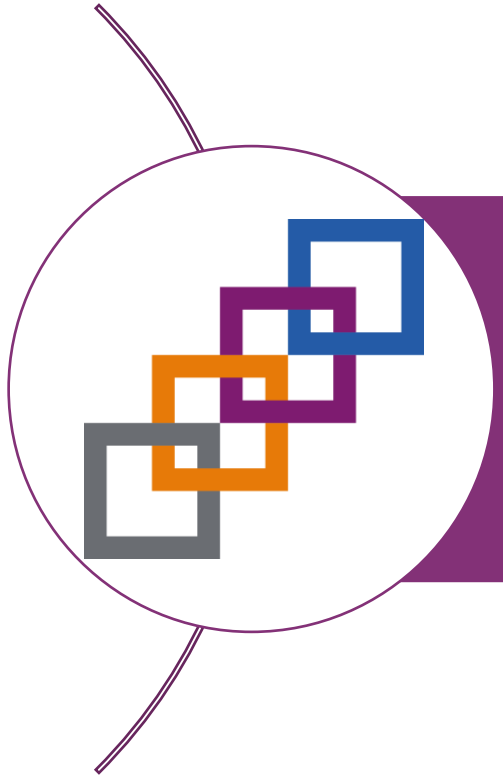
JIP33 : Engineering Specifications for the Procurement of Water Mist Systems for the oil & gas sector.

29th April 2021

Mark Davies – HAAR Technology for IOGP

Agenda

- Introduction to IOGP JIP33
-  S-719 the water mist project
- Digitalization
-  Case study
- What happens next?



What is JIP33?

Realising value with JIP33 – the key principles

Initiated by the IOGP and endorsed by the World Economic Forum, Joint Industry Programme (JIP)33 creates standardized procurement specifications:

- A set of requirements that meet **essential needs** that can be used and reused - leading to **standardized production processes**, **smaller inventories** and **shorter lead times.**
- Users still have some **options and choices**. They don't need to make changes or add supplementary requirements.
- Industry-wide adoption means repeatability for suppliers, leading to **improved efficiency** and **reduced risk of cost and schedule overruns.**

JIP33 adds value by making the supply chain faster and more efficient

JIP33 in numbers

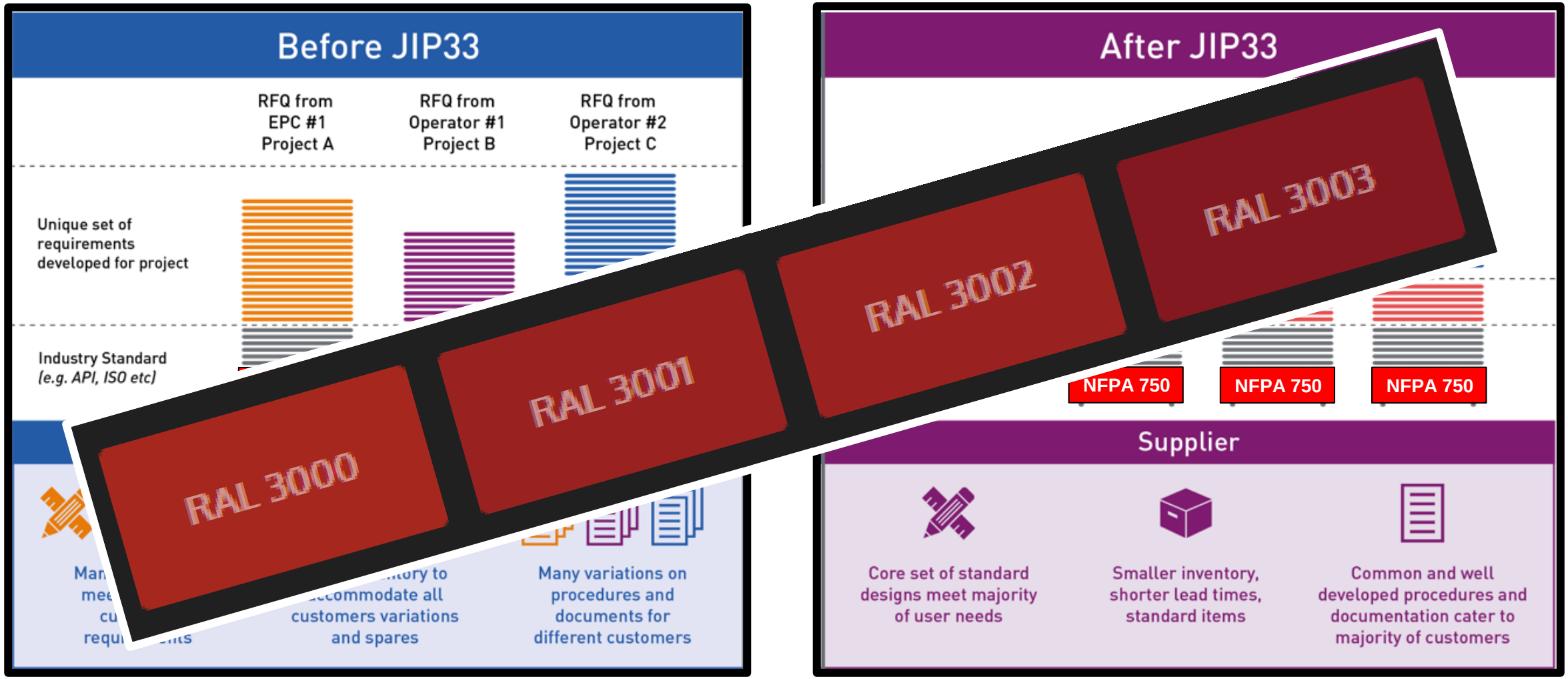
- **12 committed sponsors**

- >**20** Working Groups delivering new & upgrading existing specs, working with SDO's
- >**300 Subject matter experts** sharing knowledge, insights and expertise

- **>40** specifications published
- More than **39,000** downloads since early 2018
- JIP33 Delivery Centres in London & Houston
- Continued progress despite COVID-19

NEW in 2020/21:
- 12 EPC Partners - Contractor Group
- Supplier Case Studies

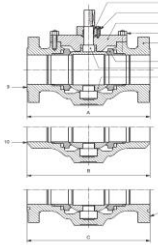
The water mist suppliers perspective



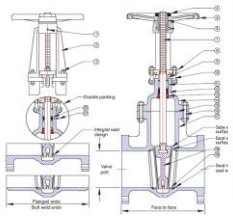
Published specifications


S-560


S-561


S-562


S-563


S-611


S-612


S-613


S-614


S-615


S-616


S-617


S-618


S-619


S-620


S-700


S-701


S-702


S-703


S-705


S-707


S-708


S-710


S-712


S-713


S-715


S-716


S-717


S-719


S-720


S-722


S-723


S-724 / S-725 / S-726

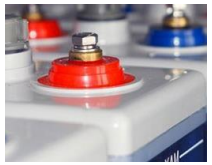

S-732


S-704


S-733D


S-738


S-734


S-740

All JIP33 specifications are FREE to download and available for use by everyone.

The more the JIP33 specifications are adopted, the more opportunities there are for efficiencies in our industry.

S-719 - the water mist project

Collaboration across the supply chain

Evaluated > 18 water mist suppliers.
- based on listings and approvals.

Reached out to 12, 6 actively engaged.

…Reliance is placed on the procurement and installation of listed water mist equipment or systems that have demonstrated performance in fire tests as part of a listing process.

* Taken from NFPA 750 1.1 scope

Framing - Work group from the 12 operators.

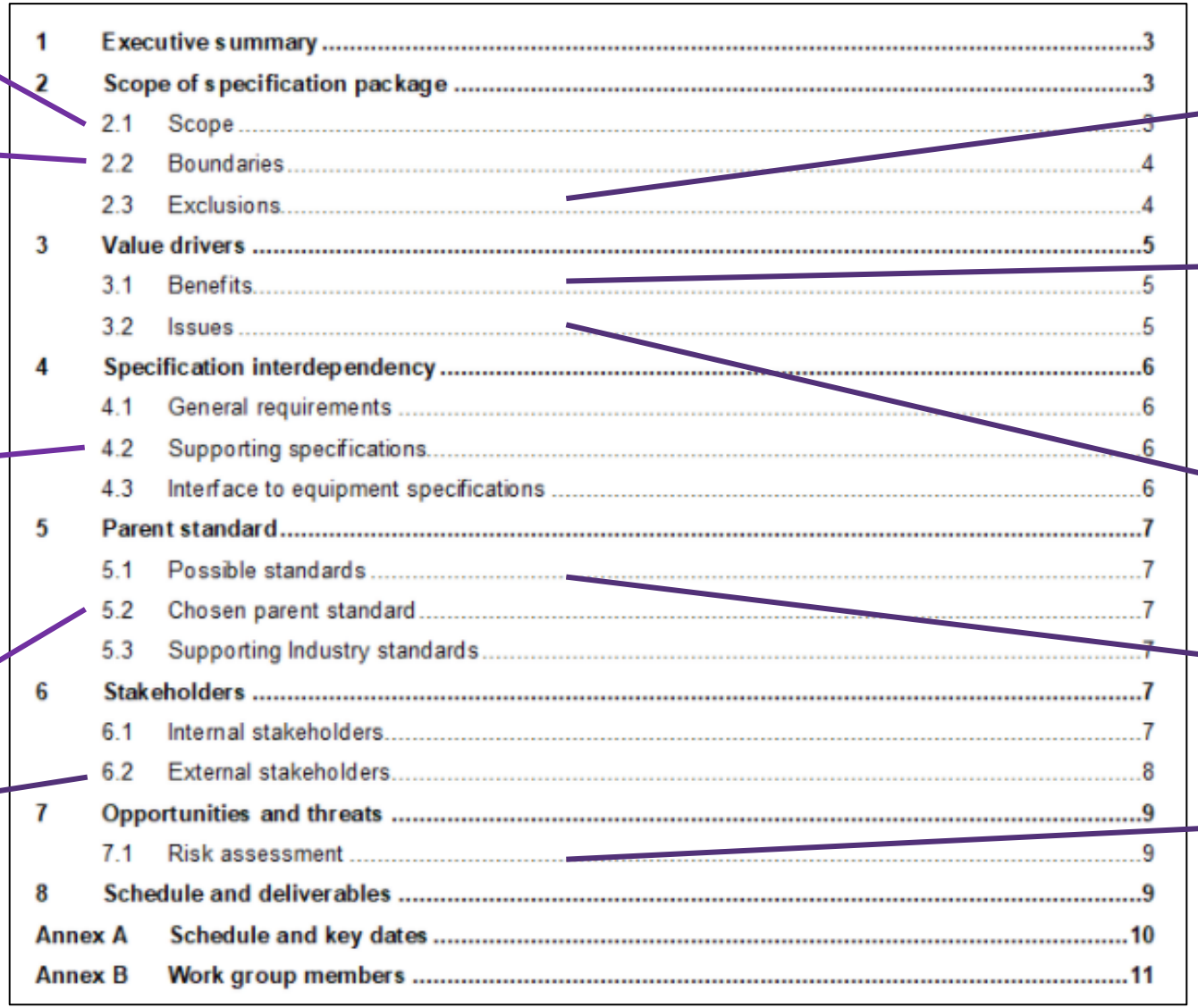
All pressures

Listed/approved /fire engineered

Supporting JIP33 specs

NFPA 750

12 suppliers contacted



Blast protection

Standardization

Design resources

Interventions

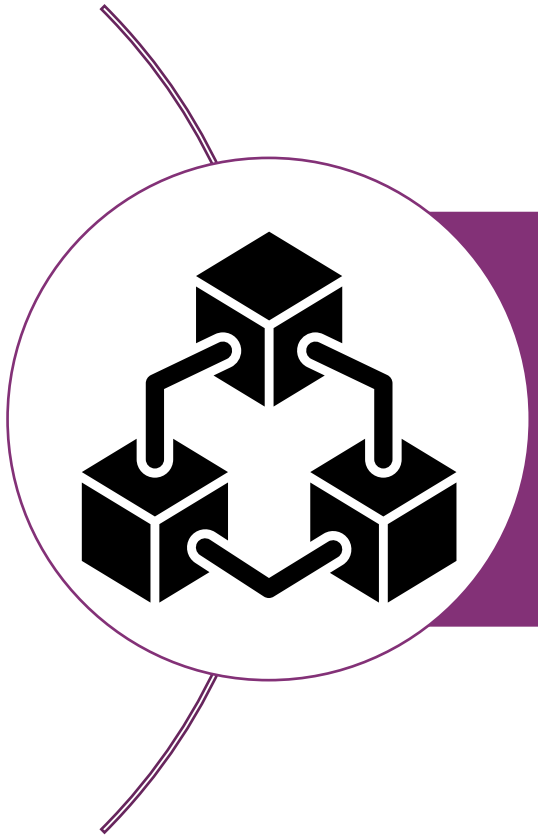
Fire engineered

CEN pr EN 14972

Volumes/fuel loads

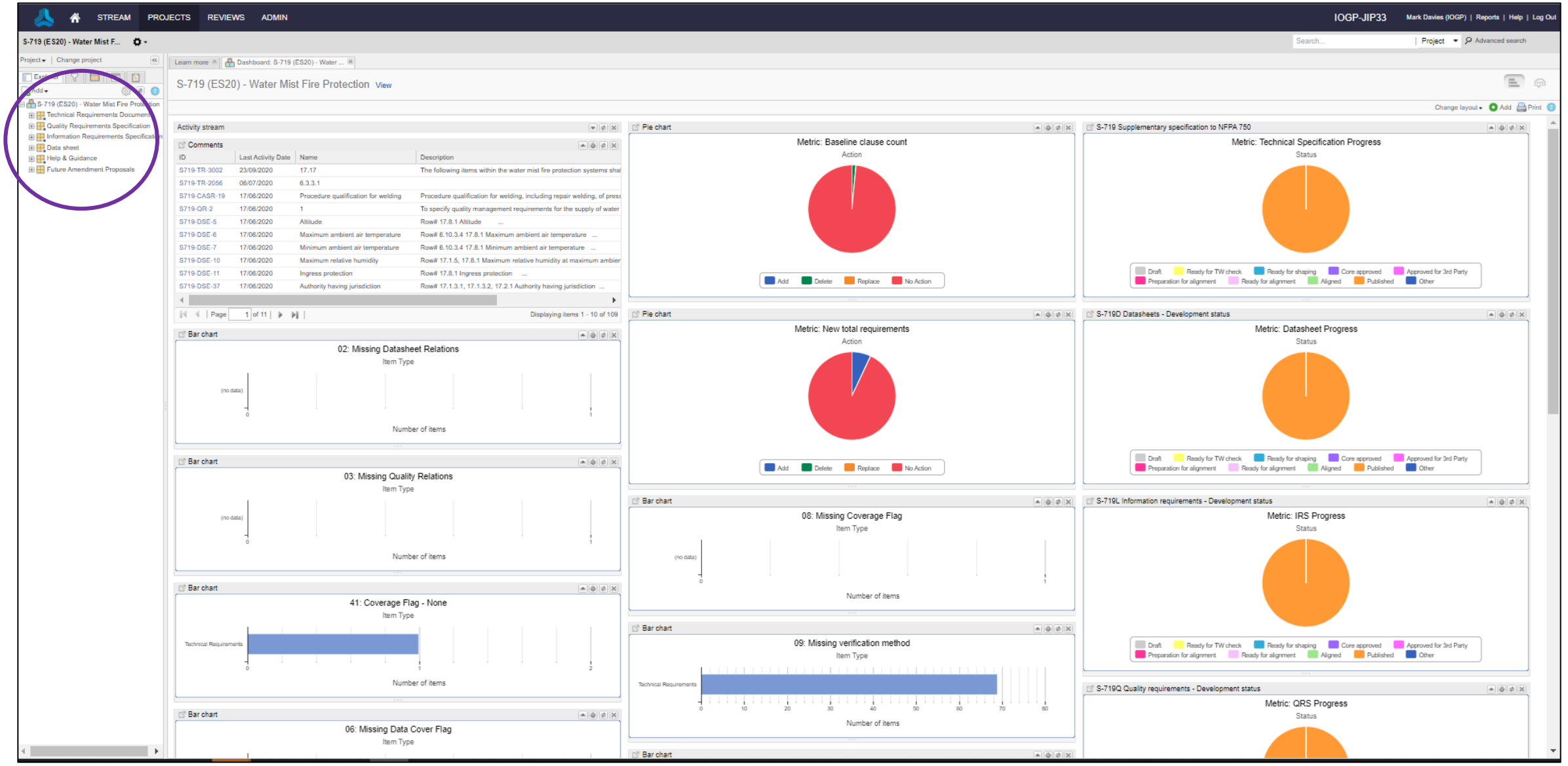
FM, IMO, UL, VDS, BS etc

Experience, knowledge, CEN, suppliers…

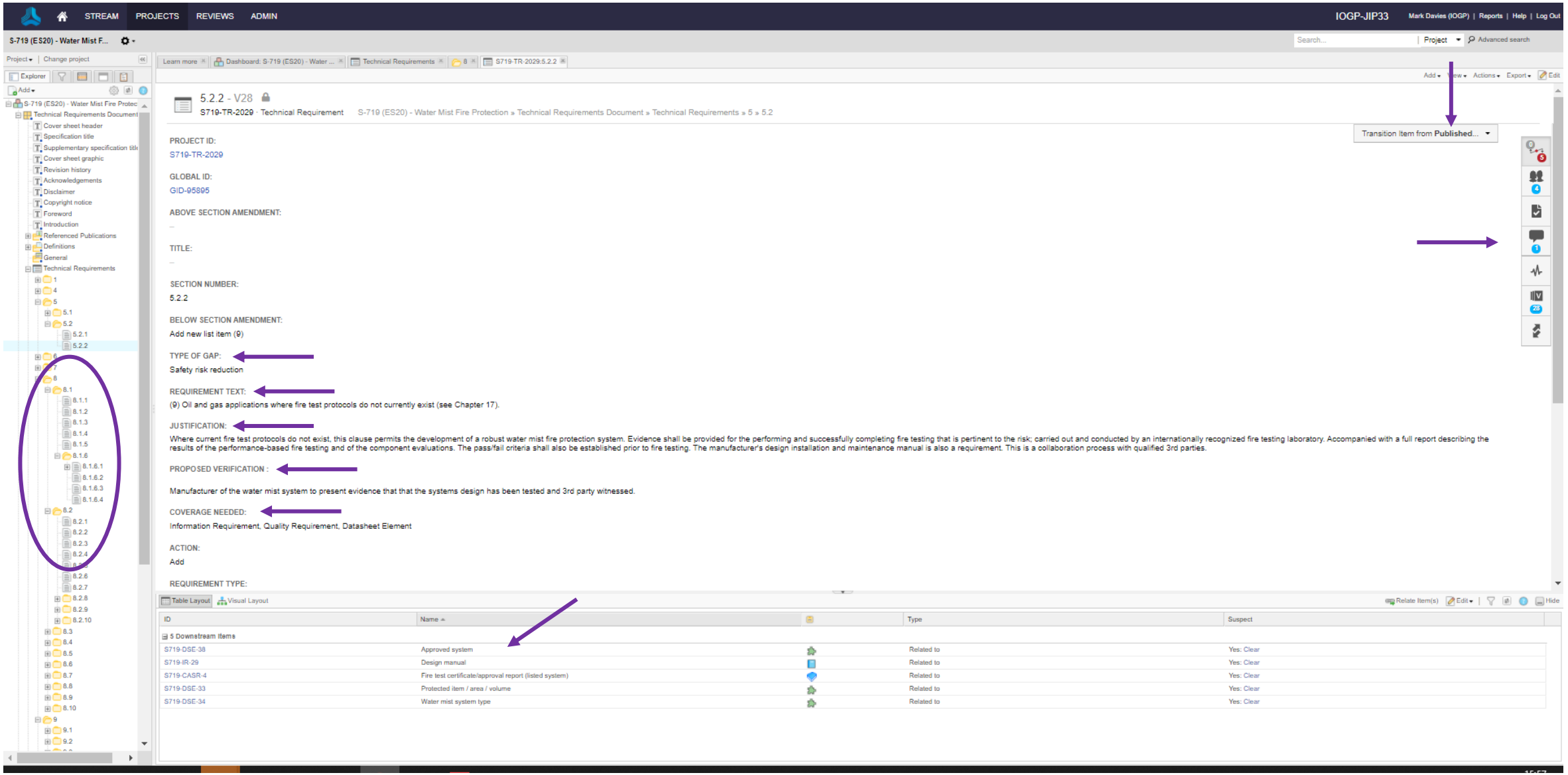


Digitization

Digitization - Jama



Digitization - Jama



Digitization - QVScribe

Supplementary requirement text (requirement)

- Short, concise and exactly <u>one</u> imperative – common understanding for a minimum essential requirement.

Quality Score Summary

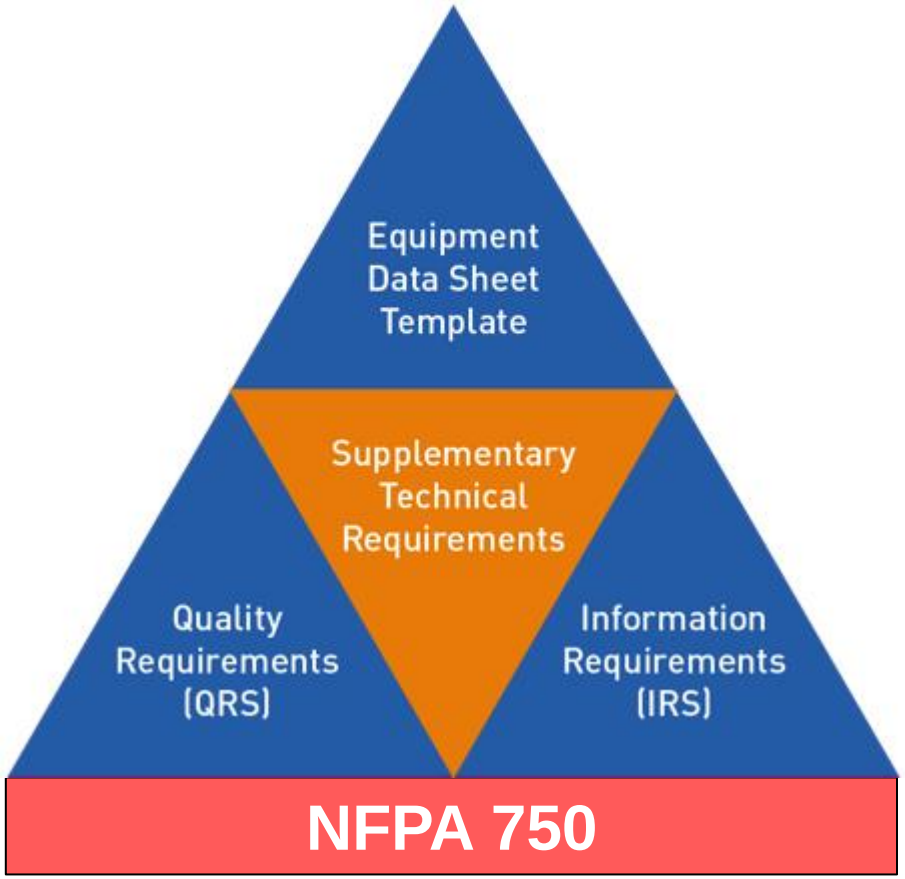
qvscribe

Score	Reason for this score	Risk and Action
5	**No problems found** with this requirement that impact the Quality Score.	**Very Low Risk** Includes exactly one imperative and uses clear, unambiguous terminology to express the requirement.
4	**Minor problems** with this requirement. These may include: - Excessive use of continuances - No Directives (off by default)	**Low Risk** These issues are generally low-risk but they make the requirements more difficult to work with and should be addressed.
3	**Major problem** with this requirement. These may include: - A single vague, subjective, or weak term - A single negative imperative	**Medium Risk** The presence of these terms usually indicates that the meaning of the requirement will be ambiguous, and it may be difficult to test.
2	**Multiple major problems** with this requirement. These include more than one: - Vague, subjective, or weak terms and/or - Negative imperatives	**High Risk** Having multiple quality issues within the same requirement heightens the risk of misinterpretation. This can lead to product failure or costly rework.
1	**Critical problems** with this requirement. These may include: - No imperative or multiple imperatives, and/or - Several vague, subjective, or weak terms	**Very High Risk** Requirements that have problems with the imperatives or more than two instances of problematic language represent the highest risk. It is likely that important information will be missed in the development process.
⚠	**Quality Warnings** were found in this requirement. These may include: Universal Quantifiers, Passive Voice, Incomplete Sentences, and/or Justification Information	**Potential for Risk** The proper use of phrases identified in these categories depends on the context in which they are used. When these potential issues are found a warning will be shown but they do not impact the Quality Score.

Hydraulic chambers **<u>shall</u>** be provided with two ports for flushing.

Hydraulic chambers **should** have two ports located at **extreme** ends to allow **efficient** flushing.

Specification Development



Lead SME & Core WG

- **TRS** – **full gap analysis**, **development** of **essential minimum** supplementary requirements over NFPA 750.
- **DS –** for **procurement**, not product.
- **IRS** – minimum information for the project – e.g. DIOM, hydrostatic test certificate etc.
- **QRS –** minimum **quality interventions** (by purchaser) according to CAS level.

Standardized digital proposal formats, templates & datasheet configurations = less reworking and faster responses when tendering.

Shaping – Full work group

The Datasheet

Row		S-719D Data Sheet for Water Mist Fire Protection Sytems		JIP33 JOINT INDUSTRY PROGRAMME	Issue
2	Tag No. :	*Insert Tag Number*			
3	Service :	*Insert Service Description*			
4	Ref. Clause	Description		Additional notes	
21		**Site conditions**			
22	17.8.1, 8.5.6.6.2	Location environment :	Select		
23	8.5.4	Blast protection consideration :	Input Data		
24	6.2.2.1, 6.5.7.1, 8.3.7	Seismic consideration :	Input Data		
25	17.8.1, 6.1.3.1, 6.6.4, 6.6.5, 8.1.3, 8.5.4	Corrosive atmospheres. :	Input Data		
26	17.8.1	Altitude :	<1000		
27	12.5.1.1, 12.5.1.2	Water quality :	Input Data		
28	17.8.1, 6.10.3.4	Minimum ambient air temperature :	4	°C	
29	17.8.1, 6.10.3.4	Maximum ambient air temperature :	54	°C	
30	12.5.4.3, 17.7.1, 17.7.2, 17.7.3, 8.1.3, 8.1.4, 8.3.7, 8.5.4	FFS enclosure (fire fighting skid) :	Select		
31		Transport and storage conditions :	within normal service conditions		
32		Extended periods of standstill :	No		
33	17.8.1	Maximum relative humidity :	100	%	
34	17.8.1	Ingress protection :	IP55		

Select
onshore – coastal
onshore – desert
onshore – inland
offshore – fixed
offshore – floating
marine (ship)

94	5.2.2, 7.2 (Acut)	Water mist system type :	Select	
95	4.1.1.1	Water mist performance objective :		
96	5.2.2	Protected item / area / volume :		
97		Protected item / area (additional fire protection) :		
98		Protected Item / area Storage :		
99	6.10.1.1	System actuation :		
100	8.2.2	Maximum height of protected item / area / volume :		
101	6.6.6.1	Nozzle protection :		
102		**Pre-engineered systems**		
103	12.3.1	Duration : rundown time of turbine :	Input Data	
104	12.3.1	Duration : time necessary to secure fuel lines to the rotating equipment :	Input Data	

Select
Select
deluge
dry pipe
engineered
fire scenario engineered
local-application
occupancy protection
preaction protection

Select	Supplier completed, pick list of pre-defined values (may be pre-populated with a default value).
Input data	Supplier completed data entry.
Select	Purchaser completed, pick list of pre-defined values (may be pre-populated with a default value).
Input data	Purchaser completed data entry.
Select	Either supplier or purchaser completed, pick list of pre-defined values (may be pre-populated with a default value).
Input Data	Either supplier or purchaser completed data entry.
Select	Selection of units from a pre-defined pick list.

The Quality Requirements

	CUSTOMER ASSESSMENT ACTIVITIES	CAS			
		A	B	C	D
1	**Operational planning and control activities**				
1.1	Quality planning (ISO 9001, 8.1 and ISO 10005)	H	W	R	-
1.2	Inspection and testing planning (ISO 9001, 8.1 and ISO 10005)	H	W	R	-
1.3	Pre-assessment/inspection planning	H	W	S	-
2	**Design and development activities**				
2.1	Design documentation review (datasheet, P&ID, G/A)	H	H	W	R
2.2	Fire test certificate/approval report (listed system) 13.4.6, 16.1.2.1, 16.3, 17.1, 17.2, 17.4.1, 17.5.2, 5.2.2	H	W	R	R
2.3	Fire scenario engineered solutions only 13.4.6, 16.3.2, 17.1.4, 17.1.7, 17.2, 17.5.2, 9.1.5	H	H	H	H
5	**Release of product or service from suppliers/manufacturers works**				
5.1	Documentation review; as per IRS (S-719L) 17.18, 17.19, 17.2	H	H	H	H
5.2	Preparation for handling, packing, preservation and storage 17.7.9, 8.5.5.2	H	H	-	-
5.3	Spare parts and special tools check 5.1.3	H	H	S	S
5.4	Final inspection 17.11, 17.19.1	H	H	W	W
5.5	Release equipment	H	H	H	H
6	**Water mist system commissioning & site acceptance test (SAT) when performed by the supplier**				
6.1	Pneumatic test 14.1, 14.2, 17.19	R	R	R	R
6.2	Hydrostatic test 14.1, 14.2, 8.3.2	W	W	W	W
6.3	Electrical detection and actuation test 12.6.2.2, 14.1, 14.2, 16.1, 16.2.9, 16.3, 17.6 6.10, 6.9, 7.2.1.3, 8.6.3, 8.8, 8.9, FIGURE A.14.1.4	W	W	W	W
6.4	Mechanical equipment inspection and testing 12.5, 12.6, 13.4.4, 14.1, 14.2, 16.1, 16.2, 16.3, 16.4, 17.1.8, 17.17, 17.7, 6.10, 6.3, 6.4, 6.5, 6.6, 6.7, 6.9, 7.2.1.3, 7.4, 8.1, 8.10, 8.2, 8.3, 8.5, 8.6, 8.8, 8.9, FIGURE A.14.1.4, Table 8.3.4.2	W	W	W	W
6.5	Water supply inspection 12.1.2, 12.4, 12.5, 12.6, 12.7, 14.1, 14.2, 17.5.2, 8.7.2, 8.8.4.2	W	W	W	W

Conformity Assessment System

H = Hold
Activity shall not proceed without the approval of the customer or customer's representative

W = Witness
Supplier shall notify the customer before proceeding. (May proceed without witness - if the customer does not attend after the agreed notice period.)

R = Review
Review of the supplier's information to verify conformance to requirements.

S = Surveillance
Observation, monitoring or review by the customer of an activity, operation, process, product.

- = No participation
No intervention is required by the customer.

The Information Requirements

S-719L Information Requirements for Water Mist Fire Protection Systems

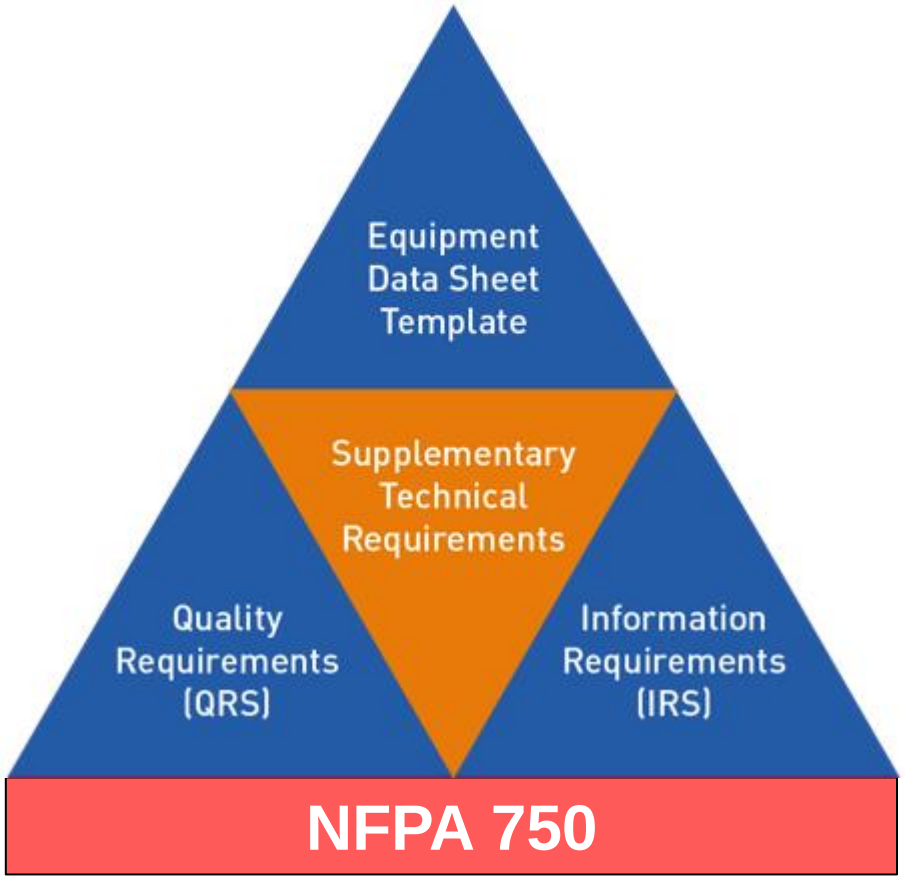
Requirements

Column	Heading - Details and requirements
A	**Code** - a unique identifier for the Information Requirement assigned by IOGP JIP33 DigitalTool
B	**Requirement** - a short description of the Information Requirement based on the description in the Parent Standard, IOGP Specification or an Industry Standard Information Requirement Title.
C	**Condition Invoking Requirement** - describes special condition(s) under which the Information Requirement is required; e.g.. service offshore and weight greater than 1 tonne means information is required. NB: if blank, always required
D	**Typical Deliverable** - Purchaser to advise the short description of the Information Deliverable that would typically include this Information Requirement
E	**Submit With Proposal** - Yes or No, where 'Yes' means the Information Requirement is required to be submitted with Suppliers Proposal or 'No' is not required
F, G & H	**First Issue Post Purchase Order** - issue purpose ('For Information' or 'For Acceptance'), time in weeks for issue of the Information Requirement and Period defined after Purchase Order placement.
I	**Required As Built** - Yes or No, where 'Yes' means the Information Requirement is required to be 'As Built' on completion or delivery of equipment or 'No' is not required 'As Built'
J	**Fulfilled by Information Deliverable Number(s)** - identifies which Information Requirement(s) listed in the Supplier Master Information Schedule (SMIS) addresses the Purchasers requirements. NB; it should be noted that one Information Deliverable can fulfil more than one Information Requirement.
K	**Translation Required** -Yes or No, where 'Yes' means the Information Requirement should be translated into a language(s) (to be advised) other than English and 'No' means to be provided in English
L	**Remarks** - may include bid clarification questions & decisions (specify author & date)

Col A											
Code	Code	Requirement	Condition Invoking Requirement	Typical Deliverable	Submit At Proposal	First Issue Post Purchase Order			Required As Built		
					(Yes/No)	Purpose	(Weeks)	(Period)	(Yes/No)		
S719-IR-39	S719-IR-39	Production test certificate - flexible hose	Required for CAS A only	General Certificate	No	-		WPTD	No		
S719-IR-44	S719-IR-44	Production test procedure - section valve	For CAS A & CAS B only	Manufacturing Qualification Procedure	No	For Information		WPTD	No		
S719-IR-40	S719-IR-40	Production test certificate - section valve	Required for CAS A only	General Certificate	No	-		WPTD	No		
S719-IR-56	S719-IR-56	Production test procedure - cylinders high	Not required if pump system, for CAS	Manufacturing Qualification	No	-		WPTD	No		
S719-IR-57											certificate may be in one combined document.
S719-IR-47	S719-IR-35	Factory acceptance test (FAT) procedure		Factory Acceptance Test (FAT) Procedure	No	For Acceptance		WAO	No		No	The water mist manufacturer will have their own FAT requirements, these requirements can be increased or decreased in collaboration between, the supplier and the customer, and where applicable the AHJ.
S719-IR-42	S719-IR-69	FAT records		Factory Acceptance Test (FAT) Records	No	For Information		WAT	No		No	
	S719-IR-66	Weight report		Weight Report	No	For Information		WPTD	No		No	
	S719-IR-50	Pneumatic test procedure		Pressure Test Procedure	No	For Acceptance		WAT	No		No	
	S719-IR-52	Pneumatic test records	include in MRB (Manufacturing Record Book)	Pressure Test Report	No	For Information		WAT	No		-	
	S719-IR-51	Hydrostatic test procedure		Pressure Test Procedure	No	For Acceptance		WAT	Yes		No	
	S719-IR-53	Hydrostatic test records	include in MRB (Manufacturing Record Book)	Pressure Test Report	No	For Information		WAT	No		No	
	S719-IR-25	Commissioning / SAT procedure		Commissioning Instruction	No	For Acceptance		WAT	No		No	
	S719-IR-49	Commissioning / SAT records		Completion Certificate	No	For Acceptance		WAT	Yes		-	
	S719-IR-37	Spare part list		Spare Part List	No	For Acceptance		WAT	No		No	
	S719-IR-43	Special tools list		Special Tools List	No	For Information		WPTD	No		No	
	S719-IR-80	Fluid schedule		Fluid schedule	No	For Information		WAO (Monthly)	No		No	
	S719-IR-68	Safety datasheet for liquids		Safety Datasheet	No	For Information		WAO	No		No	

Shaping – Full work group

Shaping



Full work group – 12 operators

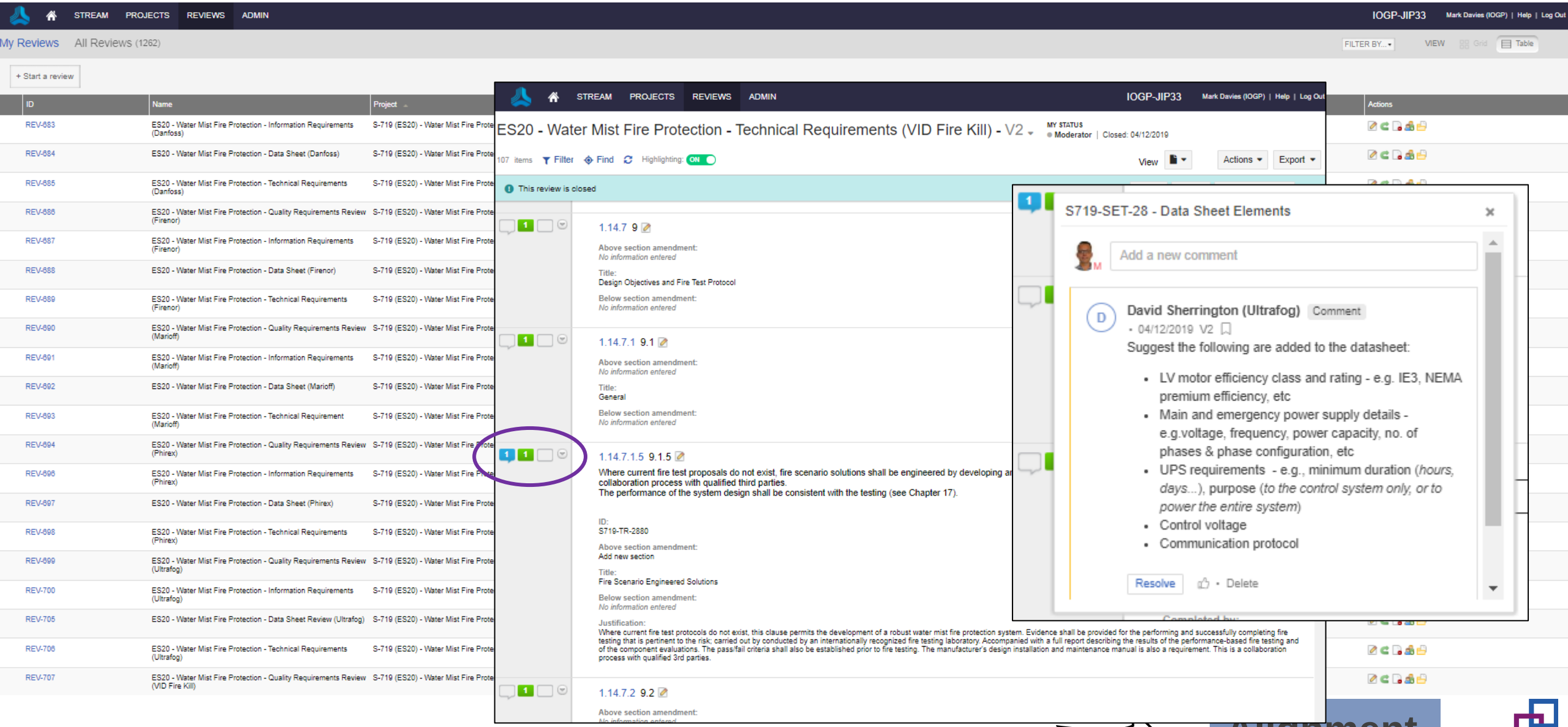
Full WG agreement to essential minimum

NFPA 750 requirements 909 unmodified;
68 additional requirements

179 - Data sheet items
36 - Quality requirements
64 - Information requirements

Public Review

Stakeholder Review – Operators, water mist suppliers …



Alignment.

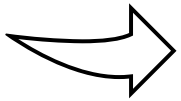
Alignment – address comments from the public review.

- **482 comments**
  210 TRS ; 105 DS; 126 QRS & 41 IRS - [47 red flags]

  - **Analysis and resolution**
    - Tiered system, primary focus on red flags;
    - All comments reviewed and actions justified.

    - **Finalization drafts for publication**
      - Technical writer checks;
      - Justification paper.

      - **Approval to publish**
        - Project director sign off.



Specification Voting

Specification Voting – 12 operators

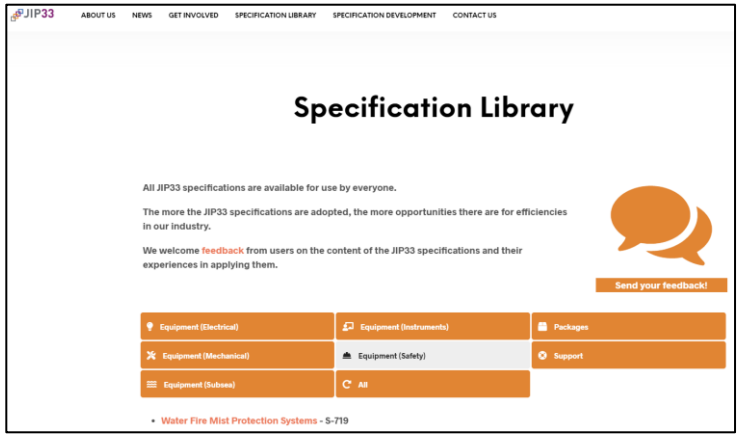
Operator	Voted	FAP
ConocoPhillips	Approved	
Woodside	Approved (with comments)	Datasheet to be rationalized.
Equinor	Approved (with comments)	IRS to be rationalized.
Shell	Approved	
Petrobras	Abstain	
ExxonMobil	Approved (with comments)	General FAPS
IOGP	Approved	
ENI	Approved (with comments)	General FAPS
Saudi Aramco	Approved	
BP	Approved	
Petronas	Approved	
Chevron	Approved	

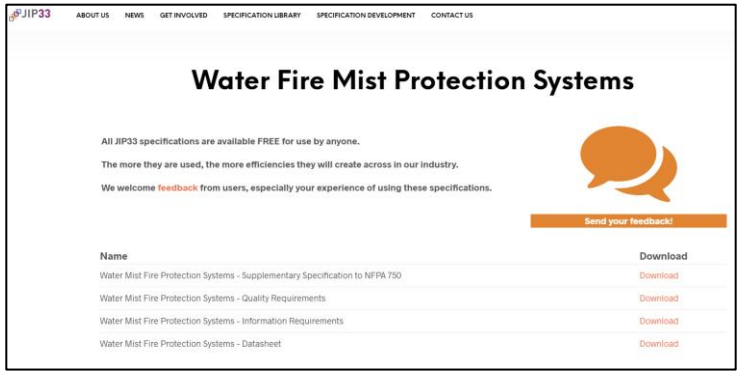
Publication of S-719

Publication of S-719

Use the specifications

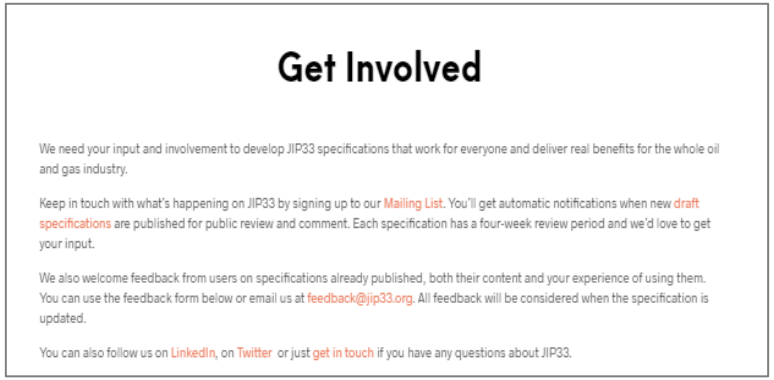
FREE to download from our [Online library]





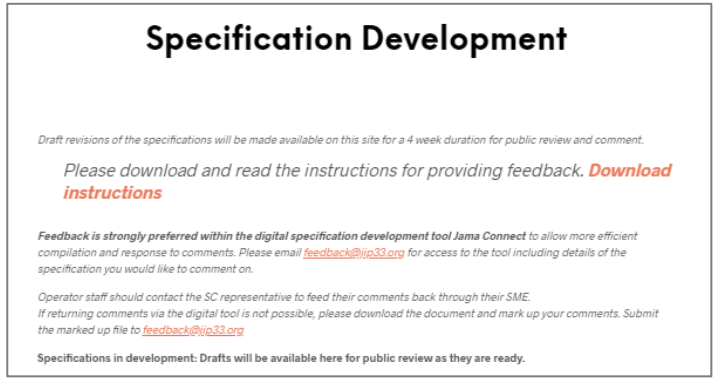
Stay informed

[Sign up to our mailing list] to keep up to date with all JIP33 news.



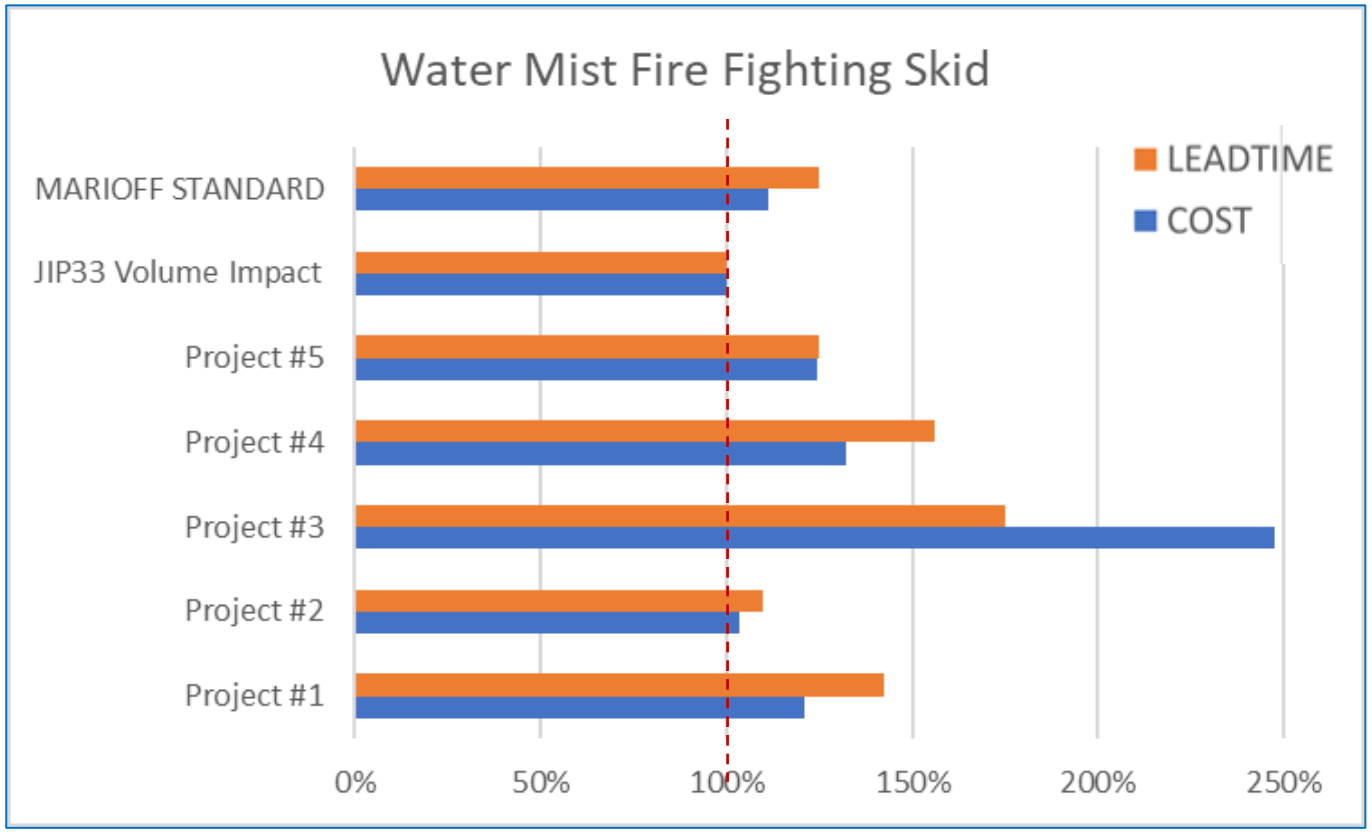
Contribute to development

[Comment on specifications] during their consultation periods and give us feedback at events.



Case study

Supplier Case Study – Water Mist Fire Protection



Notes:

- On average JIP33 gives 36% cost reduction and 35% lead time reduction over prior OpCo specs

MARIOFF

Supplier Case Study – Water Mist Fire Protection

DESIGN COMPARISON / ASSUMPTIONS

Sheet on the right is showing main cost/lead time drivers in each project. However they are not the only factors on these projects explaining the cost and lead time.

Marioff standard design is equal to the JIP33 from technical part, but difference in cost and lead time comes from assuming a significant volume impact.

OPTION LIST	MARIOFF	Project #1	Project #2	Project #3	Project #4	Project #5
MARIOFF base standard design						
Pressure Transmitters instead of Pressure Switches						
Visual Level Indicator for water content monitoring						
JB in SS316 with bottom cable entry instead of lateral						
Tubing and fittings in 6Mo instead of SS316						
Cabinet designed to resist to blast load overpressure						
Lighting system inside the cabinet						
JB in SS316 painted according to marine cycle						
JB in SS316 - special vendor						
Cable - special vendor						

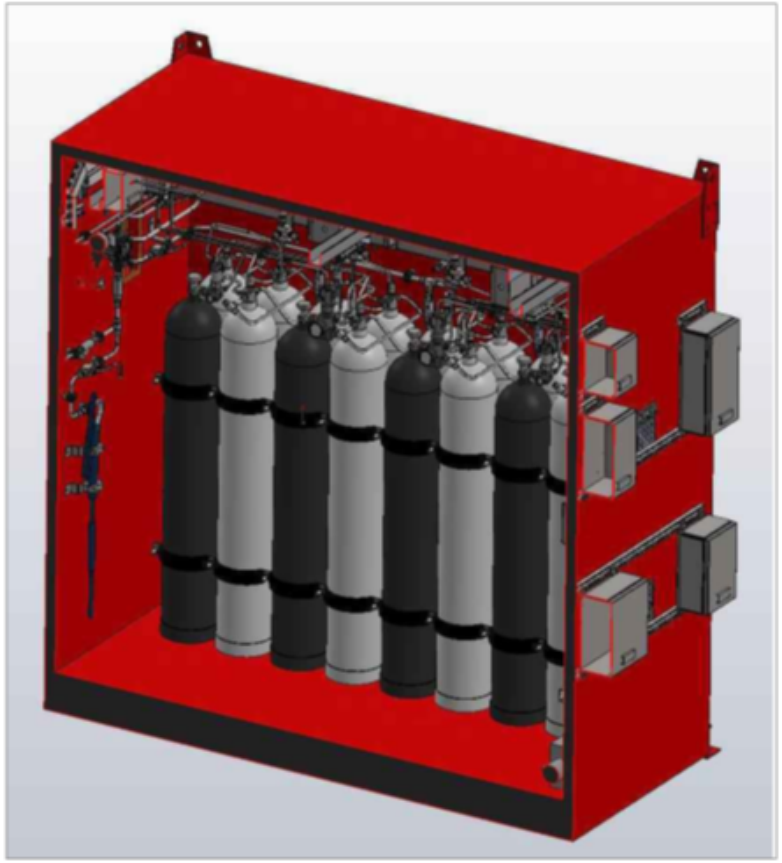
Supplier Case Study – Water Mist Fire Protection

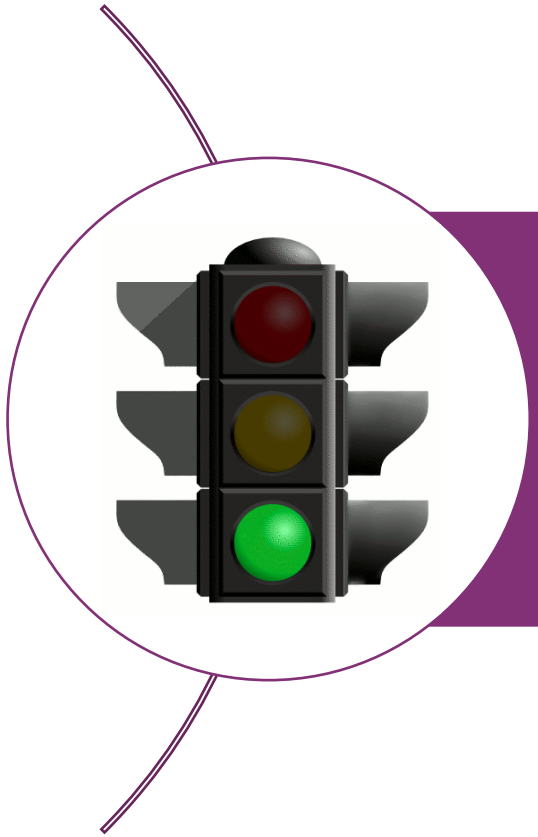
CONCLUSION

The «Water Mist» part has only a limited impact on the overall system design, because it is the part that cannot be changed due to type approvals.

The main drivers that affect cost are instrumentation, cables and wiring, material of specific components (tubing/fittings) and special requirements like blast resistance.

In order to reduce cost and improve delivery times, we recommend to adopt Marioff standard design which complies to JIP33 standards inside the cabinet when possible. Terminal Points and interfaces of the skid can be configured project specifically.

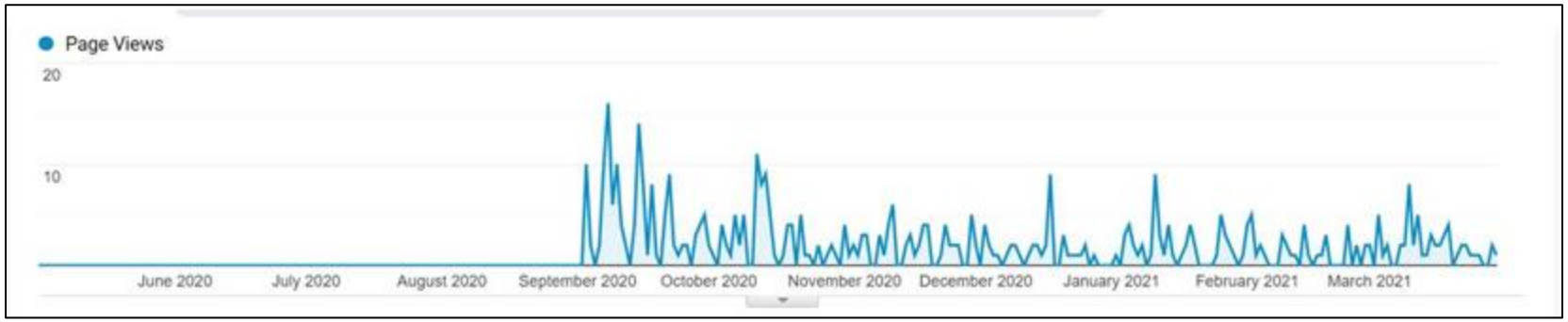


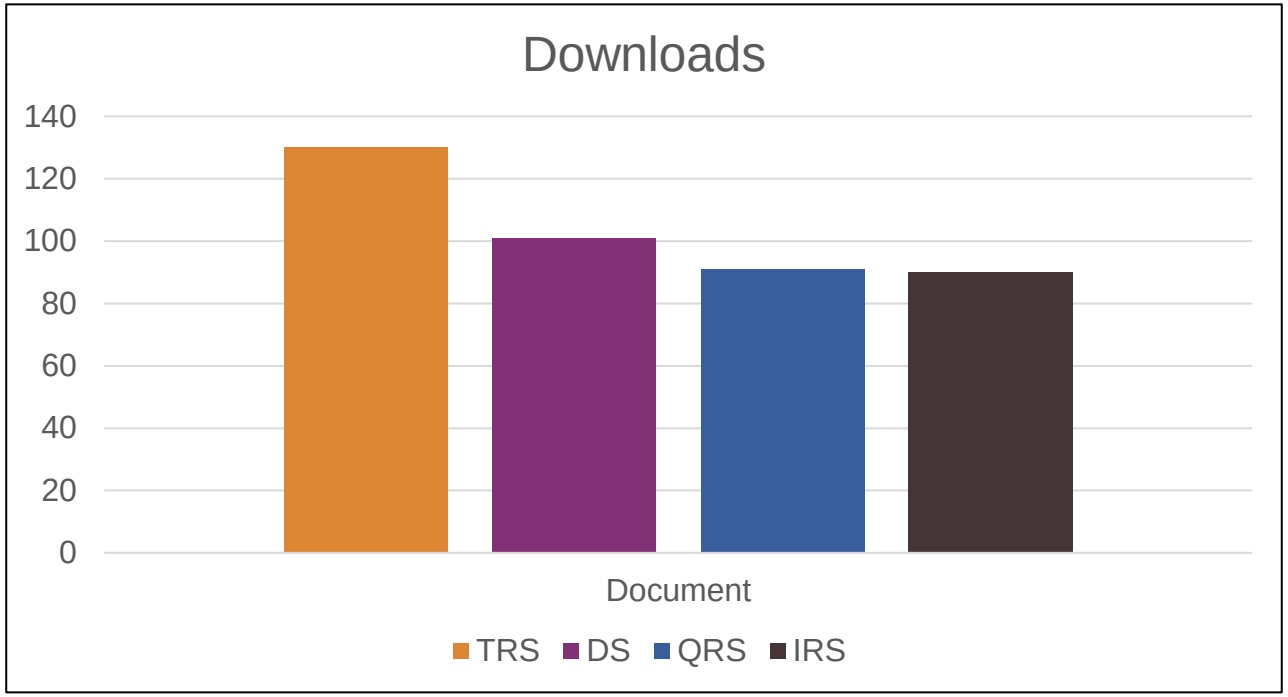


What's next?

https://www.iogp-jip33.org/

- **Access to the specifications** – IOGP measure the interaction.

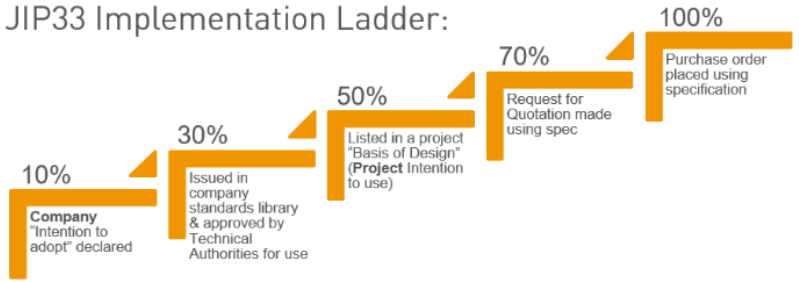




What happens next?

- **Adoption** – IOGP measures the implementation of the specification.

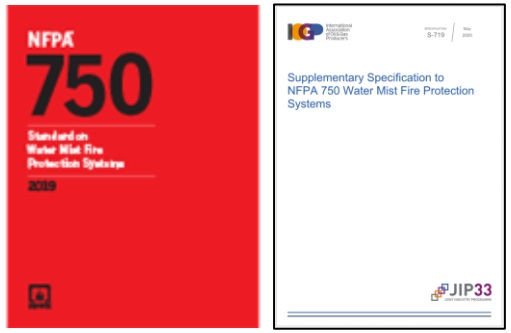
Full Title	OpCo1	OpCo2	OpCo3	OpCo4	OpCo5	OpCo6	OpCo7	OpCo8	OpCo9	OpCo10	OpCo11	OpCo12
S-719 Water Fire Mist Protection	50% ▲	10%▲	10%	30%	10%	30% ▲	10%	30%	30% ▲	30%▲	10%	10%



Average Progress (Supplementary Specification only)

- **Case studies** – feedback from the water mist suppliers.

- **Maintenance / Expansion** – IOGP shall update S-719 in line with NFPA 750 2023, and consider expanding to match technological advances in the water mist sector.
  Public user feedback review.



Acknowledgements

- Keith Robson — PE Aker Solutions — London, UK
- Mark Davies — LSME Aker Solutions — London, UK
- Geir Haugvaldstad — CSME Equinor — Oslo, Norway
- Gregg Sapp — CSME ConocoPhillips — Houston, USA
- Michael Moberly — SME BP — Houston, USA
- Mariagrazia Di Florio — SME ENI — Milan, Italy
- Bander S. Al Ghamdi — SME Saudi Aramco — Saudi Arabia
- Evert Jonker — SME Shell — Netherlands
- Andrew Spear — SME Woodside — Australia
- Piero Distefano — SME ENI — Milan, Italy
- JIP 33 Team — Aker Solutions / IOGP

- Antti Hurme (Marioff)
- Alex Palau (Minimax Viking)
- David Sherrington (Ultrafog)
- Gene Haas (Securiplex)
- Henrik Abrahamsen (VID Fire Kill)
- Matthew Bebich (Phirex)

Thank You.

International Association of Oil & Gas Producers

JIP33 JOINT INDUSTRY PROGRAMME Standardizing procurement specifications Enabling supply chain efficiency

HAAR Technology & Engineering

IWMA International Water Mist Association