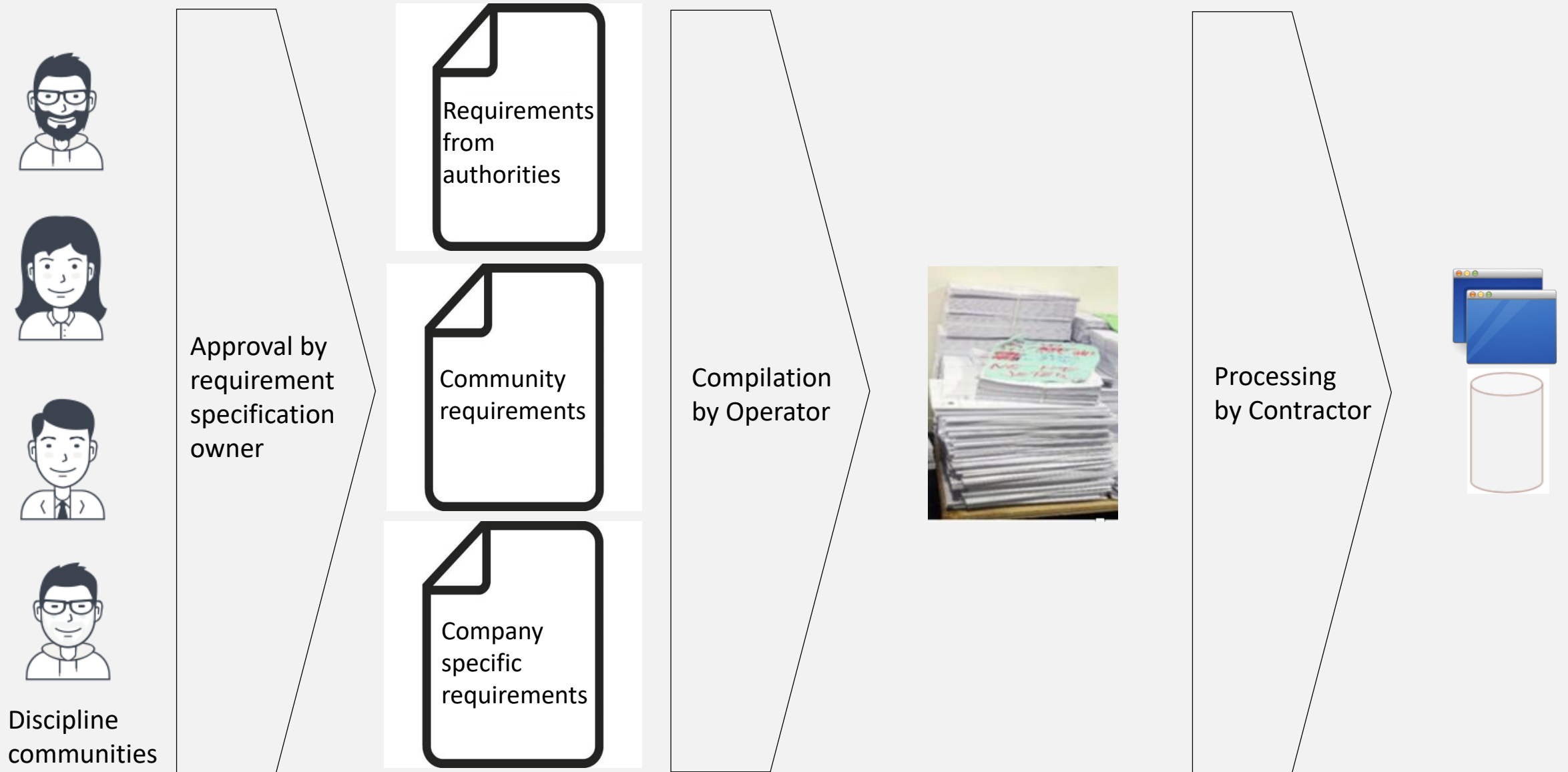


Contractor

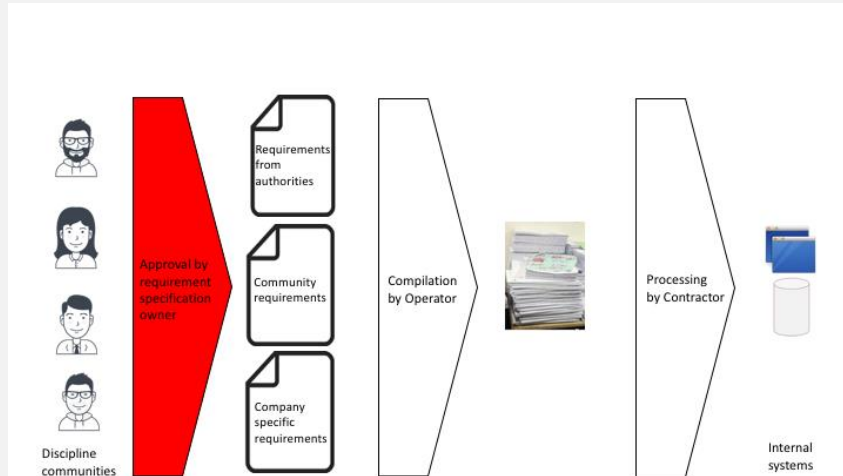


Supplier/
Manufacturer

Requirements pipeline

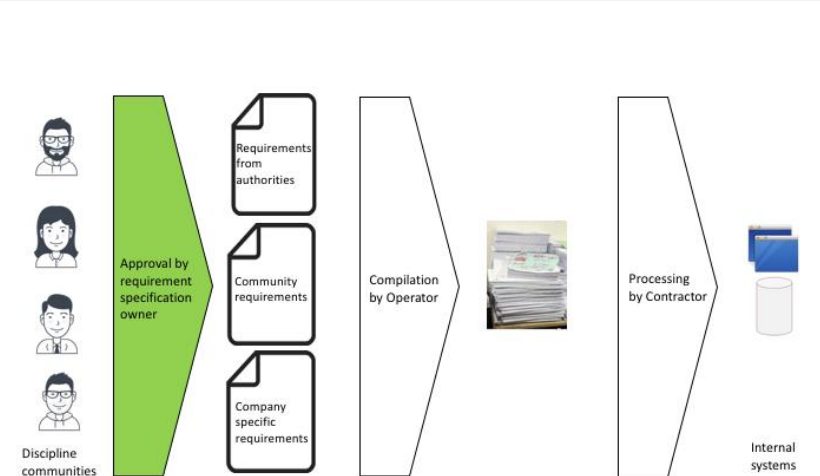


Document centric



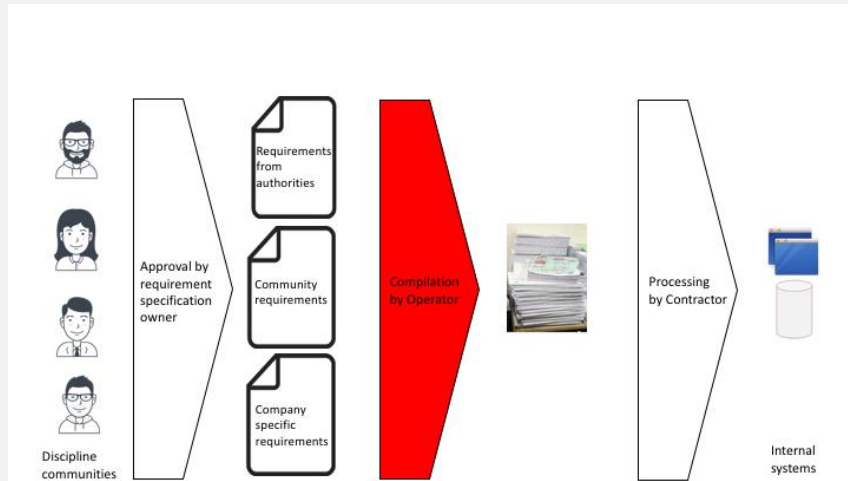
- Requirements identified as paragraphs in text documents
- No explicit correlation across specifications
- Revision regime cumbersome and for entire specifications
- Push needed to migrate from company specific to community level

Data centric



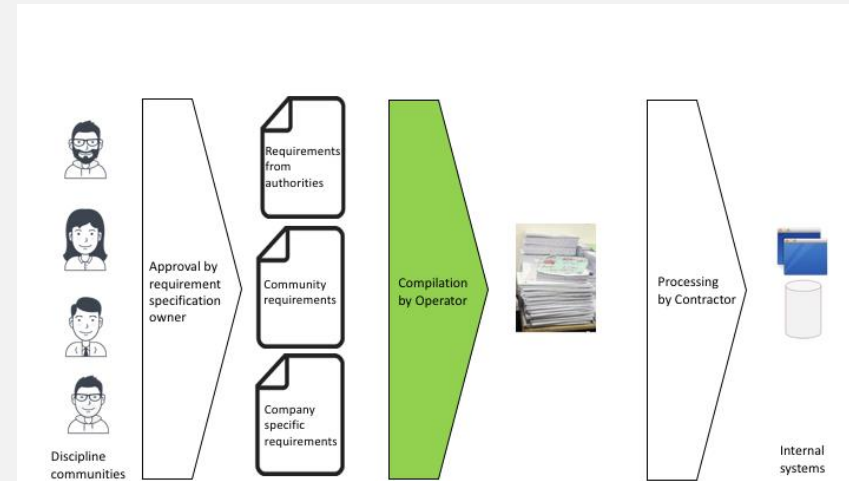
- Requirements have unique electronic ID
- Meaning of each statement clear
- Correlation between each requirement clear
- Revisions coordinated and pr. element
- Community pull to migrate from company specific to community level

Document centric



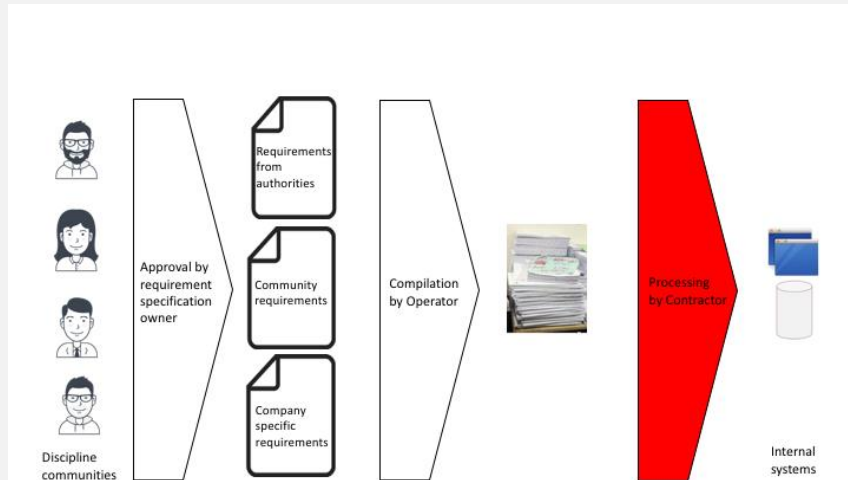
- Up to contractor to distinguish relevant requirements from irrelevant
- Up to contractor to link requirements to objects
- Difficult to accommodate revisions and link to check procedures for deliveries
- Difficult to detect inconsistent requirements

Data centric



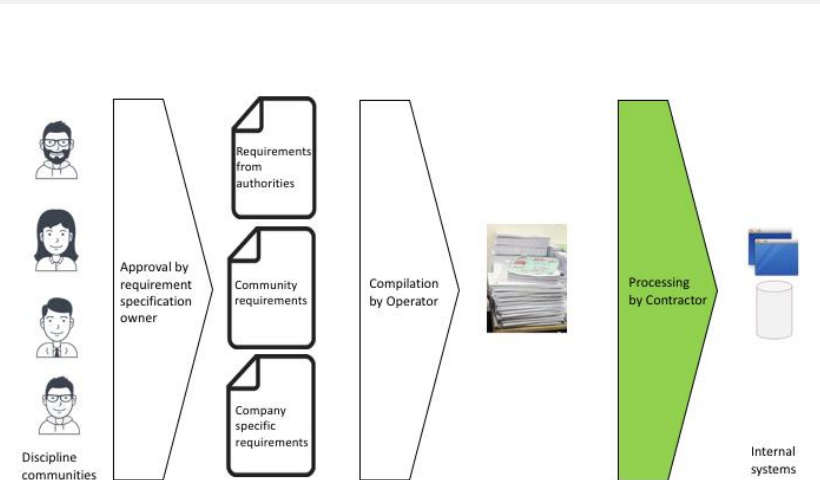
- In each context the relevant requirements are singled out
- Each requirement can be easily linked to objects
- Each requirement can be managed and linked to check procedures for deliveries
- Inconsistencies detected using AI

Document centric



- Work intensive to interpret and represent in discipline applications
- Challenging to route essential requirements to the right persons

Data centric



- Open standards and digital requirements enables powerful automated processing
- Structure on requirements facilitates routing of elements to the right persons